

## **The Role of Smart Clothes Among the Data of Modern Technology and Design Requirements**

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### **Abstract:**

Technological progress has become a subject of study and interest in scientific laboratories with the aim of creating modern textile fibers and materials with high-quality aesthetic and functional properties and performance that are used in the rapidly developing fashion industry using the era's innovations of modern technical methods, advanced technology, scientific techniques and new materials, so the field of designing fashion is a rapidly changing field as an inevitable result of constant innovation and renewal in line with the language of the times.

Smart technologies were able to enter the field of modern technology and fashion design, as it imposed on fashion designers, many challenges that could be used aesthetically and functionally in international fashion shows, this field achieved many scientific and technical applications that were difficult to achieve before, by finding many solutions and alternatives to enrich the aesthetic and functional values on clothes. The trend of smart fashion appears in clothing and its accessories, color manipulation through the dynamic's movement of the color, future schools has clearly achieved this trend by using unconventional materials and various techniques to combine technology with fashion.

The importance of research comes through finding new ideas for smart clothes and enriching them with graphic designs that fit the post-modern period, where the world of technology is considered a very important revolution, as well as the need to include it in some of the teaching curricula in universities and institutes in the Arab world in general, in addition to the University of Petra and Jordan in particular.

The problem was manifested in the lack of interest in the Jordanian folklore and its inclusion in clothing through the development of decorative design units to form them in a manner commensurate with modernity and the requirements of young people, to enrich the folklore in a new format, in addition to the lack of references and local research in the field of smart clothing, which requires intensified effort and scientific research to include it as a basic teaching material within colleges and institutes.

### **Key words;**

*Smart clothes– Technology - Design requirements*

### **Search limits:**

Smart Clothes

Modern technology

**Design using software:**

Adobe Illustrator & Adobe Photoshop

**The research sample:**

Age group 18-23, number 63 of both sexes

Specialized experts / graphic design, industrial design / faculty members in Jordanian universities from / Jordan / Egypt / Iraq.

**Research Hypothesis:**

The research hypothesis came through the two questions:

1. Is it possible to produce a proposal for the design of smart wearable clothes that combine modern technologies with electronic sensors, and a design derived from the Jordanian heritage?
2. Can functional design be aesthetic?

**Search Tools:**

A questionnaire entitled (The role of smart clothes in our daily lives between the data of modern technology and the requirements of graphic design in Jordan).

Adobe Illustrator & Adobe Photoshop,

Smart fabrics.

**Research Methodology:**

The research adopted the descriptive analytical method and the experimental method.

Research axes: The research includes three axes:

- The first axis: previous studies.
- The second axis: Technology and smart clothes.
- The third axis: Experimental interactive design.

Research tools / practical experiments / analysis of results / the most important conclusions.

**Previous study:**

The study of Massachusetts Institute of Technology in 2018, researchers have created smart clothes that use special fibers to sense a person's movement by touch, including smart watches that can measure all kinds of measures of human movement and health, to clothes that are able to monitor a person's vital signs without having to touch the wearer. MIT researchers believe that the smart clothing can be used for sports training or rehabilitation.

They also developed a range of prototypes for wearable items, including socks, gloves and bulletproof vests. The research team believes that smart clothes can be used in robots to provide a type of skin for the robot to provide tactile sensing, at the conclusion of this study they indicated the use of available materials that are easy to produce in large quantities.

**Second Axis:**

The data of modern technology for smart clothes which did not stop at a certain point was discussed, as it was employed in the world of clothing and fashion in a way that is closer to science fiction which turned into a tangible reality for designers who combined electronics and textiles together as shown in Pic (1).



picture number 1, fashion show 2017

Organza fabric is a good example of electrical current transmission because it contains a copper conductive wire and silk thread (Pic. 3,2).



Picture No. (2) A dress made of organza fabric



Picture No. (3) organza fabric

Smart textiles represent the next generation of fibers, fabrics and products manufactured from them, especially clothing can be described as textile materials that are able to control without external influence, meaning that they are able to give us a feeling of warmth in cold weather with their ability to give us a reverse thermal feeling (feeling cold) if changed. Environmental conditions to hot climatic conditions without the need to replace them or make any change in their materials or tissue composition Picture No. (4).



Picture No. (4) the smart jacket/2015

### **The Jet Suit:**

One of the modern experimental curricula subject to interactive design in 2021, which is still in the process of experimentation, is the jet suit, it was designed in cooperation between Gravity Industries and the Royal Navy.

