



Advancements in 3D Digital Technology for Virtual Fashion Design and Education

Reem R. Muhammad ^a, Kholod Mohammed ^a, Shrouk T. Farghaly ^a, Mariam H. Alaswad ^a,
 Nourhan S. Fiad ^a, and Ahmed G. Hassabo ^{b*}

^a Benha University, Faculty of Applied Arts, Clothing and Fashion Technology Department, Benha, Egypt

^b National Research Centre (Scopus affiliation ID 60014618), Textile Research and Technology Institute, Pretreatment and Finishing of Cellulose-based Textiles Department, 33 El-Behouth St. (former El-Tahrir str.), Dokki, P.O. 12622, Giza, Egypt

Abstract

This study demonstrates how 3D digital technology may be used to create clothing in virtual spaces that is exactly like the real thing. This study is important for growing the virtual fashion design field. This research examines the real-world applications of three-dimensional computer graphics in the field of fashion, and a virtual 3D fashion design simulation using 3D studio max, poser, and Photoshop is suggested in accordance with the process of fashion design. The "temporary bridge" from Rainbow is the primary design idea. The "temporary bridge" is a rainbow bridge that unites the past, present, and future with nature, humanity, and technology. The development of technology-based fashion design is essential to the success of the Clothing and Industry curriculum for vocational schools; students must be given the necessary abilities. The design of body proportions, fashion components and forms, collage- inspired drawings, Adobe Illustrator design services, fashion illustration, sketching designs, and design manufacturing are all included in the field of fashion design. Because the computer aided design programs enhance students' skills in fashion education, it is strategically designed to be relevant in response to community service activities and to build computer technology- based education. Therefore, we need to compare between the different programs and know the advantages of each one.

Keywords: digital fashion, traditional fashion, computer aided design, Artificial Intelligence..

Introduction

In this article, we will talk about the various fashion design programs (general - specialized) and compare them, and we will study them in all their aspects and importance, as these programs saved the designer time and effort while ensuring higher quality of designs and the possibility of making modifications to the design and making more than one color for him very easily, but they will not perform the function or replace the designer, but only help him in the design process.

What is traditional fashion design?

This process alludes to the age-old custom of hand-drawing fashion patterns. The fundamental skills of fashion design that have been practiced for millennia include drawing, drafting, sewing, and draping. Let us investigate this further: [1-10]

– Sketching: Designers translate a creative concept into a concrete design by sketching their

ideas onto paper. It's a private, intimate procedure that frequently calls for a notebook and a sturdy pencil.

- Drafting: The next stage is to draft the design when the drawing is complete. This entails drawing the design in full scale on paper using a precise pattern. It is an exact task that calls both a steady hand and an acute attention to detail.
- Sewing: Now that the draft is complete, it's time to implement the design. By piecing the parts together, designers create a three-dimensional garment from a flat template. Sewing is where the magic happens, whether it's a chic jacket or a dress.
- Draping: Not to mention, draping is the act of developing a garment's structure by positioning and pinning cloth on a dress form. This method provides an accurate idea of how the clothing will fit and appear in real life.

*Corresponding author: Ahmed G. Hassabo, E-mail: aga.hassabo@hotmail.com, Tel. 01102255513

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Overall, traditional fashion design is a labor-intensive process requiring patience, expertise, and a thorough grasp of the trade. However, as we'll see in the next sections, there are advantages and disadvantages to this tried-and-true approach when it comes to digital fashion design. [11]

What is digital fashion?



