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CREATIVE TEXTILE DESIGN: A WALLAS MODEL-BASED APPROACH

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Abstract. This study aims to develop innovative and versatile surface designs inspired by parametric architecture by examining the integration of Wallas's creative thinking model into the textile design process. An experimental approach was employed and the textile design process was structured according to Wallas's four-stage creative thinking method (preparation, incubation, illumination, verification). Within this framework, six different patterns were created using Adobe Illustrator, digitally transferred onto three types of polyester fabrics and subsequently manipulated using the pleating technique. Throughout this process, intuitive and analytical thinking modes operated together, enabling the development of versatile surface designs that combine functional and dynamic qualities. This paper introduces an applicable methodology for designers who manage the creative process and presents an interdisciplinary approach that combines aesthetics, functionality and diversity in textile design. Furthermore, the model can be utilized academically as a tool to enhance students' creative thinking skills in design education. At the same time, it can be used in industrial settings as a strategic thinking method within creative industries. In particular, in the textile industry, creating multiple pattern effects on a single surface is expected to increase material efficiency and support the development of value-added products that improve user interaction.

Keywords: *Creative thinking model, parametric design, textile design, fabric manipulation, digital printing.*

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1. Introduction

1.1. Background

Textiles have been a fundamental phenomenon from the dawn of humanity to the present day. Since ancient times, humans have utilized textiles to meet their covering and protection needs. Over time, this necessity has evolved into a field situated at the intersection of art, craft and technology (Tatari, 2022). As an applied art form, textiles have developed in parallel with societal, economic and technological advancements, becoming a discipline that combines aesthetics, functionality and innovation (Gür Üstüner, 2017).

In today's technological era, the textile sector is expected to adapt to the dynamic potential for continuous change and development in design and production activities, driven by the competitive nature of the industry. The implementation of innovative and originality-based design and production approaches in the sector requires the integration of technical knowledge, digital tools and the collaboration of diverse disciplines such as design, science, engineering and art. This multidisciplinary approach facilitates effective and efficient processes. To this end, the pursuit of innovation can transform into an advantage in textile design and production by aligning with modern understanding, leveraging computers and technology and addressing innovative aesthetic demands (Canava, 2015).

1.2. Creativity in Textile Design

Textile design involves not only the visual qualities of a surface but also its tactile and emotional interactions. This discipline aims to provide functional and aesthetic solutions by integrating creativity with materials, techniques and processes (Valentine *et al*., 2017). While creativity can be defined by some as the ability to produce work that is both novel and appropriate (Armstrong, 1989), it can also be described as the ability to reshape the domains individuals work in by introducing new perspectives and original ideas that make life easier (Gürcüm & Çifçi, 2017).

Creativity does not only emerge during the stages where new ideas are incubated and sketched; it is equally influential in prototype design and production processes, where materials and techniques are approached holistically. Creativity plays a significant role in determining the technical elements necessary for transforming fabric into a tangible entity, such as the type, fineness, color, texture of the material, weaving technique, knit structure, fabric construction and finishing processes (Halaçeli, 2011).

The concept of manipulation, which has become prominent in various fields in recent years, originates from the French word manipulation. While the term has different interpretations across economics, psychology, art and other domains, it generally refers to methods used to alter or direct perception. Fabric manipulation, on the other hand, is a multifaceted concept encompassing numerous traditional and technological techniques, making it subject to multiple definitions (Özgün, 2019).

Designers often employ chemical, mechanical or handcrafted techniques in surface design (Gong & Shin, 2013). These techniques are particularly pivotal in fabric manipulation, enabling the creation of unique structures by altering the existing texture or structure of fabrics. Advances in technology and new materials continue to expand these techniques, allowing for constant refinement and innovation.

1.3. Parametric Design

Parametric design is a process driven by specific variables, enabling the production of different outcomes by altering these variables. This algorithm-based design method is utilized in various fields such as concept development, space creation, façade design and detailing. It allows updating a design at any stage of the process by modifying the parameters (Varli, 2013; Bakirhan, 2019).

Fashion and architecture are disciplines that exhibit similar approaches during design processes and draw inspiration from each other. Both fields employ common design elements, including color, texture, material, proportion and form. Fashion designers can shape their collections using architectural principles, interpreting their designs as structures built on the body. Shared design elements include concepts like texture, pattern, fluidity, layering and the interplay of fullness and void (Harmankaya *et al*., 2014; Güldür & Bayram, 2016).

In architecture, parametric design is particularly prominent in creating modern and futuristic forms based on curvilinear geometries. Computer-aided design (CAD) tools play a critical role in this process, contributing significantly to both visualization and precision (Bakirhan, 2019).

Parametric design, shaped by the tools offered by modern technology and particularly prominent in architecture, also serves as an inspiration in textile design. Parametric architecture provides designers with a fresh perspective by integrating aesthetics, functionality and innovative approaches in surface design. This approach finds broad applications in textile design, from pattern creation to production processes. When combined with manipulation techniques, it adds three-dimensional visuality and tactile richness to textile surfaces, making designs not only visually but also physically captivating.