Also, the suit has been tested by paramedics in the remote Lake District in England to deliver it to people at risk in a fraction of the time it takes to travel by car or on foot Pic No. (5)



Pic. No (5) The British Navy Jet Suit / 2021

**Smart Shoe:**

An Austrian company recently unveiled smart shoes that use ultrasonic sensors to help blind and visually impaired people detect obstacles with a range of up to four meters. The website (oddy Central) confirms that the smart shoe known as (Enomike) aims to become a modern alternative to the usual walking cane used by the blind, and millions of people around the world will be roaming as safely as possible Picture. No. (6).

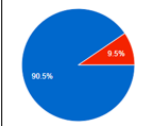
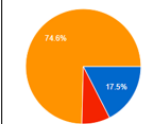

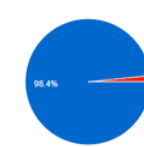
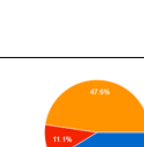

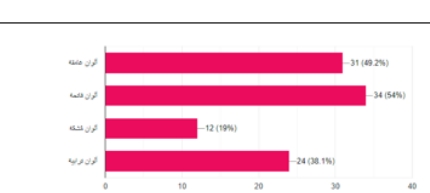


Picture No. (6) The smart shoe for the blind/2021

**Research tools/questionnaire;** the questionnaire was sent to a random sample of (100) individuals of both sexes, and the number of people who answered it from the original community was (63) people, who were approved to achieve the research objectives to reach the conclusions, and the data were unloaded in the tables as follows:

<table border="1"> <thead> <tr> <th>Percentage chart</th> <th>النسبة المئوية %</th> <th>الجنس</th> </tr> </thead> <tbody> <tr> <td rowspan="2"> </td> <td>%20.6</td> <td>ذكر</td> </tr> <tr> <td>%79.4</td> <td>أنثى</td> </tr> </tbody> </table> <p>Table No. (1)</p>	Percentage chart	النسبة المئوية %	الجنس		%20.6	ذكر	%79.4	أنثى	<p>Sex percentage</p>						
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<p>مخطط النسبة المئوية</p>  	<p>هل ستبادر بالتسجيل في معاهد وجامعات للملابس الذكية</p> <p>%17.5</p> <p>%7.9</p> <p>%74.6</p>	<p>الرغبة في فتح التخصص في الجامعات للملابس الذكية</p> <p>%90.5</p> <p>%9.5</p> <p>-</p>	<p>فتح تخصصات للملابس الذكية</p> <p>نعم</p> <p>لا</p> <p>ربما</p>	<p>Desire to open specialties</p>
Table No. (8)				
<p>مخطط النسبة المئوية</p> 	<p>النسبة المئوية %</p> <p>%100</p> <p>-</p>	<p>تأييد تنفيذ مشاريع ملابس ذكية لطلاب الذكاء الاصطناعي في الأردن</p> <p>نعم</p> <p>لا</p>	<p>Implementation of smart clothing projects</p>	
Table No. (9)				
<p>مخطط النسبة المئوية</p> 	<p>النسبة المئوية %</p> <p>%98.4</p> <p>%1.6</p>	<p>تأييد اشترالك طلاب الذكاء الاصطناعي والتصميم الجرافيكي لإنتاج ملابس ذكية</p> <p>نعم</p> <p>لا</p>	<p>Support for students of the Departments of Artificial Intelligence and Graphic Design</p>	
Table No. (10)				
<p>مخطط النسبة المئوية</p>  	<p>تصاميم برؤية حديثة تتناسب مع لغة العصر</p> <p>%95.2</p> <p>%4.8</p> <p>-</p>	<p>تصاميم مستنبطة من التراث الأردني</p> <p>%41.3</p> <p>%11.1</p> <p>%47.6</p>	<p>نوع التصاميم على الملابس الذكية</p> <p>نعم</p> <p>لا</p> <p>ربما</p>	<p>Smart clothes with a variety of designs</p>
Table No. (11)				
<p>مخطط النسبة المئوية</p> 	<p>النسبة المئوية %</p> <p>%49.2</p> <p>%5.4</p> <p>%19</p> <p>%38.1</p>	<p>ألوان التصاميم على الملابس الذكية</p> <p>ألوان غامقة</p> <p>ألوان فاتحة</p> <p>ألوان مشعة</p> <p>ألوان تريبية</p>	<p>Designs colors</p>	
Table No. (12)				





مخطط النسبة المئوية Percentage chart	النسبة المئوية %	هل هذا النوع من الملابس كافي لحل الكثير من المشكلات
	%92.1	نعم
	%7.9	لا

Smart clothes solve problems





Table No. (13)

**The research experiments:**

Practical experiments were carried out using Adobe Illustrator & Adobe Photoshop.

