Student Craft Teachers' Choices During the Garment Design and Making Process

A Qualitative Analysis of Posters

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This study aims to identify the choices made by university student craft teachers during the garment design and making process. The research utilises a theoretical framework centred around the clothing design and making process, employing the functional, expressional and aesthetic (FEA) model and Papanek's function complex model. Two research questions were set: 1) Related to their garment design and making process, what kinds of choices did students outline in their posters? 2) How did student teachers utilise garment analysis models (FEA and Papanek's functional analysis)? The methodology involved a qualitative content analysis of 23 posters that combined visual elements and textual descriptions created by the participants. The posters highlighted the emphasis on participants' pragmatic considerations, such as usage intention, making methods and expressional and sustainable choices. Additionally, the studied posters showcased the participants' satisfaction with their garments, as these garments provided them with a means to express their personal clothing styles and experiences. The findings suggest the need for an increased focus on sustainable practices in teaching clothing courses, as well as design-focused tools that specifically aid in craft product analysis in craft teacher education programmes.

Keywords: clothing, garment design and making, garment construction, higher education, poster analysis

TECHNE SERIES

Techne Series 31(3), 2024
Pages: 1–15

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https://doi.org/10.7577/TechneA.5922

Introduction

Clothing is a basic human need. Its primary objective is to protect the body from the elements, but it also serves human needs related to religion and culture, modesty, decoration and personal style (Arnold, 2009; Erwin & Kinchen, 1977; Horn & Gurel, 1981; Kaiser, 1998). Kaiser (1998) characterises clothing as an embodiment of a 'second skin', representing and reinforcing an individual's personal identity, values and beliefs. As a phenomenon, clothing is a personal experience, but it is also a public display, a junction between the private and public spheres (Entwistle, 2000), 'an outward expression of how people feel about themselves and the world around them' (Erwin & Kinchen, 1977, p. 14). Indeed, the cultural and social significance of clothing has been widely emphasised in many studies (Arnold, 2009; Horn & Gurel, 1981).

Fairhurst et al. (1989) indicated that age is a crucial determinant of clothing attachment and usage. Younger individuals tend to prioritise their appearance and view clothing as more significant than older individuals do (O'Cass, 2004). The importance of clothing, especially for young individuals, encompasses creativity, self-expression, and both individuality and belonging to a group while also highlighting values, such as sustainability, or different clothing styles, such as goth, hip-hop or military (e.g., Arnold, 2009; Kaiser, 1998). In this study, the youth were represented by student craft teachers (later, student teachers).

In a clothing-focused study, the emphasis is typically placed on the clothing design process, omitting the garment-making component (e.g., Harvey & Ankiewicz, 2022), consumer clothing preferences (e.g., Lou & Cao, 2019) or sustainable fashion (e.g., Aakko & Koskennurmi-Sivonen, 2013). This study utilises the functional, expressional and aesthetic (FEA) model developed by Lamb and Kallal (1992) and the function complex model developed by Papanek (1995). The FEA model provides a user-centred framework for apparel design and making (Orzada & Kallal, 2021). Papanek (1995) emphasised solution-oriented design, and his model has been applied in designing and making new products and assessing design stages, drafts and prototypes. In this study, both models were presented to student teachers as tools to help them assess the garments they created by considering the needs and demands of usage alongside the visual and cultural aspects, with each student teacher selecting one of these models. The aim of this study was to identify the choices that student teachers made during a clothing course. This course requires future craft teachers to reflect on their clothing needs while engaging in the design and making of personalised garments for themselves and to develop didactic approaches suitable for teaching clothing courses.

In this study, two research questions (RQs) were set:

> RQ1. Related to their garment design and making process, what kinds of choices did students outline in their posters?
>
> RQ2. How did student teachers utilise garment analysis models (FEA and Papanek's functional analysis) in designing and making their garments?

The FEA model and function complex model as models for analysing garment design and making

The FEA model was originally developed to help students designing clothing for individuals with special needs adopt a more holistic approach to apparel design (Lamb & Kallal, 1992). It divides users' need for apparel into three dimensions (functional, expressive and aesthetic) that are interconnected and interdependent. The functional dimension refers to the practicality of a garment, such as fit, comfort and performance. The second dimension, the expressive aspect, refers to a garment's emotional and psychological impact, such as its ability to communicate an individual's style or mood. The third dimension, the aesthetic aspect, refers to the visual appeal and design of the garment; thus, design principles and the relationship between the person and the garment are analysed (Lamb & Kallal, 1992).