1.4. Literature Review and Research Aim

Textile designers typically use a retrospective view and produce stylized samples for a specific product. In this production process, the qualities of the fabrics are often determined solely by the designer's intuition. Accordingly, samples are not only the final products of a design process, but also living representations of the ideas raised, the possibilities imagined and the proposals that take shape (Morrow, 2014; Forst, 2022). However, the combination of intuitive thinking and analytical thinking for textile design supports and develops creative thinking. In this way, addressing the creative process within the framework of a systematic model is an effective method for directing textile design. Some studies on the implementation of Wallas' method in the field of textiles are noteworthy. For example, Arslan (2021) applied Wallas' creative thinking model in textile pattern design and discussed how students can effectively use their imagination while designing original and innovative patterns and how they manage this process. In addition, Mandour (2024) proposed a seven-stage model that can be used in textile printing design education to develop creativity. The model was applied in a course at Damietta University in Egypt and students were asked to design patterns inspired by traditional cultural heritage. The proposed process includes various stages from idea generation to implementation, from communication to evaluation. Based on the literature review, it was observed that there are limited studies on the integration of the Wallas model into the textile design process as a systematic and experimental approach. Therefore, using Wallas’s (1926) four-stage creative thinking model as a methodological framework is considered to be a valuable contribution to the literature.

Although there have been various studies on the implementation of the creative thinking model in textile design education, the majority of the research have focused on the processes of developing students' individual creativity and only a limited number of studies have addressed the association of the model with concrete production outputs in pattern design. Accordingly, the current study aims to fill this gap in the literature by demonstrating how patterns inspired by parametric architectural forms can be integrated into digital printing and fabric manipulation techniques through the use of Wallas's creative thinking process. Thus, an innovative method that supports both creative thinking and an interdisciplinary approach to textile design is proposed. This study aims to address this gap by exploring how patterns inspired by parametric architectural forms can be integrated with digital printing and fabric manipulation techniques utilizing Wallas’s creative thinking process. In doing so, it proposes an innovative method that supports both creative thinking and an interdisciplinary approach to textile design.

Consequently, the aim of this research lies in understanding the impact of creative processes and architectural parametric design on textile design and enabling the development of innovative design approaches by merging these two disciplines. The combination of fabric manipulation techniques and digital transfer printing methods, guided by Wallas' creative process, is expected to contribute to generating original and functional solutions in textile design. Additionally, pattern designs inspired by parametric design methods used in architecture offer a new design perspective by blending aesthetics and functionality across both fashion and architecture disciplines.

This research is believed to promote interdisciplinary interactions and collaborations by integrating creative thinking with diverse perspectives in the design world, fostering various practical applications. By aiming to establish new academic literature and provide theoretical contributions, as well as offering practical, applicable design examples, the study demonstrates how creative processes can be effectively utilized in textile design and how they can contribute to innovation in the industry.

2. Method

A comprehensive literature review was conducted and an experimental research method was employed. Wallas's (1926) four-stage model of creative thinking was used as the basis for the experimental approach and the design process was structured accordingly.

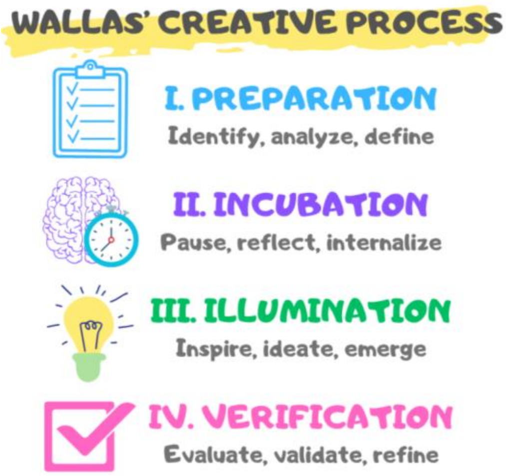


Figure 1. Wallas' creative thinking model

According to Wallas (Figure 1), a creative process consists of four stages:

1. **Preparation Stage:** This is the phase where the research problem is identified and investigated.

2. **Incubation Stage:** A resting phase where active thinking about the problem is set aside.

3. **Illumination Stage:** The phase where the "happy idea" suddenly emerges and inspiration occurs spontaneously.

4. **Verification Stage**: The phase where the solution is evaluated, corrected if necessary and refined (Wallas, 1926).

Each stage of the model was directly integrated into the design process. In the preparation phase, the research problem was identified and visual and conceptual data were collected for the theme. In the incubation phase, active thinking was avoided and design ideas were deliberately put on hold to allow creative insights to develop. In the illumination phase, the emergence of spontaneous ideas was supported and these ideas were transformed into digital designs in Adobe Illustrator. Finally, in the validation phase, the digital outputs were tested with physical examples and final adjustments were made to the designs.

As important studies in the field, Gong and Shin (2013) discussed fabric manipulation techniques from a theoretical perspective. Özgün (2019), on the other hand, focused on experimental studies in the fields of textiles and fashion and stated that simple folds, controlled pleats and folds inspired by origami art can be used to reshape fabric as an architectural material by creating dimensional effects and structure. Accordingly, pleating was preferred because it is a technique suitable for parametric design. Additionally, this method was chosen as the fabric manipulation method since it allows for the volumetric expression of features such as repetition, directional changes and surface depth commonly found in parametric patterns. Furthermore, this technique provides flexibility and visual richness for exploring the physical applicability of the ideas that emerge during the illumination and verification stages of the Wallas model.

The experimental approach used in this study focuses on modeling the creative process and prototyping practices, but it does not cover the long-term environmental impacts of production techniques. The selected fabric types (100% polyester) and the digital transfer printing method are commercially common, accessible and practical in terms of application. The material selection was based on criteria such as pattern visibility, ease of production and support for experimentation; however, sustainable, recyclable or organic textile materials were not included within the scope of this research.