The visual depiction of apparel created using computer technology and 3D software is known as digital fashion. Basically, you purchase the desired suit, and the company's website applies Photoshop magic to you. All you need to do is submit them the photo you want to utilize, making sure your attire will not go in the way of the chosen ensemble, then wait for the outcome. Then, before a single thread is stitched in real life, these computer-generated garment designs may be refined, improved, and altered. With a few clicks, you can alter the design's Color, pattern, and even fabric, just like if you had a magic wand. What is the finest thing, then? You may view the design from any perspective on a digital model! [12]

General programs for clothing design:

the most important of these programs are ADOBE ILLUSTRATOR and PHOTOSHOP,

Comparison of computer design programs

Table 1: General programs:

Photoshop	Adobe illustrator
<p>This program works with bitmap images that consist of ((pixels), which is one of the most famous programs in the field of clothing design and can achieve any idea on it, coloring and placing decorations, changing design colors, placing prints by any frequency of size narrations, making CAD presentations, and shading dimensions. When using both Illustrator and Photoshop together, there are many uses, so we can work with bitmap and vector images together at the same time, and the colors in fabrics can be easily changed such as jeans and sewing, as well as adding color effects and realistic shades with No loss of details. Its advantages and disadvantages are similar to illustrator.[13]</p> 	<p>Illustrator is a standard graphical vector design program for technical drawing or flats and basic lines of design. Its job is to design drawings, logos, symbols and illustrations for the web, and it was created to serve students, designers, medium and small companies and photographers, helping designers to create a logo for companies or advertisements in general, as well as clothing designs and many different fields. Features: It is easy for the designer to draw any shape he imagines and helps him to be creative and easy to put repetitive shapes and printed drawings in the design, and he can also create more than one color for one design easily with the ability to erase or return any step, which helps the designer to work without worrying about doing something wrong. Disadvantages: Drawing the basic lines of the design on it is more difficult than drawing on paper.[13]</p> 

They do many tasks in the Fashion section and many things that we will address in this article.

Specialized programs for clothing design

such as Prostyle, Cd esign, 3d max and CLO MARVELOUS DESIGNER and these programs are specialized in the field of fashion design only and are available to students, university doctors and graduates. The strongest attempts were through the Maya program, then the additions of the 3Dmax program appeared that achieve the same function, then a very distinctive program appeared, which is Virtual Fashion , and in the end, the most powerful program in three-dimensional design is currently the CLO program , and they are Marvelous Designer or Virtual Fashion two versions of the same program with different capabilities. Due to the progress of scientific and technological fields in the current era , we were able to transform the design works from drawn paper to a three-dimensional perspective that can be seen from all sides and clarify its ideas for companies, which prompted companies interested in the field of fashion to compete in obtaining the best and latest of these technologies. This helped more to increase design ideas and increase capital in this field, which helped engineers and specialists in the development of these programs.

