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Abstract:

Technological experiences have been in continuous motion to decades. because of the powerful ideas and projects, these experiences produced Augmented reality is a live, which is an interaction paradigm that aims to combine computer-generated information with the real world This advanced technology, which can be employed on multiple devices such as interactive screens and smart phones become very useful in many fields like fashion, accessories ,footwear ,furniture and finally in education which aimed this research to prove the direct impact of augmented reality in the educational process by using questionnaire method for both students and teachers to reveal the output results from augmented reality in the educational process. The findings reveals that Augmented Reality (AR) in education can empower teachers by providing highly stimulating digital content and features that can engage learners in no time. This research aims to know the impact of augmented reality engagement in learning by students and their designs further more Augmented Reality in education has been proven to improve teacher-student collaboration in classes. this research try to contribute in the field of textile design research and facilitate the implementation designs before printing and applied .

Keywords:

Augmented Reality, Fashion, Textile, Design Education

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Introduction:

Augmented Reality (AR), a computer science field could alter the way we interact not only with computers but also with the real environment surrounding us, as well as with other human beings. Augmented Reality has so far been used for applications linked with military training, medicine, maintenance, architecture and urban planning, tourism, and entertainment. This last category embraces museums, considered by many not only as research and exhibition spaces but also as important informal learning environments. (A. Damala, I. Marchal, P. Houlier, 2014) Users of AR are still able to sense the real world around them, unlike the users of the Virtual Reality technology, which is a completely computer generated, immersive and three-dimensional environment. (Holger Glockner, Kai Jannek, Johannes Mahn, Bjrn Theis ,2014) .

AR is defined as the expansion of physical reality by adding layers of computer-generated information to the real Environment in many fields like fashion, accessories ,footwear furniture and educational process . Visitors can visualize, manipulate and browse exhibition information. (Shimaa Salah Sadek Sedek, Nashwa Moustafa Nagy ,2020)

It is known as a type of digital technology based on supplying virtual models and its related information in a user real environment to provide him additional information and fulfill full indulging. (Ibtihal Quqandy 2018). has defined it as it is "integration of virtual information in user physical environment so that information will be viewed as it is in the real environment. Augmented reality technology is considered modern technology based on Computing visions of integrating sound, video, graphic, and other sensors that are based on some elements in the physical environment to provide a unique experience in the real world. **(** Mahony, S. O. (2015)

Research problem :

1- studying augmented reality technology has not been covered sufficiently in previous textile design and printing studies

2-Augmented Reality applications in the field of textile design and printing have not been extensively addressed in academic studies

3-The benefiting from Augmented Reality applications in the field of interactive education for textile design and printing has not been mentioned before.

Significance:

1-Augmented reality technology is considered one of the new scientific experiments that deserve research and study.

2-Using augmented reality technology in the field of textile design and implementing it virtually before the actual application .

3-Developing the spirit of creativity and innovation for textile printing designer by imagining the design virtually printed on products provides the opportunity for imagination, modification and experimentation

Objectives:

-Studying augmented reality technology extensively and the difference between it and virtual reality

-Studying the applications of augmented reality in various fields, with a focus on textiles, accessories ,furnishings and educational process accurately.

-The textile design and printing department students benefit from this new technology in interactive education and enriching the design field.

Hypotheses:

The research assumes that:

1-Using augmented reality technology opens new horizons in the field of textile design and printing.

2- The use of augmented reality technology in the field of textile design leads to a number of innovative core ideas and clearly enriches the educational process.

3- Using augmented reality applications helps textile printing design students to implement design virtually on fabrics and clothes and enrich the design field through modification and experimentation

Methodology

1- **Descriptive approach**: to describe the role of augmented reality in the field of fashion and textile design education process .

2- **Analytical approach**: for the different applications and uses of augmented reality in the field of fashion, Accessories, Furniture, textile design .

3- **Experimental approach**: It deals with the innovative aspect of making experiments and technical solutions for a number of designs using augmented reality approaches and techniques

4- **Statistical Approach**: It includes a public opinion polls, for textile printing students and professors on the extent of benefit from using augmented reality applications in the field of textile design education .