The pattern designs were created as vector graphics using Adobe Illustrator. The prints were applied onto three different types of polyester fabric using digital transfer printing at a resolution of 300 DPI. During the manipulation process, parameters such as pleat depth, repetition form and directional changes were observed; however, these variables were evaluated through qualitative visual analysis rather than numerical measurement. This is considered one of the methodological limitations of the study.

3. Findings

3.1. Textile Design Process Based on Wallas' Creative Thinking Model

Wallas' creative thinking model was utilized as a method for the textile design process. The sequential application of the Preparation, Incubation, Illumination and Verification stages was employed to develop creative, original and innovative textile product designs. Each stage, from the initial conceptual phase to the final product/output, is detailed in the following sections to illustrate how the model guided the entire design process.

3.1.1. Preparation

The preparation stage is described as the period during which data related to the research problem is gathered, detailed information from available resources is obtained and ideas undergo rapid changes while the research problem is being precisely defined. In addition to information gathered from written and visual sources, engaging in discussions with others, exchanging ideas and obtaining feedback represent alternative methods for gaining insight. Identifying the problem often requires access to various resources, data collection and the selection of the most appropriate problem from the obtained data, necessitating an extended period of mental effort. This stage may last from a few minutes or hours to several months or even years. During this intense cognitive process, researchers may experience various emotional states, including doubt, anxiety and frustration (Patrick, 1955).

As the first stage of the creative thinking process, the preparation phase in this study began with the identification of a research problem related to textile product design. A thorough literature review was then conducted on the subject.

The research problem was defined as: "Designing an innovative, theme-based and creative textile pattern and achieving pattern variation on the same fabric sample". Within this framework, extensive investigations were conducted on methods for creating original, thematic and innovative fabric designs, as well as achieving pattern variations within a single product.

In the preparation stage, the first phase of the creative thinking process, data related to the theme were collected from various sources and visualized through mood boards. The aim of the research is to design patterns inspired by examples of parametric design in architecture, create textile surfaces with versatile pattern variations using the pleating technique-a fabric manipulation method- and analyze this design process in detail.

Figure 2. Moodboard

The moodboard panel, developed as part of the research process, was created based on a visual analysis of patterns and colors found in examples of parametric architecture. This mood board served as a source of inspiration throughout the design process. The visual analysis of the parametric architecture theme helped establish the design's color and pattern objectives. The panel includes diverse color palettes, pattern samples and inspiring visuals, providing a cohesive framework for the creative process (Figure 2).

3.1.2. Incubation

During the incubation stage, the researcher focuses exclusively on the creative design process and a single subject. However, this intense focus can hinder functional creativity and the generation of new ideas related to solving the research problem. To address this, the researcher allows time for idea generation (Arslan, 2021).

Various ideas were proposed and discussed to develop solutions for the identified design problem. However, in some cases, it was not possible to produce new design concepts due to the repetition of similar ideas. At this stage, instead of directly concentrating on solving the research problem, the researcher shifted their attention to activities such as reading books, listening to music and similar endeavors. While interest in design studies remained, the creative thinking process did not progress as expected. Consequently, it was concluded that the researcher needed additional time for design ideas to emerge effectively.

Consistent with this view, Dijksterhuis and Meurs (2006) argued that unconscious thought is freer, less focused, less accessible and particularly conducive to generating more creative ideas compared to conscious thought. They suggested that when faced with a task requiring a certain level of creativity, delegating the thinking process to the unconscious mind can be effective.

Schooler and Melcher (1995) reviewed the literature on incubation and found that distraction can lead to mental set-shifting. People often approach a problem with incorrect cues, faulty heuristic strategies and/or wrong information. A period of engaging in a distracting activity may reduce access to these incorrect approaches or cause them to be completely forgotten. The effects of distraction on set-shifting can be both strong (e.g., when a person gets ‘stuck’ on a wrong line of thought while solving a chess problem) and quite subtle (e.g., reducing the guiding effect of primacy and recency in attention). These processes can generally be grouped under the explanation of “restructuring the problem”: setting the problem aside for a while allows for a fresh, unbiased start.

The incubation period can last for hours or even years without any direct conscious effort related to the problem’s necessity. Insight, on the other hand, occurs as a sudden realization or brilliant idea that is not prepared by the conscious mind. In other words, the incubation and insight phases largely happen without conscious thought and/or effort; they emerge as a result of a spark of genius or chance (Wallas, 1926).

3.1.3. Illumination

During the illumination stage, the visual inspirations and sources compiled in the moodboard prepared by the researcher contributed significantly to the formation of preliminary design ideas and the development of sketches. This process enabled the sudden and spontaneous emergence of a creative solution, driven by the synthesis of all visual and written data accumulated through conscious or unconscious experiences in the previous stages. The unexpected triggering of creative thought, accompanied by a sense of enlightenment, allowed the researcher to independently reach a resolution. At this stage, the fundamental elements of the pattern design were shaped and the initial steps toward materializing innovative ideas were taken.

Sketch Studies:

Drawing inspiration from visuals related to the theme of parametric architecture, the researcher created eight geometry-based sketches. These sketches were digitally developed using Adobe Illustrator. The sketches prepared for the pattern design are presented below (Figure 3).

