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From Inspiration to Garment Ideas

Elucidating the Threads of Inspiration in Apparel Design Ideation

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Abstract

In this dissertation, I explore the phenomenon of inspiration in the apparel design processes of both experts and craft education students, particularly during the early conceptual phase of the design process. The theoretical foundation is grounded in the view of design as a creative, problem-solving process influenced by sociocultural and material factors, and inspiration as both a motivating force and a source of stimuli for design. While design processes have been widely studied, research on inspiration in varied apparel design contexts remains limited. The core aim of my study was to explore the inspiration process in apparel design ideation systematically. In pursuit of this aim, I asked: How does the interplay between inspiration and ideation function in different apparel design contexts?

The empirical data for this dissertation comes from three qualitative case studies. Study I involved three designers completing an ideation task using the thinking-aloud method, recorded on video. Study II observed the ideation and inspiration of three teams of 12 craft education students through video, while Study III used interviews to explore individual inspiration and ideation. The data includes transcripts, notes, photos, and participant materials. The analysis involved data-driven and theory-driven approaches, with specific methods in each study.

The first study revealed that designers iteratively developed ideas, using external inspiration and sketching to refine concepts. Overall, it sheds light on how expert designers derive unique concepts from provided inspirational sources, laying the groundwork for further exploration into student-level processes. The second study showed that collaborative inspiration and ideation, driven by open dialogue and shared visual sources, led to curated mood boards. The third study demonstrated that these mood boards inspired individual creativity, sparking deeper, more emotional idea development.

The study highlights the importance of conceptual sources in inspiring both designers and students, fostering emotional engagement, metaphorical thinking, and enriched ideation. It underscores the collective, socially influenced nature of inspiration and ideation, emphasizing the role of material engagement, like sketching, in connecting inspiration to ideas. Pedagogically, it advocates for using unconventional sources and collaborative mood boards to create deeper, more meaningful design experiences.

Keywords: sources of inspiration; design ideation; mood board; metaphors; collaboration; apparel design

Tiivistelmä

Väitöskirjassani tarkastelen inspiraatiota ja ideointia ammattilaisten sekä käsityönopettajaopiskelijoiden vaatetussuunnittelussa. Vaikka suunnittelua yleisesti on tutkittu laajasti, on tutkimus inspiraatioprosessin ja ideoinnin dynamiikasta käytännön vaatesuunnittelussa vielä varsin vähäistä. Näin ollen tutkimukseni päätavoitteena oli systemaattisesti pureutua inspiraatioprosessin ja vaatetusideoinnin suhteeseen eri käytännön vaatesuunnittelun konteksteissa sekä tarkastella inspiroitumista yhteisöllisenä prosessina. Tutkimuksessa syvennytään inspiraatioprosessin hienovireisiin vivahteisiin vaatesuunnittelun alkuvaiheessa.

Tutkimus koostuu kolmesta tapaustutkimuksesta. Tutkimuksessa I ja III inspiraation lähteiden roolia sekä visuaalisten ärsykkeiden ja ideoinnin dynaamista vuorovaikutusta tarkasteltiin kahdessa vaatetussuunnittelun kontekstissa: ammattisuunnittelijat (tutkimus I) ja käsityönopettajaopiskelijat (tutkimus III). Tutkimuksessa II pureuduttiin inspiraatioon käsityönopettajaopiskelijoiden yhteisöllisenä prosessina.

Laadullisen analyysin avulla havainnollistui ideoiden kehittämisen iteratiivisuus, inspiraationlähteiden monitulkintaisuus sekä näiden vastavuoroinen suhde. Yhteisöllisesti syntyneet monitulkintaiset tunnelmataulut olivat tehokkaita inspiraation lähteitä, jotka stimuloivat ja syvensivät opiskelijoiden yksilöllistä ideointia. Tuloksissa korostui konseptuaalisten inspiraationlähteiden tärkeys. Ne rikastuttivat ideointiprosesseja ja edistivät emotionaalista sitoutumista sekä metaforista ajattelua. Tutkimus tuo esiin inspiraation ja ideoinnin subjektiivisen ja kollektiivisen luonteen, sekä sen kuinka materiaalinen tekeminen yhdistää näitä prosesseja. Tutkimus kannustaa epätavanomaisten inspiraationlähteiden hyödyntämiseen ja tunnelmataulujen yhteisölliseen luomiseen pedagogisina käytäntöinä.

Avainsanat: inspiraation lähteet; ideointi; tunnelmataulu; metafora; yhteistyö; vaatetussuunnittelu

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Index

List of original publications

This thesis is based on the following publications:

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III Omwami, A., Lahti, H., & Seitamaa-Hakkarainen, P. (2023). Individual Outfit Designs: Expanding Idea Development using Shared Mood Boards. *Art, Design and Communication in Higher Education, 21*(2), 173–189. https://doi.org/10.1386/adch_00054_1

1 Introduction

Clothing is an integral aspect of our daily existence. From the moment we enter the world, garments envelope most of our bodies, becoming an inseparable part of our lives. Throughout our recorded history, clothing has played a significant role in serving to protect, adorn, and showcase the human body, but also to carry stories reflecting our sociocultural history (e.g., Jones, 2011). Apparel designers, equipped with knowledge of historical trends and an ability to forecast future styles, create these essentials, which often transcend mere functionality and are regarded as being works of art. At times, the garments we wear are created by us or in the hands of someone familiar to us. Yet, regardless of whether the garment was crafted by a seasoned professional or a newcomer, the evolution of its design followed a similar trajectory. It unfolds as a dynamic and iterative journey of creative problem-solving, characterized by a complex interplay between exploring the design challenge at hand and generating ideas (Lawson, 2006). This creative journey is fueled by imagination (Vygotsky, 1930/2004), and shaped by material constraints (Cross, 2006, p. 9), as well as the contextual and socio-cultural realities surrounding the design endeavor (Tanggaard, 2015; Strickfaden, 2015).

In this dissertation, I explore the phenomenon of inspiration in the apparel design processes of both experts and craft education students, particularly during the early conceptual phase of the design process, commonly referred to as ideation. Given this research focus, prior scholarly works on design ideation and inspiration form the theoretical foundation of my study, with apparel design providing the specific subject of inquiry.

In academic literature, several terms are often used interchangeably to describe the process of designing clothing, though each has its own nuanced meaning. For example, the term “fashion” encompasses the broader cultural and artistic aspects of clothing, often influenced by societal changes and trends (e.g. Kennedy et al., 2013; Snodgrass, 2017). “Clothing design”, then again, focuses more on the technical aspects of garment creation, including pattern making and fabric selection relying on established techniques and practices (e.g. Almond, 2017). “Garment design”, a subset of clothing design, centers on creating individual pieces, emphasizing fit and functionality (Kwong, 2004), and often using advanced technologies to enhance design efficiency and quality (Yan & Ma, 2022). "Outfit design" involves the combination of various clothing items to create a cohesive

look, with a focus on color, style, and occasion, leaning more toward styling and presentation than technical garment creation (e.g. Juhlin et al., 2013). For the purposes of this study, I refer to the creation process of garments as "apparel design." This decision was made mostly for the sake of clarity, but also because the characterization of apparel design—creating clothing items that balance functionality, aesthetics, and market trends, while integrating various design elements such as materials and styles (see Lee, 2015)—captures all aspects relevant to both professional and student contexts. While the terms mentioned above highlight different facets of the design process, they are interconnected and together reflect the fundamental ideas behind ideating and developing clothing.

A key theoretical cornerstone of my thesis is based on an understanding of the early stages of the design process. This stage, often referred to as ideation and idea development, is also the one in which everything is possible but is also uncertain. In general, the ideation stage of the design process is said to encompass the generation, refinement, and communication of ideas, all emphasizing the fundamental unit of thought (Jonson, 2005). However, ideation in this study also involves the careful task of selecting promising concepts for further exploration. A "design concept", then again, serves as the manifestation of a designer's abstract ideas, particularly in the context of apparel design, in which it represents the final garments envisioned. It is significantly important in establishing the vision for the ultimate product (Aspelund, 2010).

Although apparel design shares similarities with other creative design processes, it has unique characteristics that distinguish it from other creative disciplines, making it an intriguing creative field to discover and to still learn from. A key element in apparel design is the interaction between the garment, the human body, and the surrounding environment (e.g., Berglin et al., 2007; Fiore & Kimle, 1997; Mete, 2006; Jones, 2011). For instance, designers select and manipulate fabrics based on their tactile qualities—how the fabric feels—and how it behaves under different environmental conditions, such as variations in lighting or temperature. They also consider how garments complement the form of the body, and, in turn, how the body enhances the garment's appearance. Mete (2006) highlights that the distinctive feature of apparel design, often referred to as "visual and tactile sensory design," emerges when aesthetic considerations harmonize with practicality (see Lamb & Kallal, 1992). Thus, design concepts integrate both aesthetic principles and functionality, reflecting the multifaceted nature of the discipline in relation to sociocultural and material realities. Therefore, these distinct nuances of apparel design and its principles navigate and enrich the theoretical core of my thesis, and they served as a reflective base on which to build the theoretical foundation.

In all design processes, ideas and concepts rarely emerge out of thin air. On the contrary, they require an enormous amount of effort, and often stem from some

form of trigger or stimulation, commonly known as inspiration – a concept that constitutes the other cornerstone of my thesis. Much like clothing, the experience of inspiration is ever-present in our lives, and this is the second theoretical core of my thesis. Inspiration is a universal phenomenon that can arise unexpectedly; a simple sight or encounter on the street can suddenly evoke emotions or spark the urge to act. However, in the context of this study, inspiration is viewed as a more complex and intentional process, intricately connected to creative activity. Moreover, reflecting the contemporary discourse, inspiration here is viewed as a process of uncovering and selecting sources of inspiration that are then transferred during the design process (Eckert & Stacey, 2000; 2003; Mete, 2006; Petre et al., 2006). At the fuzzy beginning of the design process, sources of inspiration can especially provide directional constraints. Therefore, designers invest considerable effort in seeking appropriate sources of inspiration, particularly in apparel design, during which finding inspiration is of paramount importance and is an integral aspect of the research phase (e.g., Jones, 2011; Mbonu, 2014; Shreeve, Bailey & Drew, 2004). Inspiration can be manifest in myriad forms, limited only by one's imagination. It might emerge from an image, a person, a melody, a tangible object, or even a scent.

These inspirational sources are full of interpretative information that at its best, resonates with our feelings, and triggers tangible or associative and metaphorical connotations with respect to the design context (cf. Eckert & Stacey, 2000; 2003; Petre et al. 2006). While design involves a blend of action and contemplation, based on exploratory and investigative practices aimed at tackling open-ended tasks, at its best, it is intertwined with emotional dimensions (e.g., Neidderer & Townsend, 2014; Casais, 2021). Emotions infuse the design process with significance, fostering deeper connections to products (Casais, 2021). This is especially pertinent in the contemporary apparel industry, in which designers ought to navigate societal and environmental concerns. Reflecting this, scholars have highlighted the importance of emotional and empathetic approaches in apparel design to promote sustainable solutions (e.g., Niinimäki & Koskinen, 2011; Townsend & Sadkowska, 2018). Despite the acknowledged significance of sources of inspiration in the design process, there has still been a surprisingly limited focus within the design and design education research communities on how designers and creatives navigate their search for inspiration—an aspect referred to as inspiration search strategies, as argued by Biskjaer et al. (2020). Especially in the realm of apparel design and craft education, systematic analysis of the inspiration process, and collaborative creation of inspirational sources, remain scarce.

Overall, while design processes have been extensively researched over the past few decades, studies focusing particularly on the early phases of apparel design, especially the exploration of how inspiration functions within diverse practical contexts, have been rather limited. Thus, the motivation for this study arose

primarily from the need to expand and deepen our understanding of the early ideation phase of apparel design, and specifically the inspiration process within this stage. As an iterative process, design involves activities and phases that repeat and overlap until successful solutions are found—often through extensive trial and error. Ideation is a critical phase in which key decisions are made to give creative ideas direction. I see that studying this essential stage of the design process can still offer valuable theoretical and practical insights to all creative fields and education. As an experienced and trained seamstress, I have become intimately familiar with the entire garment-making process—mentally, creatively, culturally, materially, and physically—from the initial vague ideas to testing potential solutions and, finally, sewing the pieces together. As a craft teacher, I am particularly interested in understanding how we can motivate and encourage students to keep their minds open to ideas that have yet to materialize, as well as exploring the productive combination of collective and individual work during the early stages of (apparel) design.

In Finland, contemporary craft education draws from pedagogical methods commonly found in design studio education. Typically, studio pedagogy emphasizes learning-by-doing and reflection-in-action, often through open-ended design tasks culminating in public presentations (Cennamo & Brandt, 2012). Assignments are crafted to guide students towards deeper learning and reflection, fostering the internalization of both material and embodied knowledge (Sheridan, Zhang & Konopasky, 2022; Seitamaa-Hakkarainen, 2022). Additionally, while learning and design are often seen as individual pursuits for personal growth in a specific field, they rarely occur in isolation. The studio-based approach recognizes that creativity is nurtured within the shared practices of creative communities and networks, thus frequently incorporating collaborative approaches in open-ended design tasks within craft education (examples in Lahti et al., 2016; Härkki et al., 2018a; 2018b). Consequently, craft education teachers must be adept at instructing not only design skills, but also collaboration and various craft techniques across all educational levels. Even though students are not exclusively trained as designers in craft teacher training, design holds a crucial and integrated role within the curriculum, with clothing and apparel design being a part of the study subject. By positioning design as a central, though not sole, component of craft teacher training, my dissertation emphasizes its importance and widespread influence across various educational frameworks.

The core aim of my study was to explore the inspiration process in apparel design ideation systematically. Building on existing research, and to deepen and expand the path toward a richer comprehension of inspiration, ideation, and their symbiotic relationship within the vibrant tapestry of apparel design, I asked: How can the interplay between inspiration and ideation be understood across different apparel design contexts? I sought to answer this in this thesis with three

interconnected yet separate qualitative case studies. Empirically, my study is based on the creative ideation processes of three trained apparel designers and craft-education students. While these empirical contexts vary when it comes to professional experience and education, in my study they come across and complement each other in the shared interface of the creative and theoretical grounds, and of course the principles and characteristics of apparel design. Studies I & III focused on clarifying the role and importance of sources of inspiration in both expert and student-level apparel design and investigating the dynamic relationship between visual stimuli and idea development through analyzing the apparel ideation process of three experienced apparel designers (Study I) and 11 craft education students (Study III). Study II explored inspiration as a collaborative process by analyzing how 12 craft education students, organized into three design teams, developed shared sources of inspiration through the creation of shared mood boards using visual and textual material sought online.

This dissertation unfolds as follows: In Chapter 2, I depict the theoretical perspectives that guided my study. The conceptualization of inspiration as both a process and a source motivating designers to solve design problems and providing specific stimuli to be perceived, interpreted, and adopted into the design process. It also leads to understanding design ideation as a complex problem-solving process that is driven by creativity and imagination, intertwined with sociocultural and material realities. Chapter 3 outlines the aims and objectives of my research, as well as the detailed research questions linked to these objectives. Following this, in Chapter 4, I describe the main methods by walking through how I conducted the separate case studies. The main results and summary of my findings are presented in Chapter 5 and further discussed in Chapter 6.

2 Theoretical framework

In this chapter, I delve into the intricacies of inspiration and ideation processes reflecting on design in general and apparel design in particular. I begin by introducing previous research on sources of inspiration, the processes of searching for and selecting inspiration, mood boards in design, as well as the transformation and incorporation of sources of inspiration into design ideas. Following an overview of the concept of individual and team ideation and sketching as an integral part of idea development.

2.1 Inspiration process in apparel design

2.1.1 External and internal sources of inspiration: motivational catalysts and a wellspring for adapting elements into ideas

Ideas rarely emerge out of thin air; instead, the creation of new ideas in design often requires some form of trigger or stimulation—what we commonly refer to as inspiration. In the academic literature, the term "stimulus" encompasses various sources of information, distinguished by attributes such as their origin (internal or external), analogical proximity (close or distant), and format (textual, visual, or otherwise) (Blandino et al., 2023), that aid in generating ideas by providing sources of inspiration for the creative work (e.g., Gonçalves et al., 2014). The search for, selection of, and ultimately, the use of sources of inspiration are crucial for fostering creativity in design (e.g., Eckert & Stacey, 1998; 2000; 2003; Gonçalves et al., 2014; 2016; Mete, 2006).

To grasp inspiration within the design context, it is important to explore briefly the nuanced difference between inspiration and the source of inspiration. The concept of 'inspiration' encompasses both the motivational state of action and the object or source that ignites individual motivation and creativity. Trash and Elliot (2003) defined three core characteristics of the state of inspiration: evocation, transcendence, and approach motivation. Their understanding underscores inspiration as a motivational state that is spontaneously evoked, leading individuals to break away from conventional modes of thought and action, thereby striving for improvement. Thrash and Elliot (2004) posit that inspiration involves

two processes: a passive phase of being *inspired by* something, followed by an active phase of being *inspired to* act. The former involves acknowledging and appreciating the object that serves as a stimulus, while the latter denotes the motivational drive to surpass the qualities of the specific object that initially inspired the individual. For example, a fashion designer might draw inspiration from the colors or characteristics of a painting and subsequently feel compelled to create a new garment that surpasses the inspiration adapted from the painting. In line with this perspective, inspiration should not be narrowly construed as merely the source of novel ideas, but also as a motivational response to them (see Oleynick, 2014, p.2)

In the current discourse, inspiration is framed as both a process of discovering and selecting sources that serve as the motivational catalyst for ideation, and as something that can be integrated into the design process—a reservoir from which specific design elements can be extracted and employed for idea development (Eckert & Stacey, 2000; 2003; Gonçalves et al., 2014; 2016; Howard, Dekoninck & Culley, 2010; Mete, 2006; Lee & Jirousek, 2015; Petre et al., 2006). The sources of inspiration, in this context, specifically refer to distinct entities that are (more or less) deliberately and consciously introduced into the creative process to catalyze inspiration, often for the purpose of idea generation (see Eckert & Stacey, 2000; Trash & Elliot, 2003). The phase of ideation is closely intertwined with these sources. According to Mete (2006), whose focus lies particularly on the interplay of inspiration sources in apparel design, observes that the fashion industry employs both tangible and conceptual approaches to these sources. Moreover, within this framework, sources of inspiration are laden with information that is discovered, perceived, and conceptualized by designers—whether they are experts or students—and they elicit a response that can be traced throughout the ideation process and the resulting ideas (e.g., Gonçalves et al., 2016; Rangarajan, Onkar, De Kruiff & Barron, 2022).

In the previous literature, sources of inspiration have been shown to play diverse roles in the design process (e.g., Eckert & Stacey, 2000; 2003; Mete, 2006; Laamanen & Seitamaa-Hakkarainen, 2014; Petre et al., 2006). For instance, they aid in the generation of ideas and concepts (e.g., Halskov & Dalsgaard, 2007) and facilitate the transition from fuzzy concepts to concrete solutions (Laamanen & Seitamaa-Hakkarainen, 2014; Petre et al., 2006). In the realm of creative design, these sources have demonstrated their capacity to expand the idea space and maintain designs within their contextual framework (Eckert, Stacey & Clarkson, 2000; Laamanen & Seitamaa-Hakkarainen, 2014). Moreover, prior research has discussed how sources of inspiration serve as a means of connecting design work to the social and cultural milieu, allowing designers to link their ideas to current trends or broader thematic elements (e.g., Eckert & Stacey, 2000; Petre et al., 2006; Strickfaden et al., 2015). According to Petre and colleagues (2006, p. 189),

sources of inspiration fulfil various functions. They provide information regarding potential competitors through style and design samples, offer foundational elements for ideas (e.g., elements/ideas that can be integrated into the design), and serve as a tool for conveying concepts (i.e., using the source to elucidate the idea). Mete (2006, p. 290) further elaborates that sources of inspiration in fashion and clothing design serve multiple roles, such as enhancing originality in design, facilitating the design process, providing inspiration for color schemes, ensuring coherence and unity within a collection, and contributing to the development of professional knowledge (e.g., providing insights into technical structures, details, and aesthetics). In addition to these functions, sources of inspiration serve as the professional language of designers, always contingent upon the design context and the individual's experiences (e.g., Eckert & Stacey, 2000), reflecting "the social spirit of the times" (Mete, 2006, p. 283). In their study, Strickfaden, Stafiniak, and Terzin (2015) explored the interconnectedness of sources of inspiration and the influence of designers' personal lives. While inspiration is intertwined with individuals' experiences, Strickfaden et al. differentiate between the two, emphasizing the impact of previous experiences on how designers operate during the creative process. Additionally, they enumerate various sources of inspiration derived from designers' lived experiences, memories, and socio-cultural context. Their research underscores the complexity of creative work and thinking, highlighting the dynamic interplay between designers' experiences and the sources of inspiration.

