Al-Academy Journal
Issue 116
Journal homepage: https://jcofarts.uobaghdad.edu.iq
ISSN(Online) 2523-2029/ ISSN(Print) 1819-5229
DOI: https://doi.org/10.35560/jcofarts1604

The effectiveness of an educational unit to develop female students' skills in manufacturing graduation clothing and accessories using sustainable materials

Samar Mahmoud Abd Elghani Maqlan [a]

[a] *Participant Professor of Clothing and Textiles-College of Design - Umm Al-Qura University*

ARTICLEINFO

Article history:
Received 10 March 2025
Received in revised form 9 October 2025
Accepted 26 March 2025
Published 15 June 2025

Keywords:
educational unit , manufacturing graduation clothing , sustainable materials

ABSTRACT

Educational units are considered one of the forms of curriculum development to benefit the new information revolution. They are an organization planned in a way that includes the educational material, methods, accompanying educational activities and teaching methods, in addition to the evaluation process, which together leads to achieving the desired goals To go through the experiences that entail It requires the learner to acquire information, skills and attitudes.

The researcher aimed to build an educational unit to develop female students' skills in manufacturing graduation clothes and accessories using sustainable materials and measuring their effectiveness.

The research followed the quasi-experimental approach, and the research sample consisted of (25) female students from the College of Design at Umm Al-Qura University, and the educational unit was implemented in the academic year (2022 AD).

Introduction:

Kingdom's Vision 2030 emphasized the keenness and interest in investing in education and enhancing efforts that are compatible with the educational system's outcomes and the needs of the labour market. Since its launch, the vision has worked to increase attention to developing education in terms of curriculum, teachers, students, and teaching, to ensure that curriculums keep pace with scientific and civilizational developments. Saudi woman is considered an element of the nation's strength, so the Kingdom seeks to develop their skills, invest their energies, and enable them to obtain appropriate opportunities to build their future and contribute to the development of society and the economy (Kingdom's Vision 2030 Document, 36).

Education is considered the most important means of building peoples and facing the variables and challenges of the future. It is also the true beginning of progress. Since each era has its ideas and philosophy, the urgent need of the individual and society emerged for necessary capabilities that are consistent with the nature of the era to achieve balance according to the conditions of society and the environment, as well as to achieve balance between quantitative and qualitative variables, modernize education systems and diversify their patterns, and adapt to the accelerating scientific and technological variables and emerging specializations, as many of them disappear and new ones are born that suit the new stage of development (l-Sheikh, A.M. & Kamel, S.A. & Najm Al-Din, A.H. & Al-Barbari, A.F. 2023, 77).

Educational units are considered one of the forms of curriculum development that benefit the new information revolution, they are an organization that is planned in a comprehensive manner that includes the educational material, accompanying educational means and activities, and teaching methods, in addition to the evaluation processes that lead in their entirety to achieving the desired goals. This requires going through certain experiences that result in the learner acquiring information, skills, and attitudes (Anwar, S.F. & Ali, D.N. 2020, 179).

The ready-made clothing industry is one of the basic industries, as it is based on producing a commodity from the necessary goods that are used by different people at all times, and countries pay special attention to this industry, by expanding the establishment of many factories and facilitating investment operations and encouraging it by providing scientific and technical assistance with the latest modern equipment and establishing specialized scientific centers to reach international specifications for measurements and global quality conditions (Hasani, A.S. 2023, 247).

It is necessary in functional clothing design to take into account the freedom and ease of movement of their wearer, and also take into account the standards of physical changes so that they must be flexible, comfortable, and achieve efficiency. Functional design is associated with the utilitarian goal for which it was designed. When putting the idea, the designer keeps two things in mind: one is the occasion for which it was prepared, and the method of implementing it to perform its function. Functional clothing has special specifications that are compatible with certain needs and characteristics with the aim of reaching the best compatibility between the specifications of the clothing and its purpose (Issa, Y.M. 2014, 22). Training human resources is one of the effective trends that contribute in increasing productivity, as it is a response to the variables of the external environment. Therefore, it was necessary to prepare trained technical cadres who can contribute to the rotation of the wheel of development, considering the human element is the basis of the development and training process and the tool of development and its means, which if properly invested and employed, the efficiency in performance and production can be achieved. (Johar,I.2014, 303)

Graduation clothing and their accessories is one of the functional clothing that is worn at graduation parties, they are a symbol of achieving personality and the long efforts made during years of study and learning. Graduation party clothing varies in its designs, materials and colours, and these variations reflect the different personalities and tastes of graduates, from traditional classic fashions to modern and innovative designs. Also, these clothing embody the development of taste and fashion over the years, and the importance of choosing graduation clothing is evident in being keen to appear elegant, as they play a major role, as they give confidence, elegance and respect. Graduation clothing and their accessories are represented in each of the "graduation gown, hat, and scarf" (https://web.archive.org).

Design selections of graduation clothing and their accessories (https://www.dominican.edu)

Today, the world is moving towards achieving sustainability in various fields, so the interest in the environment has become an urgent necessity, as industrial progress has had a negative impact on the environment, which causing an imbalance in the ecosystem. The concept of designing products has developed to be compatible with the environment and work to avoid harming it (Abdo, B.H. & Sanusi, A.M. & Ismail, H.S. 2020, 112).