The Theoretical Framework

What is augmented reality:

Augmented Reality (AR) is an interaction paradigm that aims to combine computer-generated information with the real world. (Rashmi Supriya , 2021) This technology in which the user experience an interactive real-world environment., the computer-generated images are enhanced. These images are usually touchable However, on the other hand, virtual reality is an animation or virtual view in a computer-generated environment . (Rabeel ,2018) AR is the ability to see contextually relevant information superimposed on your view of the world. Usually this is the view you see through the camera lens of your phone or mobile device. you see virtual content suspended in space as if the device has magically uncovered it. (Shelley Mannion,2014) AR has helped a lot of women to get in touch with a different side of themselves. They can now try clothes and make-ups that they would not normally try.. (Vedant Darji ,2019)

This advanced technology, which can be employed on multiple devices such as interactive screens and smart phones, has been increasingly adopted in the retail sector both publicly and privately (Javornik 2014). Prominent examples of AR applications are 'magic mirrors',

Figure (1) magic mirror

(Javornik 2016). The so-called magic mirrors have become increasingly popular since 2010 (Poulter 2010), particularly in stores, whereby they utilise AR technology to enable consumers to superimpose garments onto themselves The magic mirror is life sized and overlays the shoppers' image with pictures of their selected clothes through touch-based interfaces or gestures (Kim et al. 2017). This facilitates consumers being able to virtually try on clothing without actually having to take off any of their garments, as well as change the colours and sizes of garments (Hwangbo et al. 2017).

Advantages of Using Augmented Reality Technology:

- Virtually show physical products in the user's physical environment to see and examine.
- Allow users a high degree of freedom of

experience as much as wanted.
- Attracting a large number of users and developing participation.
- Help to create a particular emotional connection between user and product.
- Save time and effort as it allows users an augmented process at any place .
(Nashwa Moustafa Nagy, 2020)

Augmented Reality Systems Components and Tools:

The augmented reality system captures a real-world view with the camera, followed by enhancing the real scene with virtual elements in the form of layers and displaying the results via the display method. The augmented reality system consists of:
1. Camera
2. Computer (data processing unit)
3. Display unit
4. Display tool (Nermin Kayrat ,2021)

How augmented reality technology works:

The captured image data of the real scene, which is captured by the camera, is entered into the system and analyzed by a tracking technology in which the distinctive marks or details are detected, and the registration information is obtained so that the default information presented by the display medium is combined in time.

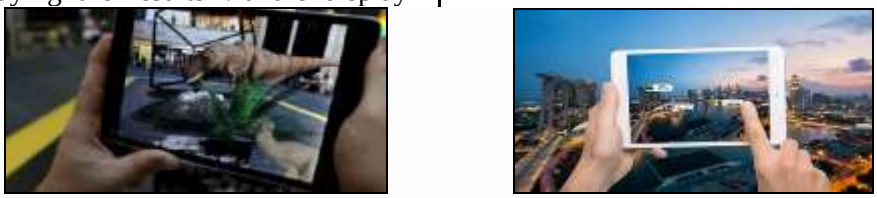


Figure (2) camera tracking

Actual, efficiently and accurately with the real scene. These steps occur together and at the same time, and are eventually shown by augmented reality projectors. In order for this to happen, the system needs to know what the user thinks and their location. The camera is often used as a multi-media-enhanced overall view display.(Nermin Kayrat ,2021)

Various Applications for augmented reality:

Vuforia

Vuforia is one of the most popular AR platforms for developers. Vuforia is a AR library that is compatible with iOS, Android, and some brands of smart glasses. Its SDK (Software Development Kit) is constantly evolving.

Figure (3) AR Vuforia application

Unity

Unity is a multipurpose game engine - which is primarily used to develop both 2D and 3D video games and simulations for consoles, computers, and mobile devices.

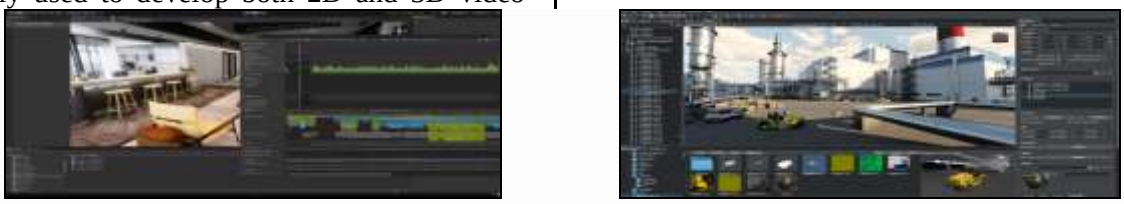


Figure (4) AR Unity application

Easy AR

Easy AR SDK is a mobile application and an Augmented Reality Engine, making AR easier. Among the features that Easy AR supports are 3D object recognition, image recognition, environment perception, smart glass solution, cloud recognition, app cloud packaging.