The concepts outlined above highlight the crucial and versatile role of sources of inspiration in a designer's creative journey. Also, it may be presumed that designers often excel when engaging in the creative process with these wellsprings of inspiration. But what exactly do these sources of inspiration entail? Generally, sources of inspiration have been categorized into two main groups: existing sources, also known as external sources, and internal sources (e.g., Eckert & Stacey, 1998, 2000; Gonçalves, Cardoso & Badke-Schaub, 2014; Mete, 2006; Petre et al., 2006).

External sources of inspiration encompass a variety of elements, such as selections of past designs, existing objects, or components thereof, as illustrated by the works of Eckert and Stacey (1998; 2000). Petre et al. (2006, p. 188; also Eckert & Stacey, 1998; Mete, 2006) have compiled a list of inspirational sources within the realm of knitwear design. These include other garments and representations of them (e.g., images, sketches, illustrations), materials (e.g., yarns, fabrics, also noted by Dasgupta, 2011; Jones, 2011), art pieces (e.g., paintings, sculptures), and even natural phenomena and objects that mirror them (e.g., sunsets, plants, animals). Mete (2006) expands on this list by highlighting the significance of history and costumes representing diverse socio-cultural contexts as pivotal sources for apparel design. In terms of representational modalities, external

sources can take on various forms, including pictorial, textual, verbal, digital, two-dimensional, and three-dimensional (see Eastman, 2001; Gonçalves et al., 2014; Strickfaden et al., 2015). In addition to these sources, internal sources—such as memories derived from lived experiences—hold equal importance for designers (Eckert & Stacey, 2000; Eckert, Stacey & Clarkson, 2000; Mete, 2006; Petre et al., 2006; Strickfaden et al., 2015).

As mentioned above, the choice and utilization of these sources is influenced by the context within which individuals are working in. Garments as sensory design products are predominantly experienced through visual and tactile senses. Consequently, sources of inspiration are often conceived visually and interpreted through the same sensory channels (Mete, 2006). On the other hand, while designers commonly lean towards visual sources (e.g., Gonçalves et al., 2014; 2016; Mougenot et al., 2008) inspiration can stem through other senses too. For instance, a fabric (stimulating visual and tactile senses) might inspire a musical composition (auditory), or a fragrance (olfactory) could inspire a sculpture (visual/tactile) (see Mete, 2006). Moreover, the utilization and depth of inspiration may vary between novice designers and professionals. Mougenot, Bouchard, and Aoussat (2008) suggest that novices often explore a broader spectrum of inspirational sources and engage in more preliminary research, whereas experienced designers may primarily draw from their wealth of experiences and established design.

Visual and textual sources

While anything may inspire the evolution and realization of an idea, designers notably exhibit preference for visual sources among the myriad influences available to them, as highlighted by previous research (e.g., Eckert & Stacey, 2000; Henderson 1999; Goldschmidt & Smolkov, 2006; Gonçalves et al., 2014; 2016; Mougenot et al., 2008). We inhabit an environment rich with visual sources, and designers, often recognized as visualizers (Mednick, 1962), consider 'seeing' as pivotal for capturing essential information and imbuing meaning within the visual medium (cf. Schön & Wiggins, 1992, p. 135).

Visual sources such as images of past designs and other objects, often serve as sources of inspiration, particularly for designers who are adept in creating and harnessing visual inspiration, especially those emphasizing form and function (Herring et al., 2009). Visual examples are efficient as they demand less cognitive effort for accessing, keeping, and conveying information compared to textual sources (Malaga, 2000), especially concerning spatial relationships (Sarkar & Chakrabarti 2008). Prior research has discussed the benefits of visual sources in design problem-solving, and it has been argued that designers utilize a rich mixture of visuals during design problem-solving, which may act as analogs for target

problems (Casakin & Goldschmidt, 2000; Goldschmidt & Smolkov, 2006). For instance, Casakin and Goldscmidt (2000) examined the impact of visual arrays on solving well- and ill-defined design problems among two groups: one immersed in a room filled with imagery and the other in a similar room devoid of visual sources. They found that when faced with ill-defined problems, the group exposed to visual sources outperformed the group without access to these. However, when tackling well-defined problems, the benefit from external visual displays correlated with the designers' accumulated experience. Similarly, Goldschmidt and Smolkov (2006) illustrated the dual nature of visual sources in different design problem-solving contexts. Depending on environmental conditions, visual sources either enhance both originality and practicality, or enhance originality while detracting from the practical aspects of ideas.

Another study by Casakin (2005) demonstrated that a diverse collection of visuals has the potential to assist both students and professionals in addressing ill-defined problems. The study showed that participants provided with a rich array of images produced higher-quality solutions. Participants were stimulated by visual analogues, even without explicit instructions, to use analogical reasoning in problem-solving. Fundamental to intelligent thinking and creative problem-solving, analogical reasoning refers to the utilization and transfer of previously acquired knowledge to facilitate problem-solving and decision-tasks (e.g., Casakin, 2004; Casakin & Goldschmidt, 2000; Goucher-Lambert, Moss & Cagan, 2018). In contrast, Laing and Masoodian's (2016) study suggested a minimal impact of access to visual sources on designers' creativity. They argue that the significance of these sources should not solely be judged based on their creative and productive impact. Instead, visuals can be of benefit to the ideation process through how designers experience the process itself. Nevertheless, visual sources are highly valued in design as they can provide cues that do not require translation across different perceptual modalities (Gonçalves et al., 2014), thereby aiding in the creation of new ideas (Eckert & Stacey, 2003; Lee & Jirousek, 2015; Petre et al., 2006).

Despite these positive effects of visual sources, other research studies have indicated contradictory results. For example, the use of images of existing examples may hinder the generation of creative ideas and impede the search for new inspiration (e.g., Jansson & Smith, 1991; Purcell & Gero, 1996). Using closely related imagery can lead to a fixated mindset, conflating past designs into new ideas, thus affecting the novelty and creativity of these ideas (Perttula & Liikanen, 2006). The balance between inspiration and fixation, as well as the benefits between using closely or distantly related inspiration in creative work, has been a topic in the earlier scholarly literature, highlighting the complex and subjective nature of inspiration (e.g., Cardoso & Badke-Schaub, 2011; Chan, Dow & Schunn, 2015; Crilly & Firth, 2019; Gonçalves et al., 2014; Kim & Maher, 2023).

Goldschmidt (2011) argues that to avoid fixation, inspiration should be drawn from outside the design context through abstraction. This analogical distance, where analogy refers to the 'similarity between relationships' (Goldschmidt, 2001, p. 201) in apparel design, could involve using more conceptual imagery, such as images from nature or architecture that can be interpreted at a more abstract level. Cheng, Mugge, and Schoormans (2014) suggest the use of partial images to break design fixation in pursuit of more creative and innovative designs. In their study, professional evaluators assessed various product designs, revealing that visuals with lower pictorial complexity served as more potent stimuli for creativity compared to those with higher complexity. In opposition to this, Chan et al. (2015) found no evidence to support the hypotheses that the most creative ideas arise from using only the most distant sources. Moreover, Eckert and Stacey (2000) suggest that referring to past designs may aid in dealing with the complexity of the design task by enabling the use of mental representations. Therefore, rather than solely focusing on the distance or proximity of visual sources, it is crucial to pay attention to the diverse selection of stimuli provided to designers (cf. Gonçalves et al., 2014) and acknowledge the relational complexity of sources of inspiration—these sources are handled subjectively in the context of creative work.

While images offer an easily accessible and quick source of inspiration for perception and interpretation, relying on textual and written sources is another way to inspire design or even foster greater creativity in the design process. Some research studies suggest that textual sources are more effective at fostering design creativity (Goldschmidt & Sever, 2011). Additionally, alongside visuals, textual sources also demonstrate a positive influence on design creativity, with text at an intermediate analogical separation potentially leading to a greater abundance of ideas. Chiu and Shu (2007, 2012) demonstrated that text facilitates exploration of the solution space during design idea generation, leveraging the inherent ambiguity in textual sources to stimulate creative outcomes. Similarly, Goldschmidt and Sever (2011) found that text-based sources during ideation resulted in the creation of more original ideas compared to a no-stimulus condition. Recently, in their study, Royo et al. (2021) found that using questions as textual stimuli resulted in the production of fewer ideas. However, these ideas tended to exhibit higher quality levels while demonstrating reduced novelty and variety. On the other hand, the choice of inspiration might vary according to the design conditions. For example, findings by Gonçalves et al. (2014) revealed that student designers, working on tasks allowing flexibility in exploring inspiration, tended to use more textual stimulus compared to professional designers who often work under more constrained conditions. However, designers often seek information from both typologies of sources, as well as other modes of representation (Gonçalves et al., 2016). Related to this, Luo and Dong (2017) emphasized the crucial role of acquiring the skills to connect sources of inspiration

within the context of design education. Their investigation specifically examined the impact of two types of cultural inspiration—textual and pictorial. Notably, the results indicated that students who drew upon textual inspiration demonstrated higher levels of creativity in comparison to those who drew from pictorial inspiration.

2.1.2 The active search for inspiration and the process of incorporating inspirational sources into the design process

Arguably, sources of inspiration play a crucial role in the design process, particularly in its early stages when the direction is still taking shape, and the active search for inspiration (e.g., Harms, Reiter-Palmon & Derrick, 2020; Jones, 2011; Makri & Warwick, 2010), is fundamental across all design domains. Designers invest considerable effort in seeking suitable inspirational sources for their creative endeavors. However, surprisingly little attention has been given within the design and design education research communities to how designers and other creatives navigate their search for inspiration—referred to as inspiration search strategies, as argued by Biskjaer et al. (2020).

Creative problem-solving entails synthesizing a myriad of information from diverse sources, both internal and external. Particularly in the realm of apparel design, the quest for inspiration is paramount (Mbonu, 2014; Sorger & Udale, 2012), often considered to be a pivotal aspect of the 'research' phase of the process (e.g., Eckert & Stacey, 2001; Jones, 2011; Mbonu, 2014; Mete, 2006; Min, Delong & LaBatm, 2015). At the beginning of apparel design, designers gather background information and seek inspirational sources through research and observation (Eckert & Stacey, 2001; Mete, 2006). Seivewright and Sorger (2017) have delineated three distinct categories of research in apparel design. The first involves seeking visual inspiration, which establishes the overarching theme, atmosphere, or concept crucial for shaping the creative process's identity. The second entails sourcing and accumulating tangible materials relevant to the fashion collection, such as fabrics, trims, and buttons. However, the third category holds utmost significance, as it directly relates to the intended consumer base and market. Despite initial insights from the brief, it is imperative for designers to delve deeper into understanding the audience's lifestyle, interests, and broader market landscape, including competitor analysis.

In the context of this study, the focus lies on the search for and utilization of inspiration. In the realm of apparel design, common visual research themes encompass natural and urban elements, landscapes, and conceptual subjects (e.g., city decay, reflections) (Jones, 2011). Mete (2006) argues that an apparel designer searches for inspiration through visits to museums to see art objects and books, or other cities, for example. According to Mete, designers search for inspiration from

mundane, every-day life. While most research on creative problem-solving treats the search for inspiration as a component of problem construction, it is worth noting that in problem-solving settings, these processes often unfold concurrently. As individuals formulate a problem framework, they instinctively seek additional information to formulate innovative solutions (e.g., Gonçalves et al., 2016; Harms, Reiter-Palmon & Derrick, 2020). Harms et al. (2020) investigated the significance of information search behavior in creative problem-solving. Their study, involving 221 participants, revealed that the duration, quantity, and scope of information exploration mediate the link between problem construction engagement and creativity across various domains. Moreover, they found that for individuals actively engaged in problem construction, a more efficient inspiration search correlated with a more creative solution. However, efficiency in the search did not significantly impact creativity for individuals not actively engaged in problem construction.

These studies have highlighted that the search and selection of inspirational sources are influenced by various factors such as conditions, tools, constraints, and the medium used for inspiration. Moreover, while traditional tangible objects continue to serve as sources of inspiration, using the internet for inspiration-seeking has emerged as one among several ideation techniques in design (Herring, Jones & Bailey, 2009). For instance, Mougenot et al. (2008) examined the inspiration gathering strategies of expert car designers in their quest for inspiration. Their study found visual materials, particularly images, to be predominant, with expert designers showing a preference for printed magazines over online sources for inspiring imagery. Although their study observed a lower number of images retrieved from online sources compared to printed media, it is plausible that preferences may have evolved over the past decade. Indeed, Koch et al. (2018, p. 10) observed a shift, stating that "the Internet has become a prevalent source for ideas in design," with "most designers nowadays finding potentially inspiring visual material and solutions online."

Similarly, Gonçalves et al. (2016) explored how designers gather and select inspiration using a specific online search tool tailored for their study. They noted that the search for online inspiration typically begins with framing the search using specific keywords, a practice also highlighted by Mougenot et al. (2008). Efficient retrieval of images is contingent on well-defined keywords. Although designers may vary in the specificity of their keywords, identifying the right keywords is a critical step in the search process, and thus Gonçalves et al. (2016) underscored the importance of developing tools to assist designers in formulating suitable keywords. Furthermore, their study revealed various catalysts in selecting inspirational sources, such as selecting inspiration based on their relevance in relation to the given problem, or then based on pure curiosity and recognition. More recently, Biskjaer et al. (2020) examined the inspiration-gathering strategies

of 39 novice designers and how task constraints impact the process. Their study focused on the use of Google Images as a familiar search tool for both personal and academic tasks. They found that design students employed different strategies in searching for inspiration from Google, depending on the level of task constraint. Interestingly, they observed that the quantity of material gathered did not necessarily correlate with the generation of ideas.

Understanding the processes involved in finding inspiration can yield valuable insights for designers, as emphasized by Gonçalves et al. (2016). They argue that by reflecting on their use of external stimuli, designers can make more informed choices instead of relying solely on chance encounters with the vast array of available sources. The key to a more effective search for inspiration lies in designers' awareness of their own inspiration process. Consequently, they can redirect their focus and recognize the potential value of keywords (used to initiate a search) and drivers (for selecting stimuli), which might otherwise be left to chance.

Mood board; a tool for inspiration

After the search for sources of inspiration, designers often condense their findings into a mood board, which serves as a foundational reference during the apparel design process (e.g., Jones, 2011; McKinney & Dong, 2022). According to Jones (2011; also Sano & Yamada, 2023), for an apparel designer, a mood board is a formal articulation of the design concept and intentions through carefully curated images and materials, reminiscent of a magazine layout. Some images are selected for their inspiring visual appeal, while others are chosen for their cultural significance (Eckert & Stacey, 2000). Overall, in the realms of design and design education, mood boards have been used for a range of purposes such as inspiration, communication, process organization, and aiding in problem finding and solving (e.g., Garner & McDonagh-Philip, 2001; Cassidy, 2011; McDonagh & Storer, 2004; Endrissat, Islam, & Noppeney, 2016; Warbung, Soedarso, Carina & Zahra, 2021). Despite the substantial evidence advocating for the incorporation of mood boards in the design process (e.g., Garner & McDonagh-Philip, 2001; McDonagh & Storer, 2004; Cassidy, 2011), there is still a need for further investigations of mood boards in the realm of apparel design, as highlighted by Freeman, Marcketti and Karpova (2017). For instance, identifying specific mood board creation skills will enable targeted evaluation and enhancement of these skills, crucial for the growing use of digital mood boards in expressing creativity within the fashion industry (Freeman et al., 2017).

As a collection of curated inspiring material, mood boards serve multiple functions in both design and design education, primarily serving as sources of inspiration through various media (McDonagh & Storer, 2004; Cassidy, 2011;

Garner & McDonagh-Philip, 2001). However, they go beyond merely presenting a visual collection of real-life products, instead providing an abstract foundation for the design process. Given their abstract nature, mood boards may prompt designers to work with metaphors, a practice recognized for enhancing creativity in general (Gonçalves et al., 2014; KhakZand & Babaei, 2018). Lucero (2012, pp. 442-444) further divides several roles the mood board has in the early design process: *framing* the process and the task, *aligning* as getting participant members on the same page, *paradoxing* conflicting or contradicting ideas, allow abstract thinking, and directs the design process.

Cassidy (2011) conducted research on individual design students' creation of mood boards and provided elucidation that this process is both subjective and objective, characterized by its iterative and creative nature. Beginning with a brief, the process evolves into an exploratory, stimulating journey, allowing for the unrestricted generation of initial inspiration. Subsequently, the development of the mood board and the gathering of media ensue. To foster innovative solutions, the mood board development requires a deeper level of engagement, demanding the ability to evaluate and analyze potential solutions concerning a given problem (Cassidy, 2011). Moreover, Cassidy (2011) highlights that mood board creation enhances the generation of creative and innovative ideas. The iterative nature of mood board creation has been more recently investigated by Sano and Yamada (2023). They showcase the development of mood boards through the retrieval and composition of images on a 2-D concept, introducing the Mood Board Composer (MBC), a specialized tool for aiding concept designers in locating and arranging images to effectively communicate their design concepts. Their research reveals that the process involves iterative adaptive image retrievals, where the MBC stands out due to its ability to adjust the image search based on the user's manipulation of pictures, simplifying the task of finding the ideal images to convey a concept.

Furthermore, mood boards serve as a means for individual designers and design team members to communicate beyond traditional written and spoken methods (McDonagh & Denton, 2005, pp. 37-38), particularly in within the fashion industry as noted by Cassidy (2011). According to McDonagh and Storer (2004), mood boards play a crucial role in enhancing inspiration and communication within the design process (also noted by Eckert & Stacey, 2000). Similarly, Lucero (2012; see also Warbung et al., 2021) and Endrissat et al. (2016) emphasize the aligning and communicative functions of mood boards in the design process; they provide designers with a tool to convey ideas both concretely and metaphorically.

According to Cassidy (2011), mood boards provide a vital function in expressing the stylistic and aesthetic elements of design, prioritizing these over the functional and practical aspects (also Sano & Yamada, 2023). Similarly, Eckert and Stacey (2000) highlight the significant role mood boards play in design communication

within the knitwear and fashion industries, primarily in establishing an overarching 'mood'. They continue that, typically, mood boards revolve around a focal image that captures the essence of the desired mood, accompanied by others that offer room for interpretation. The emergent mood stems from the collective interaction of displayed images and connotations from them. Mood boards illustrate a spectrum of what could be, with their efficacy perhaps best noticed through what they choose to omit. Furthermore, Eckert and Stacey (2000) note that verbal communication of moods is also possible by referring to a sequence of objects. However, within the knitwear design process, moods and styles are typically conveyed through visual boards. Unlike the sequential nature of verbal descriptions, mood boards present all information concurrently (Eckert & Stacey, 2000). Mood boards are acknowledged as a crucial component in structuring the design process and maintaining ideas within a specific context (Lucero, 2012; Endrissat et al., 2016).

Particularly within the apparel design industry, mood boards serve as indispensable tools for initiating the design process, providing designers with a starting point for the development of a collection (Lucero, 2012). Moreover, the potency of mood boards lies in their creative, abstract, and open-ended nature, allowing ample room for interpretation (Endrissat et al., 2016). An example of such mood board is provided in figure 1.

Figure 1 A mood board titled “Yellow” created by one of the participant expert designers.

In the context of design education, Garner and McDonagh-Philip (2001, p. 63) note that mood boards offer a tool for responding to brief, emerging problems, and evolving ideas throughout the design journey. Moreover, the process of creating a mood board not only aids in problem finding and solving but also ignites students'

enthusiasm for subsequent investigative activities (Garner & McDonagh-Philip, 2001, pp. 61-62). Using mood boards, however, comes with its challenges. Cassidy (2011) identifies various issues associated with the creation of low-quality mood boards, such as students' lack of understanding of the task or insufficient research during the data collection stage. Similarly, Garner and McDonagh-Philip (2001) observed that a subpar mood board can limit students' emotional engagement. In the realm of design education, they emphasize that the emphasis should always be on the process rather than the final product when it comes to mood boards. Related to this, Freeman, Marcketti and Karpova (2017) examined the assessment of the creative level of mood boards within fashion design. They observed that assessing the creative level of mood boards is complex, and the developing creative mood boards benefits from guidance combining subjective feedback from both expert and novice examiners and by programmed technology. As a conclusion, Freeman et al. (2017) highlight that further studies investigating various styles and features of mood boards, along with a deeper assessment, will contribute significantly to the field.

Perceiving, interpreting and adapting inspirational sources: the process of transforming and incorporating selected sources into ideas

Most design processes entail the perceiving, interpretation, and adaptation of elements from previous designs, as well as elements and aspects drawn from diverse objects, images, and phenomena (Eckert & Stacey, 2000). In other words, the designer transforms and incorporates the selected inspirational sources into design ideas. Whether the sought source of inspiration is visual, textual, or takes another form, these can be seen as an individual's style when identifiable elements, qualities, or expressions consistently emerge. Eckert and Stacey (2000) note that incorporating sources of inspiration into creative work involves an interplay between perception and visual imagining in which the perceived source evokes novel imaginings. The distinction between vision and perception lies in the fact that perception can be viewed as an interpretation of 'raw' vision: we consistently process the world as presented by our optical organ, the eye, before it reaches the brain (Goldschmidt, 1994).