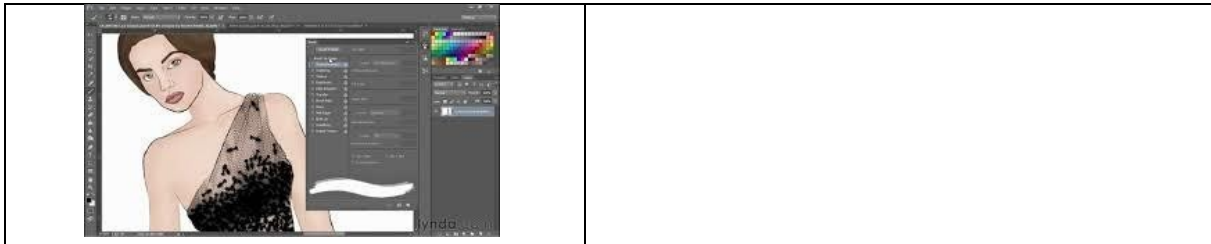

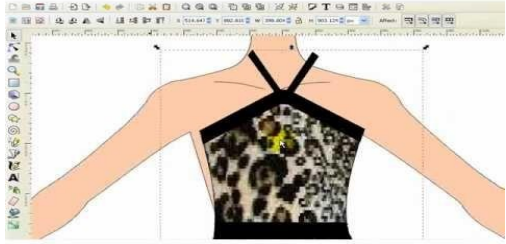
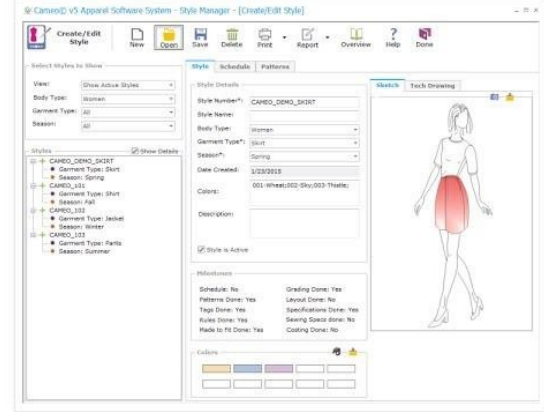
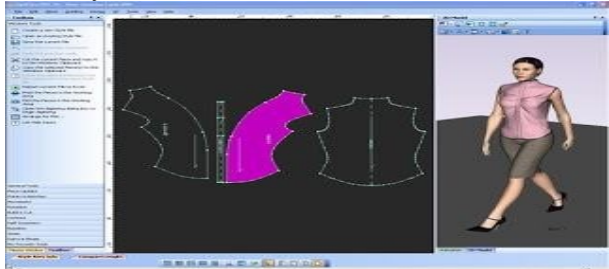
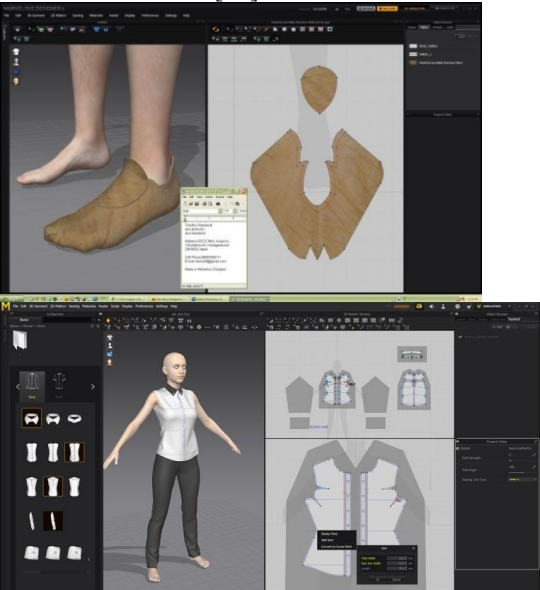



Table 2: Specialized fashion design programs:

Fashion Design CAD software	Digital Fashion Pro
<p>Easy to draw using AB fashion design template. Arrange and organize special designs in layers. Create your own design library. The possibility of making molds. The possibility of designing the appropriate fabric. Provide assistance and ready-made examples. CAD program is completely distinct and its tools are advanced for creating and modifying designs. Its simple tools enable to draw, modify and adjust designs. Work on several designs at once. Import EPS files and many images (JPG, GIF, PNG, BMP, PCX, and more)</p> 	<p>Easy to use and suitable for education in schools, for beginners and designers. Design additional styles of clothing such as dresses, coats, shoes, bags, trendy tops, hats, swimsuits, underwear, bras, sports shirts, jackets, hoodies, blouses, scarves, glasses, socks, baby's clothing and more. As a complete system (basic + upgrades), DFPro fashion design software can pretty much style and design any clothes, Digital fabric files include Cotton, Velvet, Nylon, Silk, Jeans and others. Step-by-step training, hundreds of clothing templates. After completing the design, it can be displayed on a male, female or child avatar with multiple skin colors and different attributes.</p> 
<p>Wild Ginger Cameo</p>	<p>3D CREATOR</p>
<p>The most important programs in this subject are the Wild Ginger program, a program used to develop the pattern, whether you make custom creations or design to produce large standard sizes, and you can draft, edit, and create technical specifications for the pattern.</p> 	<ul style="list-style-type: none"> - When using PDS with 3D CREATOR, you can easily add specifications weaving and knitting in 3D and accessory and make pleated on 1 of the models included in the program or one of my models. - The program offers the user a wide range of models accurate details and adjustable as well as the user can create his own models. - Its easy-to-use tools enables the creation of a wide range of models in the early stages of design. - Complete tools that use modern flat patterns that combine art and technology to deliver a simulated product of reality. 

