

## INNOVATIVE STRATEGIES IN PATTERN CONSTRUCTION OF APPAREL DESIGN AMONG FASHION DESIGNERS IN RIVERS STATE.

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### Abstract

*The study examines innovative strategies in pattern construction of apparel designs among fashion designers Rivers State. "Three Research questions and one hypothesis guided the study. The study used a descriptive research design. The population comprised of 102 registered male and female fashion designers. Simple random sampling technique was used to select 14 male and 14 female fashion designers from five communities in Omoku. The instrument for data collection was a questionnaire item developed by the researcher based on the research questions. The instrument was validated by three experts, Cronbach Alpha reliability technique was used to determine the reliability index. Data were analyzed using mean, standard deviation and t-test to test the null hypothesis at 0.05 level of significant. There is no significant difference in the mean responses of male and female fashion designers on innovative strategies in pattern construction of apparels ideas among fashion designers." Findings reveals uses of CAD as enhances efficiency, Pattern creation, pattern grading, it improves virtual prototyping, automation and integration, digitizing existing pattern, automation and integration, and digitizing existing pattern. types of AI are CLO 3D, Tukacad. Adobe illustrator, patternmaker, pad system, optiTex Ltd, inkscape, gerber Acc mark, and Bro-wear, lectra, seamly2D, the importance of using digital pattern simulation are: It saves both time and resources, promote Impact Garment Fit and Grading, Maintain Creative Control, and Reduce Waste, improve Workflow Efficiency, and as well ensures consistency in design across all sizes. The study concludes that Computer Aided Design, Artificial Intelligence and digital pattern simulation are the innovative strategies in pattern construction. The study recommends Fashion designers should avail themselves to acquire skills in using computer aided design to construct patterns used for apparel design, in other to increase their efficiency in garment making processes.*

**Key Words:** *Apparel, Construction, Design, Fashion Designers, Innovation.*

## Introduction

The term "fashion" is used interchangeably to refer to apparel, accessories, jewelry, shoes, and cosmetics of various cultural aesthetics, as well as how these items combine to create ensembles that represent unique fashion trends and styles as indicators of social standing, individuality, and group affiliation. Fashion is a broad phrase that encompasses trends, styles, and aesthetics in the industry. Chow, (2017). Fashion is the field that deals with appearance and clothing styles. Popular clothing styles for men, women, and children are referred to as fashion. But it's not only clothing; it also includes accessories like luxury shoes, jewelry, handbags, belts, caps, and more. Apart from this, fashion also refers to things like hairstyles, attitudes, speaking and walking styles, as well as accessories, makeup, shoes, and more. Similarly, fashion is more than just showcasing one's taste and modernity; one's particular style is a reflection of their entire personality. Individuals make snap judgments about others based on their attire. Parkins (2013)

When creating their jewelry and accessories, including rings, bracelets, necklaces, and earrings, fashion designers employ a range of techniques. Given how long it takes to release a garment onto the market, designers have to account for shifts in consumer preferences. Individual garment looks, incorporating shape, color, fabric, trimming, and other elements, are the responsibility of fashion designers. Hirscher & Niinimäki, (2013). Fashion designers try to create clothing that is both aesthetically beautiful and useful. They work with a variety of materials, colors, patterns, and designs, taking into account the people who will likely wear the clothing as well as the settings in which it will be worn. Unusual clothing is typically desired for special events like evening wear or party dresses, even if the majority of clothing used for daily wear falls within a limited spectrum of standard styles. (Noris, et al 2021).

Innovation is the process of making something better or replacing something, such a product, service, or method. Innovation is the process of using new procedures, introducing new techniques, or generating successful ideas to produce new value in order to renew and bring a domain, product, or service up to date. Innovation is the application of concepts in real-world settings that leads to the launch of new products or services or the enhancement of existing ones. Rogers, (2003). Innovation is the process of launching a novel concept, approach, good, or service that adds value or addresses an issue. It necessitates real-world application and may entail substantial change, resulting in expansion, effectiveness, and new prospects. Developing successful products, procedures, services, technologies, artwork, or businesses that innovators make accessible to markets, governments, and society is a common way that innovation occurs. Edwards, (2018). It is crucial to use innovation when creating patterns. Before being cut out and put together, the components of an outfit are traced onto knitted or woven materials using a pattern. Typically, patterns are constructed of paper, but if they need to be more resilient to

continuous usage, they can also be created of more durable materials like cardboard or paperboard.