Over the course of their careers, designers amass a wide array of sources from which to inspire their projects, learning to select and adapt these sources adeptly to suit their design objectives. Designers also exhibit flexibility in their approach to sources of inspiration. When constrained, such as in an experimental research setting, designers demonstrate creativity by using whatever resources are readily available in their immediate environment to integrate sources into their designs. According to Petre et al. (2006), the complexity of overall design arises from the amalgamation and configuration of elements. This implies that seemingly simple design elements can exist within intricate networks of relationships, leading to the

emergence of distinct design properties. However, achieving this complexity necessitates skills in selectively choosing these elements, adapted from a variety of sources of inspiration, while considering design constraints and establishing appropriate relationships among them. For instance, when presented with an image or art piece, a designer can derive various interpretations. Goldschmidt (1994, p.163) explains this process by suggesting that images contain visual 'clues that can be isolated, possibly recombined, and deciphered as reminiscent of something meaningful in a particular context'. These clues become valuable when they can be linked to something relevant to what the individual is seeking or focusing on. Essentially, a clue should trigger the retrieval of pertinent information stored in memory that might otherwise be challenging to access. Reflecting on Goldschmidt's arguments, the incorporation and effective use of sources require more than just observing the source; it demands skills and knowledge in combining and transforming the information from the source into ideas.

Apparel design, like design in general, revolves significantly around mental imagining, especially visual imagining. Overall, mental imagery empowers designers to integrate experiences from diverse contexts and eras into their current reality through varied modalities (cf. McFie, Hay & Rodgers, 2023). Visual imagery, specifically, refers to the capacity to form mental representations of objects, individuals, and locations that are not currently within an individual's visual scope (e.g. McFie, Hay & Rodgers, 2023; Tedjosaputro et. al, 2018). Through visual imagery, designers can conceptualize ideas, explore various possibilities, and iterate on designs before translating them into tangible forms (e.g., Eckert & Stacey, 2003; Tedjosaputro et. al, 2018). In their study, Eckert and Stacey (2000) suggest that adapting sources of inspiration can arise from discrepancies between visible or imagined design elements and the overarching design objectives. They continue, that experienced designers in visually oriented fields, particularly knitwear design, excel in generating intricate mental images of designs and possess strong visual memories. They often have the subjective sensation of perceiving complete pictures, even though certain aspects or details might shift or become more prominent under focused scrutiny (Eckert & Stacey, 2000). In the context of knitwear design, Petre et al. (2006, also Eckert & Stacey, 2000) argue that designers can accurately visualize fabrics, alter elements of their mental images (such as silhouettes or cuts), and even manipulate details (like the number of pockets) within their mental constructs. Designers process and utilize mental images through imagery based on the real world (Stacey & Eckert, 2010).

The interplay between external and internal realities—be it the lived experiences, knowledge, memories, or emotions of the designer, as well as textile materials, past designs, or sought-after inspirational sources—informs visual imagery that serve as sources for idea development. Eckert and Stacey (1998; 2000; 2003) and Petre et al. (2006), studying sources of inspiration and visual

imagining in knitwear design, observed that designers have the ability to visualize their designs, evaluating and discarding ideas before bringing them to fruition in tangible forms. The information gleaned from sources of inspiration often evokes mental images early in the design process, guiding designers in the creation of upcoming designs. Designers employ systematic and conscious strategies to draw upon suitable experiences stored in memory to generate ideas (e.g., Eckert & Stacey, 2000; 2001). Moreover, the transformation of sources into design concepts resonates with Vygotsky's (1930/2004) view of imagination as a process intricately tied to the creation of meaning. Vygotsky describes imagination as the mental activity through which familiar elements are taken up and recombined in novel ways. Ultimately, a designer's imagination is informed by their personal experiences and the broader social, cultural, and historical context, as highlighted by Vygotsky (1930/2004) and Glăveanu, Karwowski, Jankowska, and de Saint-laurent (2017).

Eckert and Stacey (e.g., 2000; 2003), Petre and colleagues (2006), and more recently Lee (2017) and Lee and Jirousek (2015) have systematically analyzed how designers adapt elements from sources of inspiration into their designs. According to Eckert and Stacey (2000), when designers describe their designs using the language of the source, it often includes references to objects and visuals, occasionally abstracted as concepts like 'sad' for a mood or cultures, and expressions detailing how they modify and combine these sources into novel ideas. Petre et al. (2006; see also Eckert & Stacey, 2003) have outlined three fundamental strategies employed by designers when applying sources of inspiration: (1) selection; (2) adaptation; and (3) transformation. In the selection strategy, designers choose compelling elements such as specific shapes or motifs, integrating them into their designs. Adaptation is manifested in various ways, ranging from literal incorporation with no alterations to simplification (e.g., minimizing the color palette or reducing intricate details), abstraction (capturing 'the essence of the source, but not the specific element'), modification (rearranging, replacing, and combining elements), and association (linking elements from similar contexts or with similar properties in other contexts), or even deviation when the designer opts for entirely different sources (pp. 200-201). Transformation involves geometric manipulations like rotation, scaling, and mirroring. These core strategies, along with their associated nuances, not only underscore the visual aspect of designing but also emphasize the complex and multifaceted nature of incorporating sources into design work.

Reflecting the above-mentioned aspects of transforming and incorporating sources of inspiration into design, the concept of metaphorical mapping (or reasoning) is worth mentioning. The theory of metaphor, as elucidated by Lakoff and Johnson (1980) posits metaphor as a cognitive tool that facilitates the categorization of experiences within a conceptual framework. Central to this theory

is its capacity to shape an individual's thinking, perception, understanding, and mental classification of experiences (cf. Vygotsky 1930/2004). The metaphorical reasoning and mapping allow for the exploration of unfamiliar concepts and the establishment of novel connections with distant domains unrelated to the immediate problem (e.g., Abdullah, Anwar & Zainuddin 2018; Casakin, 2007; 2011, Weiß et al., 2022).

According to Abdullah et al. (2018) metaphorical mapping within design is a creative process that entails reshaping subject matter into fresh design concepts by employing metaphors. This technique is used by designers to abstract and reimagine existing elements or themes, thereby generating innovative and distinctive designs. The study by Abdullah and colleagues (2018) highlights the importance of metaphorical mapping by demonstrating how design students engage in metaphorical mapping to reinterpret and abstract existing matter. By its very essence, as a concept, a 'metaphor' is seen as a figurative language tool that aids designers in transforming an abstract design concept into a tangible design element (Hekkert & Cila, 2015). However, according to Schilperoord (2018), metaphorical images do not exist, but there are images that trigger metaphorical thinking, as Abdullah et al. (2018) study demonstrates. Any source, may it be a painting, or an image retrieved online, can be perceived and understood metaphorically.

Ultimately, any physical object or its representation has the potential to be perceived in numerous ways and serve as the basis for further development into a design concept (Schön & Wiggins, 1992; Eckert & Stacey, 2000). However, it can be challenging to incorporate them successfully in creative work. Furthermore, even finding suitable inspiration does not guarantee a successful ideation process if the designer cannot 'bring it to reality or interpret it properly' (Mete, 2006, p. 291). Reflecting on this, Dazkir, Mower, Reddy-Best and Pedersen (2013) examined design student's inspiration process. They discovered that while students found inspiration easily, they lacked experience in using inspirational sources in their work, which ultimately had an impact on the creative effect of the projects. How and to what extent the influence of introducing sources of inspiration may have on creativity hinges on the level of expertise possessed by a designer or any creative individual involved in the design process, as discussed by Bonnardel and Marmèche (2004).

2.2 Garment ideas: the creative journey of ideation and idea development in apparel design

2.2.1 Ideating garments as an emerging cultural and materially mediated problem-solving process

In this chapter, the concept of ideation in apparel design is explored, building on earlier perspectives that frame it as a multifaceted, iterative, and evolving process of problem-solving. Moreover, the ideation phase within the design process is often regarded as the pinnacle of creativity and abstraction in design, demanding the ability to break free from familiar patterns and perceive beyond the obvious. For instance, designers frequently draw inspiration from sources beyond their immediate field (e.g., Goldschmidt, 2003). Thus, in the realm of creative endeavors, imagination stands as the vital wellspring of creativity, an essential force driving innovation and guiding the processes of design and idea development (see Vygotsky, 1930/2004). Imagination holds the transformative power to imbue meaning, without which new possibilities would remain undiscovered. This capacity to link disparate sources to create innovative ideas "requires us to break settled ways of looking at things, to come apart with respect to them, prior to the formation of a new concept," as articulated by Donald Schön (1963, p. 8).

While apparel design can be addressed in the same way as any other creative design process, it has its unique characteristics that distinguish it from other creative fields. One of the fundamental elements in apparel (or fashion) design lies in the synergy between the garment, the human body, and the environment (e.g., Berglin et al., 2007; Fiore & Kimle, 1997; Mete, 2006; Jones, 2011). For instance, designers select and manipulate fabrics based on their tactile experiences—the feel of the fabric—or how fabrics behave in various environments (e.g., different lighting or temperature conditions). They also consider how garments express the body and vice versa. According to Mete (2006) the unique characteristic of apparel design and clothing, often described as 'visual and tactile sensory design', occurs when aesthetic considerations seamlessly merge with practicality (see Lamb & Kallal, 1992), highlighting the multifaceted nature of the process. Furthermore, when the physical elements such as the body and materials are not physically present, the designer's ability to imagine them visually plays a crucial role (cf. Eckert & Stacey, 2000; 2003, Petre et al., 2006). As discussed in previous chapters, through mental imagery, designers can conceptualize ideas, explore various options, and iterate on designs before translating them into tangible forms (e.g., Eckert & Stacey, 2003).

The early, conceptual phase (Howard et al., 2008), addressed in this dissertation as ideation and idea development has been defined by Johnson (2005, p. 613) as the generation, development, and communication of ideas, whereby an

idea is seen as a fundamental unit of thought, whether visual, tangible, or abstract. However, this dissertation goes beyond the mere act of generating numerous ideas. Instead, ideation is understood here to involve the refinement and selection of the more promising concepts for further exploration, echoing Vinod Goel's (1995) description of the preliminary design phase. Goel (1995) characterizes ideation as the initial creation and exploration of ideas, a process through which various alternatives emerge through the gradual evolution of a few core concepts.

Numerous models have been proposed in the literature to illustrate the design (ideation) process as a "space" involving movement between a problem space and a solution space (Dorst & Cross, 2001; Goel & Pirolli, 1992; Goel, 1995). Central to this idea development is the concept of "design iteration," emphasizing the continuous refinement of ideas through feedback and testing (Schön, 1983). Goldschmidt (2014) expands on this notion, suggesting that this space incorporates sociocultural norms, values, the designer's experiences, and skills. This perspective underscores the relational nature of design, viewing it as a creative process situated within the "relational space between subjects, objects, and cultural signs" as articulated by Tanggaard (2015).

Cash and Štorga (2015), as well as Gonçalves and Cash (2021) understand ideation through 'a dual process' theory – a combination of process and cognitive approach to study ideation. According to them, the ideation process can be depicted as an expanding network of ideas shaped by external inputs (such as stimuli or problem requirements). In this study, the evolution of apparel ideas is seen as a gradual, intertwined process shaped by both sources of inspiration and preceding ideas. This phenomenon has been explored in earlier works (e.g., Goldschmidt 1994; 2014; Gonçalves et al., 2014; 2016; Gonçalves & Cash, 2021; Eckert & Stacey, 2003; Petre et al., 2006; Laamanen & Seitamaa-Hakkarainen, 2014). In her studies, Goldschmidt (1994; 2014) presents the design process as a structural pattern, a network of moves with interconnections, through which each design move transforms the situation from its prior state (Goldschmidt, 2014, p. 42). Particularly focusing on the early stage of design, Gonçalves and Cash (2021) similarly illustrate the interconnectedness of ideas as a network with various types of links (forelinks/backlinks). Based on their results (2021) they discuss ideation as a process combining the creation of ideas and the processing of ideas through judgement.

Furthermore, Biskjaer et al. (2014, p. 461) argue that the design space is co-constituted and shaped by the designer's choices in selecting or deselecting sources of inspiration, which act as constraints on creativity. Seitamaa-Hakkarainen (2000) and Seitamaa-Hakkarainen and Hakkarainen (2001) depict the design process as a dual search within the composition and construction space. Here, ideation involves the cyclical process of manipulating visual elements to craft aesthetically pleasing garments (Lee & Jirousek, 2015), whereby visual elements

such as shape, color, patterns, and size reside within the composition space, while materials, textures, and production procedures occupy the construction space.

Central to these ideas of evolutionary design is the need to generate a spectrum of alternatives, requiring divergent thinking (e.g., Brown & Katz, 2011; Lee & Ostwald, 2022; Yilmaz & Daly, 2016). Divergent thinking in design refers to the generation of multiple, often unconventional options involving the ability to think in multiple directions and generate a wide range of ideas (e.g., Cropley, 2006; Silvia et al., 2008). This type of thinking is essential in the conceptual design process in which designers need to explore various options and consider different perspectives (e.g., Lee & Oswald, 2022; Yilmaz & Daly, 2016). Divergent thinking challenges initial ideas, encouraging designers to take risks and seek new perspectives to avoid fixation and remain open to novel concepts (Cross, 2011; Jansson & Smith, 1991). Black, Freeman, and Stumpo (2015) emphasize the importance of divergence in a conceptual model of creative thinking specific to apparel design. Their model focuses on four divergent thinking abilities: *fluency*, *flexibility*, *elaboration*, and *originality*, aiming to increase the volume of ideas for novel solutions. In this model, *fluency* refers to creating alternative ideas in response to the given inspiration source, *flexibility* refers to the variation in garment types (i.e. dress, jacket, haute couture, outerwear) in response to the source of inspiration, *elaboration* suggests how much detail should be added into the garment ideas, and the *originality* refers to the inventiveness of the garment ideas (Black, Freeman & Stumpo, 2015). These notions of divergence concentrate on increasing the volume of ideas to generate novel solutions. However, it is not only important to generate a multitude of ideas but equally vital for designers is to engage in the process of reduction and selection from this array—an exercise in convergent thinking, as highlighted by Cropley (2006). This dance of creation and refinement, echoed by scholars throughout various studies, underscores the inherent complexity of the design process.

As discussed in previous chapters, the development of ideas in design is closely intertwined with sources of inspiration. Scholars emphasize the role of inspiration as a stimulus and a foundation for idea development. In their study of student idea generation process, Laamanen and Seitamaa-Hakkarainen (2014) found that interpreting inspirational sources led to the development of primary generators that served as *anchor* and *key* ideas. The primary generator, when used as an anchor, constrains a line of ideas to the source of inspiration, while a key idea generates alternative concepts not directly traceable to the source. Building on these findings, Laamanen (2016) proposes an hourglass model of design ideation, where initial ideas are iteratively developed through the exploration of these anchor and key ideas. This model emphasizes the cyclical nature of ideation, balancing stimulus and constraint while stressing the importance of creating representations in the initial idea generation process.

In both professional and educational settings, ideation typically begins with a brief or a task. In professional contexts, these tasks or problems are often shaped by client requirements (Lawson, 2006). Within apparel design, this could involve following current trends or designing for specific commissions. These tasks are rarely simple, often lacking a singular solution. Therefore, framing the problem effectively becomes crucial as it influences subsequent cognitive processes, impacting idea generation and solution development (Dorst, 2015). Initially, a design problem may seem vague or ill-defined but reframing it can transform it into a well-defined challenge. Designers, through reflection-in-action (Schön, 1983, e.g., pp. 128-140), respond to each moment in the ideation process, carrying out the process without necessarily foreseeing the outcome. This approach involves skillfully adapting knowledge and skills to the unique circumstances of a situation, rather than following fixed procedures.

Schön (1983 e.g., pp. 76-79) stresses the role of conversation with the situation in fostering reflection-in-action, when designers engage in an internal and external dialogue, making sense of their experiences and decisions in real time. This approach challenges the idea of professionals simply applying fixed knowledge to clear-cut problems, highlighting the dynamic and adaptive nature of professional practice, through which learning and problem-solving unfold in action (pp. 128-136). Additionally, individual perceptions of ideation and creativity can influence how designers approach design problems (Silk et al., 2021). Silk and colleagues (2021) found that innovative framing of design problems is linked to creative and diverse ideas among novice designers, while more adaptive framing can hinder idea generation. This discovery emphasizes the importance of reframing problems, a skill often exhibited by more experienced designers.

Similarly, in the realm of apparel design, Dasgupta et al. (2011) note that experience and expertise play crucial roles in decision-making. They highlight numerous factors influencing the finalization of an idea, emphasizing the importance of whether the collection or selection of garments fulfills the original needs and principles. In the context of fashion design, solving a design task is intertwined with socio-cultural realities. Eckert and Stacey (2001) suggest that fashion designers often create ideas with characteristic and aesthetic resemblances due to the emergent cultural process of fashion design. This shared cultural context and adherence to cultural precedents can lead to a design fixation, where designers develop similar mental images of the space of possible garments. Reflecting on the discussions above, the development of garment ideas in apparel design shares similarities with other ideation processes. Yet, it also possesses unique aesthetic and technical nuances arising from the norms, conditions, and requirements set by the human body (cf. Berglin et al., 2007; Fiore & Kimle, 1997; Jones, 2011), cultural, historical, and social contexts, as well as the material world (cf. Tanggaard, 2015). From a sociocultural perspective (e.g., Glăveanu, 2010; 2014),

the distinction between having an idea and creating an idea that is acknowledged by a broader audience becomes apparent. For instance, Sawyer (2006) posits that creative ideas are not inherently creative; rather, the creativity of ideas (or products) is shaped by and contingent upon the "audience," reflecting the sociocultural and historical contexts in which they are received.

Navigating the ideation process: the role of external and internal constraints in developing ideas

Following the notions discussed above, in this dissertation creativity and imagination (visual imagining especially) are acknowledged as being pivotal and nurturing characteristics that underpin the ideation and thought processes of designers. Recognizing their pivotal role in ideation and as catalysts for creative problem-solving, it is crucial to understand that mere creativity does not guarantee the realization of a final idea. In studies of creative works, scholars have emphasized the need for boundaries or constraints when developing creative ideas (e.g., Eckert & Stacey, 2014). These constraints are typically categorized as external and internal, with the former often materializing in design briefs and contextual information that provide a framework for problem-solving (e.g., Seitamaa-Hakkarainen, 2000; Dasgupta et al., 2011; Lawson, 2006). In the realm of professional apparel design, these external constraints may encompass a spectrum of considerations, including client preferences, trend forecasts, seasonal color palettes, fabric options, manufacturing constraints, and even the nuances of the human body itself, all of which serve as stimuli for ideation.

Lawson (2006) notes that mass-produced garments typically adhere to standard size charts, but designers in high fashion, those with their own brands, or students designing for personal projects, often draw inspiration from external constraints stemming from specific body types, client personalities, and the intended purpose of the garment (cf. Lee & Jirousek, 2015; Lee, 2017; Mete, 2006). In the fashion industry, all designers work within a shared foundational framework (Eckert & Stacey, 2001), thereby imposing certain demands on their creative endeavors. For instance, Dasgupta et al. (2011; see also Gaimster, 2015) emphasize the importance of designers understanding their clientele and being attuned to the social and historical connotations associated with each design. In essence, designing clothing transcends the creation of mere garments; it involves crafting artifacts that reflect broader social, cultural, historical, and political contexts.

While external constraints remain fixed, internal constraints arise from the designers themselves during the creative process. These self-imposed boundaries, or what Darke (1979) refers to as primary generators, play a crucial role in stimulating and shaping ideation. Darke (1979) suggests that in the initial stages of ideation, these primary generators serve as the objective, concept, and starting point for generating solutions. While these generators may initially be ambiguous,

enhancing awareness enables designers to evaluate and expand their scope as needed (p. 39). Similarly, Lawson (2006) explains that internal constraints possess a flexible nature and are under the designer's control. When self-imposed limitations are perceived as being overly restrictive or ineffective, designers have the ability to adjust them. Consequently, a critical skill in the design process lies in the capacity to assess and analyze internal constraints—a skill that design students may lack, as noted by Lawson (2006).

Reflecting on external and internal constraints, Min, Delong, and LaBat (2015) explored the experiences of apparel design students in creative flow. They discovered a range of external and internal factors influencing the sense of flow, ultimately increasing the likelihood of more creative design outcomes. Elements such as the environment (e.g., a clean workspace, inspiring surroundings), tasks with suitable levels of challenge and flexibility, and the designer's own experience in creative work all contribute to fostering creative flow. Designers gradually learn the most effective ways to navigate and utilize constraints to support their creative endeavors.

Moreover, rather than being seen as mere limitations or demands on creative work, Biskjaer and Halskov (2014) suggest that constraints should be viewed as being multifaceted, possessing a dual role in design as both "restraining" and "impeding," as well as "enabling" and "advancing." The concept of "decisive constraints" introduces a perspective on their role in radical decision-making and creativity, underscoring the intricate interplay of constraints within the design process.