Figure (5) Easy AR Application

AR Kit

AR Kit provides a cutting-edge platform for

developing AR apps for iPhone and iPad respectively. It integrates into the iOS device camera and motion features in order to produce AR experiences in iOS apps.

Figure (6) AR Kit application

Examples of Augmented Reality:

Augmented Reality in the Jewelry and Accessories Sector

Figure (7) AR Jewelry

Augmented Reality in Jewelry Industry is trying to change the conventional concept in every aspect, whether it is shopping, designing, or manufacturing.Augmented Reality in Jewelry Industry can help consumers to get the best piece online.

Augmented Reality in the Cosmetics and Beauty Products Sector:

Figure (8) AR cosmetics

Augmented Reality allows customers to try on products and makeup from any location. letting them try it on via their cell phone camera helps make the decision easier (Ilya Dudkin, 2019) Augmented reality can also be used for educating customers about how to achieve a certain look and what products they will need to do it. (Daniel Levine, **2014**)

Augmented Reality in the Footwear Sector :

Figure (9) AR Footwear

Fitting room for legs with Augmented Reality allows consumers to view the shoes on their feet, uses a combination of computer vision, machine learning, to measure the complete shape of the user's feet and infer the fit perfect for every style . https://augray.com/blog/augmented-reality-disrupting-footwear-industry-with-virtual-try-ons

Augmented Reality Furniture

Figure (10) AR Furniture

Augmented reality has given a different approach to everything and the furniture business is not left out. AR outlays virtual animated objects to the real environment creating a more personalised shopping experience for customers. Apps like the IKEA allows to build a live living room, bedroom and Kitchen design and renovation ideas to further increase sales and engagement.. (Ayn de

Jesus, 2020)

Augmented Reality in fashion

fashion industry is one of the ever populating and demanding industries all over the world. Also Augmented Reality (AR) helps online shoppers understand what they are buying and precisely determine how items ranging . (Yaoyuneyong, G.; Foster, J.; Johnson, E.; Johnson, D, 2016) Augmented reality allows the customer to try out the outfits virtually with AR virtual trial rooms. The customer can try it in a real-time environment and size fitting can be rectified easily. (Javornik, A.; Rogers, Y.; Moutinho, 2016)

Figure (11) AR fitting room

The majority of online shopping websites display garments through 2D photos of garments and human models. (Martin, C.G.; Oruklu, 2012) Consumers purchasing decisions will mostly depend on the 2D images of garments, without being able to look at the piece of clothing in detail or better understand the garment style. (Beck, M.; Crié, D. ,2018) which may negatively impact their shopping experience and purchase intention .Today, with the growth of the virtual try-on (VTO) technology, consumers can browse a broad range of products and try items on in the online shopping environment. (Shin, S.J.H.; Chang, H.J.J, 2018**)**

Figure (12) 3D virtual avatar

Some VTO used a 3D virtual avatar created by reflecting body measurements and facial features of users (Kim, D.E.; LaBat, K. ,2013) This 3D virtual avatar may increase the accuracy of virtual fitting and enhance the hedonic experience while shopping AR is an interesting feature of digital signage for advertisement and will also help in attracting crowds Ray-Ban virtual mirror. (Lau, K.W.; Lee, P.Y.) The idea of the app was that the customer is able to pick a body avatar similar to theirs in size and then try on different clothing items, getting an idea of what the clothes would look like in 3D.