Some studies applying the FEA model focus on consumer satisfaction, such as the clothing needs of adolescent girls with disabilities (Stokes & Black, 2012). Others use the model in developing specific apparel, such as research on developing golf wear for mature women (Chae & Evenson, 2013) or Western-style Nigerian apparel (Adelaja et al., 2016). The FEA model has been utilised in educational studies to support ideation; for instance, student craft teachers explored sources of inspiration through a collaborative concept-design process focused on creating performance wear with a future vision (Riikonen, 2019). Lahti and Nuutinen (2014) explored how concept design can be applied to collaborative design, focusing on outdoor, exercise and leisure clothing, using the FEA model. Additionally, it has proven suitable for evaluating apparel design (e.g., Chae & Evenson, 2013; Gam & Banning, 2012) and has been selected as a design process model in literature reviews, particularly for developing problem-based design research pathways (Bye, 2010) or sustainable design approaches (Armstrong & LeHew, 2011).

Papanek's (1995) function complex model has six evaluation criteria for the design quality of products, examining the use, need, method, aesthetic, association and environmental consequences. In garment design and making, the use of a garment refers to the intended activities, environments and occasions for which it will be worn. The second criterion, the need aspect, refers to the specific requirements and expectations of the wearer, for example, physical needs, such as comfort, fit and protection, as well as emotional needs, such as confidence, self-expression and identity. The third criterion, the method, for example, involves the materials, tools and technologies that must be used optimally; thus, this aspect plays a critical role in clothing design and making. Fourth, aesthetic criteria are elements of garment design and making, as they can influence the appearance, style and appeal of the garment and the

emotions and experiences of the wearer. The fifth criterion, association, refers to the emotional and cultural connections that people make with clothing. The sixth criterion, environmental consequences, emphasises sustainable design that considers the environmental, social and economic consequences of a garment throughout its entire lifecycle (Papanek, 1995).

Papanek's function complex analysis has been utilised in various studies focusing on clothing and crafted products. Koskennurmi-Sivonen (1998) used the model to analyse the designs and cultural significance of Riitta Immonen's fashion creations. Luutonen (1997) applied the function complex model to analyse traditional knitwear and developed a semiotic-based essence analysis from it, linking the analysis of knitwear to its cultural and societal context. Rönkkö (2011) examined the crafted products made by student teachers in teacher training using the function complex model, with data consisting not only of the products themselves, but also of interviews and portfolios, providing additional support for the product analysis.

Garment design process

The process of garment design and making involves transforming an idea and sketch into a completed garment that can be worn (Omwami et al., 2020). Garment design encompasses not only sketching a visualisation but also considering the related material, technological and cultural connections. Furthermore, fabrics, materials, garment cuts and decorations are all important elements that enable expression and creativity (Ulvang, 2021).

The first stage of garment design involves ideation, in which the maker generates creative ideas and concepts for the garment (Laamanen, 2016). In this stage, it is beneficial to observe one's environment to assimilate and amalgamate various visual concepts and effectively translate them into a garment design (Aakko & Niinimäki, 2022). Within the pedagogical context, students – novices in designing – can have difficulties coming up with ideas for personalised garments. Designing can be supported by using inspirational sources with either material or non-material stimuli (Omwami et al., 2020). These sources can be provided in various ways, such as through pictures, drawings, examples, visits, trips, memories and various artistic experiences (music, literature, movies, etc.) (Pöllänen, 2009).

Professional garment designers create multiple sketches when generating ideas, reviewing and refining them, and selecting the most promising one for further development (Laamanen, 2016; Omwami et al., 2020). Through diverse visual representations, designers explore various design solutions and evaluate them before proceeding to make their chosen design (Laamanen & Seitamaa-Hakkarainen, 2014). However, the value of sketches as a tool for exploration and idea development varies in relation to individual skills and preferences, and the use of visualisations depends on the designer's problem-solving style (Jonson, 2005). While sketching can be a highly valuable tool for professional designers (Eisentraut & Günther, 1997), novice designers can be reluctant to sketch – perhaps related to their beliefs about not being good enough (Booth et al., 2016) or simply to them not being used to sketching.

In general, sketches can be classified according to their function: investigative, explorative, explanatory or persuasive (Olofsson & Sjölen, 2005). For garment design, several types of representations are essential, some emphasising visual impressions and some focusing on technical structures. According to Pei et al. (2010), design representations can take the form of sketches (idea sketch, study sketch, inspirational sketch, etc.), drawings (concept, presentation, technical, etc.), models (three-dimensional, appearance model, functional concept model, etc.) or prototypes (appearance prototype, experimental prototype, etc.). These representations can be appended with design information (design intent, form and detail, visual character, usability and operation, scenario of use, areas of concern, etc.) and technical information (dimensions, construction, etc.). In garment design, a technical drawing of a clothing item depicts either the front and back views or a specific detail (Nejedlá, 2014), and cross-sectional drawings illustrate technical sewing structures (Risikko & Marttila-Vesalainen, 2006).