2.2.2 The integral role of sketching in apparel design ideation; steering through the ideational landscape through sketching

Every design problem/task demands a complex process of finding a solution that qualifies both aesthetically and practically. Schön and Wiggins (1992) describe the process of designing as 'a conversation with materials conducted in the medium of drawing and crucially dependent on seeing' (Schön & Wiggins, 1992, p. 1). Therefore, one of the core elements in understanding the inspiration and ideation processes of designers and students is through sketches. In this dissertation, sketching is viewed as an integral activity for developing garment ideas, with sketches representing hand-drawn, chosen, and self-generated manifestations of visual imagination and thought (i.e., ideas). Across all realms of design, sketching plays a vital role in visual representation (e.g., Goel, 1995; Goldschmidt, 2001; 2014b; Jones, 2011; Lee, 2017; Lee & Jirousek, 2015; Schön & Wiggins, 1992). Early studies highlighted sketching as the primary 'thinking tool' for designers (Eisentraut & Gunther, 1997; Ferguson, 1992; Goel, 1995; Suwa & Tversky, 1997).

Furthermore, particularly in the early, conceptual stages of design when ideas are nebulous and not yet fully formed, sketching provides a means for exploring these ambiguous alternatives (e.g., Goldschmidt, 2003; Goel, 1995; Tedjosaputro et. al. 2018), and the type of sketch, whether rough or detailed, provides insight into the completeness of ideas (Eisentraut & Günther, 1997; Goel, 1995).

Previous studies have highlighted the role of sketches and sketching as crucial means of communication (Bucciarelli, 2002; Cross, 2011; Härkki et al., 2018a & b; Lawson, 2006, 2012; Perry & Sanderson, 1998; van der Lugt, 2005; Self, 2019). For instance, in their study of student collaborative sketching, Härkki et al. (2018a) observed that sketching has a pivotal role in facilitating collaborative designing, team discussion and interaction. Designers, often referred to as 'visual thinkers' by McKim (1972), possess the ability to harness their visual imagery, transforming absent ideas into tangible forms. McKim describes the process of visual thinking as a cyclical interaction of Seeing – Imagining – Drawing. This process entails designers first "seeing" the problem, creating a visual understanding of it, and then entering the imaginative phase during which mental images of potential solutions emerge. However, rather than solely relying on imagination, designers translate these alternative solutions into sketches for evaluation and comparison (McKim, 1972). This form of visual thinking, as Goldschmidt (1994) suggests, is both intuitive and organized, with sketching offering designers a method to manage both the specific details and the conceptual aspects of a design, transitioning from the particulars of an idea to the overarching design concept (Cross, 1999).

Lawson (2012) argues that there are no predefined rules for the progression of sketches—designers can move from rough to explicit or vice versa. In the process of idea development, early sketches, often referred to as thinking sketches (Ferguson, 1992), are primarily intended for the designers themselves to solicit reflective feedback. Thus, sketching becomes a conversation between the sketches and the self. Tversky et al. (2003) note that sketches embody the created constructs while enabling examination and evaluation with an open mind. Novice and experienced designers alike draw new insights from their own sketches. Therefore, the hand-drawn sketch, with its lines, dots, and forms, can spark the birth of new ideas (Goldschmidt, 2003).

Gabriela Goldschmidt (e.g., 1991; 2003) has studied the interconnection of design problem-solving, visual thinking and sketching, emphasizing the role of sketching in ideation. She describes how through an iterative process, designers elucidate their ideas through sketching (1991; 2003). More recently, Lee and Jirousek (2015; also Lee, 2017) discovered that apparel designers use sketching for idea development; as they sketch, ideas evolve organically without there being a predefined 'goal' for the work. Seen as an extension of the designer's imagination (Goldschmidt, 1991; also Härkki et al., 2018a; Tedjosaputro et al., 2018), sketching can be understood as a reciprocal dance between the designer's ideas and the

physical sketch (Kavakli & Gero, 2001). Thus, each sketch produced by the designer may lead ideation down new paths, uncovering unexpected properties embedded within the visualization. Goldschmidt (1991) suggests that starting from draft images which may stem from previous designs, inspirational images, or metaphors, designers continue sketching in a serial manner until they arrive at a desired sketch. In recent studies exploring the interconnection and interplay between sketching and mental imagery, Tedjosaputro, Shih, Niblock and Pradel (2017; 2018) discovered that sketching and mental imagery can complement each other, and provide a way to explore and revise ideas (also Härkki et al., 2018a). However, Tedjosaputro et al. (2017) note that the differences between sketches and mental imagery stem from the physical properties of sketches and the presence of visual cues beyond the drawings themselves. Sketches offer an extra layer of interaction during the interpretation phase that is absent in mental imagery sessions.

Typically, apparel designers create multiple sketches (Lee & Jirousek, 2015; Lee, 2017) and use sketching to interpret and adapt sources of inspiration into their designs. In their research, Lee and Jirousek (2015; see also Eckert & Stacey, 2000, 2003; Petre et al., 2006) examined the inspiration, ideation, and sketching processes of apparel designers. They illustrate how experienced apparel designers integrate features from external sources directly into elements of the apparel design domain. Through an iterative and cumulative process, features adapted from visual sources are transformed, sketch by sketch, into final garment ideas (Lee, 2017; Lee & Jirousek, 2015). Goel (1995) analyzed the role and evolution of sketching, identifying two levels of transformation in drawings: lateral and vertical. Lateral transformation involves moving from 'one idea to a slightly different one,' while vertical transformation entails progressing 'from one idea to a more detailed version of the same idea' (p. 119). Reflecting on Goel's work, Lee (2017) discovered a similar pattern of transformation in the sketching process of apparel designers, identifying two distinct phases. The first phase, involving lateral transformation, sees designers interpreting inspirational sources superficially through sketching without extensive evaluation. The second phase entails detailing the sketches (i.e., ideas) through refinement, reinterpretation, and reorganization. Similarly, Seitamaa-Hakkarainen & Hakkarainen (2000) abstracted two strategies of sketching in the context of textile design: horizontal and vertical development of sketches. Horizontal development involves moving from one idea to another without additional articulation, while vertical development results in a detailed and articulated version of an idea.

The act of sketching, therefore, emerges as a distinct and foundational aspect of designing. Furthermore, Jones (2011) underscores the role of sketching in cultivating expertise in apparel design. However, the skills required and expected in sketching may pose challenges for student designers. Goldschmidt (2003)

presents the ambivalent role of sketching; while it is undoubtedly a useful tool for creative thinking and ideation, it demands skills. Without a certain set of sketching abilities, students might not fully utilize it for idea development. On the other hand, despite the crucial role of sketching in developing expertise in apparel design, being an expert designer does not necessarily demand exceptional drawing skills (Jones, 2011). In this dissertation, the focus is not on evaluating the requisite level of sketching skills, but rather on acknowledging sketching as a vital tool for developing ideas based on inspirational sources. Additionally, sketching is regarded as a central tool for thought and reflection during ideation, offering insights into the designer's mental processes

2.2.3 Team ideation (ideas evolve through materially facilitated group work)

In the modern understanding of design, it is recognized not just as an individual process but also as being physically and socially distributed (Bucciarelli, 1994; Matthews & Heineman, 2012). Even when carried out individually, designing occurs in concert with the sociocultural and material world, as previously discussed. In the current study, inspiration and ideation are viewed not only as individual processes but also as collaborative efforts among students creating together, functioning as a design team. Drawing from the work of Hennessy and Murphy (1999; see also Lahti et al., 2016), team ideation is understood here as active communication and interaction aimed at finding solutions to complex problems. Within this collaborative process, team members share ideas and thoughts, identify and develop constraints, generate and modify solutions, and evaluate the outcomes of their joint work, ultimately creating a shared design idea or object. Thus, in team-based design, ideas evolve through interaction and communication, which can take various forms (e.g., linguistic, gestural, graphical) (Jeong, 2013; Luff, Heath, & Pitsch, 2014; Wardak, 2016). To achieve a common goal, such as solving a design task, the team must navigate social and organizational factors alongside the creative work at hand. In their seminal work on team design, Cross and Cross (1995) observed that design teams, comprising members with diverse roles and relationships, invest significant effort in establishing a shared understanding of the problem (also Valkenburg, 1998). In an iterative design process, they continue, the design team grapples with conflicts arising from individual interpretations of information, ideas, and concepts.

In apparel design, design collaboration, especially between fashion and textile designers and buyers, occurs because it empowers the sharing of insights regarding aesthetic, technological, temporal, and economic constraints (Wang, Shen & Liu, 2017). Recently, Bang (2022) calls for cross-disciplinary collaboration to tackle with the unsustainable issues of fashion and textile industry. Johnson (2002)

investigated collaborations between textile suppliers and designers, observing that the integration of suppliers' and manufacturers' insights on new materials and processes amplified designers' creativity and elevated the performance of resulting products. Moreover, in the context of apparel design education, it has been acknowledged that collaborative approaches contribute to design students' personal achievements (Simoes & Ribeiro, 2019), learning, and the level of sustainable awareness (Onur, 2020). Collaboration can also provide students with a steppingstone for the creative process in the form of collective digital clothing concepts, as exemplified by Riikonen (2019; also Riikonen & Nuutinen, 2017).

The prerequisites for collaboration and communication in team design can be understood through various concepts, such as shared understanding and common ground (cf. Koskela et al., 2016). While none of these terms are here adopted verbatim, they serve as a backdrop to explain the importance of establishing understanding among members through interaction. In essence, group understanding implies an alignment of understanding between individual design team members' perspectives on the objectives, the task, and solutions (e.g., Koch & Oulasvirta, 2018; Zahedi, Tessier & Hawey, 2017). Kleinsmann (2006) discusses how this understanding is constructed through knowledge sharing. Valkenburg (1998, p. 113) describes shared understanding as "a mutual view amongst the team members on relevant design topics and design activities." The lack of shared understanding, it is said, can lead to problems in the team's decision-making process, which in turn can disrupt subsequent activities due to divergent perceptions among individuals on critical matters (Valkenburg, 1998). To overcome these barriers to collaboration, members need to ask questions and provide feedback to one another (Cash, Dekoninck & Ahmed-Kristensen, 2017). Overall, communication and interaction were emphasized in earlier studies concerning the formation of group cohesion and team-based design; team understanding, crucial for effective teamwork, emerges from interactions and communication.

On the other hand, communication in team-oriented design projects relies not only on individuals' verbal interactions, but also on the role of materiality (e.g., working tools, images) and embodied activities (such as sketching, gestures) in facilitating and directing communication in collaborative design (Ball, Christensen, & Halskov, 2021; Heiss, 2020; Lockton et al., 2020; Luck, 2007). As previously mentioned, design is inherently laden with visual elements, whether imagined or physical, and in this study, ideas and design artifacts are created using visual entities. The active role of visual objects in supporting collaboration in design has sparked discussions in the literature. For example, Gergle, Kraut, and Fussell (2013) discovered that visual information supports situation awareness (i.e., providing team members with a precise view of the task's status and other members' activities, aiding in task coordination) and conversational grounding

(i.e., supporting verbal communication to create a common understanding). Sharing the same visual workspace, such as viewing the same screen on a computer, enhances collaborators' understanding of the task and each other's perspectives. Comi, Jaradat, and Whyte (2019, p. 118) found that conversations with visual objects made professional designers from different fields aware of 'each other's ways of seeing.'

Similarly, earlier studies have discussed how artifacts can mediate understanding in design conversations (Luck, 2007; Lahti et al., 2016) and how a shared material exploration can deepen mutual understanding of the work (Lockton et al., 2020). In the realm of apparel design, Townsend et al. (2018; Townsend & Sadkowska, 2018; 2020) investigated the role of textiles in a participatory, collaborative fashion design project aimed at developing sustainable fashion for an aging demographic. They discovered that textiles not only served as an incentive for the whole project, but also enabled tactile interactions. Additionally, abstract elements can also support communication. Objects to support team design do not always need to be physically present. For instance, Graff and Clark (2019) illustrate how working with metaphors can improve knowledge sharing, foster group understanding, enhance individual learning, and thus support communication in collaborative design. In any case, the selection of theoretical arguments underscores the role of materiality in supporting team-based design.

3 Research questions

Building on prior academic work of inspiration and ideation in apparel design, in my study I have sought to explore systematically the inspirational process and ideation in the context of expert-apparel design, and craft teacher education. This overall aim is delineated by two objectives, both further elaborated into detailed research questions. On that account, the first objective was to elucidate the role and significance of sources of inspiration in expert and student-level apparel ideation, and to investigate the dynamic interplay between visual stimuli and the evolution of ideas within apparel design. The second objective was to examine inspiration as a collaborative process in craft education students' apparel design. Related to the overall aim and objectives of my study, I asked

How can the interplay between inspiration and ideation be understood in varied apparel design contexts?

Context 1: Professional apparel design – Study I

How do visual sources stimulate expert designers' ideation?

How do professional apparel designers develop their kernel ideas by sketching?

Context 2: Craft education students' collaborative design – Study II

How are mood board ideas generated and cultivated in student design teams?

How do the student teams gather inspiration material found online for their mood boards?

Context 3: Craft education students' individual apparel design – Study III

How do the students describe the role of specific sources of inspiration i.e. shared mood boards in apparel design?

How can we interpret the adaptation of sources of inspiration (i.e. shared mood boards) into ideas?

To achieve the objectives of this PhD, I undertook a series of distinct yet interconnected studies, which have been published as three separate journal articles. These investigations consisted of a deep dive into the realm of inspiration and apparel ideation, employing iterative qualitative analysis on data gathered from multiple cases of early apparel design processes among both seasoned apparel designers and students in craft education. In the subsequent chapters, I will outline the primary methods utilized and the key findings derived from these three studies. This will be followed by a discussion of the results and concluding remarks.

4 Research design

In this chapter I depict the empirical and methodological approaches to explore the phenomenon of inspiration in apparel ideation. In chapter 4.1, I introduce a brief description of the rationale behind using a multiple case study as my research strategy, accompanied by description of my research settings and main data acquisition. Then, in chapter 4.2. I portray how I conducted the data analysis.

4.1 Multiple case study and research settings

Design is inherently complex and multifaceted, with numerous factors that come into play when exploring this process. A multiple case study approach was deemed appropriate for this study, as it allows for an empirical investigation of complex phenomena within their real-life contexts (Yin, 2009; 2014). This method offers the flexibility to examine design using a range of data sources and methods, emphasizing the need for detailed descriptions that enable an in-depth exploration of the phenomenon being studied (Creswell, 2014; Yin, 2009; 2014).

Interrelated with time and activity, as noted by Creswell (2014), case study research is akin to meticulous craftwork—a carefully planned research design that ensures the validity and reliability of the study outcomes (Yin, 2014, p. 28). As highlighted by Yin (2009), it is important to note that a case study is not merely a method for data collection but rather a strategy for studying a social unit. Moreover, conducting multiple case studies, as opposed to one, can help mitigate the risk of potential errors in data collection and biases (Yin, 2014).

The aim of this study was to systematically examine the processes of inspiration and ideation in apparel design among expert apparel designers and craft-education students. The empirical foundation consists of three qualitative case studies exploring these processes in different contexts: individual ideation by three professional apparel designers and 11 craft-education students, as well as collaborative ideation and inspiration by 12 craft-education students working in design teams. The multiple case studies were structured into three studies based on specific ideation tasks. The first study focused on professional apparel designers, while the second and third were part of a course assignment for craft teacher training at the University of Helsinki.

Following the standard practices in case study research (VanWynsberghe & Khan, 2007), I employed a variety of methods to study ideation and inspiration activities systematically, in detail. Methodologically, this study combined the use of the thinking-aloud method, interviews, and observations to gather rich, reflective, and dense data, as outlined in Table 1.

Table 1 An overview of the main methods, participants, and data in each study.

Study	Study participants	Methods of data collection	Empirical data
Study I	Three professional apparel designer	Thinking-aloud & semi-structured post-ideation interviews with material stimulation	Thinking-aloud protocols from the ideation experiments. Video recordings of the designers' ongoing design processes. Transcriptions of post-ideation interviews. Photographs of the sketches and inspirational images
Study II	Three teams of 12 second-year craft education students participating on an 'inventing and craft design' course at the University of Helsinki.	An observational video study	Video recordings of three team design sessions. A real-time screen capture videos of the work on the computer. Observation notes Three design artefacts (i.e. mood boards)
Study III	11 students from the twelve students who volunteered in the second study.	Materially stimulated, post-ideation interviews with open-ended questions.	Video recordings of the material stimulated interviews. Photograph of Students' personal idea books and material samples, photographs of students' sketches. Three shared mood boards

In Study I, my aim was to analyze the ideation and inspiration processes of three professional apparel designers in real-time using the thinking-aloud method. This was followed by Study II, which involved observational video studies to explore the ideation and inspiration processes of three teams of undergraduate craft education students. Study III, as a natural progression from Study II, utilized materially stimulated interviews to delve into the individual ideation and inspiration processes of craft education students, stemming from the team ideation session investigated in Study II. In addition to these, video-recordings played a pivotal role, yet more like an instrumental role, in capturing visual data of ideation and inspiration processes. All interviews were also video recorded to ensure that the embodied and material aspects of the processes were not overlooked. Only recording the verbal reports of a complex process that includes bodily activities (such as sketching) and material entities could have ended up in keeping some crucial elements hidden. Above all, having these moments and happenings captured as video was essential for a thorough examination the phenomena of ideation and inspiration.

4.1.1 Study I: using thinking-aloud method to explore expert designers' inspiration and ideation

The focus of my first study was to investigate the early ideation, inspiration, and sketching processes of expert apparel designers, employing the thinking-aloud method and interviews. Three professional apparel designers based in Helsinki, each sharing similar educational (BA in fashion & clothing) and professional backgrounds, willingly participated in this study to tackle a specific, small-scale ideation task. All data for this study was gathered from three ideation experiments, each organized separately, along with post-ideation interviews. To capture the ideation processes, I employed the thinking-aloud method, closely following Ericsson and Simon's (1984) protocol analysis technique and used video recordings of the ideation sessions. Furthermore, I conducted individual open-ended post-ideation interviews to complement the insights gained from the thinking-aloud method.

As discussed in the theoretical chapters of this dissertation, the study of design ideation and inspiration poses unique challenges due to their dual nature: comprising both external activities and outputs, as well as internal processes that may remain hidden from the researcher's view. To address this complexity, I initiated my research (Study I) by employing the thinking-aloud method, also known as protocol analysis, developed by Ericsson and Simon (1984; also see van Someren, Barnard & Sandberg, 1994).

The thinking-aloud method has been widely used in studies about design processes (e.g., Dorst 1995; Seitamaa-Hakkarainen & Hakkarainen, 2001) as it offers a valuable means of capturing designers' mental activities while they engage in their design tasks. Essentially, this method requires participants to verbalize their thoughts continuously from the beginning to the completion of the problem-solving (Ericsson & Simon, 1984; van Someren et al., 1994). According to Ericsson and Simon (1984), the thinking-aloud method allows for the collection of verbal data directly from the designer's working memory—information that is within the designer's immediate attention and consciousness. This approach provides a window into the inner workings of the designer's thought processes, shedding light on the otherwise concealed aspects of ideation and inspiration.

In the fall of 2015, I conducted individual ideation experiments with each of my three participants. For these experiments, I presented them with a carefully crafted ideation task that was designed to closely resemble real-life design challenges. The task was selected with specific criteria in mind: it had to be solved within a relatively short timeframe, could be approached from varied perspectives, and reflective of the tasks these designers typically encounter in their professional practice. The task assigned to the designers was to create a design for a spring jacket intended for women. To facilitate their ideation process, I gave the participants the freedom to choose their preferred location for working. Each participant opted to work in either a studio or a workroom setting. In addition to the task itself, I provided the designers with a set of ten photographs—five depicting natural settings and five depicting urban landscapes. These photographs were offered as optional sources of inspiration for their creative process. Given their choice of work location, I acknowledged the possibility of other sources of inspiration being present in their immediate surroundings that were beyond my control.

During the ideation experiments, I instructed each participant to verbalize their thoughts continuously from the outset to the conclusion of their problem-solving process, adhering to the principles of the thinking-aloud method. While the thinking-aloud method is a straightforward technique for the researcher to gain insight into the designer's thought processes in real time, it is not without its challenges for the study participants. As noted by Lee and Jirousek (2015), designers may find it challenging to articulate their thoughts clearly while they are deeply immersed in the creative process. In my study, however, all three designers were able to verbalize their thoughts fluently, requiring no additional prompts or assistance from me during the data collection process. Nevertheless, the key to obtaining comprehensive and meaningful data lies in the use of multiple methods that complement the thinking-aloud method (Lee & Jirousek, 2015; Pedgley, 2007; Petre, Sharp, & Johnson, 2006). Furthermore, when the design process involves physical, embodied activities (e.g. sketching, leafing through inspirational

sources), it becomes essential to gather a range of data sources such as video recordings, interviews, and photographs to gain a deeper understanding of the designer's creative process. Scholars like Goel (1995) and Lee & Jirousek (2015) have argued for the importance of employing such varied methods in studying design processes. Following these notions, and to enhance the reliability of the study while supporting the thinking-aloud method, I chose to video-record the ideation experiments. This allowed me to capture real-time data on the designers' bodily activities, such as sketching, as illustrated in Figure 1.