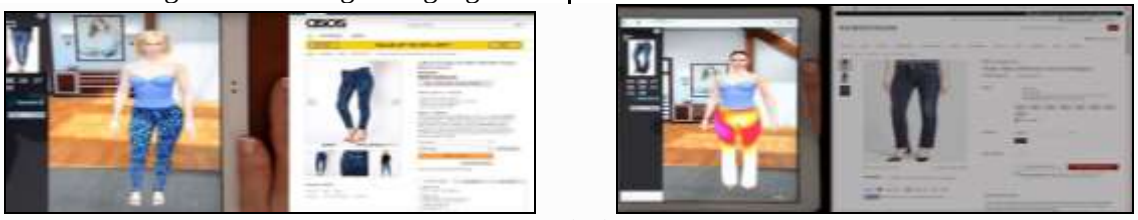


Figure (13) 3D

Model

It's great because when rendering garments and body models**, the thickness, weight and texture of the fabrics are taken into account,** as well as individual **body types.(** De França, A.C.P., 2018)

Augmented Reality Technology in Education

Teachers and educators routinely seek new tools, techniques, and technologies to enhance learning and engage learners. One such tool, with an exciting array of new possibilities in technology-enhanced learning, is augmented reality (AR). (Akçayır, M, Akçayır, G ,2017)

Augmented reality is shifting from being a technological novelty to a practical instrument of instruction The growing affordability of requisite technologies is leading to an increase in the adoption of AR for a wide range of educational applications ,The field of education presents fertile ground for the large-scale integration of AR technologies and applications. (Lee, H.; Leonas, K, 2018) Little studies have been conducted on the question of the use of augmented reality technology in the education field. the effectiveness of augmented reality technology in developing students' fashion and textile design skills. from a three-aspect, (the functional, aesthetic and creative). Findings showed that fashion products of students who were taught via the use of augmented

reality technology achieved higher success and acceptance in all aspects (the functional, aesthetic, creative), and the fashion design skills as a whole ones than the products of students who learnt via the traditional teaching method supported by educational videos provided by the learning management system. The findings provide important evidence for the augmented reality benefits in research and development of educational technology. (Augmented reality in education, 2018)

AR in Educational Settings

Augmented reality is best known as a visualization technology with animated 3D models and graphics .Augmented reality is more than a physical sensory experience. (Bujak et al. (2013) summarize AR experiences as impacting learning along three key dimensions:

1.Physical, which refers to the interaction with and manipulation of objects.

2. Cognitive, which involves spatial and temporal contiguity.

3.Contextual, adding personal relevance to real-life settings.

As with other digital innovations, the significance of AR is how the technologies and applications are capable of supporting meaningful learning outcomes. The 2016 Horizon Report: Learning environments with AR are also able to provide interactive materials that allow learners to easily visualize abstract concepts and complex spatial relationships not otherwise possible or visible, such as views into outer space (Johnson et al. 2016).

Researchers organized the advantages of utilizing AR in education into the following three categories:

1.Learner outcomes—improved academic achievement, increased learning motivation, improved understanding, positive learner attitude, and enhanced satisfaction.

2.Pedagogical contributions and interactions—enhanced enjoyment, increased learner engagement, fostered interest, provided collaborative opportunities, improved communication between learners and instructor, increased student interaction, and promoted self-learning.

3. facilitates visualization of invisible or abstract concepts, easy for students to use, and reduced material cost. (Kidd SH, Crompton H ,2016)

Augmented Reality and Textile Printing Education:

A picture tells a thousand words, so What if pictures could be projected into the real world and brought to life in 3D, This is Augmented Reality (AR) where designers can engage and interact in the real world .