The garment-making process

Garment construction has several stages. The following description is largely based on Erwin and Kinchen (1977). Pattern making starts with body measurements and pattern drafting or the selection of a ready-made pattern, after which the pattern is tested and altered. Pattern testing can occur, for instance,

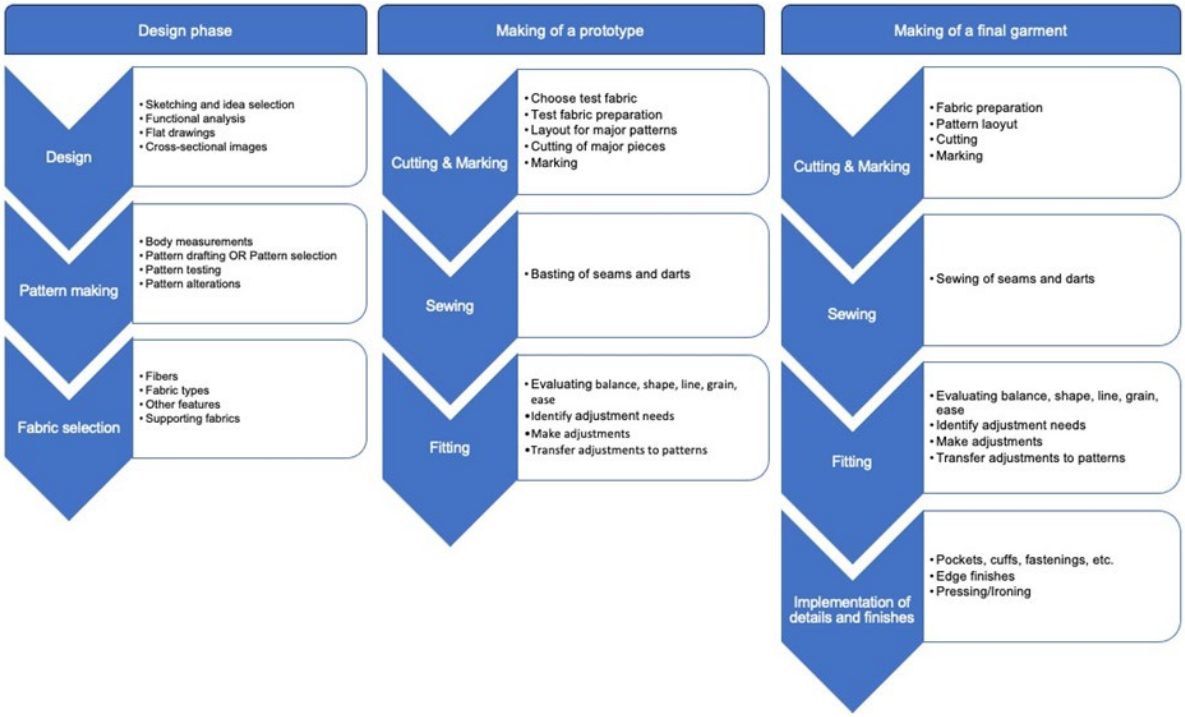
by comparing the measurements, fitting the pattern or making a test garment (a prototype). Fabric selection, if not already done during the design stage, involves the coordination of fibres and fabric types with the pattern and considering the need for supporting fabrics, such as underlining, interfacing and lining, as well as colours, figures, textural and other visual and tactual features. Before sewing a garment (the prototype or final garment), the fabric needs to be prepared, the pattern layout for cutting needs to be decided on, and the fabric cut and pattern markings copied to cut pieces.

Furthermore, Erwin and Kinchen (1977) emphasised integrating the construction process with fittings, suggesting that for most garments, two main fittings (and related correction fittings) are adequate. The prototype is made to assess whether the garment design and fit align with the original vision (Härkki & Rönkkö, 2023). The prototype assists in concretising the intended shape of the garment, because it is difficult to model all the dimensions of a three-dimensional body in a two-dimensional pattern (Salo-Mattila, 2014). The evaluation of fit encompasses balance, pattern shape, lines, grain and ease (Keiser & Garner, 2012). During the fitting process, fit issues can be identified, pinned and chalked onto the prototype. Afterward, the alterations are transferred to the patterns before cutting and sewing the actual garment (Erwin & Kinchen, 1977).

Construction of the final garment begins with ironing the interfacing materials and sewing the details. Pieces are sewn together with a straight stitch, and seam allowances are meticulously pressed open after each step (Erwin & Kinchen, 1977). The seam allowances are finished with an overlocker or a zigzag stitch to prevent the fabric edges from fraying (Erwin & Kinchen, 1977).

The holistic process of garment design and making, as typically implemented in Finnish craft teacher education, is illustrated in Figure 1.

Figure 1.
Garment design and making process



Method

Study context

Ethical principles of research with human participants in the human sciences in Finland (Finnish National Board on Research Integrity TENK, 2019) were followed. The participants were given the opportunity to withdraw from the study at any time.