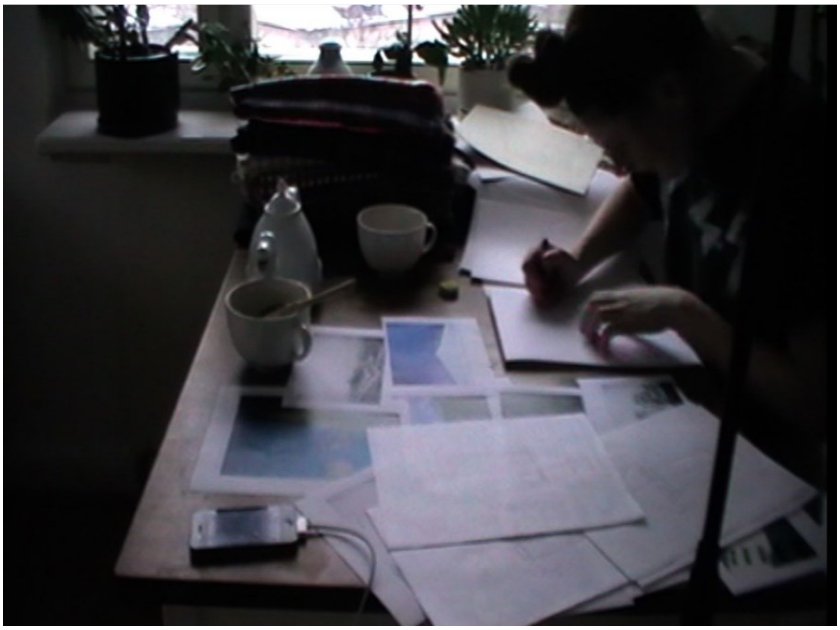

Figure 2 A screen capture of the thinking-aloud session; the expert designer immersed in the creative work.

In addition to the video recordings of the ideation sessions, the data were further enriched with photographs capturing the designers' sketches and my detailed observational notes. While the thinking-aloud method offers valuable insights into the information actively managed by the designer's working memory, it may sometimes lack the participant's narrative explanations or the rationale behind their actions. Therefore, to support the method and my own interpretations I decided to conduct open-ended, semi-structured post-ideation interviews (Brinkmann, 2020) that focused on participants' reflections on their processes, and their why's and why nots. Cross (2011) notes that an interview is a useful way to gain information about design. To address this gap and to support both the method and my own interpretations, I decided to conduct open-ended, semi-structured post-ideation interviews, as suggested by Brinkmann (2020). These

interviews were designed to focus on the participants' reflections on their processes, and on their motivations, reasons, and decision-making processes. Cross (2011) highlights the interview as a useful tool for gaining insights into the design process. Tailored to each participant, these interviews were conducted immediately after the ideation experiments. This timing allowed the designers to elaborate on the genesis of their ideas and inspirational process in a reflective manner.

Overall, the data for this study consisted of 1) verbal thinking-aloud protocols, 2) video-recorded activities, 3) written and drawn material produced by the participants during the design sessions, and 4) post-ideation interview data. In total, I collected four hours and 24 minutes of data that included protocols from the ideation experiment data and the post-ideation interviews.

4.1.2 Study II: collecting observational video-data to study craft education students' team ideation and inspiration processes

The data for my second and third studies were collected as part of the 'Inventing and Craft-Design' study module at the University of Helsinki. This 15-week long module is structured into three segments: conceptual design, modeling, and production. It is specifically designed for students in their second year of craft teacher training. As a compulsory segment of studying intermediate craft education, this study module offers a comprehensive exploration of the fundamental principles of conceptual design and its application in craft design. As part of the module, students work on creating a collective mood board and then proceed to individually design and prepare an outfit based on this board.

In this study, I used video data and observational methods (as described by Derry et al., 2010) to investigate team-based ideation among student designers. Specifically, I focused on understanding inspiration as a collaborative process within these teams, as well as the development of a shared mood board (i.e. a shared source of inspiration). The use of video as a research tool has been well-established in previous studies examining craft and design practices (see, for instance, Härkki, Seitamaa-Hakkarainen & Hakkarainen, 2018a, 2018b; Mehto & Kangas, 2023; Seitamaa-Hakkarainen et al., in press). In the realm of design research, Härkki and colleagues (2018a, 2018b), for instance, employed video techniques to analyze collaborative sketching and gestures in the context of design processes.

I collected data from three student teams during their sessions working on the initial assignment of the conceptual section within the study module. This assignment involved collaborative team design work and the development of a shared mood board. For this study, I recruited 12 students from the module, all of

whom volunteered to participate. Following instructions, the students, including those involved in my study, naturally organized themselves into teams of three or four members. They were tasked with collectively creating shared mood boards using digital tools such as computers, mobile phones, and iPads, within a 90-minute timeframe. The specific task given to the students was outlined as follows: *while working in design teams, you are to develop a digital mood board for representing the clothing concept*. Additionally, the task had two key requirements: 1) the mood board should not include any materials directly related to clothing, and 2) each design team was required to provide a name for their respective mood boards.

To gather the data, I arranged separate sessions for each team to complete the task of creating a mood board. Each team was assigned a dedicated room, where they worked without any interaction with the teacher or other students during the 90-minute sessions (Figure 2).

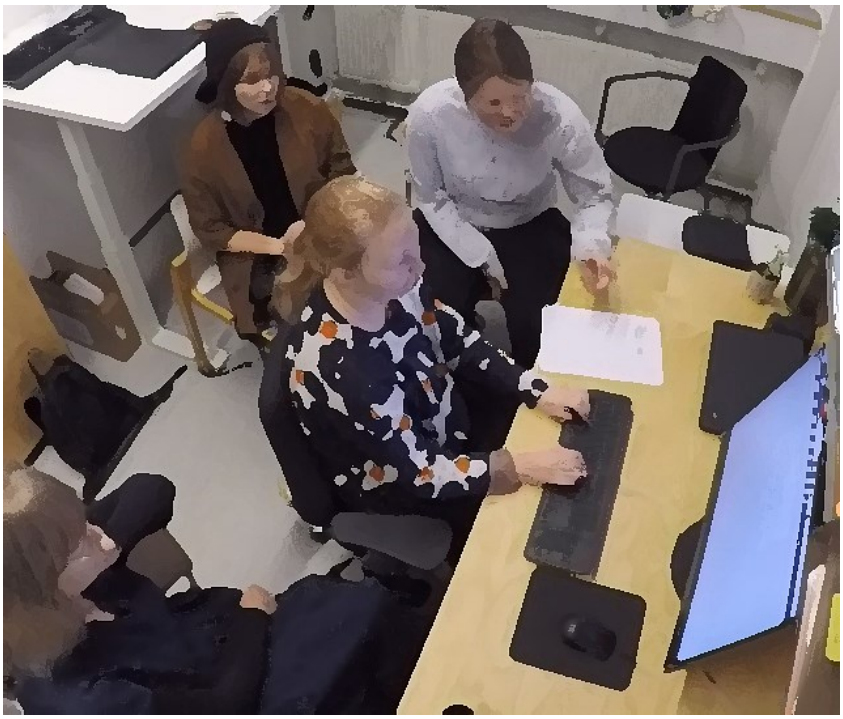

Figure 3 A team of students working on the computer during the team design session

Within this workspace, the teams were provided with three computers and access to their own digital tools. To ensure the data collected were comprehensive and reliable, I employed two Go Pro cameras equipped with microphones to video record the teams' sessions from both wide and close-up perspectives. Additionally,

I used Screencast-O-Matic software to capture real-time footage of the mood board construction and the process of gathering inspiration on the computers. To gain a deeper understanding of the collaborative process, I was physically present throughout the sessions of all three teams. This allowed me to observe, listen, and document how the students collaborated and collectively developed their source of inspiration. I also made reflective notes on these observations (DeWalt & DeWalt, 2011, p. 4) to enhance the depth of the study further.

Throughout these sessions, the teams engaged in the creation of mood boards that encompassed a blend of visual and verbal elements. This included concepts, metaphors, and imagery sourced from the internet. They worked collaboratively to ideate and develop a central theme for their mood boards. For the sake of clarity within this study, I named the teams so they corresponded to the titles of their respective mood boards: team 'Pearl' (mood board; the Pearl of a Year), team Summer (mood board; the Finnish Summer), and team Sprout (mood board; the Sprout).

Team Pearl's design sessions lasted approximately 52 minutes, team Summer's approximately 90 minutes, and team Sprout's around 63 minutes. Altogether, the data for this study consisted of nine hours and 59 minutes of video recordings, plus the final three mood boards developed by the teams.

4.1.3 Study III: materially stimulated interviews with craft education students

Taking place within the same educational context as described in the previous chapter (specifically, the conceptual section of the 'Inventing and Craft Design' study module), this study explored the role of the shared mood boards the teams created in the students' individual ideation and inspiration processes. To gather insights into this aspect, I conducted materially stimulated semi-structured interviews with the participants. This approach draws from established methodologies in qualitative research, as exemplified by scholars such as Brinkmann (2020), DiCicci-Bloom and Crabtree (2006), Fox-Turnbull (2009), and Roulston and Choi (2018). These interviews were designed to elicit reflections and insights from the students regarding their experiences with the shared mood boards, shedding light on their personal creative and inspiration process.

For this study, I collected data from the second task assigned to the students within the study module. Building on the processes investigated in the second study, 11 students from the student teams volunteered to continue their participation in this third study. As previously described, the students' journey began with the creation of a mood board in their design teams, which served as the foundation for their individual design processes. The second assignment for all students in the course involved ideating personal apparel designs—a knitted top

and a stitched bottom—based on their team's mood board. As part of this assignment, each student was tasked with generating a minimum of ten ideas for both the top and bottom garments. Additionally, students were guided to maintain a personal idea book, where they were instructed to compile all written and drawn materials related to the development of their ideas. This served as a repository for their creative processes, allowing them to track and document their evolving designs and inspirations.

In this study, I focused on the participant students' personal views on their apparel ideation processes and the shared mood boards they had created with their peers. Therefore, I decided to use semi-structured interviews to be able to collect data from participants' reflective, thoughts, views and interpretations. Commonly, the main purpose of interviews in qualitative research goes beyond merely collecting 'facts' to generating knowledge through interpretive understanding about the participant's subjective views, experiences, beliefs, motives and motivations, and to learn from these (e.g. DiCicci-Bloom & Crabtree, 2006; Flick, 2018; Gill et al., 2008; Hopf, 2004). Additionally, interviews have been proved to be suitable in studies on design processes and design thinking, as argued by Cross (2011) and Lawson (2012).

While seemingly a straightforward method, interviewing requires careful consideration of various factors that can significantly impact the responses of the interviewees (see Brinkmann, 2020). In designing my interviews, I opted for a semi-structured format, as it allows for a more dialogic approach to knowledge production. This format provides the flexibility for the conversation to flow freely, enabling both interviewer and interviewee to engage equally in a dynamic exchange of ideas and insights (Brinkmann, 2020). With the intention of fostering an open and conversational atmosphere, I structured my interviews to be fluid and adaptable, allowing for spontaneous discussions and the emergence of unexpected topics and viewpoints, mirroring real-life conversations (see Arksey & Knight, 1999; Denscombe, 2014).

However, as we are aware, articulating one's thoughts and experiences can sometimes be challenging. To facilitate conversation and to aid my study participants in recalling their processes during the interviews, I arrived to the decision of employing a variation of the stimulated recall method (Fox-Turnbull, 2009; Lyle, 2003) alongside open-ended questions (Noaks & Wincup, 2004). Lyle (2003) describes the stimulated recall technique as an introspective method used to uncover cognitive processes and thinking strategies related to a specific activity or task. Traditionally, researchers conducting stimulated recall use video and audio materials collected during observations (Moreland & Cowie, 2007). In my study, however, I took a different approach by using materials as stimuli. I provided my participants with the opportunity to interact with and reflect on all the materials relevant to their creative processes—including inspirational images,

sketches, notes, and material experiments—during the interviews (see Figure 3). This method aimed to deepen the exploration of their ideation and inspiration processes, allowing for a richer and more nuanced understanding of their creative journeys.

To conduct the interviews, I arranged individual sessions with each of my 11 participants following their completion of the idea development phase. These interviews took place approximately one month after the collaborative mood board creation sessions. I made the decision to video-record these interviews to ensure a comprehensive record of the discussions. In addition to using material stimulation, I prepared a set of open-ended questions designed to prompt participants to reflect deeply on their ideation processes and sources of inspiration. As noted by Noaks and Wincup (2004, p. 80), the open-ended nature of these questions encourages "active listening," allowing the interviewee the freedom to express their thoughts and attribute meanings as they see fit. Specifically, I asked the students to describe in their own words: (1) their main garment ideas and (2) the role of the shared mood board in their ideas. For answering these questions, and to recall and reflect on their idea development and inspiration the participants brought in all the material they had produced.

Figure 4 A screen snip of a student interview; a craft education student is recalling the ideation process with the shared mood board, idea book, sketches, material samples, and other materials related to the apparel ideation process.

Additionally, I took close-up photographs of all the materials the students brought along to the interviews to be able to revisit them in my analysis. The interviews lasted between ten and 23 minutes and enabled us to collect short stories from each participant. The data consisted of (1) video-recorded interviews (approx. 165 minutes in total), (2) the teams' shared mood boards, (3) 56 photographs (e.g. sketches, notes, material samples and experiments and (4) eleven idea books (containing written and visual material).

4.2 Data analysis

Since my dissertation consists of three studies published in peer-reviewed academic journals, every phase of the research process required criticality and rigorous analysis. In each study, I applied qualitative content analysis, a method suited for examining textual and other meaningful materials (Krippendorf, 2019, p. 24). While there were nuances specific to each of my three studies (see Table 2), the analytical approach in all of them resembled an abductive approach. Sociologists Timmerman and Tavory (2012, 171) describe abduction as 'the form of reasoning' through which we perceive the phenomenon as related to other observations either in the sense that there is a cause and effect hidden from view, that the phenomenon is seen as similar to other phenomena already experienced and explained in other situations, or in the sense of creating new general descriptions. They further elaborate that while inductive analysis seeks to derive theories solely from the data, without prior theoretical knowledge, and deductive analysis aims to validate a theory by fitting data into the theoretical framework, the abductive approach strikes a balance between the two. In the abductive approach, the analysis navigates the middle ground, considering the data alongside existing theoretical perspectives while also allowing for the emergence of new insights and interpretations.

Navigating between previous theoretical knowledge and the data, I conducted the analysis reflecting on both the abductive approach and Hsieh's and Shannon's (2005) description of data and theory-driven qualitative content analysis. In their framework, Hsieh and Shannon (2005) describe the data driven approach as deriving coding categories directly from the data itself, while the theory-directed approach involves starting with existing theories or prior research to develop an initial coding scheme that reflects the data. For me, the goal was not to impose preconceived concepts onto the data, but rather to use existing theories and earlier studies as a foundation for understanding. This approach, as noted by Wincup (2017), allowed me to view previous research as a starting point—a lens through which to make sense of the data. As the analysis progressed, I then looked for patterns and similarities in the data that resonated with the existing theoretical frameworks. This iterative process ensured a balanced integration of theory and

data, enriching the analysis and deepening the understanding of the inspirational and ideational processes in apparel design.

Table 2 Summary of the analysis method, the focus of analysis, and data used in Studies I-III

Publication	**Main data**	**Focus of analysis**	**Analysis method**
Study I	The designers' transcribed thinking-aloud protocols and the video-recorded activities. Designer's sketches (i.e. ideas they developed)	The early phase of expert designer's apparel design process, how professionals develop their kernel idea by sketching, and how visual sources stimulate their ideation; the interaction and relationship between the designers' kernel design ideas, the sources of inspiration and sketching in expert-level design.	Data and theory-driven qualitative content analysis + utilization of visual problem behavioral graphs
Study II	The video recordings of the team sessions, and the transcriptions of the team members' verbalizations. Three mood boards the teams created. Observational notes.	The evolution of the mood board ideas and the role of visual sources in team ideation, as well as the collaborative search for inspiration online.	Data and theory-driven qualitative content analysis with elements of group interaction analysis + utilization of visual Cytoscape networks
Study III	Video-recorded and transcribed interviews. Materials that the study participants produced (e.g. sketches, notes, material experiments)	Participants' reflections on individual idea development, the role of shared mood board in their apparel designs and ideation.	Data and theory-driven qualitative content analysis

4.2.1 Study I: analyzing a professional designer's inspiration, ideation, and sketching from three video-recorded thinking-aloud experiments

The analysis here relied on the designers' transcribed thinking-aloud protocols and the video-recorded activities. Interview data, along with photographs I used to verify my interpretations and to visualize these interpretations. Through a close examination of the data, I focused on analyzing the early phase of professional designer's apparel design process, how professionals develop their kernel idea by sketching, and how visual sources stimulate their ideation.

The qualitative content analysis conducted in this study unfolded in three primary phases, characterized by a cyclical nature. The process involved a

meticulous examination of the thinking-aloud protocols, coupled with close observation of the activities and idea generation evident in the video data. In the initial phase of analysis, my aim was to develop a comprehensive understanding of the designers' processes of idea development. This involved a systematic approach of reading through the designers' protocols word by word, alongside thorough review of the video-recorded ideation sessions. The process began with the identification of design episodes, often signaled by phrases such as 'I will...' or 'I have to...'. By zooming in on these episodes, I was able to discern various phases of idea development, including the presentation of all ideas (initial kernel ideas and their subsequent iterations), the emerging sources of inspiration throughout the process, the primary generators developed (as described by Darke, 1979), and the quantity of sketches produced. Consequently, I constructed graphical maps known as problem-behavioral graphs for each design process (see Ericsson & Simon, 1984). These graphs served as visual tools to illustrate the sequence of transitions from one idea or design element to another, capturing the transformation of ideas over time. Additionally, they allowed for the identification of instances in which certain ideas were not further pursued or developed. Through this detailed analysis, I was able to map out and visualize the intricate pathways of idea evolution within the context of professional apparel design.

In the second phase of analysis, I moved to take a closer look into the inspirational processes of the designers, focusing on how they utilized sources of inspiration and developed ideas during the sketching phase. Throughout this phase, I continuously reflected on observations from the first phase, the graphical maps created, the collected data, and existing theories in the field. I organized the designers' inspiration process under two main categories: 1. the sources of inspiration that elucidates the types of sources—whether external or internal—the designers referenced or utilized throughout their creative process., and 2. the adaptation of sources. Within this main category, I further subdivided these into five sub-categories based on theories put forth by Petre et al. (2006) and Eckert and Stacey (2003): 1. literal adaptation of the source (i.e. the source is directly copied into the design), 2. adaptation by simplification (e.g. inserting a detail from the source in the design), 3. abstraction (i.e. capturing the essence of the source), 4. modification (i.e. replacing, re-arranging, or combining source elements, and 5. association (i.e. an association is made with other visually similar elements that originated in a similar context; e.g. the source is 'school' and the designer adapts an element from that context into the design). From the video-data, the examination of each sketch and idea development move, along with the identifying the sources of inspiration that informed the design, enabled me to explore the intricate relationship between sketching techniques and the adaptation of elements from these sources. Furthermore, I traced the evolution and transformation of ideas as they were influenced by the designers' engagement with

their sources of inspiration. This phase of analysis provided deeper insights into the creative processes of the designers and the ways in which external and internal inspirations shaped their design outcomes.

In the final phase of analysis, building on the insights gained from the preceding stages, I was able to reveal the iterative nature of ideation by identifying the generation and transformation of ideas, and the relation of separate ideas. Drawing from my previous observations and the problem-behavioral graphs (PBGs) created earlier, I developed simplified graphical representations—referred to as idea development diagrams (examples of which can be found in the publication)—for each designer. These diagrams aimed to illustrate how the designers progress from initial ideas to finalized ones, depicting the evolution of ideas and the quantity of sketches produced. Moreover, they highlighted the interconnections and relationships among various design elements. Additionally, in this phase, I conducted comparisons of the designers' sketches to identify potential similarities and establish a continuum of design evolution. This comparative analysis provided further insights into the creative processes employed by the designers, revealing patterns of ideation and the evolution of design concepts over time. To validate and corroborate my interpretations, I relied on data from the post-ideation interviews.