<p>Experiment No. (1)A</p>  <p>The design was inserted into the smart shoe derived from the Jordanian heritage as decorations. Design and function are combined, also the shoe can be used by both men and women</p>	<p>Experiment No. (1)B</p>  <p>A design was created with a modern vision commensurate with the language of the era based on the desire of the respondents in the questionnaire, which reached 95.2% of those who preferred modernity in designs compared to heritage designs, and the focus was on abstract elements from point and line with irregular formations.</p>
<p>Experiment No. (2) A</p>  <p>Two different models of Jordanian embroidery were chosen to be used in the smart bag, the middle of the bag that is placed on the back was chosen to show the importance of the design and draw attention to the adoption of geometric shapes as a design unit that is employed in the smart bags to demonstrate the integration between functional and aesthetic technology through design.</p>	<p>Experiment No. (2) B</p>  <p>Pic No. (7)</p>



<p>Experiment No. (3)</p>  <p>The men's necktie was chosen because it is an aesthetic element that is widely used in official occasions and as a functional element that was manufactured to prevent a lot of the possibility of feeling sick according to the sensors in it.</p>	 <p>Pict No. (8)</p>
<p>Experiment No. (4)</p>  <p>Through the questionnaire, it was found that the largest group prefers normal clothes by 88.9%, since sportswear is used by everyone of both sexes, picture No. (9) was employed in the fourth experiment which combined preference and opinion that emphasized the interest of young people in designs of a modern nature.</p> <p>Therefore, abstract geometric shapes were employed to suit the sports suit.</p>	 <p>Picture No. (9)</p>

### The most important conclusions:

1. The percentage of those who want to get smart clothes reached 88.9%, which indicates the desire of people to wear them and get them according to their needs and desires.
2. From the questionnaire, it was found that the most smart and comfortable clothes that people desire to create Jordanian heritage designs were the largest percentage of accessories which amounted to 66.7%, then the shirt by 47.6% and shoes by 28.6%, so they were chosen to apply the designs to them.



3. The largest percentage of smart clothes that people need are for heart patients which deserve attention according to the viewpoint of the examinees as it reached 7.9%.
4. It is possible to produce designs with a modern vision derived from the Jordanian heritage, containing innovation in design that supports the functional aspect.
5. The largest percentage stressed the need to open specializations for smart clothes in universities, institutes and fashion houses, as the percentage of supporters reached 90.5% and the probability of registration in it was 74.6%, which is a good percentage.
6. The possibility of joint work between the graphic designer and the student of artificial intelligence to make smart clothes that combine the functional and aesthetic element together to employ the Jordanian heritage.
7. The possibility of smart clothes playing an assistant role for the doctor in some cases; as it may be able to save the lives of patients, such as patients with heart diseases, neurological diseases, and those who have lost one of the senses, and others.
8. Designing smart clothes requires familiarity with the elements of interactive design, its relationship and its impact on the external environment in order to know the obstacles and causes for its practical application.
9. Supporting the implementation of smart clothing projects for students of artificial intelligence in Jordan, especially at the University of Petra, where the percentage reached 100%.

### Recommendations:

1. Introducing a subject for the design of smart clothes in the Department of Graphic Design at the University of Petra (UOP) and the rest of the universities that study this specialization in Jordan, in order to enrich a modern aspect that combines technology and design.
2. Do studies and research that enrich this topic from various other aspects that this research did not address, in order to identify smart clothes and their modern requirements in terms of technicality and design.
- 3.

### AKNOLEGMENTS:

The authors would like to thank and express their appreciation to the university of Petra for the great supporting of this research in this year 2021.

### Questionnaire link

[https://docs.google.com/forms/d/e/1FAIpQLSeA195t25GARGQDYJYiFZYLYsV4Ds6V9PA sWfhb3VYNrvq8Dw/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSeA195t25GARGQDYJYiFZYLYsV4Ds6V9PA sWfhb3VYNrvq8Dw/viewform?usp=sf_link)

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