The data were obtained during an 11-week master's-level course titled 'Clothing and Consumer Behaviour' (5 European Credit Transfer and Accumulation System credits) at a Finnish university as a

mandatory fifth-year course in the programme for student craft teachers. The course objectives entailed acquiring the capability to design and construct intricate garments, alongside gaining a fundamental comprehension of teaching garment design and making. Both researchers worked as teachers for the course.

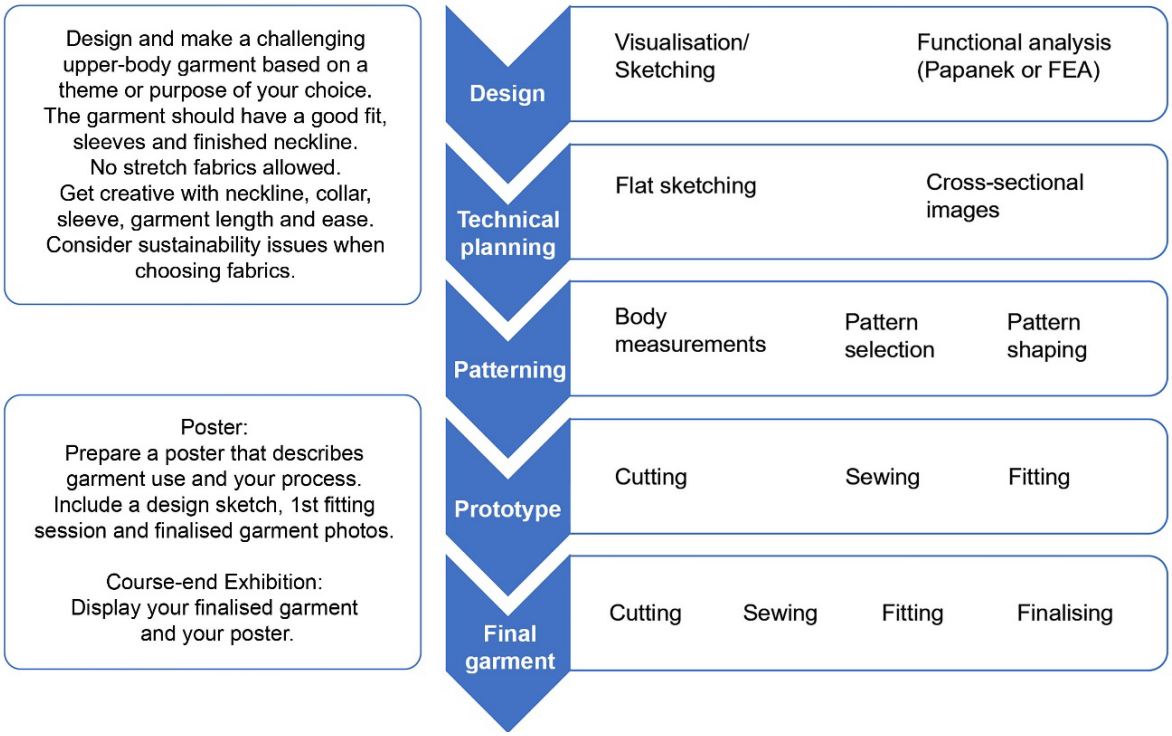
During the course's first lecture, students were introduced to the FEA and function complex models through examples, with future reading available in the course material. Course lectures delved into the multifaceted implications of clothing and the central principles of clothing physiology and examined the circular economy from a clothing perspective. During lectures, an array of images depicting diverse upper-body attire was analysed to expand the student teachers' comprehension of fit, degree of spaciousness and factors that evoke associations (such as materials, methods and patterning).

During the autumn 2022 course implementation, student teachers were tasked with designing and making challenging garments for themselves. The assignment included several constraints: the garment had to be a well-fitting upper-body piece of attire with neckline finishing and sleeves, and the use of stretch fabrics (such as those containing elastane) was excluded. Students were encouraged to incorporate creative elements in the neckline, collar, sleeve shape, length and width using materials of their choice while also considering sustainable garment use. The design was to be based on a student-chosen theme, image or usage scenario with the final making achieved through sewing.

The learning tasks included sketching a visual representation of the garment, functional analysis (FEA or function complex model), flat drawings and cross-sectional images of garment structures, taking body measurements, pattern selection and shaping, sewing, fitting and adjusting the first prototype garment and then producing a final garment. To support fitting, a form listing the order of items to consider was provided (Härkki & Rönkkö, 2023). The participants were instructed to complete the form and document the adjustment needs and corrections they had identified, as well as being asked to video record their first fitting of the prototype. Knowing our students' essay writing-related sentiments, we asked them to compose posters of their designing and making processes. Posters allow one to express one's intentions and feelings, as well as processes and results, by combining various types of visuals with text that they saw as meaningful. The coursework and continuation of the learning process are presented in Figure 2.