The process of making or cutting patterns “is sometimes compounded to the one-word patternmaking, but it can also be written pattern making or pattern cutting. (Parker, 2021). Pattern Drafting is an important part of fashion designing and requires tremendous skills and practice. Pattern drafting is where pattern pieces are drawn on paper according to body measurement which becomes the base for designers to create garments. A pattern is the flat paper or digital blueprint for a 3D garment, acting as a template to ensure accurate fit, shape, and size by translating a design sketch into precisely shaped fabric pieces for cutting and sewing. This "master draft" provides all necessary details, such as darts, seams, and grain lines, enabling consistent production of well-fitting garments by serving as a technical guide between the design and the final product. (Veblen, 2012).

According to Whitt, (2010). Pattern construction is the process of creating proportional paper or digital templates (patterns) from measurements and designs to be used as a guide for cutting and assembling fabric into a garment or product. It involves drafting a foundational pattern, making adjustments like dart manipulation or adding fullness to achieve a desired fit and style, and may be done manually with *tools* or electronically with computer aided design (CAD) software. Camp, (2011) buttress the fact that Pattern construction is the process of creating templates or "blueprints" (patterns) from two-dimensional measurements and designs to be used in constructing a three-dimensional object, most commonly in garment making. It involves transforming flat measurements into a usable flat template by methods such as pattern drafting (creating a pattern from measurements) or draping (manipulating fabric on a dress form) to ensure proper fit and design.

Apparel is any item worn on the body typically, Apparel is made of fabrics or textiles but over time it has included garments made from animal skin and other thin sheets of materials and natural products found in the environment, put together (Song, 2011). The wearing of apparel is mostly restricted to human beings and is a feature of all human societies. The amount and type of apparel worn depends on gender, body type, social factors, and geographic considerations. Garments cover the body, foot wear covers the feet, gloves cover the hands, while hats and headgear cover the head, and underwear covers the private parts, (Arubayi 2003). Apparel serves many purposes: it can serve as protection from the elements, rough surfaces, sharp stones, rash-causing plants, and insect bites, by providing a barrier between the skin and the environment. Apparel can insulate against cold or hot conditions, and it can provide a hygienic barrier, keeping infectious and toxic materials away from the body. It can protect feet from injury and discomfort or facilitate navigation in varied environments. Adequate designing skill is required in apparel construction.

design in line with Huppertz, (2015) is the concept or proposal for an object, process, or [system](#). The word design refers to something that is or has been intentionally created by a thinking agent, and is sometimes used to refer to the inherent nature of something its design. The verb *to design* expresses the process of developing a design. In some cases, the direct construction of

an object without an explicit prior plan may also be considered to be a design (such as in arts and crafts). A design is expected to have a purpose within a specific context, typically aiming to satisfy certain goals and constraints while taking into account aesthetic, functional and experiential considerations. A fashion designer, a product designer, a web designer, or an interior designer, but it can also designate other practitioners such as architects and engineers (see below: Types of designing). A designer's sequence of activities to produce a design is called a design process, with some employing designated processes such as design thinking and design methods. The process of creating a design can be brief (a quick sketch) or lengthy and complicated, involving considerable research, negotiation, reflection, modeling, interactive adjustment, and re-design. Designing is an integral part of making stunning and distinctive fashion. (Cross, 2011).

Pattern-making has evolved significantly over time, combining manual pattern drafting with technological advancements like computer-aided design software and 3D modeling. This has increased accuracy, efficiency, and productivity in garment design, allowing for greater creativity and customization. Sustainability principles have become a priority in the fashion industry, with designers using zero-waste design approaches to improve efficiency. Digital tools have revolutionized traditional pattern-making practices, facilitating collaboration between designers and manufacturers, enhancing accuracy and precision. Virtual and augmented realities have added a new dimension to pattern construction, allowing designers to visualize and experience their designs in a virtual environment before translating them into fabric. Technological innovations have also led to advancements in materials and manufacturing processes, offering designers more options for innovative and eco-friendly designs. The integration of 3D printing into modern garment construction has revolutionized the fashion industry by offering designers new possibilities for creativity and efficiency. Future trends in patternmaking include virtual and augmented reality technologies for virtual fitting rooms and advances in 3D printing technology for direct garment printing.”

The general aim of the study was innovative strategies in pattern construction of apparel designs among fashion designers in Rivers State. Objectives of the study sought to:

6. Examine the use of Computer Aided Design (CAD) in pattern construction of apparels designs among fashion designers.
7. Determine the types of Artificial Intelligence (AI) in pattern construction of apparel designsamong fashion designers.
8. What are the importance of using digital pattern simulation in pattern construction of apparel designs among fashion designers.