marvelous designer	Virtual Fashion Professional
<p>One of the best programs in making three-dimensional designs and saving time, as the folds and decorations that take a lot of time in drawing can be easily done in the program, so very complex designs can be made in a few clicks, and it also offers the most realistic simulation, so we first draw the pattern of the piece, then sew the piece by connecting every two pieces together, so the programs display the piece on the mannequin automatically, so the designer can modify mistakes and identify weaknesses in the design and the pattern, as well as modify the sizes and move the piece and see it from In all respects, you can also choose the type of fabric and color, print on it, try it, and choose the most appropriate and beautiful appearance for the design with ease. This program is not limited to clothes only, but can be used to design shoes and other goods once it is provided with the shape of the material used and the shape of the commodity to be able to simulate. [14]</p> 	<p>It's the first fashion design tool that enables anybody to express their creativity in a variety of fashion lines in the area of fashion design. One of the top apps for the fashion and design industries, Virtual Fashion Professional has a number of elements that allow the user to replicate the world of fashion. Virtual designaids in the creation of clothing pieces by providing a clearer perspective of the fit and cut of the items; all of this is possible with Fashion Studio, without the need to generate actual patterns. Virtual fashion design greatly improves the performance of your job by optimizing the entire creative process. Digital processes provide for more agility in the development process, since there is no need to go through many procedures to create a piece of clothing and then verify or recreate it if there is an issue. In addition to being done online, virtual fashion design may also be completed by hand and then scanned. As a result, you may test the style variety, minimize the sample pieces, inspect and change the garment realistically, and maximize the models' acceptance.</p> <p>Virtual Fashion Pro 1.5</p> 

Advantages and disadvantages of fashion design programs

Advantages

Fashion design comes with many benefits, through which users can coordinate and control many workflows in real time thanks to technology in addition to innovative tools and solutions for programs in ready-to-use templates and it is one of the ways that distinguish these programs as it makes testing the program easy for beginners and experienced people and also allows the designer to work on more than one design at the same time and to display his creations and designs before he starts cutting clothes Through this, we have been able to save many capitals and significantly reduce costs, which increases productivity and significantly improves efficiency. Digital fashion is being hailed as the next big environmental movement. Digital

clothing eliminates the pollutants associated with manufacture and manufacturing, as well as the typical throwaway cycle associated with conventional clothing once we finish using it. Social norms around physical appearance are essentially absent from digital fashion as each piece of clothing may be customized to fit the buyer. Since the clothing will not even take up room in their closet, buyers do not have to worry too much about how an outfit looks or if it is too risky. Do you want to appear to be attending the MET Gala? Completed. How about space travel? Reduce your words. My favorite part about this trend is that it lets customers be as creative as they want!

Disadvantages

The digital world has drawbacks even if it could also have some attractive benefits.

The following are some of the obstacles you could encounter:

- **Learning Curve:** Learning a new piece of software may be difficult. Learning the tools and techniques used in digital fashion design may need patience and effort.
- **Dependency on Tech:** Digital design necessitates reliance on technology. Any technological problems, such as power outages or program breakdowns, might completely stop your job. Not to mention the necessity of routine software upgrades and the potential expenses involved.
- **Lack of Tactility:** You may touch and feel the cloth in traditional fashion design. Not exactly the same in digital design. Working with tangible items may not have the same tactile sensation for you.
- **Impersonality:** Some argue that digital design lacks the personal touch and uniqueness that comes from hand-drawn sketches. It's easy to fall into the trap of using pre-made templates, which can make your designs feel less unique.