Figure 2.

Coursework and continuation of the learning process



Data and data analysis

The course involved 35 students in the craft teacher education programme. Out of these, 23 gave their informed consent to use the posters and exercises (i.e., sketches, technical drawings, videos) that they submitted as coursework. These study data, 23 posters, represent a piece of data from one cycle of an educational design research (McKenney & Reeves, 2013) endeavour stretching over several years.

The poster needed to include garment sketches, a photo of the first garment fitting and of the finished garment being worn by the maker, as well as a brief written description of the progression of the making process and an analysis of the garment design and making process using either the FEA (Lamb & Kallal, 1992) or the function complex (Papanek, 1995) model. The participants printed their posters in A3 size and attached them next to the exhibited garment – as the poster size was limited to A3, students were required to carefully consider what to include and exclude. Over long textual descriptions, the students referred to figures. Below, we present the images extracted from the posters, as the text on the posters is not clearly visible when displayed in a small size and with the text in Finnish (see Figure 3).

Figure 3.

An example of a complete poster describing the garment design and making process (IT)

In this study, we adopted a qualitative content analysis (Mayring, 2013) approach to delve into the textual and visual elements of posters. The posters were categorised as a type of visual learning aid that can communicate information using written text and symbols in a visually descriptive manner (Rissal & Muhtadi, 2022). For the analysis related to RQ1, both visual and textual elements were included, whereas results related to RQ2 are based only on poster text.

Based on the synthesis of the theory (FEA and Papanek models) and our data, we developed the following analytical framework to analyse the choices made by the participants: the intended purpose, method, expression and sustainability (Table 1). First, both authors analysed the posters separately, which was followed by a critical discussion of the coding scheme and interpretations of the posters. Due to their character, visuals often incited long discussions involving multiple viewpoints on student work and the possibilities of using visual media. The findings below represent the results of these discussions.

Translations of original expressions from the student teachers' posters are included in Table 1 and the presentation of the findings; all the initials appearing below are pseudonyms.

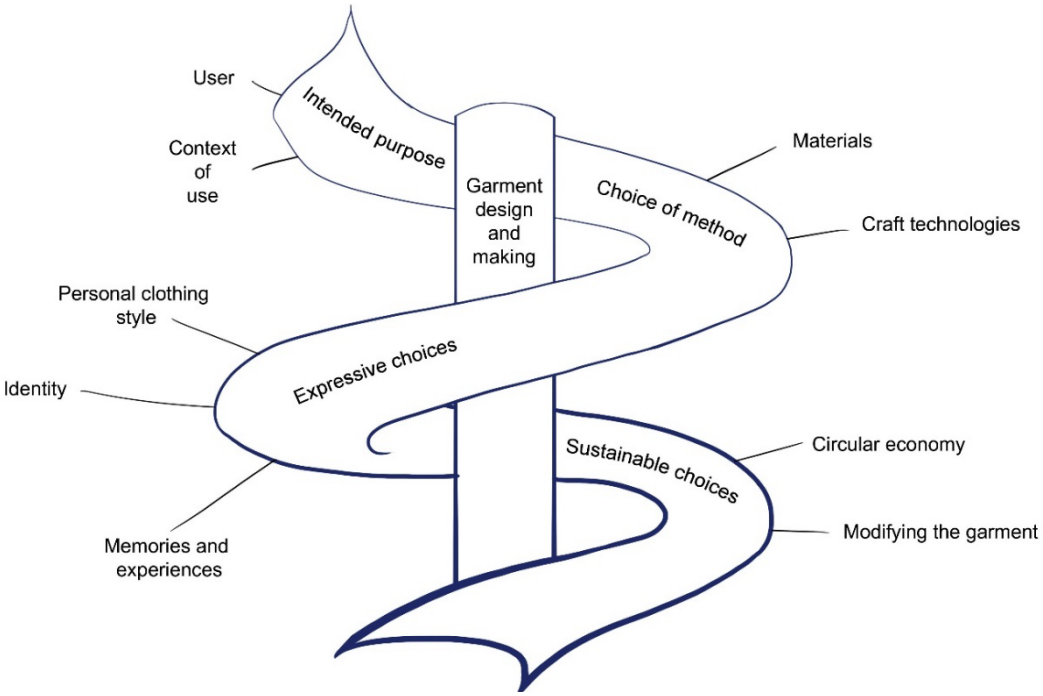
Table 1.
Participants' choices for their garment-making analysis