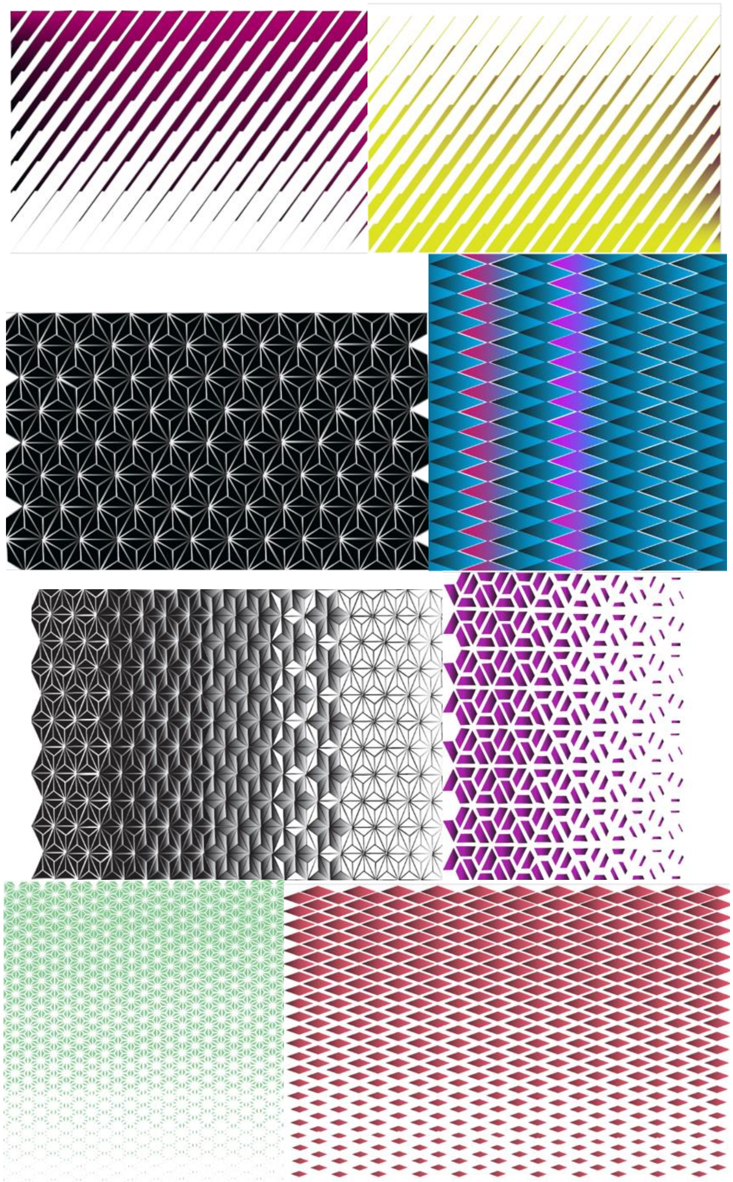


Figure 3. Sketches developed for pattern design

Prototype Implementation:

During the illumination stage of Wallas' model, the prototype of the design was meticulously created on paper. This step was carried out to gain a deeper understanding of the appearance, color transitions and details of the patterns. The paper prototype allowed for a comprehensive evaluation of the design's physical dimensions, forms and structural features (Figure 4). This process not only materialized the creative solution but also provided an opportunity to highlight the design's strengths and identify any deficiencies. During the illumination stage, a prototype was prepared based on only one sketch. Ideas previously developed in a digital environment were physically realized, offering valuable insights into pattern appearances, placement variations and their effects prior to actual implementation. These insights provided a solid foundation for refinements and optimizations in subsequent stages of the design process.

Figure 4. Sketch and prototype application

3.1.4. Verification

The verification stage, the final phase of the creative process, is where abstract ideas born from inspiration pass through the filter of imagination to take on a more robust and realistic form (Kneller, 1965).

In this phase, the researcher extensively evaluates the solution that has emerged, testing its accuracy, validity, suitability and effectiveness. If the proposed solution is found to be inappropriate, it is revisited and necessary corrections are made, marking the conclusion of the process (Sak, 2018; Csikszentmihalyi, 1996).

As the final step of the creative thinking process, the verification phase aims to assess whether the design aligns with the theme and predetermined objectives. The final designs were validated concerning design principles and thematic compatibility and necessary improvements were implemented. This stage ensures that the design process produces a valid and effective outcome, confirming the feasibility and applicability of the final design.

Product Design Studies:

The experimental phase involved applying the pleating technique, a fabric manipulation method, to textile surfaces after executing the digital transfer printing method, which is designed to print on flat surfaces. Different pattern studies, aligned with the theme, were transferred onto textile surfaces using the digital printing method. These surface applications were then combined with fabric manipulation techniques and the resulting designs were evaluated in terms of functionality and aesthetic features.

The manipulation techniques applied not only enhanced the aesthetic qualities of the designs but also increased the functionality of the textile products. The interventions made on the texture of the fabric provided users with a visual experience while emphasizing the originality and character of the designs.

This experimental study represents a significant step in demonstrating how the combination of digital transfer printing and fabric manipulation techniques in textile design can yield creative and functional results. The resulting designs offer not only aesthetic richness but also highlight the potential for innovation and experimental applications in textile design.

The printed surfaces obtained from the research are the outcomes of this three-phase process:

Phase 1: Six distinct print pattern designs aligned with the theme of parametric architecture were digitally created using Adobe Illustrator.

Phase 2: The designs created in Adobe Illustrator were resized to match the dimensions of the fabric surface to be printed. They were transferred onto transfer paper using digital printers. The printed patterns were cut to size and positioned on fabrics laid on the printing bed. A heat press was set to 180°C and applied for 50 seconds, transferring the patterns from the transfer paper onto polyester fabric surfaces using the digital transfer printing method.