Even with these possible drawbacks, digital fashion design has the potential to be an effective tool. Always keep in mind that it all comes down to striking the ideal balance for you. The question is not whether to use conventional or digital fashion design, but rather how to combine the best aspects of both.[15]

Comparing Traditional and Digital Fashion Design

- **Speed and Efficiency:** Digital design has the potential for speed. It is possible to alter colors, patterns, and forms with a single button click. Conversely, traditional design necessitates a more laborious, manual procedure.
- **Cost:** Since traditional design doesn't require pricey software, it could appear less expensive. Physical materials may get pricey, too. Although digital design necessitates an initial hardware and software expenditure, it can result in long-term cost savings since less physical materials are required.
- **Flexibility:** Editing and sharing designs created digitally are simple. It only takes a few seconds to share your drawings with the public and make quick adjustments. Though less adaptable, traditional design offers provide the opportunity to make unique, tactile objects.
- **Creativity:** The fields of conventional and digital design both provide creative potential. Traditional design enables a tactile, hands-on experience. On the other hand, with the aid of

technology, digital design provides countless options.

Thus, take into account your project's requirements, your budget, and your personal tastes while comparing the benefits and drawbacks of conventional vs. digital fashion design. Choosing the appropriate instrument for the task is crucial!

AI in fashion design

Fashion is impacted by technology and artificial intelligence in every way, from design to manufacturing and consumption. Fashion has always been a progressive phenomenon, quick to embrace new technological advancements. Since AI advances at the same rate as fashion, it is not an exception. For more than ten years, AI has been utilised to analyse consumer demands and fashion trends. Its influence on fashion and the development of the fast fashion phenomenon is undeniable. As the garment industry 4.0 digitalization progresses towards its 5.0 version—the use of artificial intelligence in a wider range of activities—it is becoming more and more dependent on cutting-edge technology.

Nonetheless, the examination of artificial intelligence's brief history in the fashion business makes it abundantly evident that AI has a big influence on this phenomena as well as the associated sector, which is a major actor in the world economy. Many issues regarding one of the main cultural phenomena are raised by the current state of affairs. Some experts in the field of fashion raise concerns about the uncertain social, cultural, and economic landscape that is shaping the industry today. In addition to sustainability, a number of people are tackling the problems brought up by the use of artificial intelligence. Therefore, it is crucial for the growth of the creative industries to assess the proposed directions and forecast their effects. AI has helped designers include popular colors, important patterns, and styles by evaluating and storing information from hundreds of photos and films using computer vision. This may shorten lead times overall and increase designers' creative discovery. AI is also being utilized to help stylists make recommendations for products based on the price, size, general style, order history, and social media activity of each consumer, including fashion photos saved on Pinterest. Additionally, to improve and combine customers' online and offline experiences, fashion stores (including Nordstrom, Nike, Macy's, and Farfetch) have integrated AI into chatbots, virtual assistants, and product navigators. Amazon's Echo Look, a virtual style advisor and the newest product under the Echo brand, is one example of a recently released AI product. This device has several features, such as voice-activated photo capture,

style- checking, and social media sharing. In the current research, we pay close attention to every feature of this device, but we especially highlight the style-check feature, which boasts the most cutting-edge technology and is heavily advertised in Amazon's promotional film. With this innovative technology, fashion experts' advice is combined with machine learning. Although Echo Look is not now offered on retail websites, it could be in the future.[16] An overview of the application of AI in the fashion market and industry is attempted in this article.

AI pros

- **Supply Chain Management:** Supply chain management is one of the areas where AI is having the most effects on the fashion industry. Businesses may now make more educated decisions about what to stock and when by using AI models that can be taught by past inventory levels and sales success. Profits can rise, customer satisfaction can be raised, and waste can be decreased. Since AI may potentially simplify the entire supply chain process, I believe this to be one of the most important benefits of the technology for the fashion industry.
- **Marketing:** AI is also transforming the fashion industry's approach to product marketing. Businesses may use AI-powered marketing solutions to target the appropriate customers, identify the best marketing techniques, and optimise the effect of their advertising by analysing data. By spotting new trends and developing markets, this helps firms stay ahead of the competition while also saving time and money. The fashion industry is excited about this trend as it allows companies to expand their consumer base and increase revenue.
- **Design:** The design process is another area where AI is making a big difference. Fashion companies may lower the risk of creating designs that don't sell by using AI algorithms to forecast trends and analyse client preferences. This allows them to produce designs that are more likely to be popular with their target market. This, in my opinion, is especially exciting as it gives companies new chances to produce creative, market-driven designs. When it comes to AI in fashion, there are drawbacks as well as advantages to take into account.
- **Diversity and inclusivity:** Diverse body shapes, races, and skill levels may be represented by AI-generated models, which might support inclusion and diversity in the fashion business.
- **Cost-effectiveness:** Fashion firms may save money by using AI-generated models, which

can be manufactured and utilised for a lot less money than traditional human models.