FEA model (Lamb & Kallal, 1992)	Function complex model (Papanek, 1995)	**In these data**	**Expressions of original expressions**
Functional	Use Need	**Intended purpose**	*The dress is designed to suit the wearer both structurally and aesthetically, with colours chosen to complement them. The design process began with a needs-based approach in preparation for upcoming celebrations.* (GK)
	Method	**Choice of method**	*The shirt is made of 65% linen and 35% viscose. The linen blend was chosen for its strength, breathability and fabric behaviour. The shirt was created using ready-made patterns, which were extensively modified and adapted.* (MJ)
Expressive Aesthetic	Association Aesthetic	**Expressive choices**	*The design is inspired by Dior's classic New Look, a style many still consider timeless and elegant today. The coat is intended to convey a polished impression of its wearer.* (SO)
	Environmental consequences	**Sustainable choices**	*The output is a timeless, long-lasting garment that will be truly worn and appreciated.* (NI)

Results

In the following, we present the results of our analysis of the garment design and making process implemented by the participants, as represented on the posters describing their coursework. Based on photographs of the finalised garments, several participants appeared to have invested in creating stylish representations of their garments. Most of the participants chose to be photographed in a special classroom equipped with a professional photographic studio with lighting and backgrounds. Their poses were carefully considered, and they strove to present their garments in the most favourable light. Some photographs focused on details pertaining to the participants' adeptness in garment making, which we interpreted as indicating the participants' intention to showcase their skills. Evidently, the participants appeared pleased with the outcome of their endeavours. The findings revealed that the participants' explicated choices in garment design and making placed primary importance on the intended use of the garment, emphasising the importance of the user and the context of use. The participants also highlighted the need to balance out their choices regarding methods, expression and sustainability (Figure 4). Next, we will examine these dimensions in the student teachers' posters based on these themes.

Figure 4.
Participants' explicated choices during the garment design and making process



RQ1: Related to their garment design and making process, what kinds of choices did students outline in their posters?

Intended purpose

According to the posters, the intended use of the garment appeared to be the most frequent starting point for the design and making of the garment. Other design considerations were related to the acquired fabric (i.e., the use of Marimekko fabrics), a specific pattern (i.e., a pattern from a new Finnish pattern book *Helmat* [in English 'Hems']) or a desired look (such as a Dior jacket or the stereotypical teacher's clothing style). Their approach to garment design and making was quite pragmatic, and the aim was to create a garment suitable for various occasions and activities. Despite this otherwise pragmatic approach, dynamic measures and the effects of various usage situations on fit, mobility, protection or donning and doffing were not mentioned in the posters.

Some participants emphasised the importance of versatility in their garments, highlighting the need for garments that were appropriate for a range of settings. They described their upcoming celebrations and their need for attire that was suitable for such events. Some participants named their graduation ceremony as the most significant event, and others cited birthdays, anniversaries and other milestones. One participant, TQ, highlighted his intention to make a collared shirt with the distinct feature of a bow-tie collar. He regarded a bow-tie collar as a symbol of distinction and considered that it would 'crown' his graduation celebration.

Some participants emphasised the importance of practicality in their daily lives and wanted garments that could be worn comfortably for long periods. They cited their hobbies as a significant factor in their garment design and making process and wanted a garment that would be suitable for physical activities, such as sports and outdoor adventures. One of the participants, MbK, designed and made a linen shirt *specifically for outdoor activities, such as hiking and forest hunting.... It is pleasant to use and reminiscent of a traditional thresting shirt* (MbK, poster). MbK envisioned the shirt as a field shirt, reminiscent of old-fashioned hunting shirts. This relaxed-fit shirt was designed for easy movement and was especially suited to forest environments (Figure 5, bottom left).

Figure 5.

MK's denim jacket, NF's dress, MbK's shirt and SO's coat

Choice of method

The participants made several choices during the design and making process regarding the method, for example, the materials, tools and making of the product. For several participants, this garment was the first self-made garment since their classes in basic education. (The participants do not represent typical student craft teachers due to the impact of COVID-19, as previous clothing courses were conducted through remote teaching methods.) NK described the importance of the garment by stating that what mattered most was the fact that it was self-made. According to him, *the garment showcased the craftsmanship acquired during his studies [in addition to it] being a functional garment tailored specifically to his needs as a craft teacher* (NK, poster).

The selection of materials played a significant role in the design process for many participants. In fact, many of them began their process only after they had found suitable fabrics. In the aforementioned case, MbK carefully selected the material for the shirt. The linen material was chosen for its breathability and durability, making it ideal for outdoor activities, where comfort and protection from the elements are crucial. Furthermore, SO had acquired the high-quality wool fabric and other materials necessary for making a woollen coat before this course. Consequently, at the beginning of the course, SO immediately had *a vision of a classic New Look-inspired Dior-style jacket that ... the fabric was suitable for* (SO, poster). SO chose a pattern in which the garment lines corresponded with her vision. In the sewing phase, SO made some modifications, such as changing the button closure to a hook fastening and omitting the pockets. *The patterns are from McCall's, but they needed to be adjusted for a better fit* (SO, poster) (Figure 5, bottom right).