4.2.2 Study II: analyzing three team ideation and mood board creation sessions

In this study, the analysis was grounded in the video recordings of the team design sessions and the transcriptions of the team members' verbalizations. The approach to qualitative content analysis was both data-driven and theory-driven, drawing inspiration from studies on multimodal group interaction analysis (e.g., Luff, Heath & Pitsch, 2014; Jeong, 2013). These examples of multimodal group interaction analysis highlight the manners in which materiality (i.e. technology, tools, materials) and the construction of artefacts are significant for the formation and achievement of activities. Building on these insights, in my study, the content analysis involved the observation of varied entities in the team ideation process. Overall, the content analysis unfolded in two main phases, each of which was an iterative and interactive process with the data. This involved closely examining the team's interactions with one another and with the material objects present during the sessions. These objects included the mood board, working tools, and visual stimuli utilized by the teams in their ideation process.

The initial phase of the analysis was conducted on two levels; 1. to create a holistic view of team processes: The initial goal was to develop a comprehensive understanding of the teams' processes by closely examining both the video recordings and transcriptions of verbal interactions. This involved exploring the nuances of team dynamics, collaborative efforts, and the overall flow of activities

during the ideation sessions; and, 2. to create an understanding of the evolution of the mood board ideas, and the role of visual sources in ideation. By first systematically analyzing design activities and their content from the video, while reflecting previous theories on collaborative design and mood board creation, I was able to categorize the teams' main design activities into nine distinct categories, with each category representing a different aspect of the ideation process. These categories included activities such as presenting ideas, analyzing and interpreting, and organizing the process to make joint decisions. Additionally, I identified 14 content categories to describe the specific content of these activities or ideas generated during the sessions. For instance, I observed moments when the teams analyzed initial ideas, interpreted visual sources found online, and discussed potential platforms for the mood board. These activities were categorized as main design activities, while the ideas and visual sources themselves were classified as the content of these activities. As the analysis progressed, the content categorization expanded to encompass all aspects of the teams' ideas, providing a detailed understanding of the scope and depth of their creative exploration (e.g. whether the content explains the idea of what platform to use for the mood board, or the name of the mood board).

Subsequently, to represent the evolution of ideas and synthesize the mood board creation process visually, I used Cytoscape (3.8.2) software to create process networks (Figure 5). The creation of a Cytoscape network served as a supportive analytical tool to understand the evolution of ideas, and to synthesize the mood board creation process and the idea development visually. The creation of the process networks happened through systematic video analysis and content analysis. I used visual process networks to illustrate the relational, iterative and cyclical nature of the creation process but also to show the activities and their content. I employed symbols to denote the main activities and key ideas, color-coding to represent the content of activities or ideas, and lines to indicate the relationships between ideas and their progression over time. Detailed description of the categorization and examples of the process networks can be found in the original the publication of study II.

Secondly, in this phase of the analysis, I zoomed in on the evolution of the mood board ideas and the role of visual sources in shaping ideation. Building on the insights gained from the initial process networks and my preliminary observations, I embarked on a detailed exploration of the ideas generated by the teams. I followed the trajectory of ideas, meticulously examining the nature of each idea and the interrelationships between them. This involved tracing the teams' processes through cycles of opening, broadening, and deepening. The opening cycle was when the teams revisited and reinterpreted previous ideas. They analyzed these anew, seeking to extract the most promising ideas for further development. This phase served as a gateway, allowing the teams to explore

various directions and options. Subsequently, the teams engaged in cycles of broadening and deepening. In the broadening phase, they expanded on the initial ideas by introducing new, yet related concepts. This process of diversification allowed for a richer exploration of potential design directions. Conversely, the teams also focused on deepening their ideas. This involved refining and elaborating on the selected ideas, often through explanations, abstractions, or the merging of related ideas.

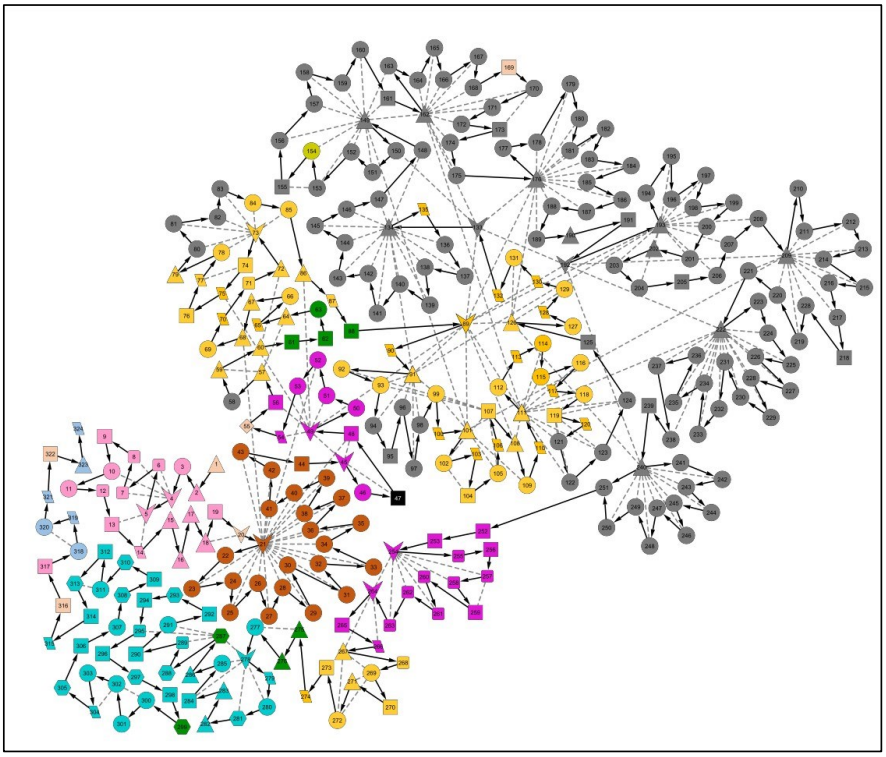

Figure 5 An example of a participant team's process network

Following the initial phase of analysis, my focus shifted to examining how the teams engaged with online sources to gather inspiration for their mood board creation. This led to a new round of video analysis, specifically homing in on the teams' interactions with their computers and the dynamic between their ideas and the online images they discovered. First, I pinpointed moments in the video recordings where team members were actively engaged with images (highlighted as yellow nodes in the process networks). This served as a starting point for a more detailed examination of their digital activities. By closely analyzing these segments, I identified the core practices employed by the teams for gathering materials. This involved scrutinizing the actions performed on the computer, the flow of images

coupled with team communications, and the strategies used for searching and selecting images. In addition, I identified the requirements the teams created for the image search; i.e. how the mood-board idea should be explained through images, the constraints placed on the image search, what keywords and search engines were used, the roles these played in the process, and what images where selected. Moreover, I identified the specific parameters and requirements established by the teams for their image search process. This encompassed how they intended to articulate their mood board ideas through images, the limitations or constraints placed on the search process, the keywords and search engines used, the roles these played in shaping their process, and ultimately, what images were selected and why.

4.2.3 Study III: analyzing the role of shared mood boards in student-level ideation and inspiration process

Here, I conducted an in-depth analysis of the interview transcriptions and visual materials using a data- and theory-driven approach to qualitative content analysis (Hsieh & Shannon, 2004). The analysis was composed of two phases that involved an iterative examination of the data and reflection with previous theories. Overall, the analysis unfolded by comparing and cross-examining the interview data and the students' idea books, materials, material experiments, sketches and notes to each other in order to find any resemblance and additional evidence of the role of the shared mood boards, and the interconnection between the students' ideas and the mood boards.

During the initial phase of the analysis, my focus was on the interview transcriptions and video-recordings, aiming to delve into how the students described the significance and role of the shared mood board in their apparel designs. Here, I identified the starting point of the ideation for each participant, following the closer examination of the students' descriptions of the shared mood boards in their personal processes: such as how they used the board, how they viewed the value of the board, or whether they mentioned it at all. This involved identifying the pivotal moment of ideation initiation for each participant, followed by a careful examination of the students' accounts of the shared mood boards in their personal creative processes. I looked closely at how they described the use of the board, or perceived its potential value, or whether they referenced it in their narratives at all. From these initial observations, I distilled emerging themes which then served as the foundation for developing theory-based categories. Drawing on established theories such as the mood board as a design catalyst or source of inspiration (e.g. Garner & McDonagh-Philp, 2001; Cassidy, 2011; McDonagh & Storer, 2004), I iteratively refined and expanded these categories through multiple cycles of analysis. This iterative process involved revisiting and comparing the

existing themes/categories, as well as the systematic grouping and organization of the content within these themes. The resulting broader categories that define the role of the shared mood board in the students' ideation processes encompass various dimensions, the mood board as: *inspiration, mental images, design anchor, enabled including a personal dimension, kept ideas in a specific context, tool for reflection and evaluation, starting point, design catalyst, design constraints and enabled ambiguity*.

In the second phase of the analysis, I aimed to determine how the adaptation of the shared mood board into ideas can be interpreted. Starting by comparing the material the students had produce and the mood boards to each other, I was first able to identify their connections. In the subsequent phase of the analysis, my goal was to interpret the ways in which the shared mood board was adapted into tangible design ideas by the students. I began this phase by carefully comparing the materials generated by the students with the shared mood boards, seeking to uncover their intricate connections and overlaps. From there I moved to work with earlier theories of inspiration in design (e.g. Petre et. al. 2006). By juxtaposing my initial interpretations of the interconnection of the students' ideas and the mood boards with their own articulated descriptions, I proceeded to formulate three primary categories that explain the process of adaptation: associative, simplified and abstractive adaptation. These categories served as lenses through which to understand and categorize the diverse ways in which the shared mood boards were transformed and integrated into the students' evolving design concepts.

Overall, this analytical approach allowed for a reflective investigation into the individual student-level inspiration, and the role of specific sources of inspiration, that are the shared mood boards in the students' ideation processes. By closely examining the interview transcripts and visual materials through the lens of existing theories, I uncovered meaningful insights into how the collaborative creation of mood boards influenced the students' apparel ideation.

4.3 Ethical considerations

This study adhered to the general guidelines outlined by the Finnish Advisory Board on Research Integrity (Varantola et al., 2012). All participants who volunteered for the study were requested to provide written informed consent prior to the commencement of data collection. Additionally, participants were informed of their rights to withdraw from the study at any point (Marshall & Rossman, 2016). To make the data collection sessions as convenient and accessible as possible, the researcher prioritized flexibility. This included offering various session dates to accommodate participants' schedules and to minimize disruptions to their lives. To maintain the anonymity of study subjects, each participant was assigned a pseudonym, and photographs were altered to ensure individuals

remained unidentifiable. However, it is important to note that video data could not be anonymized, therefore all the video and photographic material was retained in locked cabinets. The written material and observational notes were stored in secured cloud space, and all data were managed securely off-line. The tasks assigned to expert designers were carefully tailored to align with their professional work, ensuring relevance and engagement. For student participants, these tasks were integrated into their course assignments to avoid additional workload arising from their participation in the study. Throughout the study, the researcher encouraged open communication regarding all aspects related to data collection and participation. This approach aimed to cultivate a safe and transparent environment for all involved.

5 Findings

My dissertation consists of three studies. The first focused on inspiration and ideation in expert-level apparel design. Studies II and III investigated inspiration within the student context, delving into both collaborative and individual processes for developing clothing ideas. In this chapter, I outline the primary findings from these three studies in relation to the research questions. This will be followed by a synthesizing subchapter in which I summarize the main findings reflecting the main research question. If a more in-depth understanding is required, please refer to the studies as originally published.

5.1 The variation of the idea development process in apparel design: a multiple case study (Study I)

This research focused on the ideation processes of three experienced apparel designers as they developed kernel ideas for outerwear based on photographs they were provided with for voluntary use. I specifically concentrated on examining these designers' ideation practices, and more specifically the interconnection and relationship between their kernel design ideas, the sources of inspiration (i.e. the ten photographs or other sources that were provided), and sketching. The study relied on the thinking-aloud method, video recordings of the ideation experiments and post ideation interviews, and results base on the qualitative content analysis of the data. The theoretical underpinning of this study drew significantly from previous notions of design ideation (e.g., Goel, 1995; Johnson, 2006; Howard et al., 2008), theories of sources of inspiration (e.g., Darke, 1979; Eckert & Stacey, 2000; 2003; Mete, 2006; Petre et al., 2006), as well as categorizations of adapting and interpreting inspiration (e.g., Petre et al., 2006), complimented with conceptions of sketching (Goel, 1995; Seitamaa-Hakkarainen & Hakkarainen, 2000). In detail, this publication concentrated on finding answers to questions: *how do professional apparel designers develop their kernel idea by sketching*, and *how do visual sources stimulate expert designers' ideation?*

The findings revealed the iterative nature of idea development, the types of inspiration the designers had in their ideation, and the distinct approaches to source utilization, as well as the role of sketching. Overall, the results display a diversity in designers' approaches to utilizing the provided sources and their

ideation methods. The cyclical content analysis unveiled how these designers crafted their kernel ideas based on the sources provided, how inspiration was transformed into ideas, and how these ideas were in turn shaped through sketching. A pivotal observation was the designers' iterative movement between ideas. They crafted, refined, discarded, and combined elements until arriving at optimal solutions. By comparing the designers' sketches and their interaction with the provided sources during the experiment, I discerned variations in idea development and the role of inspirational sources in their processes. In interaction with the sources of inspiration, they created ideas, refined them, created a new idea, returned to previous ideas, analyzed them, combined elements between ideas, or discarded ideas, until arriving at a final solution.

Furthermore, by juxtaposing the evolving ideas (i.e., designers' sketches) with their actions (thought processes, verbal expressions, physical handling) regarding the sources used during the experiment, I deciphered nuances in idea development and the significance of inspirational sources in the designers' workflows. For instance, my analysis uncovered discrepancies in how the designers engaged with the visual sources throughout the ideation process. Notably, two designers said that they selected, set aside, and actively referred to two distinct sources as they progressed, despite the other one noting that they found the theme of the photographs to be somewhat uninspiring. The third did not select any of the source but kept them scattered around the working space. In contrast, the third designer, while not explicitly singling out any specific sources, seemed to have a predetermined design concept from the onset of the experiment sessions. This concept was subtly reinforced by the visual stimuli, which seemed to trigger mental images guiding the designer's path. Despite these variations, all three designers demonstrated a connection to the inspirational sources provided within the context of apparel design right from the inception of ideation. This early integration of external stimuli set the stage for a rich interplay between personal creativity and external inspiration throughout the design process.

The results underscored how designers draw inspiration from three distinct realms during their ideation process: 1) the actual sources of inspiration: these encompassed tangible elements such as the photographs and fabrics, serving as direct stimuli guiding the designers' creative paths; 2) abstract sources of inspiration: this category included intangible factors like mental images and memories; and 3) Professional domain-based sources (e.g. brand ideologies, earlier designs). I unraveled the interplay between them and the ideas evolving. This exploration led to a deeper understanding of how the visual sources catalyzed idea development, often through avenues of simplification, abstraction, or association. In my analysis, I employed the categorization framework by Petre et al. (2006) as an instrumental guide. This framework facilitated the identification of how each designer interpreted the sources, weaving them into their professional

knowledge and personal experiences to form a "primary generator" for their ideation. These sources sparked a range of ideas, from considerations of garment functionality to fabric requirements in diverse weather conditions. Additionally, they evoked association to personal memories of childhood and youth, alongside abstract concepts such as 'graphic straightness,' 'contrast,' and 'softness.' In a varied manner, two of the designers adapted elements through simplification and/or association. As an example, one of these two adapted a lavender color and a geometric angle from the photographs into ideas. Additionally, the visual sources stimulated mental images of fabrics. In a nuanced fashion, two of the designers adeptly adapted elements through simplification and association. Moreover, the visual sources stimulated vivid mental images of fabrics, prompting the designers to connect visual cues with ideas of soft, fluffy textures or rigid stiffness. All these were interpreted as the primary generators that helped the designers to set constraining directions for their creative work. All these inspirations served as primary generators, guiding and constraining the designers' creative trajectories. This dynamic interplay between external stimuli and personal interpretation formed the backbone of their ideation processes, resulting in apparel ideas.

Furthermore, the findings highlight sketching as a provider of a way for each designer to think, reflect, and communicate, as well as to develop, analyze, combine, and edit ideas. They used hand drawn sketches to represent their evolving ideas visually, incorporating elements from the provided sources. These sketches served as visual representations of the designers' evolving concepts, with each stroke and line incorporating elements from the sources. In this process, all sources underwent a transformative journey, reinterpreted and reshaped through the act of sketching. Sketching took on two primary forms in this context: horizontal transformation (here, each subsequent sketch represented a new idea, branching off from the previous one), or vertical refinement (conversely, vertical sketching involved developing a more detailed version of a preceding idea). As such, all the sources were re-interpreted and transformed through horizontal (i.e. with the following sketch represents a new idea) or vertical (i.e. with a more detailed version of the previous) sketching. However, the study revealed an intriguing insight: not all the sources of inspiration were distinctly traceable solely through the sketches themselves (e.g. colors, the stiffness of the fabric). Instead, a comprehensive understanding of the design process emerged from a fusion of the designers' verbal expressions, design activities, and the sketches.

In sum, the study highlights the diverse approaches to inspiration and ideation among expert apparel designers, displaying how they draw inspiration from provided sources to create unique and personalized designs for outerwear. The designers' final concepts reflect a blend of their personal style, memories, and the visual cues provided by the photographs. However, most importantly, the results

of this study provided a beneficial stepping-stone and reflective base from which I can continue my investigation into student-level processes.

5.2 Creating inspiration together: craft-education student teams' approaches in developing mood boards and gathering online inspirational material (Study II)

This study explored inspiration and ideation from a collaborative standpoint. In the context of student-level apparel design, I investigated how three teams, comprising a total of 12 undergraduate craft education students, were assigned the task of creating digital mood boards for their individual clothing concepts. This assignment was part of the 'Inventing and Craft-Design' study module at the University of Helsinki. With content analysis inspired by multimodal group interaction on the video-recorded team design sessions, this study was to answer questions: *How are mood board ideas generated and cultivated in student design teams, and how do the student teams gather inspiration material found online for their mood boards?* The results of this investigation were framed in reference to previous academic works, such as inspiration gathering and selection (e.g. Biskjaer et al. 2020; Gonçalves et al. 2014; 2016; Mougenot et al. 2008), team design (e.g. Cross & Cross, 1995; Hennessy & Murphy, 1999), mood boards in design and design education (e.g. Cassidy, 2011; Garner & McDonagh-Phillip, 2001), along with theories on key and anchor ideas (e.g., Laamanen & Seitamaa-Hakkarainen, 2014). The results in this study address notions related to team design, the creation of a shared mood board and its composition, ideation in general, and the collaborative search and gathering of inspirational sources, particularly online.

The primary focus of this study was to construct a systematic and comprehensive understanding of the teams' design processes. This involved creating process networks for each mood board creation, visually depicting all design activities, ideas, and their interrelations. A detailed exploration of the student teams' processes was crucial, as it allowed for the identification of key moments related to inspiration and the evolution of mood board ideas. Based on this, I identified that the process of creating a shared source of inspiration, in this case a digital mood board, is a complex process and involves *opening*, *broadening,* and *deepening*. These cycles encompass various team design activities such as presenting ideas, analyzing them, interpreting them, and organizing the overall process. While each team organized their collaborative work around a single computer, one team opted to use personal phones for their creative endeavors.

The findings highlighted the importance of developing a shared understanding of the task among team members before delving into the creative work. This shared

understanding, which was clarified through referencing course materials and prior lecture information, served as a foundation for defining a joint conception of a mood board. Each team concluded that a mood board, at its core, should be something inspiring. This served as a guiding anchor throughout their creative journey. Each team initially conceptualized ideas around the notion of a mood board being inspirational. These initial themes served as key ideas that the teams experimented with, to arrive at final solutions. This process was dynamic, involving a shift between the deepening and broadening of these key ideas. During the deepening cycle, teams focused on elaborating the selected key ideas, supplementing them with explanatory elements such as images and words. The broadening cycle, on the other hand, involved expanding on the ideas with additional, yet related, concepts. As a result, all teams created mood boards consisting of curated images sourced online, accompanied by textual materials, such as concepts, adjectives and nouns. For instance, 'The Sprout' mood board centered around a single image, with the team selecting concepts and terms reflecting the essence of the board. 'The Finnish Summer' board comprised eight images and textual content, while 'The Pearl of a Year' was constructed using 17 images and textual elements.

Furthermore, the process of developing a mood board involved searching for and gathering inspirational images. This process was characterized by its reciprocal nature, shaped by various design constraints and requirements (e.g., no clothing images). The image search and gathering happened through interactions with selected search engines, coupled with ongoing negotiations between team members regarding which images to search for and include in the board. The results emphasize that to use the search engine effectively, teams had to first define specific keywords based on the key ideas they had developed. While defining a keyword to find images online is a familiar task in everyday life, doing so in a collaborative setting may not be as straightforward or effortless. On the contrary, collaboration requires sensitive, reciprocal, and interactive negotiations between team members, their creative ideas, the task at hand, and any constraints they face.

