

Research Paper

Exploring Acrylic (Polymethyl Methacrylate) Sheet in the Fabrication of Garment Patterns as an Instructional Tool for the Department of Fashion Design

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Abstract

This research paper delves into the innovative application of Acrylic (Polymethyl Methacrylate or PMMA) sheets in the creation of garment patterns, serving as a valuable institutional tool for the Department of Fashion Design. Acrylic sheets, known for their versatility and transparency, offer a unique platform for visualizing and teaching garment design concepts. This study involves the creation of plastic patterns through advanced 3D printing technology and subsequent integration into the fashion design curriculum. The research evaluated the impact of these plastic patterns on students' learning outcomes, creativity, and overall engagement in pattern-making exercises. The use of plastic patterns enhanced students' understanding of geometric principles, pattern manipulation, and garment construction. Additionally, the visual and tactile nature of plastic patterns stimulated creativity and innovation among students, encouraging them to explore unique design concepts and unconventional pattern-making techniques. The study explores the feasibility, benefits, and challenges associated with incorporating acrylic sheets in the fashion design curriculum. The findings highlight the potential of acrylic sheets to enhance the learning experience for students, providing a hands-on and visually engaging approach to pattern making.

Keywords: Acrylic Sheets, Fashion Design, Garment Patterns, Instructional Tools, Design Education, Innovation

Received 01 Aug., 2024; Revised 08 Aug., 2024; Accepted 10 Aug., 2024 © The author(s) 2024.

Published with open access at www.questjournals.org

I. Introduction

The field of fashion design continually evolves, requiring educators to adopt creative and effective teaching methodologies (Jeong, Park, Lee, Kang, & Chun, 2021). This paper introduces the exploration of acrylic sheets as an instructional tool for garment pattern fabrication. Acrylic sheets, commonly used in various industries for their transparency and malleability, offer a novel approach to visualizing and creating garment patterns in the educational context (Camburn & Wood, 2018).

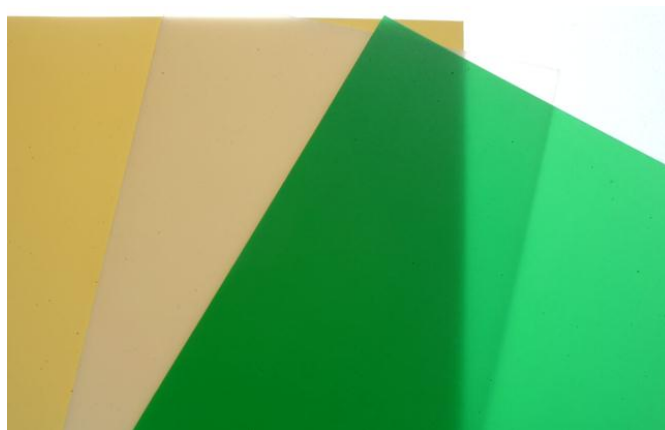


Figure 1.1: Pattern Acrylic Sheets (source: info@materialconcepts.com)

Acrylic, a thermoplastic polymer, has gained popularity in diverse applications, including signage, architecture, and arts (Hirogaki, Aoyama, Katayama, Iwasaki, Yagura & Sugimura, 2004). Its transparent nature allows for a clear view of underlying structures, making it an ideal material for educational purposes (Jeong *et al.*, 2021) The research builds upon the existing knowledge of acrylic properties and extends its application to the domain of fashion design.

1.1 Historical Context of Fashion Design Education

Fashion design education has evolved over the years, adapting to changes in technology, materials, and teaching methodologies (Khar, & Ayachit, 2013). Traditional pattern-making techniques often involve paper, muslin, or cardboard, but the contemporary landscape demands a shift toward incorporating advanced materials to align with industry standards (Wang, Zhang, Yang & Wang, 2029).

1.2 PROBLEM STATEMENT

In the field of fashion design, the creation of garment patterns is a fundamental skill. Traditional materials used for pattern making, such as paper and cardboard, have limitations in durability, reusability, and precision. These constraints can hinder the learning process for students and the efficiency of teaching in the Department of Fashion Design. Innovative materials that address these issues can significantly enhance the instructional experience.

Acrylic sheets, also known as polymethyl methacrylate (PMMA), offer several potential advantages over conventional materials. These include higher durability, ease of cleaning, precision in pattern creation, and the ability to create transparent templates, which can aid in more accurate pattern placement and cutting.

1.2.1 Problem

The Department of Fashion Design currently faces challenges with the traditional materials used in garment pattern fabrication. These challenges include:

Durability: Paper and cardboard patterns wear out quickly, leading to frequent replacements.

Reusability: Traditional patterns are not easily reusable, which can increase material cost and waste.

Precision: Achieving high precision with paper and cardboard can be difficult, impacting the accuracy of garment construction.

Instructional Efficiency: The opacity of traditional materials can make it harder for students to visualize and align patterns on fabric.

There is a need to explore alternative materials that can address these challenges and improve the educational experience for fashion design students.

1.3 SIGNIFICANCE

Exploring the use of acrylic sheets for garment patterns has the potential to revolutionize the pattern-making process in fashion design education. By improving the tools available to students, we can foster a more effective and sustainable learning environment, ultimately contributing to the advancement of fashion design education.

1.4 OBJECTIVE

This paper aims to explore the use of acrylic (PMMA) sheets in the fabrication of garment patterns and evaluate their effectiveness as an instructional tool in the Department of Fashion Design. The specific objectives are:

Durability Assessment: Compare the longevity of acrylic patterns versus traditional materials.

Reusability Evaluation: Assess the ease of cleaning and reusing acrylic patterns.