The course assignment required the participants to consider various technical solutions while choosing suitable sewing structures. However, most garments had fairly basic structures and lacked tailored versions of the garment in terms of details or seam structures. The participants added some details to the neckline, collar or sleeve shape. Many participants chose decorative details (such as buttons, collar structures or belts) that were highlighted on the posters, emphasising the garment's uniqueness. This was meant to encourage the participants to consider the details of their designs and how they could make their garments more appealing.

One of the course requirements was that the use of stretch materials was excluded. This requirement was in place to encourage the participants to think about alternative solutions for ensuring a comfortable fit, such as using different types of waistbands or creating a relaxed silhouette. For instance, NF's wrap-style garment design enabled an easier adjustment of fit, as with wrap garments, the wearer has more control over how snug or loose the garment is (Figure 5, top right).

> The dress, along with its execution and design, supports a celebratory style. The dress is the Silva dress from the book *Helmat* [Hems] by *Mekko Tehdas* [Dress Factory]. The patterns for the dress were modified after fitting the prototype to ensure a better fit. (NF, poster)

Expressive choices

It appears that the participants were primarily inspired by their own world of experience. For example, IT collected ideas that reflected her personal memories and preferences. Her design was inspired by the peaceful and relaxed atmosphere of a cottage surrounded by the beauty of nature, including forests and the heat of the sun. IT's experience of chopping trees and other outdoor activities also influenced her garment. The design emphasised an aesthetically pleasing and tidy appearance, with a relaxed fit that would allow for ease of movement. The choice of colour and pattern was carefully considered to complement the garment's style and fit (Figure 3).

Many participants emphasised how their garments needed to reflect their personal clothing styles and preferences. This manifests their desire to create garments that were unique to them and that represented their individual tastes. On the other hand, the participants emphasised their sense of belonging to a group through their choice of decoration for their garments. As an example, MT created a bomber jacket with vinyl printed details, golden buttons and golden piping incorporated along the sleeve seam. The design of the bomber jacket was inspired by stereotypical college sports team jackets, which often feature a large printed or embroidered decoration and logo. He aimed to *emphasise the significance of individual athletes as part of a team* (MT, poster) (Figure 6).

Figure 6.

MT's bomber jacket

Sustainable choices

Most of the participants in this study were conscious of the impact of textile materials on the environment, to the point where they sought to minimise the environmental footprint in the design and making of their garments. To achieve this, several participants used recycled materials sourced from flea markets or Facebook's marketplace. Additionally, the participants reflected on garment usage situations and how the garment could be modified according to specific situations. In practice, this meant, for example, envisioning the post-event use of an evening gown by shortening the hemline so that the dress would be suitable for more casual celebrations as well.

This approach was intended not only to reduce waste but also to add a personal touch to the garment, reflecting the participant's connection to their family history and heritage. For example, in her denim jacket, MK used zippers and floral lining fabric from her late grandmother's estate. Furthermore, MK chose an elastane-free denim fabric, which would be durable and long-lasting, reducing the need for frequent replacements and, thus, the overall environmental impact of textile production (Figure 5, top left).

> The jacket is comfortable, well-fitting and looks nice. It reminds me of my grandmother, who gave me many sewing supplies from her own stash during my studies, including the zippers used in this jacket.... Denim is not the most eco-friendly option, as its production consumes a lot of water, but the denim I chose is thick and of high quality, making it a durable choice. (MK, poster)

Considering the course objectives, it was alarming that a few of the participants did not mention the themes of sustainable development or the circular economy in their posters. The absence of these themes in their posters suggests that they did not capture the concept of environmental consequences in Papanek's function complex model.

RQ2. How did student teachers utilise garment analysis models (FEA and Papanek's functional analysis) in designing and making their garments?

Out of all the participants, only two utilised the FEA model. Their analysis described garment use as 'functional', and they did not distinguish between 'aesthetic' and 'expressive' characteristics. The rest of the student teachers used Papanek's function complex model. Users of the function complex model combined 'use' and 'need' rather than analysing the differences between them. Their primary focus was on the user and the context of garment usage. As for the 'method', participants followed the function complex model by noting the selection of materials and technologies used for making the garment. The

participants struggled to differentiate between 'association' and 'aesthetic', resulting in them defining similar aspects under these two terms. The participants described these criteria as expressive choices. As a concept, 'environmental consequences' was important to the participants, but they preferred to use the terms 'sustainability' and the 'circular economy'.