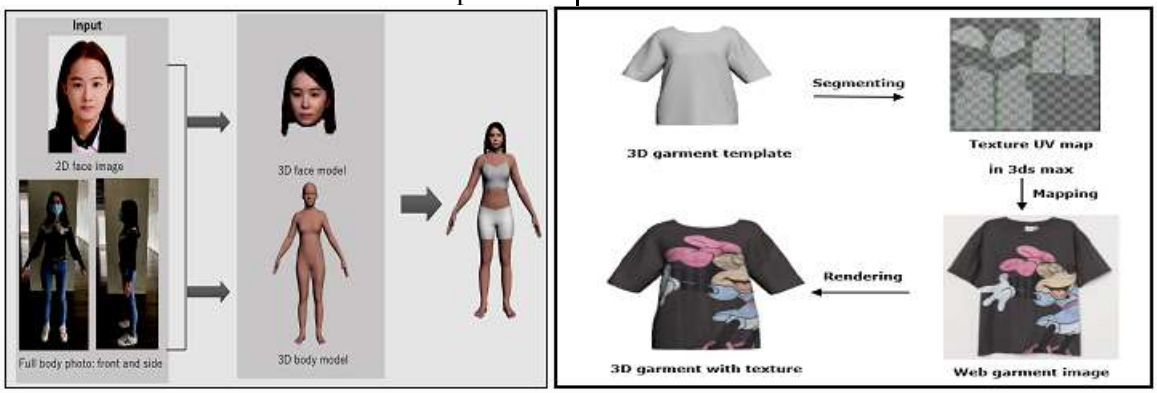


Figure (14) 3D garment models

Compared to 2D images, 3D garment models precisely simulate garments. the 3D AR-based try-on is better than 2D overlay AR-based try-on. Because the 3D garment model matching to 3D avatars presents a more accurate representation of the design and its fit. It also provide users a multi-angle view of the garments.(the-advantages-and-disadvantages-of-augmented-reality.html)

The poor representation of printed design may lead to an unrealistic perception of the design, thus strongly affecting the quality of the design outlook, when trying on clothes in real life. designers can view their own designs on dressed body in the real world from different viewpoints In addition, we propose that the virtual body model includes the design own personalized motion. This allows designer a better understanding of whether the design on garment is suitable while moving in their own way. (Anthony Stephen Mendes, 2017)

The system implements interaction techniques across the AR technologies To gather feedback method for reshaping the garment image based on human body shapes to make fitting more realistic (Yamada et al, 2014) Comparing with the existing system, our proposed AR try-on system tries to make the improvement from these three parts:

(1) Personalization: Existing Our proposed AR -based try-on system improves the level of personalized avatars. provide a new way for designers to view the virtual garment by the augmented personalized motion.

(2) Interactivity: Most existing VTO systems only

overlay the 2D images of garment onto a real body, without using 3D information and not allowing designers to check the garment from different viewpoints. Our proposed AR- based try-on system enables designers to view a life-size personalized avatar with garment models and posing or walking augmented in the real-world. Designers can view the virtual design interactively and immersive in 360 degrees. (Chen, X.; Zhou, B.; Lu, F.X.; Wang, L.; Bi, L.; Tan, 2015)

(3) Realism of design model: Existing VTO systems usually use some pre-defined garment model. 3D garment design models can enhance education process , presentation and help students to better visualize garments.

3D Garment Model Templates

Marvelous designer is a popular 3D software used for 3D garment design based on 2D sewing patterns. Marvelous designer includes a garment template library that is used as the basis for creating various garment models. We customized several 3D garment model templates for the personalized human model using Marvelous designer We provided some 3D clothing templates of t-shirts, skirts, shirts, dresses . (Marvelous Designer. Available online ,2020).

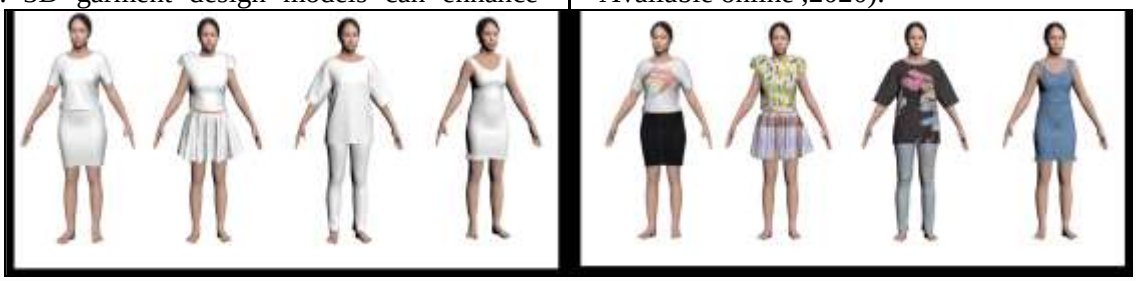


Figure (15) 3D templates and designs

Personalize Motion of the Avatar

To allow designers to gain a sense of the real fit of their designs on templates, we personalized a virtual avatar. Previous research provided virtual try-on with motions.(Gültepe et al). provided a realistic fitting experience with customized static poses using a depth sensor (Gültepe, U.; Güdükbay, 2014) Adikari et al. introduced a virtual dressing room

for real-time simulation of 3D clothes with users performing various poses.