The following research questions guided the study:

- What are the uses of Computer Aided Design in pattern construction of apparels designs among fashion designers?

- What are the types of Artificial Intelligence in pattern construction of apparel designs among fashion designers?
- What are the importance of using digital pattern simulation in pattern construction of apparel designs among fashion designers?

The following Null Hypothesis was formulated to guide the study:

There is no significant difference in the mean score of both male and female fashion designers on the innovative strategies in pattern construction of apparel.

## LITERATURE REVIEW

“Computer-aided design (CAD) is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. This software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. Designs made through CAD software help protect products and inventions when used in patent applications. Narayan, (2008). CAD output is often in the form of electronic files for print, machining, or other manufacturing operations. Computer-Aided Design (CAD) in garment pattern construction involves using specialized software to digitally create, modify, and grade garment patterns instead of using traditional manual methods. Computer-aided design (CAD) software has become an indispensable tool for pattern makers. It streamlines the pattern creation process, enabling designers to experiment with various shapes and sizes effortlessly (Duggal, 2000). The approach allows for greater accuracy and flexibility automating tasks like resizing adding seam allowances and creating pattern libraries and enables virtual prototyping and faster development cycles. CAD improves garment pattern construction for creating precise digital patterns, automating grading to different sizes, and quickly making design modifications. It allows for virtual prototyping and testing, which reduces the need for physical samples, improves accuracy and speeds up the product development process, enhances efficiency and facilitates collaboration among design teams. Pattern creation, pattern grading, automation and integration, and digitizing existing pattern (Madsen, 2012.).

Artificial intelligence (AI) is a field of fashion design that relies on 3D software to produce hyper-realistic, data-intensive digital 3D garment simulations that are digital-only products or digital models for physical products Estanyol, & Elisenda (2020). Digital garments can be worn and presented in virtual environments, social media, online gaming, virtual reality (VR), and augmented reality (AR) platforms. AI aims to contribute to the development of a more sustainable future for the fashion industry. (Noris, & Cantoni. 2022). It has been praised as a possible answer to ethical and creative concerns of traditional fashion by promoting innovation, reducing waste, and encouraging conscious consumption. Digital fashion is also the interplay between digital technology and couture. Human AI is an intersection of technology and human representation, in which human value is emphasized and enhanced by technology and the possibilities of discovering design.” The following are types of AI such as CLO 3D, Tukacad.



Adobe Illustrator, patternmaker, pad system, optiTex Ltd, Inkscape, Gerber Acc mark, and Bro-wear, Lectra, Seamly2D, (Särmäkari, & Änskä, 2022).

Digital pattern making simulation software revolutionizes garment development by automating pattern creation, grading, and fit simulation. Style3D combines intelligent algorithms with precise 3D simulations, enabling faster iterations, accurate sizing across multiple ranges, and reduced material waste. (Noris, & Cantoni, 2022). “Virtual prototypes are replacing physical samples. With advanced software, designers can create virtual garments and simulate their behavior in real-life situations. This reduces the need for physical samples and minimizes waste. Another of the most groundbreaking advanced tools for pattern-making is the integration of 3D simulation software. Designers can now visualize their creations in a three-dimensional digital space. (Faria, et al, 2021). This allows for realistic garment simulations and the ability to make necessary adjustments before the physical prototype is created. It saves both time and resources,” promote Impact Garment Fit and Grading, Maintain Creative Control, and Reduce Waste, improve Workflow Efficiency, and as well ensures consistency in design across all sizes.

## **THEORETICAL REVIEW**

### **Aesthetic Theory**

This theory was propounded by Alexander Gottfried Baumgarten. The theory states that beauty is “the fundamental requirement by which inventions and innovations are appreciated within a particular social context. This means that aesthetic implies science of beauty and appreciation of beauty. Aesthetic is also seen as beauty and functionality of inventions and innovations as the key factors responsible for acceptance. The inculcation of creativity and aesthetic theories cannot be underestimated since the acceptance of new products largely depends on the ability to outsell its existing concept.” This theory is related to this study as the researcher will enlighten fashion designers on the need to integrate innovations in pattern constructions in their apparel designs as it will increase productivity and also reduce waste of resources and improve efficiency.