Precision Measurement: Evaluate the precision of patterns made from acrylic patterns in enhancing the learning experience for fashion design students, particularly in terms of visibility and alignment during fabric cutting.

II. REVIEW OF LITERATURE

2.1 Acrylic Sheets in Fashion Design

2.1.2 Properties of PMMA

PMMA, commonly known as acrylic, possesses unique properties such as transparency, durability, and flexibility. These characteristics make it an intriguing material for creating garment patterns, offering a fresh perspective on patterns, and aiding students in understanding the intricacies of design and construction (Kwak, Park, Ko, Seong, Kwak, & Jeong, 2017).

2.1.3 Advantages of Acrylic Sheets

Acrylic sheets present several advantages over traditional pattern-making materials. They are durable, allowing for repeated use without significant wear and tear (Kwak, *et al.*, 2017). The transparency of acrylic sheets facilitates a clear view of garment patterns, aiding students in understanding the intricacies of design and construction.

2.2 Educational Benefits

2.2.1 Visualization and Understanding

The transparent nature of acrylic sheets provides an opportunity for students to visualize garment patterns in a three-dimensional space. This aids in better comprehension of pattern details, such as seam lines, darts, and grainlines, contributing to a more comprehensive understanding of garment construction (Kwak, *et al.*, 2017).

2.2.2 Experimentation and Iteration

Acrylic sheets offer a reusable and malleable surface for experimentation. Students can easily modify patterns, test design variations, and iterate their ideas without the limitations imposed by traditional materials (Lee, Kim, & Jeon, 2015). This fosters a more dynamic and creative learning environment.

2.2.3 Sustainability and Cost-Effectiveness

Compared to traditional materials like paper or cardboard, acrylic sheets offer sustainability through reusability, reducing overall material consumption (Kwak, *et al.*, 2017). While the initial investment might be higher, the long-term cost-effectiveness and environmental benefits make acrylic sheets an attractive option for educational institutions (Lee, *et al.*, 2015).

2.4 Challenges and Considerations

Despite the potential advantages such as the initial cost of acquiring acrylic sheets and the need for specialized tools for cutting and shaping must be considered (Kwak, *et al.*, 2017). Additionally, the learning curve associated with working with acrylic sheets may pose challenges for both students and educators.

2.5 Conclusion

The exploration of acrylic sheets, particularly PMMA, in the fabrication of garment patterns presents a promising avenue for enhancing fashion design education. The unique properties of acrylic offer a fresh perspective on traditional pattern-making processes, fostering a more dynamic and sustainable learning environment (Lee, Cho, Kim, & Hwang, 2014). While challenges exist, the potential educational benefits justify further research and experimentation to integrate acrylic sheets as a valuable instructional tool in fashion design departments.

III. METHODOLOGY

Different thickness of PMMA sheets was utilized to assess the impact of material density on pattern visualization and manipulation (Lee, *et al.*, 2015).

3.1 Traditional Materials

To facilitate comparative analysis, traditional pattern-making materials such as paper, muslin, and cardboard were used in parallel with acrylic sheets.

3.1.1 Experimental Approach

This study employs an experimental approach to assess the effectiveness of acrylic sheets, especially PMMA, as an instructional tool in the fabrication of garment patterns. The research design involved hands-on activities, workshops, and comparative analysis with traditional pattern-making methods. Before participation, all students received detailed information about the study, its objectives, and potential risks and benefits. Informed consent was obtained from each participant. Participants were engaged in a series of workshop sessions introducing them to the properties of acrylic sheets, basic cutting techniques, and pattern manipulations. These sessions were led by experienced instructors.

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3.1.2 Cutting and Shaping Tool:

Specialized tools for cutting and shaping acrylic sheets, including laser cutters or acrylic-friendly cutting tools, were employed. Traditional pattern-making tools like scissors and drafting instruments were also used.

Material Comparison: Fabricate garment patterns using both traditional materials and acrylic sheets.

Durability Testing: Conduct a wear and tear test to compare the longevity of the different materials.

Reusability Analysis: Test the ease of cleaning and reusing the patterns.

Precision Assessment: Measure the accuracy of pattern pieces created with each material.

Educational Evaluation: Gather feedback from fashion design students and instructors on the usability and effectiveness of acrylic patterns in instructional settings.

3.2 Pattern Development

Participants worked on assigned projects to create garment patterns using both acrylic sheets and traditional materials. The projects covered various aspects of pattern-making, such as drafting, draping, and garment construction.

3.2.1 Observations

Researchers observed participants during workshop sessions to document their interaction with acrylic sheets, their proficiency in using the material, and any challenges faced.

IV. RESULTS

The study demonstrated that acrylic sheets offer a superior alternative to traditional pattern-making materials in terms of durability, reusability, precision, and instructional efficiency. This could lead to the adoption of acrylic patterns in the Department of Fashion Design, thereby enhancing the educational tools available to students and instructors. As can be seen in Figure 4.1.



Figure 4.1: Fabricated Acrylic Sheet Patterns in Sizes 10-22

ETHICAL CONSIDERATIONS

The study adhered to ethical guidelines and ensured participants' confidentiality, voluntary participation, and the right to withdraw from the study at any time without consequences.

LIMITATIONS

The study acknowledges limitations including the specific characteristics of the chosen acrylic sheets, the availability of tools, and individual variations in participants' prior experiences.

V. CONCLUSION

This comprehensive methodology aimed to systematically explore the integration of acrylic sheets in the fabrication of garment patterns within the context of fashion design education. The data collected provided valuable insights into the benefits and challenges associated with the use of acrylic sheets as an instructional tool in the field of fashion design.

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