Phase 3: The textile surface obtained through digital transfer printing was further enhanced using pleating techniques, a form of fabric manipulation, to create three distinct surface designs.

Product Design I

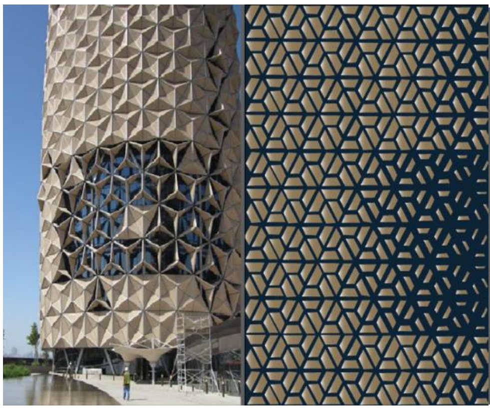


Figure 5. Pattern design 1 **Figure 6.** Pattern design 2

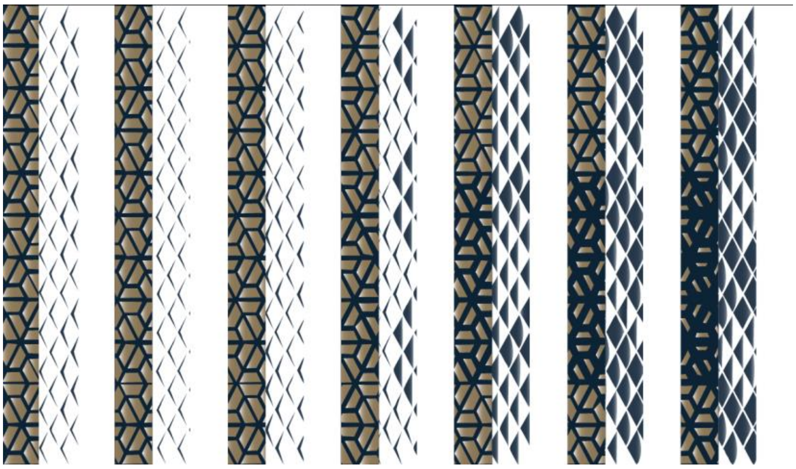


Figure 7. Print trial - first study

This fabric design incorporates two distinct pattern designs created using Adobe Illustrator (Figures 5 and 6). Each pattern was designed to fit dimensions of 50 by 33 cm and arranged in columns to occupy a 50 × 99 cm area suitable for digital printing. The designs were prepared for transfer onto the fabric surfaces using the digital printing method (Figure 7).

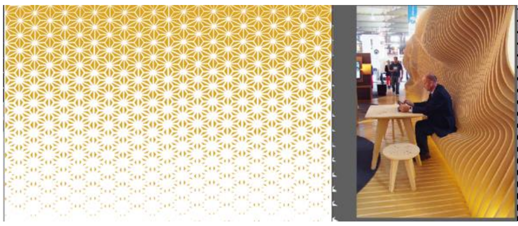
The first fabric design features two distinct patterns arranged vertically. These patterns were transferred onto polyester fabric using digital printing, a technique that accurately and vividly reproduces the intricate details and vibrant color tones of the designs on the fabric surface. This approach enhances both the visual aesthetics and the originality of the design.

The fabric was processed using the pleating technique, imparting a dynamic structure to the design. Pleats were layered on the fabric surface, enabling different patterns to appear when the fabric is rotated from left to right or right to left (Figures 8 and 9). This technique allows the fabric to offer a rich and diverse visual experience in both directions. The transformation of the patterns through rotation makes the fabric a versatile material suitable for various applications, such as fashion and interior design.

This design provides an effective solution for diverse use cases, combining aesthetic appeal with functional versatility. The visual transformation enhances the fabric's attractiveness while offering flexibility in usage. These characteristics demonstrate the design's innovative potential in both visual aesthetics and practical functionality.

Figure 8. Product Design I (left view) **Figure 9.** Product Design I (right view)

Product Design II



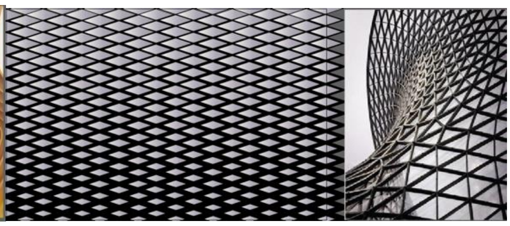


Figure 10. Pattern design 3 **Figure 11.** Pattern design 4

Figure 12. Print trial - second study

In this part, two distinct pattern designs created in Adobe Illustrator were utilized (Figures 10 and 11). The patterns were designed with dimensions of 50 × 33 cm and arranged to fit within a 50 × 99 cm area for application on polyester fabric surfaces using the digital printing method. The digital printing technique ensured that the patterns were transferred to the fabric surface with high resolution and color accuracy (Figure 12).

The pleating technique, which forms the foundation of the design, added a dynamic structure to the fabric surface. Pleats created by folding the fabric horizontally were designed to enhance visual aesthetics. To improve the fabric's mobility and add weight, a material known as *curtain lead* was inserted between the pleats. This material ensured that the pleats moved in a controlled and orderly manner while contributing to the fabric's natural drape.

To secure the pleats and maintain stability, double-sided interfacing was applied between each pleat. The interfacing prevented the layers from slipping and ensured that the pleats retained their shape, preserving the design’s aesthetic integrity. After the application of the interfacing was completed, the fabric underwent sewing processes to achieve its final form.