- **Flexibility:** Models created by AI may be altered to match the style and goals of any company. In order to save time and money, they may also be utilised to produce virtual fashion shows and product demos.
- **Sustainability:** Because AI-generated models replace the need for real photoshoots and travel, they can help lessen the environmental effect of the fashion industry.

AI cons

- **Effects on The Human Workforce:** The possibility that AI would eventually replace human labor is one of the main worries. There is a chance that certain professions could disappear as AI algorithms replace designers, marketers, and other fashion industry workers. Both the general fashion sector and the overall economy may be greatly impacted by this. This is a legitimate worry, and it's critical that companies use AI responsibly and ethically.
- **Homogenization:** The potential for AI to homogenize fashion is another difficulty. Fashion runs the danger of becoming less unique and innovative as AI algorithms take over design and marketing choices. This could result in a drop in the standard of fashion goods as well as a reduction in the sector's general level of attractiveness. This is a legitimate worry, and it is the industry's collective responsibility to make sure AI is used in a way that fosters diversity and innovation.

A large portion of the fashion business is welcoming AI despite these obstacles. Artificial Intelligence (AI) presents organisations with novel chances to enhance their operations and achieve greater success through its capacity to analyse data and generate predictions. AI is revolutionizing the design process and reshaping the fashion industry, from supply chain management to business operations.[17]

Pattern design software

Gerber AccuMark

Gerber AccuMark facilitates the completion of the supply chain from CAD to cutting room, regardless of whether you are creating made-to-order goods or mass-producing standardized designs. With the help of strong automated nesting and industry-leading patternmaking software, get your items to market quicker than before.

Gerber AccuMark maximizes material utilization, reduces mistakes, and boosts production

through automated procedures and sophisticated algorithms.

Pros

Reduce development time

- Simplify the procedure by immediately transferring files from Gerber AccuMark to Gerber AccuNest.
- Ensure accuracy and remove tedious jobs by automatically creating markers, plotting, and cutting data.
- Simplify pattern designs by using practical matching of stripes and plaids.
- From development to the cutting room, precisely identify kit groups and make sure that parts are kept packaged for manufacturing.
- Splices may be generated immediately in Gerber AccuNest, saving steps.
- Without human input, generate nests automatically 24 hours a day.
- Use automated nesting to maximise efficiency throughout the kitting process.
- Personalize with digital printing:
- Shorten and automate the motif-matching procedure in its entirety.
- Giving labels the ability to extend component geometry will improve the digital printing process.

Minimize costs

- Shorten and automate the motif-matching procedure in its entirety.
- Maximize the utility of both patterned and plain cloth.
- Cut both plain and patterned materials at the same rate.
- Utilize cutting-edge matching technologies to cut waste.[18]

Gemini CAD systems:

More than 20 years ago, three college buddies from Gemini realised that by developing better nesting algorithms, their knowledge of math and IT might reduce the amount of raw materials used in the garment business. This was the beginning of Gemini's adventure. After all these years, our conviction hasn't changed: by assisting manufacturers and designers in using fewer resources, we can make the world a better place, one outfit at a time.

Gemini is now advancing development by continuously creating cutting-edge software that

enables all fashion enterprises to lower their expenses and environmental effect.

With our software and hardware solutions being used by over 18,000 designers, manufacturers, and brands worldwide, our team of over 100 people is always looking for ways to increase performance, which can only lead to resource savings and a cleaner world.