The search and selection of images struck a balance between intuitive and systematic approaches, not solely dictated by the teams, or the individual members. Instead, the study revealed the active role of the search engine in shaping and influencing the teams' processes. By carefully defining keywords, teams collaborated with the search engine to find suitable images, often encountering unexpected yet inspiring results. Overall, the search and gathering process of inspirational material was characterized by interactive elements.

Creating a shared source of inspiration, the mood board, facilitated collaboration by providing a contextual reference point and tangible representations of ideas. However, it also demanded active interaction among team members and their tools and inspirational material. The results emphasized

the paramount importance of interaction for effective teamwork and the development of joint solutions, as each member's individual preferences and ideas were negotiated and merged in the collaborative process.

5.3 Individual outfit designs: expanding idea development using shared mood boards (Study III)

Interconnected to study II, this study focused on investigating the role of collectively created mood boards in student-level idea development and the connection between these boards and the students' apparel ideas by prompting craft education students to reflect on their creative processes and the outcomes of their work. It is important to note that the insights from this study are derived from data collected with eleven students also involved in Study II. Through an iterative qualitative content analysis of the students' creative materials (such as sketches and material experiments), their introspective idea journals, and narratives from reflective, material-stimulated interviews, the study addressed two primary questions: Firstly, *how do the students describe the role of specific sources of inspiration i.e. shared mood boards in clothing designs?* Secondly*, how can we interpret the adaptation of sources of inspiration (i.e. shared mood boards) into ideas?*

Existing research on mood boards in design and design education (for example, works by Cassidy, 2011; Garner & McDonagh-Phillip, 2001; Lucero, 2012) served as a foundation for distinguishing the functions of the shared mood board from the students' reflective narratives. Broadly, the shared mood boards were found to be active and versatile tools, playing several interconnected roles that expanded the creative space for students into more abstract and metaphorical realms, while also fostering emotional connections within the design process.

I was able to identify ten specific roles that shared mood board had in individual apparel ideation; *1. inspiration, 2. to set a starting poin, 3. to trigger mental images, 4. a design catalyst, 5. a tool for reflection and evaluation, 6. a design anchor, 7. design constraints, 8. kept ideas in a specific context, 9. enabled a personal dimension, and 10. enabled ambiguity*. First, the mood board served as a source of *inspiration* by providing external sources, but also inspiration in the form of discussions held during the collaborative creation of the board. Secondly, the mood board helped to *set a starting point* for the idea development. Initially, the mood board acted as a wellspring of *inspiration,* drawing from external sources as well as discussions during the collaborative board creation process. Secondly, it provided *a starting point* for idea development, with some students commencing their apparel design journey during the mood board creation itself.

For some students, the board and its construction triggered *mental images* that acted as primary generators for ideation. Moreover, for five students, key concepts,

design themes, or the quest for additional inspiration were borne from specific terms (e.g., 'ecological', 'sustainable') and metaphors (e.g., 'pearl of a year', 'the sprout') embedded within the mood boards. Thus, the mood board acted as *a catalyst* for the creative process, enabling students to form personalized design concepts based on the board and transition from conceptualization to concrete creation. Furthermore, the mood board served as a means for students *to reflect on and evaluate* their creative outputs, aiding them in maintaining a cohesive context for their ideas. Therefore, one of the roles of the shared mood board was to *anchor idea development* in a particular direction.

Additionally, the mood board deepened emotional connections within the idea development process, adding a personal dimension to the students' ideation. Despite some students perceiving the mood board as providing *design constraints*, it did not stifle their creative exploration of potential solutions or the emergence of individual design concepts. By remaining open to *ambiguity*, the shared mood board was interpreted by students in diverse ways, serving as a stimulus to expand their ideas while also encouraging them to challenge conventionalities and preconceived notions.

The results show that while most students found the use of the mood board to be beneficial and inspiring, not all shared this sentiment. Two students viewed it as being less meaningful, and one even perceived it as something that was obligatory. However, upon examining the mood boards alongside these students' descriptions of their ideation processes and produced sketches, it became apparent that despite their initial reservations, the mood boards ultimately inspired these students' ideas.

The results suggest that while the images on the mood boards were conceptual and drawn from contexts beyond direct design, it minimized the risk of replication. Moreover, even students who did not perceive direct benefit from the mood board themselves were influenced by the collaborative work or the board's contents. Thus, the shared mood board compelled students, including those with preconceived design ideas, to scrutinize their initial concepts collectively with peers, conduct comprehensive and concept-driven research for inspiration before proceeding with individual work, and provided opportunities for mutual inspiration among and between students.

Analyzing the boards and students' creative outcomes, drawing on the categorization by Petre et al. (2006), it was observed that students adapted inspiration through simplification, abstraction, or association. For instance, students might anchor their ideation to an element through simplification (such as a picture of bark), which then evoked associations related to personal values (for example, the necessity for ecological and sustainable designs). Conversely, students might adapt elements like colors and shapes for pattern ideas or incorporate them into the color scheme of their designs. For example, one student

abstracted the title of their mood board to be a 'pearl of a year' into an idea of a royal-rib pattern and pearls to be incorporated into the design of a knitted top.

In conclusion, the results indicate that the rich array of information—whether actual, conceptual, or metaphorical—embedded within the shared, collaboratively created mood boards, served as a significant stimulus for the eleven students involved in the study.

5.4 Summary of the findings

The following condenses the key findings to answer the main research question: how can the interplay between inspiration and ideation be understood in varied apparel design contexts?

This study addressed the significance of the sources of inspiration having multiple and ambiguous roles in expert designers and craft education students apparel ideation process. In each case, these sources were intentionally integrated into the process to cultivate core ideas, making use of both visual and textual cues through interpretation and incorporation. For experts, individual students, and student teams, the use of images and mood boards as sources served as a crucial catalyst for problem-solving. They not only anchored the process firmly within the context of fashion and apparel design from the outset, but also played a pivotal role in sparking clear visions of tangible design elements—such as the shape of a collar, the fabric, or a knitting pattern. Additionally, these sources prompted the exploration and creation of further inspiration, forming a conceptual framework for the subsequent stages of individual idea development.

For students, the content within the mood boards not only enticed them to delve deeper into the realm of inspiration but also encouraged them to gather a wide array of suitable sources, both external and internal. These included tangible items like yarns, trinkets, and fabric samples, as well as various forms of imagery, mental snapshots of personal experiences, and even envisioned scenarios of the future. In the case of the experts, the visual stimuli from these sources sparked a quest for inspiration drawn from their rich professional experiences, thereby linking the ideation process directly to their professional milieu. Ultimately, the visual and other forms of inspiration were amalgamated into a pool of information—a creative reservoir from which individuals could draw ideas freely. In this way, the sources of inspiration provided invaluable boundaries that grounded the process, while also permitting creative and instinctual approaches to the design task. Furthermore, for both experts and students alike, these sources served as tools for self-reflection, challenging and evaluating one's own ideas, and above all, maintaining a connection to the specific aesthetic and sociocultural context of the task at hand. The significance of these sources lies in their dual capacity both to confine and broaden the development of ideas. They challenge

preconceived notions and expectations while simultaneously guiding idea generation, facilitating the solution of a complex task within a relatively constrained timeframe.

This study also revealed that right from the initial stages of idea development, expert designers and students integrated and transformed visual sources within their apparel design processes. They achieved this by interpreting and incorporating elements from these sources into their concepts for garments or clothing. Interestingly, there were nuanced variations in how the specific visual sources spurred and shaped individual and collaborative ideation, such as the set of ten photographs, online images, and mood boards. Some participants approached the visual sources at a more abstract and conceptual level, while others directly adapted elements like colors, shapes, and patterns from the sources into their designs. Even though the visual sources were the same for the three experts (the set of ten photographs), within the team members of a single mood board group (who viewed the same online images), and among the individual students (four students sharing one of the three shared mood boards), each interpretation and selection of these sources was subjective, yet deeply rooted in the design context. Overall, in all instances, the interplay between the visual sources and the ideation process proved to be a complex, reciprocal dance—a delicate balancing act involving the design task, the constraints, the interpretation and adaptation of sources, the search for personal inspiration sparked by the visual cues, and the evolution of garment ideas. This dynamic interplay found support in activities such as sketching and material experiments, the arrangement of images on digital platforms, and the ongoing negotiation among team members within each mood board group.

My study demonstrated that inspiration can indeed be a collaborative process, sharing similar characteristics to when approached individually. Each of the participant teams engaged in searching, interpreting, and selecting sources in a manner akin to the individual process. Furthermore, the interplay between team ideation and the visual sources mirrored that of the individual process—a dynamic interaction involving the sources themselves, the individuals, and the generation of ideas or additional inspiration. However, what emerged from my study is that compared to an individual process, collaborative inspiration requires an open dialogue among team members and a reciprocal interaction between these individuals, the sources of inspiration, keywords designed, and the tools at their disposal. Additionally, in collaborative settings, a new inspiring element comes into play: the conversations between team members. This underscores the notion that the collaborative process of inspiration is not merely an aggregation of individual efforts, but a dynamic exchange through which ideas are shaped, expanded, and refined through shared exploration and discussion. In essence, the act of creating together not only draws from individual insights, but also creates a

space for collective inspiration to flourish, enhancing the richness and depth of the creative endeavor.

Each team aimed to craft a mood board that would act as a wellspring for their individual apparel design processes. The success in discovering fitting sources of inspiration stemmed from the team's capacity to negotiate suitable keywords and cultivate an environment of understanding and openness. Here, individuals could freely share their perspectives, drawing both personal and collective inspiration from the online images. This success also relied on their ability to assess the relevance of these sources collaboratively in light of the task at hand and the design constraints. The visual sources discovered online acted as catalysts for the teams, leading them to create an assortment of textual and conceptual materials. Through several iterative cycles, these materials coalesced into tangible boards teeming with inspirational content. Moreover, as a procedural step, the task of creating a mood board served as a solid foundation for collaborative inspiration. While mood boards inherently embrace ambiguity, the teams were able to approach the task from diverse angles. Yet, despite the open-ended nature of these boards, each team ultimately converged on a similar interpretation, viewing the mood board as a wellspring of inspiration. This collective understanding underscores the potency of the mood board not just as a design artifact, but as a dynamic force driving creative ideation and collaborative inspiration within the team.

6 Discussion

This chapter focuses on the key findings. I begin with a general discussion, followed by an exploration of the study's practical contributions. I then reflect on the research methods and limitations, concluding with suggestions for future studies.

6.1 General discussion

My study indicates that both experienced and novice designers benefit from exposure to conceptual sources, particularly in enhancing ideation at an emotional level. Across all three studies that form part of this dissertation, individuals and teams found inspiration in conceptual visual images, sparking a search for additional inspiration, and a strong motivation to tackle tasks (Trash & Elliot, 2003; 2004) and generate ideas. In line with previous studies, both experts and students drew deliberate inspiration from conceptual images and textual sources within their apparel design processes, including team collaborations. The results of my study demonstrate variations and similarities in how expert designers and craft education students draw inspiration and approach specific ideation tasks using these sources. Particularly in individual ideation processes, the experts and the students either integrated tangible design elements from these sources using various adaptation strategies (Eckert & Stacey, 2003; Petre et al. 2006), or created metaphorical concepts reflecting their personal experiences, values, and aesthetic preferences. Despite these similarities and subtle differences between the experts and students, direct comparison is not possible, due to the different research settings. However, to paint a holistic understanding of the qualitative characteristics of the inspirational process in apparel design, it is important to acknowledge these variations and discuss these further.

The variations in how inspiration was adapted into apparel ideas mainly reflected the tangible elements transformed from the conceptual sources. For experts, the adapted design elements manifested metaphorically (such as contrasts or childhood memories) or in precise and sharp ways relevant to their profession (like fabric characteristics, textures, fibers, cuts, and shapes). Similarly, craft education students' adaptations often took on metaphorical and conceptual forms by anchoring ideation in stories rich with experiences, memories, and future scenarios. The tangible design elements that the students adapted and transferred

from the source were directly manifested as expressions of form, patterns, colors, and recycled materials. Scholars have discussed the interplay between a designer's knowledge, experiences, and successful adaptation of inspiration (e.g. Dazkir et al., 2013; Mete, 2006). The nuances observed between the tangible elements adapted by the experts and students may suggest the depth of professional knowledge, and embodied experiences (e.g. Cross, 2004; 2018, Groth, 2016) possessed by experts but not yet attained by students. As in the literature, these nuances also imply that sources of inspiration are interpreted and handled from the premise of the designer's sociocultural background (e.g. Strickfaden et al., 2015). On the other hand, the nuances between students and experts may also arise from variations in their processes of searching for and selecting inspiration, influenced by their different working environments and/or the nature of the inspirational sources provided during data collection (printed photographs or online images). While the expert designers were given ten printed photographs and the opportunity to work in their own studios, surrounded by potential stimuli, the students were encouraged to explore the vast array of visual information available in digital environments but were provided with only an office room to work in. However, it is important to note that my results only suggest how the essence of inspirational material influences the apparel design process (see Sintonen, 2020). Additionally, it is worth mentioning that the expert designers may have searched for additional inspiration at a later stage of their design process, which falls outside the scope of this study.

Nevertheless, my study showed that all individuals demonstrated an ability to select adequate sources and translate them into ideas within the context of apparel design. It is important to note that the students in this study are not being trained as professional apparel designers, and yet, they were clear in their ability to connect conceptual, visually distant images and metaphorical concepts (such as mood boards) to apparel design, suggesting a growing experience in utilizing inspiration for design purposes). Through my observations, these connections often emphasized features and elements that echoed fabric and textile materials, even in the absence of tangible fabrics. This observation underscores the significance of textiles right from the outset of the apparel design process (Townsend et al., 2017), while also pointing towards the role of imagination. As discussed in the literature, to imagine and establish such intricate connections is a testament to the designers' and students' powerful cognitive capabilities (Tedjosaputro et al., 2018; Vygotsky 1930/2004). Folkmann (2013) explains that imagination in creative work is not merely confined to the designer's mind, but rather manifests throughout the design process, becoming an inherent aspect of the final design object. He suggests that designers often begin with a vague image of the design, refining and molding it through an interactive dialogue with considerations of potential forms and materials. Reflecting this, my study indicates that sources of inspiration serve as a

valuable facilitator, enabling the incorporation of crucial yet intangible material aspects into the conceptual phase of the design process, as well as to embed an imagined metaphorical and emotional story into the designs. This highlights not just the designer's and student's capacity to imagine intricate, detailed design elements and vivid scenarios depicting the usage of a particular garment or outfit during significant moments, but it also accentuates the interconnectivity between conceptual ideation and the tangible material world.

As discussed in the theoretical chapter, in this study, design is viewed as a process through which designers navigate between possibilities and constraints—both of which play unique and vital roles. Within my research, sources of inspiration were found to serve as means of constraining the process through design elements and concepts that guided the decision-making of individuals and teams (Biskjaer et al., 2014; Laamanen & Seitamaa-Hakkarainen, 2014). On the other hand, when exploring the interplay between inspiration and idea development, my study implies the role of ideation tasks in navigating this relationship. For instance, the evolution of ideas and the way inspiration was adapted in the apparel ideation processes of both the experts and the students could be attributed to the differing nature of the ideation tasks given to these groups. While the degree of ambiguity in design problems may vary, design tasks consistently involve a segment in which the designer can opt to align with their personal preferences, style, and design proficiency (Dorst, 2006). Consequently, and as the research findings indicate, the ambiguity and extent of freedom within a task, and the constraint defined by the assignment in this study varied between experts and students. Expert designers were tasked with more precise instructions, including defining the gender of the wearer and specifying the type of garment to be created (e.g., a spring jacket). Meanwhile, the apparel design task for students simply required creation of a knitted top and stitched-up bottom part, offering a more ambiguous base for interpretation and creative expression.

Additionally, previous research has presented conflicting perspectives on the modality and distance of sources in relation to generating novel ideas, avoiding a fixed mindset and premature commitment to specific sources (e.g. Crilly & Firth, 2019; Gonçalves et al., 2014; 2016). Based on my findings, conceptually distant sources appeared to provide both suitable constraints and encouragement to challenge potentially fixated ideas, fostering divergent thinking. The results indicated that in the processes of both experts and students, the distance of the images compelled individuals to explore beyond obvious solutions, questioning personal knowledge, experiences, and preconceived notions. This approach allowed for the freedom to make creative discoveries from inspirational sources, and harness the transformative power of imagination (Vygotsky, 1930/2004). For example, the creation of mood boards and the metaphorical shared mood boards were filled with distantly related information, avoiding straightforward and direct

answers. Moreover, the conceptual nature of the inspirational sources triggered imagined scenarios that were laden with multisensory information that was beneficial for developing future oriented apparel design concepts (cf. Nuutinen, Räisänen & Fernström, 2017). However, this demanded that students approach the process with reflection on the task and the design context, while also engaging creatively and intuitively.

Overall, the beneficial effect of incorporating conceptually distant sources lies in their ambiguous characteristics, which allow for flexibility in interpretation and the stimulation of the apparel design process, regardless of whether the source is personally inspiring to the receiver. For example, two expert designers explicitly mentioned that they typically do not rely on conceptual imagery for their creative work. However, traces of connection to these sources were discernible in both their verbal protocols and resulting ideas. Similar patterns of inspiration were also evident in the processes of a few individual students, as well as in the collaborative creation of team mood boards. The literature has indicated that creativity cannot be solely attributed to conscious processes, but involves automatic unconscious systems as well (e.g., Evans et al., 2009; Ritter, van Baaren & Dijksterhuis, 2012). Building on this understanding, my observations suggest the matter of conscious and unconscious stimulating effects as a single central element considering sources of inspiration.

However, the study also raises questions about how these inspirational sources were perceived by participants, urging future research to delve deeper into this aspect. As Gonçalves et al. (2016, p. 31) point out, 'information may only become inspirational after it is perceived, understood by a receiver, and integrated into the designer's interpretation of the problem and solution space'. Although the perception and interpretation of inspirational material (in this case, images and text) are considered subjective, they may also be influenced by external factors (e.g. de Wet, 2017). In my study, when the craft education students collaborated on creating mood boards in design teams, they had the opportunity to discuss the images and their meanings. During the mood board sessions, the team members shared their individual perceptions and interpretations with other team members, and thus, it is highly likely that some of these collective interpretations of the sources were intertwined with the students' subjective interpretations during the individual ideation process. As such, the individual inspiration intertwined with the collective one.

Furthermore, despite the familiar themes presented in the conceptual images and textual content of the shared mood boards (such as nature, landscapes, adjectives), individuals were able to craft unique interpretations of these materials. Notably, without specific instructions on how to use them, both experts and students managed to establish meaningful connections between the abstract images or texts, their existing knowledge, and the sociocultural context in which

they were operating. This process led to the generation of interpretations and the transformation of these interpretations into distinctive and tangible ideas. This suggests that amidst the tangible images, other sources of inspiration, and the development of ideas, something more than mere transferring clearly distinguishable tangible elements from the sources into the designs was at play. It is likely that uncovering options and hints from ambiguous and abstract sources requires the application of higher-level thinking skills, such as visual literacy skills (see de Wet, 2020). Additionally, the act of finding similarities and transferring knowledge from distantly related domains (e.g., nature, architecture) within the context of current problem-solving (e.g., fashion, garments, textiles) mirrors the process of analogical reasoning, and metaphorical mapping (e.g., Abdullah et al., 2018; Casakin, 2005; 2011; Goucher-Lambert, Moss & Cagan, 2018). Consequently, my study indicates that images possess perceptual features from which both experts and students derived ideas and design metaphors. Therefore, I argue that these images or words are not merely representations of something existing, but rather complex entities brimming with interpretive opportunities.

Most prominently, the emotional aspect of perceiving inspiration emerged in my study, with both expert designers and students, triggered by the conceptual sources, deriving inspiration from childhood memories, future scenarios, and other emotive sources. This emotional resonance seemed to imbue the apparel ideas with deeper meaning, transforming them from mere designs into personally significant creations. The literature has recognized the pivotal role of emotions in design (e.g., Gero & Milovanovic, 2020; Neidderer & Townsend, 2014; Niinimäki & Koskinen, 2011; Rangarajan et al., 2021; Tang et al. 2021). As highlighted by Casais (2021), emotions as sources of inspiration are integral to the design process, fostering immersive experiences and strengthening the relationship between humans and products. She argues that designing with emotions leads to more relevant designs and cultivates enriched human-product/human-computer relationships, ultimately resulting in enduring designs that deeply resonate with users, encouraging prolonged interaction. In my study, the conceptual images and the collaborative mood boards grounded the ideation process at an emotional level. Consequently, laden with elements stemming from emotional sources, the apparel ideas that emerged carried more than just the principles of apparel design—they evolved into something meaningful to the creators. Therefore, I argue that the importance of inspirational process is its ability to link an emotional narrative from the beginning of the design process, and thus possibly enhance personal attachment to the design outcomes, as well as to make the design process more meaningful for the designer.