Discussion and conclusions

To teach clothing design, (one of) the starting point(s) (years before this data collection took place) for our educational design research endeavour was that the design phase does not receive the attention it should, and we do not provide students with design tools that appear to ease and enrich their process. This study represents the cycle involving the FEA and Papanek models. The participants appeared unfamiliar with the idea of using the function complex model and FEA model to design or analyse the craft design and making process. Some concepts, such as 'aesthetics', 'expressive' and 'association' or 'use' and 'need', proved challenging for them to perceive, and they struggled to differentiate between the nuances. It appears that the abstract nature of these concepts hindered the execution of the analysis. Furthermore, it seems that the participants levitated towards what was easiest and clearest for them in these models. They did not perceive these models as design tools, but rather as a means for documenting the design process that they had already completed.

Even though student craft teachers may be considered novices rather than professionals in garment design, having a solid grasp of the fundamental principles of garment design and making is crucial for them, as in the future, they will have to teach and inspire their own pupils. In education, the objectives and contexts are different from those in professional design, which are backgrounded by the FEA and Papanek function complex models. According to our experience, pupils in basic education are likely to focus solely on the act of making, while neglecting the importance of design. However, through design, it is possible to personalise products and make them more unique. This perspective is particularly relevant to young people, even though the significance of clothing for youth is evident in its impact on self-awareness and on shaping their self-image, ultimately contributing to their overall well-being (Sweeney & Wilson, 1997).

According to our results, most participants were content with their creations: their designed and constructed garments. They expressed pride in their posters; however, they were also surprised at the amount of time it took to complete their garments, which required several fittings, modifications and adjustments. They perceived that they were acquiring new knowledge and skills and putting them into practice. This positive perception of the course highlights the importance of demanding, hands-on, practical learning experiences in helping participants develop a deeper connection with their subject matter. To improve the education of student craft teachers, it is essential to enhance pedagogical design models in teacher training curricula.

Craft education has the potential to raise awareness about sustainable consumption and the personal fulfilment derived from skill development and creating tangible outcomes through manual work. By integrating sustainable practices into crafts from the early stages of basic education, individuals can design and produce products that take into account their lifecycle, emphasise meaningfulness, aesthetics and high quality, and simultaneously meet needs and promote well-being (Porko-Hudd et al., 2018). Within the realm of craft education, garment design and making have excellent possibilities to contribute to the attainment of these objectives.

According to this study, the process of designing and making garments has the potential to evoke personal emotions and memories and can serve as a means of expressing personal beliefs and values. In order to enhance or create a more interesting appearance, various enhancements are typically added to garments, for example, through dyeing, painting and embroidering, and in contemporary times, garment makers employ techniques such as vinyl cutting (for printed figures) and laser cutting (for materials such as wooden buttons). The designs and patterns incorporated into the fabric often carry symbolic meanings, with the inspiration behind them offering insights into cultural beliefs and values (Horn & Gurel, 1981).

Consequently, student teachers could benefit from utilising tools, such as models of design and ideation adapted for pedagogical settings. One such model is circumstance-based design, which highlights the importance of the process of designing, making and understanding the environmental impact of a garment (Laxström et al., 2021). Another potentially appealing approach could be emotionally durable design (Drake & Heath, 2011): creating products that establish lasting emotional connections with users, thus resulting in longer and more meaningful product lifespans. For clothing, emotionally durable design refers to creating garments that foster long-lasting connections with their users, consequently promoting more sustainable ways to reuse, reduce and recycle materials instead of discarding potentially valuable materials (DeLong et al., 2016).

To summarise, this study provides insights into the student teachers' priorities regarding the role of clothing in their academic and professional lives, as well as in their private lives. It appears that the teacher training programmes in crafts place a strong emphasis on hands-on activities and making, while not sufficiently highlighting the importance of design. According to this study, these master's-level student teachers were indeed novices in design and design analysis. Their approach to designing and making garments was primarily pragmatic, while abstract conceptualisation seemed to require additional reinforcement through pedagogical solutions. Our educational design research endeavour is continuing to look for a tool that would be better suited for our students.

Limitations

Both authors acted as teachers during the course, which is typical of educational design research (McKenney & Reeves, 2013). Design research is about generating and cultivating hypotheses rather than testing them (Kelly, 2006); the results are not intended to be generalised. We employed investigator triangulation and strived to avoid including details we knew as course teachers, but were not included in the poster data. For this, we engaged in long discussions of our views about what could be stated based on the data, especially regarding the poster visuals. Unfortunately, due to student schedules and other practicalities related to a course ending near Christmas, it was not possible to acquire other types of data, such as interview data. When it comes to consequential validity (Messick, 1993) and outcome validity (Anderson et al., 2007), this study led to meaningful decisions regarding student learning and change actions relating to craft teacher education.

The participants in this study had previously studied garment design and making as part of their basic and intermediate craft education studies. However, due to the COVID-19 pandemic, their instruction was conducted through remote teaching methods during those courses, and, as a result, they did not have the opportunity to physically make their garment designs until this particular time. Despite these limitations, the students were still able to gain knowledge and skills in garment design and making during their master's course. Yet, it should be noted that these participants do not represent typical master's students in craft teacher education.

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