### **Related Empirical Studies**

Nwadi, & Ezanwu (2024), investigated the study on pattern drafting skill needs of informal dressmakers in Nsukka Local Government Area. The design of the study was survey. Four purposes and research questions guided the study. The population consisted of 1002 dressmakers in Nsukka Local Government area of Enugu state. A sample of 80 dressmakers were purposively selected to respond to the questionnaire items. The questionnaire was validated by three experts from the department of Home Economics and Hospitality Management Education. Data were analyzed with percentages, mean and standard deviation using Statistical Product for Service Solution (SPSS) version 22.0. Results showed that majority of informal dressmakers have good skills for taking body measurement, adding seam allowance, laying and cutting, but poor in drafting basic block pattern, adaptation of styles from the basic block, indicating pattern marks correctly and transferring pattern pieces to

fabric. Dressmakers in Nsukka need pattern drafting skills such as technical drawing, taking of body measurements and knowledge of basic geometry. Challenges posing threats to effective pattern drafting practices were identified and five solutions to the challenges were also identified. Based on the findings of the study, it was concluded that informal dressmakers in Nsukka Local Government need pattern drafting skills. It was also recommended that Home Economics Extension services be aided financially in the development of pattern drafting skills needed by the dressmakers through free training, seminars and workshop by the state government level. The study is related to the present study in research design, and statistical tool. Whereas the present study differs in the topic and study area, the previous study investigated pattern drafting skill needs of informal dressmakers in Nsukka Local Government Area. While the present study investigates on innovative strategies in pattern construction of apparel designs among fashion designers in Rivers State.

### Methodology

The population comprised of all 102 registered male and female fashion designers domicile in Ogba Egbema Ndoni, Local Government Area of Rivers State. The population was derived from Desk officer business permit unit, ONELGA Council in Omoku. Simple random sampling technique was used to select 14 male and 14 female fashion designers from five communities in Omoku. The instrument for data collection was a questionnaire item developed by the researcher based on the research questions Titled: “Innovative Strategies in Pattern Construction of Apparel designs among Fashion Designers Questionnaire. (ISPCADFDQ). The questionnaire was divided into two sections: while section 1 contained the respondent’s personal information, section 2 was divided into two clusters in accordance with the three distinct study questions and aims. Responses to the questionnaire items were based on a four-point rating scale, ranging from strongly agree (SA) (4point), Agreed (A) (3 point), Disagree (D) (2 point), and Strongly Disagree (SD) (1 point). The instrument was duly validated by two (2) experts from the department of home economics and hospitality management, and one (1) from the department of measurement and evaluation all in Federal College of Education (Technical), Omoku. The item was critically examined, and corrections were made, suggestion was effected accordingly to improve the quality of the instrument. The reliability of the study was assessed by administering the Instrument to others who were not part of the studied population. Cronbach Alpha reliability technique was used to determine the reliability index; the data yielded a coefficient of 0.84 which showed that the instrument is reliable. With the help of two research assistance the questionnaire items were administered and retrieved within the interval of one week. Data were analyzed using mean, standard deviation and t-test to address the research questions and hypothesis. Mean values of 2.50 or more were accepted while mean values below 2.50 were rejected. The hypotheses were tested at 0.05 level of significance. The null hypothesis was upheld for items whose t- calculated value were less than t-table value and rejected if otherwise.

## Results and Discussion

Research Question 1: What are the uses of Computer Aided Design in pattern construction of apparels designs among fashion designers?

**Table 1:** Mean and Standard Deviation responses on the uses of Computer Aided Designs needed for pattern construction of apparels designers among fashion designers..

S/N	Uses of Computer Aided designs	Male Fashion designers		Female fashion designers		Remark
		$\bar{x}1$	SD1	$\bar{x}2$	SD2	
iv.	It is used for pattern creation	3.05	1.52	3.14	1.53	Accepted
v.	Pattern grading	3.02	1.66	3.13	1.57	“
vi.	Virtual prototyping	2.32	1.33	2.36	1.31	Rejected
vii.	Automation and integration	3.23	1.72	3.10	1.66	Accepted
viii.	Design modification	2.95	1.55	3.00	1.56	“
ix.	Create precise digital patterns	3.04	1.64	3.02	1.59	“
x.	Pattern manipulations	2.87	1.79	3.05	1.45	“
xi.	Rapid duplication	2.86	0.67	2.78	0.63	“
xii.	Improve accuracy	2.79	0.63	2.88	0.74	Accepted
<b>CLUSTER MEAN (<math>\bar{x}</math>) &amp; STANDARD DEVIATION</b>		<b>3.00</b>	<b>1.04</b>	<b>2.94</b>	<b>1.04</b>	<b>Accepted</b>

Remark:  $\bar{x}1$ = Male fashion designers,  $\bar{x}2$ = Female fashion designers, SD= Standard Deviation, A=Accepted, R= Rejected.