(Adikari, S.B.; Ganegoda, N.C.; 2020,) So far, there is a lack of research exploring the dynamic VTO experience with personalized motions .We personalized the animation of the virtual avatar which allows designers to gain a sense of wearing clothes and designs from different poses. The work flow of personalizing the avatar motion is shown in Figure (16), which consists of three sections: motion capture, personalized movement, and animation library. Yuzhao Liu 1,*, Yuhan Liu 1, Shihui Xu 1, Kelvin Cheng 2, Soh Masuko 2 and Jiro Tanaka 1, 2020 The recorded animations are then smoothed out using Maya.

(Maya. Available online:,2020).

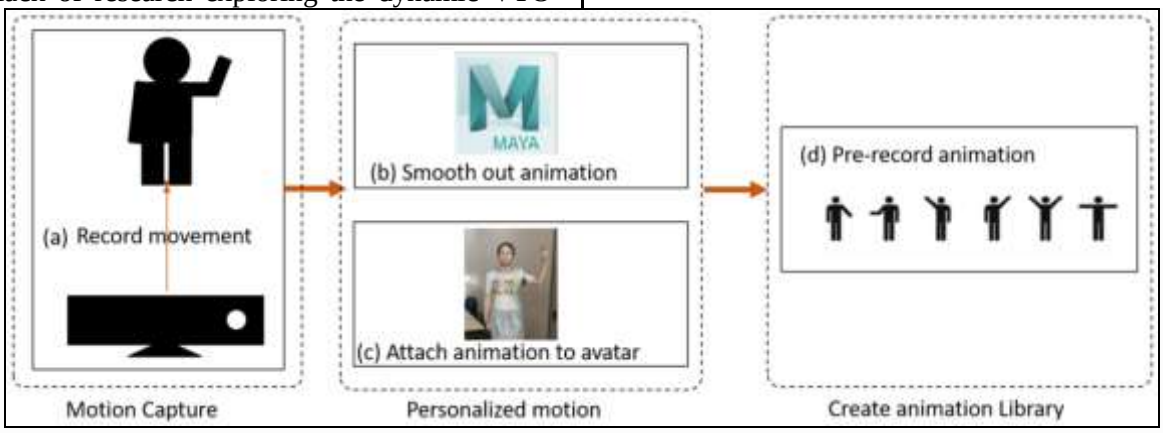


Figure (16) Work flow of motion

2D and 3D Overlay AR-Based Try-On:

2D overlay virtual try-on was mostly conducted in computer graphics. The 2D overlay VTO overlays a projected 2D image of products onto a model image .visualization of design in a virtual environment for reshaping the design garment on model image based on human body shapes to make fitting more realistic. However, 2D overlay virtual try-on does not adapt well to dynamic poses when designers perform their designs.

Compared to 2D images, 3D garment models precisely simulate garments.

the 3D AR-based try-on is better than 2D overlay AR-based try-on. Because the 3D garment model matching to 3D avatars presents a more accurate representation of the design and garment and its fit.

It also provide designers a multi-angle view of the garments and design. and allow designers to view the fitting interactively, and enable them to check the design by augmenting the motion of the avatar in the real world.

Figure (17) represents textile designs and their applications on (2D) compared with (3D) application .

The researcher tries to design some textile designs inspired from flowers and Islamic motives and tries to apply these designs on 2D image model and 3D avatars trying to find the difference in appearance between 2D and 3D application design

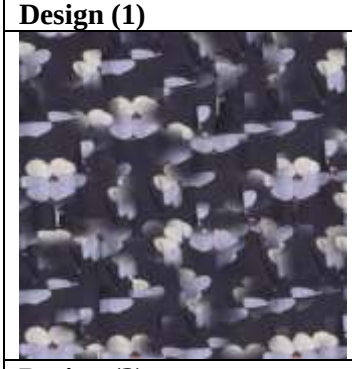
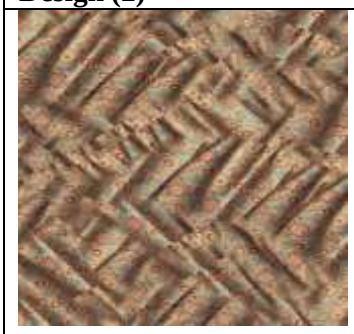
Textile Design	2D application	3D application
		
Design (1)		
		
Design (2)		
		
Design(3)		
		
Design (4)		

Figure (17) (2D) compared with (3D)

Augmented Reality and Integrated printed designs:

Augmented reality can be used in examining one print design on clothes like logos on T-shirts as designs can be saved on AR browser application running on tablet ,or mobile phone With this application designer can easily pointed out the design on the user's back or front to determine the

logo position and scale easily before printing .