Collaborative methods are practiced and acknowledged in the realm of design and design education (e.g. Cross & Cross, 1995; Hennessy & Murphy, 1999; Lahti et al., 2016). My study also set out to explore inspiration as a collaborative process,

a perspective that to my best of knowledge, has not been systematically analyzed in prior research in the realm of apparel design nor craft education. Thus, this study offers new empirical insights into comprehending inspiration from a collaborative standpoint. Study III revealed that collaborative inspiration shares similar characteristics with individual inspiration. The significance of searching for inspiration in the evolution of ideas was evident, with the definition of keywords serving as a guiding and constraining factor in crystallizing abstract ideas into tangible forms (cf. Gonçalves et al., 2016). In today's world, using online search engines and defining keywords is a common and widespread practice. However, despite its familiarity, my study reveals the nuanced nature of this activity and emphasizes the need for careful consideration when defining keywords. For the teams in my study, defining a keyword proved to be a crucial—though not always straightforward—process that facilitated both abstraction and specificity in their creative work.

Furthermore, the study demonstrated that inspiration could emerge from the interaction between the human actor and the online search engine. In an inspirational and idea development process, the reciprocal interaction stimulates the evolution of ideas as images calculated by algorithms provide a tangible reflection to the individual's imaginations, visions, and ideas, which in turn provide new inspiration to stimulate the process. Based on the results, the technology used both supported and challenged the creative processes of the teams. The findings of my study indicate that online environments offer abundant options with their stimulus-rich settings. However, taking advantage of these options demand organizational skills, as well as a reflective, analytical, and critical approach from both individuals and teams in finding and selecting suitable inspiration (de Wet, 2017; Gonçalves et al., 2014; 2016). As the results show, images provided by search engines could vary depending on the definition of a keyword and the language used; the teams found more images when using a non-native language (English), as clearly demonstrated in their processes. This raises questions about language barriers and unequal opportunities in benefiting from online search engines. However, despite these challenges, the teams managed to create rich and powerful sources of inspiration in which metaphorical and conceptual ideas were digitally represented.

Regarding the collaborative inspiration process, distinct from individual inspiration, the search, selection, and interpretation of sources are done collaboratively, necessitating skills and activities familiar to team design (cf. Hennessy & Murphy; Lahti et al., 2016). Collaborative inspiration was found to be an interactive and conversational process among team members, the tools they used, and the conceptual and abstract sources. The interactive process was informed and stimulated by the visual images sought online and the task itself. Most importantly, this process involved merging individual knowledge and

imaginations into a collective one, which required communication skills, and a basic understanding of how online search engines operate. In the collaborative process, the ability to work with diverse typologies and modalities supported the creative work of the teams but linguistic and visual literacy skills in selecting suitable inspiration were required for both. For, in the process of seeking inspiration, individuals had to articulate fuzzy ideas and collaboratively determine what images could best represent those ideas, along with defining a single keyword based on both the fuzzy idea and the desired visual search result. Thus, to inspire each other and complete the mood board task, teams needed to be sensitive and receptive to each other's experiences, perspectives, and opinions to arrive at a collective solution. Intertwined with the process of creating a mood board, the teams engaged in a process of 'joint inquiry and imagination,' whereby each member moved from external realities to internal worlds to explore and generate knowledge collectively, and from their inner selves to external realities to create something new collaboratively (Steen, 2013). In this way, individual inspiration and imagination evolved into a collective endeavor, enriching the ideation process through the joint exploration of individual ideas and the collaborative interpretation of inspirational sources.

As discussed, both students and expert designers selected visual and textual sources with the intention of developing apparel ideas and mood boards. They interpreted these sources to establish connections with their prior knowledge and experiences, crafting narratives and emotional stories within the design process. Moreover, they extracted elements from these sources to guide their direction in the design process. When confronted with an ambiguous or open-ended design task, all participants, including the design teams, turned to sources of inspiration—particularly visual ones—to seek clues (cf. Goldschmidt & Smolkov, 2006; Lee & Jirousek, 2015) for the development of garment ideas. These clues were then translated into detailed design elements and ideas, or broader, inspiring, and metaphorical concepts, providing further cues for idea development.

However, to transform these cues from sources into tangible ideas, and to bring the imagined into the realm of the feasible, required active engagement with tools such as pen and paper, as well as computer-based design platforms. In individual apparel design processes, sketching played a pivotal role in bridging the gap between inspiration and ideation, allowing designers to visualize their ideas and assess their aesthetic and practical nature. In essence, sketching served as a dynamic conduit through which ideas flowed, were transformed, and solidified. It was not merely a means of visual representation but was also a fundamental process that shaped the evolution of each designer's creative journey. Through the combination of visual, verbal, and physical elements, the designers harnessed the power of sketching to bring their inspirations to life in vivid and innovative ways. In collaborative settings the juxtaposition of images on computer screens

facilitated group discussions and the crystallization of finalized ideas. I argue that utilizing external representations such as sketching and written notes offers a valuable tool for self-reflection and examination of one's thoughts and creative outputs. These material forms provide affordances that internal representations lack (see Kirsch, 2017), underscoring the benefits of material engagement in the apparel design process.

6.2 Shared mood board as a tool for promoting metaphorical and collaborative inspiration in apparel design and craft education

This study centered on illuminating the inspirational process during the early stages of apparel design. This initial phase, referred to here as ideation, stands out as the most creative phase of designing, intimately intertwined with imagination. This stage demands breaking away from conventional modes of working, urging designers to see beyond the obvious and unearth novel approaches to their craft. As evidenced by my study, the inspirational process serves as a rich avenue for challenging conventional thinking and nurturing the development of ideas. Collectively, the outcomes of the three studies underscore the symbiotic interplay between inspiration and the ideation process within apparel design. This interplay harnesses the relational synergy of specific sources of inspiration, the designer's experiences, knowledge base, socio-cultural context, and the material world, creating a potent system with which to enrich and intensify the design journey.

For this reason, creative design problems are often vague and open to myriad interpretations (e.g. Lawson, 2006), so even seasoned designers might struggle to find a clear path at the onset of a project. My research demonstrates that inspirational sources can offer valuable directional cues for problem solving in apparel design. These cues, drawn from distantly related conceptual sources, notably sparked the creative process and prompted the search for additional inspiration. These unconventional avenues hold the promise of unveiling fresh approaches to the ideation task, offering the exploration of a wealth of options. The sources of inspiration examined here also served as a wellspring for adapting tangible elements into garment ideas. Moreover, the potency of these sources lies in their inherent ambiguity, a quality that elevates the design process to a metaphorical and emotional level, as previously argued. Thus, my study advocates for the creative design process to be commenced with such conceptual sources that invite ambiguous interpretations and foster unexpected associations. Additionally, my study implies that being sensitive about the sources used in the early stages of a creative process can lead to the discovery of valuable associations across a range of categories. In relation to what has been stated previously, however, a question emerges; how can designers and students, perhaps more accustomed to relying on

closely related sources such as past designs or trend images, be encouraged to explore non-traditional sources?

My research revealed that when the ideation task incorporates directional constraints, conceptual sources can be seamlessly integrated into the process. Consequently, professional designers should regularly reassess their typical range of sources and be open to exploring those they might not traditionally use. For this, the collaborative creation of a shared mood board provides an acknowledgeable tool, as evidenced by my results. The unconventional conceptual sources, despite the inherent constraints imposed by the professional context, can subconsciously introduce new, emotionally resonant paths into the design process. On the other hand, students in creative fields stand to gain from carefully structured course programs and problem-solving exercises that compel them to initiate ideation with conceptual sources, fostering the emergence of emotional elements. In this manner, both students and professionals are granted the opportunity to craft more immersive and meaningful design experiences and results. These in turn increase the chance of the development of deeper attachment to the apparel designs (see Neidderer & Townsend, 2014; Niinimäki & Koskinen, 2011; Townsend & Sadkowska, 2018), and potentially prolonging the use of a single garment. Furthermore, by evoking emotional responses through inspiration, the design process gains the capacity to connect with the designer's moral compass, and in turn, raise awareness about the ethical and sustainable implications related to the designs (cf. Eckert, 2015; Ræbild & Bang, 2017)—aspects that hold increasing relevance in our modern society.

As detailed in the theoretical chapter of this dissertation, the quest for inspiration holds particular significance, especially in the early stages of the design process. My research reveals that the search for inspiration can indeed be a collaborative endeavor, resulting in the development metaphorical source of inspiration not solely consisted of tangible visual and textual sources, but also with the hidden insights emerging through the collaborative process itself. The collaboratively constructed mood board has been highlighted as a valuable and information-laden source of inspiration for individual apparel design (cf. Cassidy, 2011; Garner & McDonagh-Philip, 2001). As such, the mood board as a collaborative process did not act as a source to inspire individual ideas, but to inspire the development of thought-out design concepts, even if the students had preconceived initial design decisions for the garments (cf. Bang, Kappel & Høgh-Mikkelsen, 2020). Importantly, my study suggests that a mood board can serve as a collaborative tool for actively seeking and selecting suitable inspiration, while facilitating individuals to collectively formulate a shared understanding of the design challenge and, most significantly, to draw inspiration from one another. In apparel design, to challenge the prevailing norms of the fashion industry, a collective search for inspiration through the collaborative creation of mood boards

could serve as a platform for holistic, emotionally laden co-design practices even at the conceptual stage of the apparel design process (cf. Bang, 2022; Townsend & Sadowska, 2020; Townsend, Sadkowska & Sissot, 2017). In this way, apparel designers, textile designers and customers can share their experiences, individual inspiration, and create emotionally laden creative processes together. At its best, this would result in the evolution of cherished outfits that hold more value.

In terms of educational implications, my study shows that the collaborative creation of mood boards, coupled with appropriate task constraints, proves to be an effective design tool. This approach not only facilitates the introduction and guidance of conceptual inspiration search and selection, but also cultivates more intricate methods for developing individual comprehension of the design project through research (cf. Shreeve, Bailey & Drew, 2004). My research indicates that inspirational sources, particularly through the collaborative creation of shared mood boards, serve as a stepping-stone in the individual design process. Developing a shared mood board together can be easily adapted into creative processes across different subjects to increase emotional engagement and to mediate individual preferences and values, ultimately directing students towards deeper learning and reflection (Sheridan, Zhang & Konopasky, 2022; Seitamaa-Hakkarainen, 2022). Moreover, this approach enables students to overcome potential knowledge limitations through collaboration and fosters creative thinking by expanding into the realm of metaphorical and emotional concepts. Furthermore, my study indicates that as a collaborative method, the use of mood boards opens new pathways within traditionally individually oriented apparel design practices. It fosters a shared focus and intense sharing, thereby facilitating mutual inspiration in the creative process. I argue that the shared mood board process makes it feasible for students to reap benefits from collaborative teaching arrangements.

6.3 Methodological reflections

This study examined the individual and collaborative inspiration within the realm of apparel design, spanning both expert and student levels, with a specific focus on the ideation phase. The intricate nature of design processes poses a significant challenge for researchers, given their multifaceted and cyclical nature. Additionally, designing involves covert and tacit processes, including intuition, habitual practices, rules, and values, which are often not directly observable. Communication in design transcends mere verbal exchanges; it is deeply intertwined with the act of creation itself. Moreover, the act of designing is intricately linked to contextual factors such as constraints, community dynamics, and the physical resources that are available. Given the aim of comprehensively

understanding these complex processes from holistic perspectives, meticulous planning, reflection, and sensitivity were paramount throughout the study.

Given these considerations, in this study I employed a qualitative case study method, chosen for its flexibility in using a range of data sources and methods, facilitating detailed descriptions for a thorough exploration of the complex phenomena (Creswell, 2014; Yin, 2009; 2014). To ensure a holistic approach, multiple empirical cases involving both experts and students who were working individually and collaboratively, were examined. These cases employed diverse data collection methods, including video recordings, thinking aloud, observations, interviews, and visual examples. The strength of this study lies in its reliance on multiple cases, datasets, and theories, which enhance the validity and credibility of the findings while mitigating the risks of errors and biases in data collection. This triangulation of datasets, methods, and theories within a single research project is helpful for generating a broader comprehension of the phenomenon being examined (e.g., Haydn, 2019; della Porta & Keating, 2008). However, it is essential to acknowledge the limitations of this study, despite its strengths.

The limitations of this study stem from the inherent nature of qualitative research and the ongoing discourse surrounding research objectivity. Given the qualitative case-study approach employed, the results lack generalizability. However, it is crucial to note that generalization was not the goal of this study; rather, the goal was to deepen our understanding of the qualitative characteristics of inspiration and idea development in apparel design, achievable through the multiple case study approach. Critiques of research often revolve around the researcher's objectivity in analyzing and interpreting collected data, as well as the validity of the findings. Indeed, the results of this dissertation research rely solely on the interpretations of the researcher, who also possesses the authority to select which evidence to showcase and how to present it. Consequently, achieving a fully objective perspective of reality remains elusive (e.g., Miller et al., 2012; Ormstrom et al., 2013).

However, efforts were made to enhance the external validity of the study. The findings were reported in a manner conducive to their transferability to similar contexts, as advocated by Lincoln and Guba (1986), necessitating dense and descriptive data. Using varied data collection methods contributed to the richness of the data, enabling the use of thick descriptions and visual representations in reporting the findings. Nevertheless, research on complex, real-life problems like design would benefit from even more detailed descriptions, such as short video-clips accompanied by the researcher's interpretations.

As a researcher, it is essential to critically evaluate the data collection process. Researchers must always consider the potential impact that data collection methods can have on the phenomenon being studied, as this can affect both the research dynamics and the reliability of the data. For example, since I was present

during each data collection session, it's important to recognize the possible influence this may have had on the creative work of the designers and craft-education students, as well as on the group interactions among the student teams. Additionally, In Study II, the data collection sessions were conducted in private settings to facilitate collaboration within the student teams. However, this arrangement unintentionally isolated the teams from their peers and teacher, limiting the types of interactions that would typically occur in a classroom environment.

Moreover, because this study relied on video recordings, the data was influenced by the positioning of the cameras and the framing of the shots. Video recording, by nature, captures only a selected portion of a complex situation, potentially leaving out important or interesting details. Despite this, video recordings were invaluable for systematically analyzing the collaborative mood board creation and complemented other data collection methods, enhancing the overall understanding of the richness and complexity of the processes being studied.

Additionally, interviews served as a crucial data collection method in Studies I and III. In Study I, the combination of video-recorded thinking aloud sessions and post-ideation interviews proved to be complementary methods, mutually reinforcing each other's insights. These interviews were used to validate and support the researcher's interpretations of the video-recorded ideation sessions. Conversely, in Study III, the primary data for exploring the role and significance of visual sources in idea development within student apparel design came from materially stimulated post-ideation interviews. However, interviews alone did not offer temporal information on the students' ideation and inspiration processes; rather, they provided retrospective accounts of their past activities (cf. Reis & Gable, 2000). Recognizing this limitation, the data in Study III were supplemented with visual sources such as sketches, material samples, and idea books. This enabled an examination of the relationship between inspirational sources (e.g., shared mood boards) and the students' descriptions of the ideation process and finalized ideas. Through this approach, the limitations of interviews were compensated for by leveraging other data sources, enriching the overall analysis.

Moreover, despite the acknowledged limitations, interviews can be viewed as valuable tools that encourage study participants, including experienced designers and students, to engage in reflective exploration of their creative processes and ideas. This reflective research aspect aligns with Schön's (1983, 61) theory of reflective thinking in design, especially reflection-on-action. Schön (1983) describes reflection-on-action as a method for individuals to analyze events or projects retrospectively, enabling a deeper understanding from a distanced perspective. In this context, materially stimulated interviews are particularly pertinent, as they integrate reflection into the methodological framework, allowing

participants to present and reflect on meaningful aspects of their work; materiality serves as a means for participants to articulate complex or ineffable aspects of their experiences (cf. Guillemin & Drew, 2010), a concept often discussed in relation to visual research methods. This methodological choice not only fosters reflection, but also enables participants to express elements that may be difficult to verbalize, enriching the depth and nuance of the data collected.

In summary, despite the acknowledged limitations inherent in qualitative case study and individual data collection methods, the multiple case study approach, supplemented by varied and complementary methods, proved effective in capturing the complexity of deep and intricate processes. However, it is worth noting that alternative research methods, such as practice-led and (auto) ethnographic approaches, could further enhance the chosen methods by incorporating long-term self-reflective perspectives on the intricate aspects of inspiration and ideation within the context of apparel design. These approaches could offer additional insights into the evolving nature of creative processes and contribute to a more comprehensive understanding of the phenomenon under investigation.

6.4 Suggestions for future studies, and concluding remarks

This dissertation underscores the considerable potential of deriving apparel ideas from the conceptual wellsprings of inspiration, especially when these sources emerge from collaborative mood board creation. Through my observations, it became apparent that both expert designers and craft-education students engage in a nuanced, iterative, and interactive process of ideation, wherein ideas undergo a dynamic evolution catalyzed by external and internal design constraints. This evolutionary journey is facilitated by material entities, such as sketching and online tools. My research illustrated how seemingly simple images or textual content, when coupled with carefully curated ideation tasks, can spark individuals' creativity, leading them into emotionally charged processes in which socio-cultural contexts merge with imagined scenarios in the pursuit of developing apparel ideas. Moreover, collaborative inspirational processes challenge individual perspectives, fostering an environment ripe for the emergence of unique ideas. However, while my study sheds light on the interplay between inspiration and apparel ideation, it only scratches the surface of this complex topic, being limited to three case studies and only to the ideation stage of apparel design. Therefore, further exploration of the relationship among inspiration, imagination, and the apparel design process is necessary for a deeper understanding of these dynamic aspects of creativity. This emphasizes the importance of understanding inspiration across all creative domains.

Additionally, despite emotional elements emerged as a kernel aspect, my study did not directly zoom into the specific emotions inherent in or evoked by the inspirational sources or the designs, nor did it explore how these emotions might influence individuals' perceptions of the sources of inspiration. This underscores the need for future research within the realm of apparel design.

Considering inspiration to be a collaborative process, in this study, student teams endeavored to create mood boards as foundations for their design processes, fostering an environment of understanding and openness to cultivate relevant sources, and converge on a collective understanding of inspiration. However, the analysis was limited to three student teams' creative work without considering the social or cultural backgrounds of the participants. Therefore, future studies should scrutinize the effect of social aspects on collaborative inspiration process, such as power relations, educational and cultural background. Additionally, to comprehend fully the potential of collaborative mood boards as inspirational processes, future investigations should involve participants from diverse fields and professional backgrounds.

It has been argued that the essence of a material can influence the creation process (e.g. Sintonen, 2020). In this study, inspiration was drawn solely from conceptual images and text, neglecting other existing inspirational sources. Therefore, future investigations stand to benefit from exploring how the essence of varied inspirational material shapes the interplay between the source and the development of ideas in apparel design. Furthermore, according to Gonçalves et al. (2016), designers' awareness of their own inspiration process is key to a more effective search for inspiration. While this dissertation provided experienced designers and students with the opportunity to reflect on their processes and designs through materially stimulated interviews, it did not elucidate the participants' awareness of these processes. Hence, this aspect emerges as a compelling topic for future studies.

My study demonstrated how both experienced designers and craft education students leverage tactile experiences to select and transform sources of inspiration into garment and fabric ideas, considering their interaction with everyday reality. This research illuminated how a conceptual inspiration process intertwines with emotional aspects, rendering the design process more meaningful for individuals, and thus potentially enhancing their commitment and investment. As discussed; while sharing similarities with other creative endeavors, apparel design possesses unique attributes. Central to its essence is the dynamic interaction between the garment, body, and environment (Berglin et al., 2007; Fiore & Kimle, 1997; Mete, 2006; Jones, 2011), and the fusion of aesthetics and practicality, intricately linked with socio-cultural and historical contexts (Jones, 2011; Seivewright & Sorger, 2017). As such, it offers myriad opportunities to address complex modern challenges, including socio-cultural and environmental issues. Building on my

findings, within the realm of craft and design higher education, apparel design emerges as a powerful medium for approaching socio-cultural issues from a collaborative premise, while reflecting individual values and needs. To address complex and multifaceted modern challenges within design higher education and craft teacher training requires combining multi- and interdisciplinary, and participatory collaboration. For this type of collaboration, apparel design offers acknowledgeable context for both future research and education.

While this dissertation increases our understanding of inspiration and apparel ideation, my study concentrated on a fraction of complex and multifaceted processes. It is crucial to place greater emphasis on the inspirational process across all creative domains and explore how this process can be fully harnessed and cultivated in both educational and professional contexts. Therefore, to unlock its full potential, future research should encompass the subsequent stages of apparel design processes within educational contexts. To conclude, my study has illuminated the intricate and interactive nature of inspiration and apparel ideation processes, revealing how they are intertwined with external constraints, internal visions, and material tools. It underscores the subjective yet collective essence of inspiration and ideation in design, highlighting that these processes are not isolated acts of thought, but rather are complex, interconnected phenomena shaped by social, cultural, and material realities. This study enhances the understanding that (apparel) design and the inspiration process are not solely matters of thought but are also materially and socially mediated phenomena.

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