The innovative feature of the design becomes apparent when the fabric is rotated 180 degrees. This rotation causes the pleats to shift and alters the patterns on the fabric surface. This dynamic transformation offers users diverse visual and functional experiences (Figures 13 and 14).

As a result, the dynamic structure and pattern-shifting capability of the designed fabric have been evaluated as a design that integrates aesthetics and functionality. This fabric, with its motion-responsive visual structure, holds potential for applications in interior decoration and the fashion industry, offering an innovative contribution to design concepts.

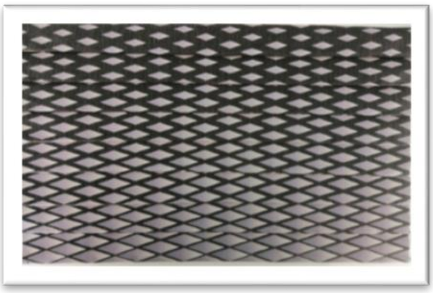


Figure 13. Product design II (View 1) **Figure 14.** Product design II (View 2)

Product Design III

In this part, two distinct pattern designs created using Adobe Illustrator were examined. The patterns were designed with dimensions of 50 × 33 cm and arranged to fit within a 50 × 99 cm area for application on polyester fabric surfaces using the digital printing method. The digital printing technique ensured that the patterns were transferred to the fabric surface with high resolution and accurate color reproduction, thereby preserving the visual impact and aesthetic quality of the design (Figures 15, 16 and 17).

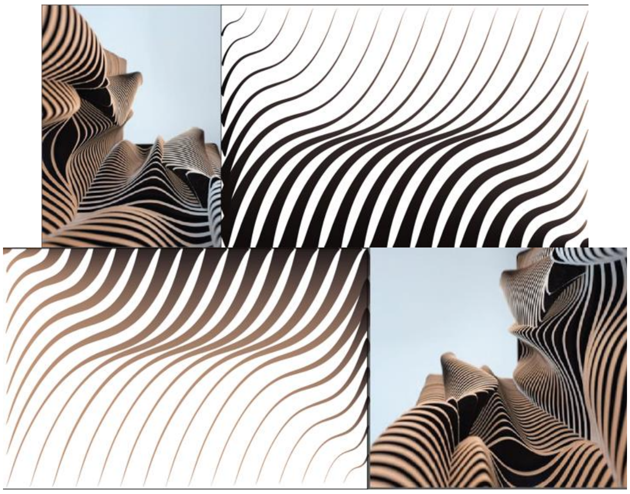


Figure 15. Pattern design 5 **Figure 16.** Pattern design 6

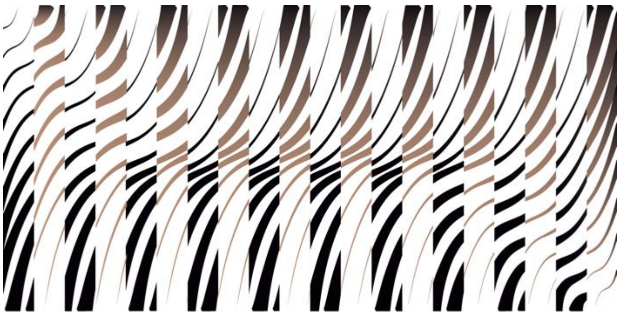


Figure 17. Print trial - third study

In the third fabric design, two vertically arranged patterns were applied to the fabric surface using the digital printing method. This design was processed with the pleating technique to achieve a dynamic visual effect. Thanks to the pleating technique, the fabric surface displays different patterns when viewed from various angles. When viewed from left to right (Figure 19) or right to left (Figure 20), two distinct patterns become visible. A third pattern emerges when the fabric is viewed directly from the center (Figure 18). This versatile design approach enhanced both the aesthetic and functional qualities of the fabric.

The digitally printed polyester fabric, measuring 50 × 100 cm, was reinforced with silk interfacing to ensure stability. The interfacing application allowed the pleated layers of the fabric to form evenly and remain stable. After the interfacing process was completed, the fabric was carefully folded according to the pleating technique and sewing processes were carried out. The sewing phase supported both the visual integrity and the durability of the design for practical use.

In conclusion, the techniques and methods employed in this study have significantly enhanced the visual diversity and aesthetic impact of the design. The ability of the patterns to present varying appearances based on the viewer's perspective transforms the fabric into an innovative material suitable for diverse applications, such as fashion and interior decoration. This design approach, combining aesthetics and functionality, offers a creative perspective in the field of textile design.

Figure 18. Product design III (front view)

Figure 19. Product design III (left to right view)

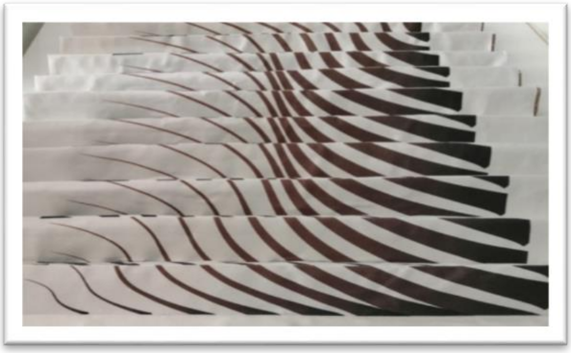


Figure 20. Product design III (right to left view)

4. Discussion

Although creative ideas in the textile design process often emerge intuitively and spontaneously, there is a need to integrate theoretical knowledge with practice within a systematic model to ensure the sustainability of the idea–design–production cycle. To this end, the study focuses on examining the potential of an experimental surface design process based on Wallas's four-stage creative thinking model (preparation, incubation, illumination, verification) to create original, functional and aesthetic products in textile design.