Figure (18) AR & integrated logos

Designer can examine the usability and acceptability of the design on clothes and whether designs need modifications or not as visual designs are part of clothing design and it will be easy to control visual style ,size ,content, type, customizability This provides a potential playground for social interplay This is a novel approach in designing clothes integrated digital application, our work has novelty in presenting an attachable and removable designs concept which engages the user in personalizing the appearance of the body-worn part of the system also very relevant from the clothing design perspective .The design process for the AR garments followed a clothing design process from ideating, concepting, to prototyping, with a strong emphasis on sketching and working with fabric and cloth. The locations to attach the designs were selected as chest height (front and back), lower arm and upper arm, based on findings on users' preferred locations for wearable logos reported in which was integrated to the visual design.

(Jonna Häkkilä, Juho Rantakari, Paula Roinesalo, and Ashley Colley, 2016).

The overall design evolved somewhat after each prototype based on color selections and wear ability factors, e.g. on how easy the garment was put on and take off. Altogether four prototypes were made, Selecting what to wear and where, and to have different content for different occasions provoked curiosity and engagement. The ability to adapt the public appearance of the garment may also be beneficial for designing fashionable wearable computing. (Oskar Juhlin, Yanqing Zhang, Jinyi Wang, and Anders Andersson, 2016).

the temporal and seasonal nature of fashion sets challenges for technology, The concept of wearable AR designs sits at the boundary of private and public information display. The highly rated use case of indicating belonging to a group and suggestions of wearing the garment to social occasions, event and parties .

Statistical Analysis :

In order to verify research hypotheses and to understand teachers' and students' attitude toward the AR-based try-on in textile design education the researcher conducted a within-subject study. In this study, a total of 20 teacher and 15 student were asked to complete a questionnaire.

Measures

The respondents completed the questionnaire using a 5-point Likert scale (ranging from 1, "strongly disagree", to 5, "strongly agree") adopted from existing research. The questionnaire and measurement items are shown in Table 1.

Table (1). Questionnaire and measurement items.

Measurement Items	Questions
implementation	implementation augmented reality into education very useful
participation	increase student participation and motivation in classes
interactive	Increased learning activity and interactive with new designs
experience	provide great experience in designing new trends
visualization	The value of visualize the design before printing
value	add value to the design and implementation
Evaluation	Using Technology For Evaluating designs

design problems	prepared clothes templates according to the design
Enjoyment	Enjoyment and Convenience in examining designs
costs	AR applications need appropriate training thus increase costs and time involved
privacy	AR application is the lack of privacy
development	The AR technology involves high costs of development

Results

We separated the results into two sections: (1) professors of textile design education (2) students in textile design department

The overall results of the analysis showed that the integration of Augmented reality into education preformed the best, being the preferred choice for participants. The worst perceived was the costs and privacy .

Differences in Ratings

For statistical analysis of differences, we used repeated measures one-way ANOVA. The study we conducted meets almost all the assumptions required for one-way ANOVA repeated measures. As for the normality assumption, it is not necessary to be too strict, as long as the data approximately obey the normal distribution. One-way ANOVA was performed using SPSS (SPSS. Available online: https://www.ibm.com/analytics/spss-statistics-software)

to assess whether there were any statistically significant differences among the means of the independent conditions. To establish the between-group difference, post hoc tests were ran The mean and standard deviation of the measured variables for every experimental condition are presented in Table 2.

The ANOVA result shows that There is no statistically significant difference between teachers and students in" implementation augmented reality in education" as The significance value reached the probability 0.702 which is greater than p>0.05 and The mean of the sample of teachers was about 4.1 with a standard deviation of about 1.25, while the mean of the sample of students was about 4.3 with a standard deviation of about 1.28.

Also There is no statistically significant difference between teachers and students in" Increase student participation and motivation" where the significance value of probability was 0.712, which is greater than p>0.05. The mean of the sample of teachers was about 3.9 with a standard deviation of about 1.33, while the mean of the sample of students was about 4.1 with a standard deviation of about 1.28.