Features

- **Ready to Wear Apparel:** Investigate quicker product creation, more astute cut-planning, automated nesting, and effective gathering and sorting.
- **Digitally Printed Apparel:** With its creative ideas, you may save up to 60% on print time or 40% on dye.
- **Custom Made Apparel:** The ideal instruments for personalization! Customized e-commerce orders to production in under 3”
- **Made to Measure:** Obtain production-ready files from your online purchases automatically by applying pre-established style modification criteria. [19]

Summary

Fashion design has evolved from a traditional to a computerized field. The country's fashion design school system is not changing all that much, but with time and computer education instruction, things will get much better. As such, it needs to begin with teaching fashion students computer literacy. Despite some students' complaints about the expensive expense of purchasing a computer, it appears that they are making an attempt to do so and are finding the study of CAD to be fascinating. It is envisaged that computer design will soon take the role of human or conventional design. A number of qualified instructors and a well- equipped computer center are among the things that must be established. Even if there were certain restrictions while using CAD, the benefits much exceed the drawbacks, hence efforts should be made to encourage its usage.

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Conflict of Interest

There is no conflict of interest in the publication of this article.

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References

- Hassabo, A.G., Hegazy, B.M., Elmorsy, H., Gamal, N., Sediek, A., Saad, F. and Othman, H. Denim manufacturing and washing as a fashioned garments, *J. Text. Color. Polym. Sci.*, **20**(2) 203-216 (2023).
- Huang, V.T. Shape trade marks are in fashion: A study of footwear and sneakers in australia, *Fashion & Intellectual Property, Cambridge University Press, Forthcoming*, (2023).
- Sader El-Dien, I.A.H.A.L. The effectiveness of scientific research on sustainability of clothing and fashion products and their impact on protecting the environment, *Arts, Humanities and Natural Sciences Conferences*, (2023).
- Abdel Wahab, S.S.M., Atallah, H.A.A., Saleh, Y.D.M., Glal El-Den, R.E. and Hassabo, A.G. Challenges and unsustainable practices in the apparel sector, *J. Text. Color. Polym. Sci.*, - (2024).
- Al-Minyawi, O.M.A., Mahmoud, M.N.I., Ragab, A.G., Al-Gizawy, A.S.H. and Hassabo, A.G. Smart technology and materials in the clothing industry, *J. Text. Color. Polym. Sci.*, - (2024).
- Farghaly, S.T., Alaswad, M.H., Fiad, N.S., Muhammad, R.R., Muhammad, K. and Hassabo, A.G. The impact of fast fashion on sustainability and eco-friendly environment in fashion design world, *J. Text. Color. Polym. Sci.*, - (2024).
- Fiad, N.S., Muhammad, R.R., Muhammad, K., Farghaly, S.T., Alaswad, M.H. and Hassabo, A.G. Transforming fashion: The influence of technology, smart clothing, and historical costumes, *J. Text. Color. Polym. Sci.*, - (2024).
- Glal El-Den, R.E., Abdel Wahab, S.S.M., Atallah, H.A.A., Saleh, Y.D.M. and Hassabo, A.G. Environmental sustainability and innovations in the fashion industry, *J. Text. Color. Polym. Sci.*, - (2024).
- Ragab, A.G., Al-Gizawy, A.S.H., Al-Minyawi, O.M.A., Hassabo, A.G. and Mahmoud, M.N.I. Environmental impact of clothing manufacturing and the fashion industry, *J. Text. Color. Polym. Sci.*, - (2024).
- Saleh, Y.D.M., Jalal al-Din, R.I.M., Abdel Wahab, S.S.M., Atallah, H.A.A. and Hassabo, A.G. Exploring innovative techniques for formation on mannequins: Incorporating optical fibers for aesthetic enhancements, *J. Text. Color. Polym. Sci.*, - (2024).
- Ahmed, J.U., Chowdhury, M.H.K., Uddin, M.J. and Ferdous, M.M. Sadakalo: Marketing of traditional fashion in the modern fashion industry, *Vision*, **18**(2) 125-135 (2014).
- Nobile, T.H., Noris, A., Kalbaska, N. and Cantoni, L. A review of digital fashion research: Before and beyond communication and marketing, *International journal of fashion design, technology and education*, **14**(3) 293-301 (2021).
- Hume, R. Fashion and textile design with photoshop and illustrator: Professional creative practice, Bloomsbury Publishing, (2020).
- Khafaji, S.H.A. Employment of the programs (3ds max & marvelous designer) in draping the pleats on the mannequin, *Era Journal for Humanities and Sociology*, **4**(7) 200-228 (2022).
- Kabakibi, K. and Eriksson, L. The role and use of 3d-simulations in fashion design, (2023).
- Liang, Y., Lee, S.-H. and Workman, J.E. Implementation of artificial intelligence in fashion: Are consumers ready?, *Cloth. Text. Res. J.*, **38**(1) 3-18 (2020).
- Ibrahim, W.M.R.W. and Hassan, R. Recruitment trends in the era of industry 4.0 using artificial intelligence: Pro and cons, *Asian Journal of Research in Business and Management*, **1**(1) 16-21 (2019).
- Linh, N.P. and Hoan, D.T. The study of automatic pattern generation for mtm product on gerber's accumark software.
- Sleem, M.M.R. and Elwan, N.A.A. The effectiveness of the flipped learning strategy in pattern making and grading of women's clothing using gemini cad system, *International Design Journal*, **8**(2) 357-369 (2018).