In the process conducted according to Wallas's model, the design-specific contributions of each stage were evaluated. During the preparation phase, clearly defining the design problem proved decisive for structuring the process. Accordingly, the research problem was defined as "designing an innovative, theme-based and creative textile pattern and producing pattern variations on the same fabric sample". In the incubation phase, conscious focus was set aside to allow ideas to develop intuitively. Although this stage was internally challenging, it was observed to play a critical role in engaging unconscious processes. In the illumination phase, on the other hand, the creative solution emerged spontaneously with the combination of knowledge, visual materials and experiences accumulated through in-depth research; moodboards and inspirations directly contributed to the concretization of preliminary design ideas. At this stage, in particular, intensive visual research was conducted on parametric architecture -the theme of the research- and how parametric design principles (such as repetitive geometries, algorithmic form generation and flexible variation structures) are reflected in surface design were analyzed. For this purpose, parametric principles were considered not only as a source of aesthetic form, but also as a systematic approach that structures design decisions. Digital modeling, variation generation and computational form transformation possibilities offered by parametric design have facilitated the creation of innovative, rhythmic and modular structures on textile surfaces.

As the surface manipulation method, pleating was preferred due to its ability to orient form and add volume to surfaces. This technique made significant contributions by emphasizing the three-dimensional character of the textile material, its openness to experimental searches and its supportive quality for the creative process. Comparative examination of the effects of different manipulation techniques on creative outputs in future studies will further deepen the guiding potential of surface design. Finally, in the verification stage, the resulting designs were evaluated in terms of their alignment with the theme, design principles and objectives. And the outcomes were finalized by making necessary adjustments. The findings revealed that intuitive thinking was particularly prominent during the "preparation" and "illumination" stages, while unconscious cognitive processes contributed to the development of innovative ideas in the "incubation" stage. This clearly demonstrated the constructive role of internal cognitive mechanisms and intuitive knowledge in creative design processes. However, the contribution of surface manipulation techniques in supporting the creative process with tangible outputs cannot be overlooked.

In this context, the study by Akpinarli and Bulat (2016) titled "*Manipulation of Textile Surfaces and Digital Transfer Printing Experiments*" is a pioneering example of the applicability of digital transfer printing and manipulation techniques to different surface structures (woven, knitted and nonwoven surfaces). That study not only demonstrated that these techniques have the potential for both physical and aesthetic transformation but also paved the way for creative design approaches for different areas of application.

Wallas's model offers an important starting point for structuring the creative process; however, some limitations of the model should be considered. In particular, the model's linear structure may not fully reflect the cyclical and multi-layered nature of design processes. Additionally, since the model is based on individual creativity, it provides a limited perspective on contemporary design practices shaped by teamwork and digital technologies. Therefore, in interdisciplinary creative processes such as the fluid relationship between architecture and textile design- the model’s flexibility and adaptability become increasingly important.

Overall, the findings showed that creative thinking models not only provide a theoretical framework but also can be used effectively as guiding, applicable and constructive strategies in the design process. Therefore, it is suggested that structured creative process approaches such as Wallas' model can be used effectively in both textile design and interdisciplinary creative practices. In this context, Black et al. (2019) developed the “Conceptual Model and Strategies for Creative Thinking in Apparel Design” and showed that the model is an effective method for developing creative thinking skills and increasing students' original problem-solving competencies.

Integrating models from various creative fields (such as systems thinking, cognitive design models, and user experience design) can enhance theoretical richness in future research. Theoretical diversity is considered to provide the capacity to approach the creative process in a more flexible, multidimensional and holistic manner.

Therefore, increasing the number of applied studies on creative thinking has the potential to transform not only academic but also industrial production processes. Especially in the field of design education, there is a clear need for structured thinking strategies that will strengthen students' identity as independent designers. Consequently, addressing models for the development, guidance and evaluation of creative abilities at both theoretical and practical levels would be beneficial.

On the other hand, Niinimäki (2019) demonstrated how a design-oriented approach to the creative thinking process can generate innovative outcomes by integrating tangible prototyping with abstract knowledge production, tactile and creative experiences with cognitive content and emotional experiences with technical knowledge. This holistic perspective reveals that design is not merely an aesthetic tool but also plays an active role in knowledge production. In this regard, the findings suggest that addressing the intuitive, cognitive and technical layers of creative thinking with a holistic approach has transformative potential in terms of both original design processes and educational practices.

5. Conclusion

By integrating Wallas' four-stage creative thinking model into the textile design process, this study demonstrates how intuitive and analytical ways of thinking can work together in parametric architecture-based digital pattern production. Each stage of the model not only structured the creative process but also interacted with digital fabrication techniques to produce viable and reproducible design outputs.

This study process revealed that intuitive approaches based on individual inspiration can lead to more sustainable design management when grounded in a disciplined and conceptual framework. This finding indicates that creativity is not only an instinctive process but also a skill that can be developed systematically.

One of the key results of the study is that the creative analyses of problems and solutions carried out during the “preparation” and “illumination” stages of the design process can generate outcomes that are not only aesthetically appealing but also functional, repeatable, innovative and suitable for production. This demonstrates that intuitive creation becomes more sustainable when supported by a research-based, disciplined methodology, enabling a more controlled design process management.