"Increased learning activity and interactive " the significance value of probability was 0.849, which is greater than p>0.05. The mean of the sample of teachers was about 4.2 with a standard deviation of about 1.27, while the mean of the sample of students was about 4.1 with a standard deviation of about 1.28

" Provide great experience" the significance value of probability was 0.863, which is greater than p>0.05. The mean of the sample of teachers was about 4.0 with a standard deviation of about 1.36, while the mean of the sample of students was about 3.9 with a standard deviation of about 1.46

"Visualize the design before printing" the significance value of probability was 0.89, which is greater than p>0.05. The mean of the sample of teachers was about 3.8 with a standard deviation of about 1.36, while the mean of the sample of students was about 3.9 with a standard deviation of about 1.46

"Add value to the design" where the significance value of probability was 0.717, which is greater than p>0.05. The mean of the sample of teachers was about 3.9 with a standard deviation of about 1.17, while the average of the sample of students was about 3.7 with a standard deviation of about 1.53

"Using Technology For Evaluating designs" the significance value of probability was 0.596, which is greater than p>0.05. The mean of the sample of teachers was about 4.4 with a standard deviation of about 1.14, while the mean of the sample of students was about 4.1 with a standard deviation of about 1.25

"Prepared clothes templates according to the design " the significance value of probability was 0.569, which is greater than p>0.05. The mean of the sample of teachers was about 4.0 with a standard deviation of about 1.41, while the mean of the sample of students was about 4.3 with a standard deviation of about 1.28

"Enjoyment and Convenience in examining designs ", the significance value of probability was 0.285, which is greater than p>0.05. The mean of the sample of teachers was about 3.8 with a standard deviation of about 1.28, while the mean of the sample of students was about 4.3 with a standard deviation of about 1.28.

"AR applications need appropriate training thus increase costs and time involved " the significance value of probability was 0.574, which is greater than p>0.05. The mean of the sample of teachers

was about 3.6 with a standard deviation of about 1.31, while the mean of the sample of students was about 3.9 with a standard deviation of about 1.46.

"AR application is the lack of privacy " the significance value of probability was 0.481, which is greater than p>0.05. The mean of the sample of teachers was about 3.6 with a standard deviation of about 1.39, while the mean of the sample of students was about 3.9 with a standard deviation of about 1.33

"The AR technology involves high costs of development " the significance value of probability was 0.46, which is greater than p>0.05. The mean of the sample of teachers was about 3.2 with a standard deviation of about 1.42, while the mean of the sample of students was about 3.5 with a standard deviation of about 1.60.

Table (2): Post hoc between groups Results.

	Teachers		Students		Significance of the Mean Difference
	Mean	S.D	Mean	S.D	
Implementation augmented reality into education	4.1	1.25	4.3	1.28	0.702
Increase student participation and motivation	3.9	1.33	4.1	1.28	0.712
Increased learning activity and interactive	4.2	1.27	4.1	1.28	0.849
Provide great experience	4.0	1.36	3.9	1.46	0.863
Visualize the design before printing	3.8	1.36	3.9	1.46	0.890
Add value to the design	3.9	1.17	3.7	1.53	0.717
Using Technology For Evaluating designs	4.4	1.14	4.1	1.25	0.596
Prepared clothes templates according to the design	4.0	1.41	4.3	1.28	0.569
Enjoyment and Convenience in examining designs	3.8	1.24	4.3	1.28	0.285
AR applications need appropriate training thus increase costs and time involved	3.6	1.31	3.9	1.46	0.574
AR application is the lack of privacy	3.6	1.39	3.9	1.33	0.481
The AR technology involves high costs of development	3.2	1.42	3.5	1.60	0.460

Source: Collected and Calculated from the Research Sample Questionnaire

Table(3. main conclusions and free comments

Conclusions	Free Comments
Teachers and AR In Education	Augmented Reality (AR) in education can empower teachers by providing highly stimulating digital content and features that can engage learners in no time
Interactive	helps teachers get the attention of students in no time and it increases engagement levels as well. It brings to life abstract topics, and learn with 3D models
Being A Guide	Make students familiar with the technology and atchive better outcomes, students grow their imaginative and thinking ability. Thus discovering and getting to know more about themselves through the learning process.
Teaming Up Students	Augmented Reality in education has been proven to improve teacher-student collaboration in classrooms Students can find the most challenging and plan lectures
participation	With AR apps, students have access to education and learning models. These models aid better and high level understanding of subjects among students. The more students understand having better grasps of topics, the more their participation

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