التطورات في التكنولوجيا الرقمية ثلاثية الأبعاد لتصميم الأزياء الافتراضية والتعليم

ريم رأفت محمد¹، خلود محمد عبد العظيم¹، شروق طارق عبد العال¹، مريم حامد الاسود¹، نورهان سعيد فياض¹، أحمد جمعه حسبو^{2*}

¹ جامعة بنها، كلية الفنون التطبيقية، قسم تكنولوجيا الملابس والموضة، بنها، مصر

² المركز القومي للبحوث (Scopus 60014618)، معهد بحوث وتكنولوجيا النسيج، قسم التحضيرات والتجهيزات للألياف السليلوزية، 33 شارع البحوث (شارع التحرير سابقا)، الدقي، ص.ب. 12622، الجيزة، مصر

المستخلص:

توضح دراسته كيف يمكن استخدام التكنولوجيا الرقمية ثلاثية الأبعاد لإنشاء ملابس في مساحات افتراضية تشبه الملابس الحقيقية تمامًا. هذه الدراسة مهمة لتنمية مجال تصميم الأزياء الافتراضية. يتناول هذا البحث التطبيقات الواقعية للرسومات الحاسوبية ثلاثية الأبعاد في مجال الأزياء، ويقترح محاكاة افتراضية لتصميم الأزياء ثلاثية الأبعاد باستخدام *3D studio max* و *Photoshop* و *Poser* بما يتوافق مع عملية تصميم الأزياء. "الجسر المؤقت" من *Rainbow* هو فكرة التصميم الأساسية. "الجسر المؤقت" هو جسر قوس قزح يوحد الماضي والحاضر والمستقبل مع الطبيعة والإنسانية والتكنولوجيا. يعد تطوير تصميم الأزياء القائم على التكنولوجيا أمرًا ضروريًا لنجاح مناهج الملابس والصناعة في المدارس المهنية؛ ويجب تزويد الطلاب بالقدرات اللازمة. يتم تضمين تصميم نسب الجسم ومكونات وأشكال الموضة والرسومات المستوحاة من الكولاج وخدمات تصميم *Adobe Illustrator* وتوضيح الأزياء وتصميمات الرسم وتصنيع التصميمات في مجال تصميم الأزياء. نظرًا لأن برامج التصميم بمساعدة الكمبيوتر تعزز مهارات الطلاب في تعليم الأزياء، فقد تم تصميمها بشكل استراتيجي لتكون ذات صلة بالاستجابة لأنشطة خدمة المجتمع ولبناء التعليم القائم على تكنولوجيا الكمبيوتر. ولذلك، علينا المقارنة بين البرامج المختلفة ومعرفة مميزات كل منها.

الكلمات المفتاحية: الأزياء الرقمية، الأزياء التقليدية، التصميم بمساعدة الكمبيوتر، الذكاء الاصطناعي..