Accordingly, the Wallas model can be considered not only as a practice for individual creativity but also as a strategic thinking tool for interdisciplinary collaborations, design education processes and team-based production environments within creative industries. The model has the potential to make the creative process more planned, systematic and manageable in design-oriented theoretical and practical education, R&D/product development processes and creative disciplines.

The integration of the model into textile design processes with different themes provided a strong perspective on how creative thinking can be structured within thematic diversity. Therefore, to increase the generalizability of the model, it would be useful to test it in the future in different thematic contexts, with various production technologies and larger groups of participants. Additionally, integrating the model into design education could provide a systematic and practical roadmap for students to develop their creative thinking skills.

In conclusion, this study presents an original approach evaluating the interaction between parametric thinking and creative processes through the Wallas model, offering both theoretical and practical contributions on how creative production can be guided in the digital age.

References

Akpinarli, F., Bulat, F. (2016). Manipulation of textile surfaces and trialling of digital transfer printing. *Motif Academy Journal of Folklore, 9*(17), 167-186. (In Turkish).

Armstrong, T. (1989). *Awakening Genius in the Classroom*. ASCD, 81.

Arslan, P. (2021). Creative process in textile pattern design: Wallas' four-stage model. *Jass Studies - The Journal of Academic Social Science Studies, 14*(85), 199-218.

Bakirhan, B. (2019). The role of parametric design in gaining computational and creative thinking skills in basic architecture education. Master's thesis, Karadeniz Technical University. (In Turkish).

Black, C., Freeman, C. & Stumpo, G. (2015). Conceptual model and strategies for creative thinking in apparel design. *International Journal of Fashion Design, Technology and Education, 8*(2), 131-138. https://doi.org/10.1080/17543266.2015.1018958

Canavan, K. (2015). Applications of textile products. In *Textiles and Fashion: Materials, Design and Technology*, 531-545. Woodhead Publishing. https://doi.org/10.1016/b978-1-84569-931-4.00021-0

Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Collins Publishers.

Dijksterhuis, A., Meurs, T. (2006). Where creativity resides: The generative power of unconscious thought. *Consciousness and Cognition, 15*(1), 135-146. https://doi.org/10.1016/j.concog.2005.04.007

Forst, L. (2022). Textile thinking in practice: Creative textile design methods as research in a circular economy. In *DRS2022*: *Research Papers*, 169. Bilbao, Spain. https://doi.org/10.21606/drs.2022.527

Gong, L., Shin, J. (2013). The innovative application of surface texture in fashion and textile design. *The Korean Fashion and Textile Research Journal, 15*(3), 336-346. https://doi.org/10.5805/SFTI.2013.15.3.336

Güldür, M.M., Bayram, S. (2016). A study on the interaction between disciplines: The interaction between fashion and architecture. *The Journal of International Lingual Social and Educational Sciences, 2*(2), 59-74. (In Turkish).

Gür Üstüner, S. (2017). An overview of textile design history. *Journal of Art and Design,* 8. (In Turkish).

Gürcüm, B.H., Çifçi, A. (2017). Creativity and inspiration in textile design. *The Journal of Academic Social Science Studies*, 54, 1-19. (In Turkish).

Halaçeli, H.M. (2011). Creativity in woven fabric design. *Art and Design Education Symposium, Proceedings Book of Yesterday, Today, Future*, 575-578. Ankara. (In Turkish).

Harmankaya, H., Yılmaz, A., Çetin, A. & Ercan, D. (2014). Fashion and architecture. *Journal of World of Turks*, *6*(1), 193. (In Turkish).

Kneller, G.F. (1965). *The Art and Science of Creativity*. London: Holt, Rinehart and Winston.

Mandour, B.A. (2024). Creativity in textile printing design: An integrative framework in design education. *International Journal of Technology and Design Education*, 35, 1031-1062. https://doi.org/10.1007/s10798-024-09936-z

Morrow, R. (2014). Drifting wall: Learning from a hybrid design practice. In *The Routledge Companion to Design Research*, 12. http://ebookcentral.proquest.com/lib/ual/detail.action?docID=1818166

Niinimäki, K. (2019). YABBA DABBA DOO: Boosting multidisciplinary innovation through design-driven approach. In *Next Wave*, *21st DMI: Academic Design Management Conference*, 303-313. London, UK.

Özgün, A. (2019). Experimental studies on fabric manipulation techniques. Master's thesis, Dokuz Eylül University. (In Turkish).

Patrick, C. (1955). *What is Creative Thinking*. New York: Philosophical Library.

Sak, U. (2018). *Creativity Development and Education*. Ankara: Vizetek Publishing, 211. (In Turkish).

Schooler, J.W., Melcher, J. (1995). The ineffability of insight. In *The Creative Cognition Approach*, 97-134. Cambridge: MIT Press.

Tatari, E. (2022). Biomimetic approaches in textile design. Master thesis, Istanbul Trade University. (In Turkish).

Valentine, L., Ballie, J., Bletcher, J., Robertson, S. & Stevenson, F. (2017). Design thinking for textiles: Let's make it meaningful. *The Design Journal*, *20*(sup1), S964-S976.

Varli, E. (2013). Examination of the readability of traditional and digital design approaches. Doctoral thesis, Trakya University of Science Institute. (In Turkish).

Wallas, G. (1926). *The Art of Thought*. New York: Harcourt, Brace and Company.