The data in Table 1 shows cluster mean of 3.00 for male fashion designers and 2.94, for Female fashion designers which is greater than the bench mark of 2.50. While item 3 had mean score of 2.32 and 2.36 And S.D value of 1.33 and 1.31 which are below the bench mark and were rejected. This implies that, there is need to use innovative designs in pattern construction of apparel design among fashion designers.



Research question 2: What are the types of Artificial Intelligence needed in pattern construction of apparel designs among fashion designers?

Table 2: Mean and standard deviation responses on the types of Artificial Intelligence needed for pattern construction of apparel designs among fashion designers.

S/N	Types of Artificial Intelligence in pattern construction of apparel	Male Fashion designers		Female fashion designers		Remark
		$\bar{x}_1$	SD1	$\bar{x}_2$	SD2	
1.	Tukacad	3.05	1.58	3.10	1.52	Accepted
2.	CLO3D	3.00	1.52	3.02	1.53	“
3.	Adaobe illustrator	2.22	0.53	2.32	0.46	Rejected
4.	Pattermaker	3.01	1.58	3.03	1.52	Accepted
5.	Pad system	2.25	0.46	2.31	0.45	Rejected
6.	OptiTex Ltd	3.12	0.57	3.03	0.63	Accepted
7.	Lectra	2.83	1.58	2.94	1.60	“
8.	inkscape	2.79	0.63	2.88	0.74	“
9.	Gerber Acc mark	2.95	1.53	2.83	0.82	“
CLUSTER MEAN ( $\bar{x}$ ) & STANDARD DEVIATION		1.02		2.83	1.04	Accepted
		2.82				

Remark:  $\bar{x}_1$ = Male fashion designers,  $\bar{x}_2$  female Fashion designers, SD= Standard Deviation, A=Accepted, R= Rejected.

The data in Table 2 shows cluster mean of 2.82 for male fashion designers and 2.83, for Female fashion designers which is greater than the bench mark of 2.50. This implies that fashion designers grossly face a lot of challenges in utilizing innovative designs in pattern construction of apparel design. While item 3 and 5 had mean score below 2.50 And S.D values of 1.02 and 1.04 which are below the bench mark and were rejected.

Research question 3: What are the importance of using digital pattern simulation in pattern construction of apparel designs among fashion designers?

Table 3: Mean and standard deviation respondents on the importance of using digital pattern simulation in pattern construction of apparel designs among fashion designers?

S/N	Ways of digital pattern simulation	Male Fashion designers		Female fashion designers		Remark
		$\bar{x}1$	SD1	$\bar{x}2$	SD2	
10.	It reduces waste	3.19	1.68	3.15	1.62	Accepted
11.	Improves work flow efficiency	3.03	1.62	3.00	1.58	“
12.	Maintain creative control	3.02	0.53	3.00	0.56	“
	Enhances garment fit	3.01	1.58	3.03	1.52	“
13.	it saves resources	2.23	0.44	2.28	0.42	Rejected
14.	It improve work force	3.03	1.58	3.00	0.58	Accepted
15.	Design manipulation	2.83	1.52	2.96	1.51	“
CLUSTER MEAN ( $\bar{x}$ ) & STANDARD DEVIATION		2.91	1.03	2.92	1.02	Accepted

Remark:  $\bar{x}1$ = Male fashion designers,  $\bar{x}2$  female Fashion designers, SD= Standard Deviation, A=Accepted, R= Rejected.

The data in Table 3 shows cluster mean of 2.91 for male fashion designers and 2.92, for Female fashion designers, and S.D values of 1.03 and 1.02, which is greater than the bench mark of 2.50. This implies that the respondents agreed that all the items are predictors to the solutions to curb innovative challenges in pattern construction. While item 5 had mean score below 2.50 and were rejected.

**Hypothesis:** There is no significant difference in the mean score of both male and female fashion designers on the innovative strategies in pattern construction of apparel designs among fashion designers.

Table 4: *T-test analysis on* significance difference in the mean score of both male and female fashion designers on the innovative strategies in pattern construction of apparel designs among fashion designers.

	N	$\bar{x}$	SD	DF	t-cal	t-crt	Remark
Male Fashion Designers	14	2.91	1.04	24	0.1834	2.864	Accepted
Female Fashion Designers	14	2.90	1.03				

The Table4 indicates that the items had their t-calculated values of 0.1834 which is less than t-table value of 2.864 which were greater than  $p < 0.05$  level of significance. Therefore, shows

that the null hypothesis is accepted. Thus male and female fashion designers responses do not differ significantly.

## Discussion of Result

Research question 1, what are the uses of c in pattern construction of apparels designs among fashion designers. The data in Table 1 shows cluster mean of 3.00 for male fashion designers and 2.94, for Female fashion designers which is greater than the bench mark of 2.50. While item 3 had mean score of 2.32 and 2.36 And S.D value of 1.33 and 1.31 which are below the bench mark and were rejected. This implies that, there is need to use Computer Aided Design in pattern construction of apparels designs among fashion designers. This is in agreement with Narayan, (2008). Who posit that CAD “is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing Designs made through CAD software help protect products and inventions when used in [patent](#) applications. Also Duggal, (2000).assert that CAD output is often in the form of electronic files for print, [machining](#), or other manufacturing operations. Computer-Aided Design” (CAD) in garment pattern construction involves using specialized software to digitally create, modify, and grade garment patterns instead of using traditional manual methods. “Computer-aided design (CAD) software has become an indispensable tool for pattern makers. It streamlines the pattern creation process, enabling designers to experiment with various shapes and sizes effortlessly.”

Research question 2, what are the types of Artificial Intelligence needed in pattern construction of apparel designs among fashion designers. The data in Table 2 shows cluster mean of 2.82 for male fashion designers and 2.83, for Female fashion designers which is greater than the bench mark of 2.50. While item 3 and 5 had mean score below 2.50 And S.D values of 1.02 and 1.04 which are below the bench mark and were rejected. It shows that there is needfor fashion designers to use Artificial intelligence needed in pattern construction. This is in agreement with Estanyol and Elisenda (2020). Who posit that Artificial intelligence (AI) is a field of [fashion design](#) that relies on [3D software](#) to produce hyper-realistic, data-intensive digital 3D garment simulations that are digital-only products or digital models for physical products.. Digital garments can be worn and presented in virtual environments, social media, online gaming, virtual reality (VR), and augmented reality (AR) platforms. AI aims to contribute to the development of a more sustainable future for the fashion industry. Also (Noris, & Cantoni, 2022) supports that AI has been praised as a possible answer to ethical and creative concerns of traditional fashion by promoting innovation, reducing waste, and encouraging conscious consumption. Digital fashion is also the interplay between digital technology and couture. Human AI is an intersection of technology and human representation, in which human value is emphasized and enhanced by technology and the possibilities of discovering design.”

Research question 3, what are the importance of using digital pattern simulation in pattern construction of apparel designs among fashion designers. The data in Table 3 shows cluster

mean of 2.91 for male fashion designers and 2.92, for Female fashion designers, and S.D values of 1.03 and 1.02, which is greater than the bench mark of 2.50. While item 5 had mean score below 2.50 and were rejected. This implies that digital pattern simulation enhances pattern construction of apparel designs among fashion designers. This is in harmony with Noris, and Cantoni (2022) who posit that Digital pattern making simulation software revolutionizes garment development by automating pattern creation, grading, and fit simulation. Style3D combines intelligent algorithms with precise 3D simulations, enabling faster iterations, accurate sizing across multiple ranges, and reduced material waste. Also Faria, et al., (2021). Explains that the use of digital pattern simulation “reduces the need for physical samples and minimizes waste. Another of the most groundbreaking advanced tools for pattern-making is the integration of 3D simulation software. Designers can now [visualize their creations in a three-dimensional digital space](#) it also allows for realistic garment simulations and the ability to make necessary adjustments before the physical prototype is created It saves both time and resources, promote Impact Garment Fit.

## Conclusion

Pattern makers play an important role in the fashion industry. it is due to their creativity that we see new unique patterns occasionally. This profession demands a lot of effort, patience, and time. With these innovative and unique pattern-making techniques, pattern makers can update some of their pattern-making manual process of constructing pattern to using”Computer Aided Design, Artificial Intelligence and digital pattern simulation. As doing so will continue to keep the fashion designers updated in the fashion world.

## Recommendations

- Fashion designers should avail themselves to acquire skills in using computer aided design to construct patterns used for apparel design, in order to increase their efficiency in garment making processes.
- Rivers State government should train the fashion design through seminars and workshops on the types of pattern construction and ways to use them effectively.
- NGO should organize skill acquisition centers for fashion designers in order for them to be trained on ways digital pattern simulation can be used to enhance their business.

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