The world has recently sought to achieve sustainability in the field of clothing manufacturing by using environmentally friendly materials, to find an environmentally friendly approach that can be supported indefinitely to reduce environmental risks to obtain sustainable materials that are compatible with the environment to ensure their sustainability and achieve justice between successive generations. The clothing producer must be fully aware of the materials that will be used in implementing the designs and know the side effects on the environment of those materials used to reduce the disruption of the environmental balance. The interest and orientation of producers to focus on manufacturing clothing products from environmentally friendly materials has emerged, as they have proven their worth when compared to competing materials, as they are made from natural materials that do not contribute to increasing environmental pollution, improve the product and maintain human health (Mohammed, S.A. 2020, 47).

Organic materials such as "cotton, linen, bamboo, ramie, soybean textile, and hemp" are sustainable materials made from organic fibers that do not require any chemicals or pesticides during the growth stage, thus achieving high value and various advantages, as they have become an important part of the textile manufacturing field, due to their positive and sustainable impact on the lives of individuals and the environment (Hussein, M.A. & Abu El Naga, H.E. 2022, 513).

The Partnership Initiative for Sustainable Textiles, it is an initiative of the German Federal Government initiatives, is committed to making the global textile sector socially and environmentally free of corruption, to be a sector that respects rights and works to protect the climate and the environment. The Partnership for Textiles works to make its work compatible with international agreements and guidelines that define principles of social, environmental and economic sustainability and set frameworks for the corporations' responsibility. (https://www.textilbuendnis.com)

The studies that dealt with preparing educational units and programs to develop the skills of female students and female graduates towards clothing manufacturing varied, such as the study of (Rasha Youssef, R.A. (2023) which aimed to prepare a program to provide non-specialized graduates with the knowledge and skills necessary for draping techniques on the mannequin, and to determine the effectiveness of the training program, and the study of (Ahmed, D.S. 2023) which aimed to build a proposed educational unit to develop the knowledge and skills of operating specialized sewing machines and measuring its effectiveness. The study of (Abu Hamda, H.M. & Ali, R.M. (2022) which aimed to build a training program to develop the knowledge and skills of technical education students "dual training and education" in ready-made clothing factories in implementing a men's patient garment and measuring the effectiveness of the training program, also the study of (Asim, H.A. (2021) which aimed to build a proposed educational unit based on hybrid education to develop the knowledge and skills of students towards the industrial sewing machine to benefit from its functions, and overcome the problem of being inside the halls in light of the Corona pandemic, and measure the effectiveness of the educational unit in raising the level of knowledge and skill performance among students, and The study of (El-Badry, M. & El-Sayed, S. & Hussein, O. 2018) which aimed to build a proposed educational unit using hypermedia and measure its effectiveness at the level of cognitive achievement and skill performance of students to learn to build a sample model for men's knitted outerwear according to customer specifications.

According to the recommendations of previous studies, which represented in the development of human energies by supporting the development process under the auspices of all state agencies, especially educational institutions, to develop services that are compatible with the needs of the industry sector, especially the clothing industry, which has many characteristics and features that qualify it to be one of the engines driving the wheel of

human development and according to the Kingdom's Vision 2030 in linking educational outcomes with labour market requirements, and that through the preparation of educational units that keep pace with the developments of the era, and are compatible with the requirements of global sustainability and the local labour market. So, the researcher prepared an educational unit to develop the skills of manufacturing graduation clothing and their accessories by using sustainable materials.

Research problem:

The research problem crystallized in the following questions:

1- What is the possibility of building an educational unit to develop the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials?
2- What is the possibility of applying the proposed educational unit to develop the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials?
3- What is the effectiveness of the proposed educational unit in developing the female students' knowledge in manufacturing graduation clothing and their accessories using sustainable materials?
4- What is the effectiveness of the proposed educational unit in developing the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials?

Research objectives:

This research aims to:

1- Building an educational unit to develop the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials.
2- Applying the proposed educational unit to develop the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials.
3- Measuring the effectiveness of the proposed educational unit in developing the female students' knowledge in manufacturing graduation clothing and their accessories using sustainable materials.
4- Measuring the effectiveness of the proposed educational unit in developing the female students' skills in manufacturing graduation clothing and their accessories using sustainable materials?

Research importance:

The importance of this research is due to:

1- Developing clothing manufacturing courses by adding an educational unit in the field of manufacturing graduation clothing and their accessories.
2 -Highlighting the role of the educational institutions in developing the knowledge and skills of female students to prepare trained technical cadres to manufacture graduation clothing and their accessories using sustainable materials.
3 -Enriching the Arab library with a scientific reference that benefits specialists in the field of manufacturing graduation clothing and their accessories.
4- Contributing to open job opportunities for female students in the field of small projects to manufacture graduation clothing and their accessories.

Research terms:

- **Effectiveness:**
  - The ability to achieve the required, desired and expected result. (https://www.dictionary.com)
  - The desired or expected impact during a specific period of time, and this impact is measured by identifying the extent to which the goals are achieved (Abu Hatab, F. & Sadek, A. 2000, 58).
- **Educational Unit:**
  - Organizing a specific topic that has educational value due to the information, skills, and educational activities it contains that are related to its title, so that it places students in an integrated educational situation that arouses their interest and leads them to go through certain experiences. It is a study part that deals with an issue in detail and may include several lessons that cover this issue, according to the depth and intensity of the required coverage in presenting the information, activities, and skills (Anwar, S.F. & Ali, D.N. 2020, 179).
- **Development:**
  - A general and comprehensive goal of a dynamic process occurring in society, and its manifestations are represented in that series of structural and functional changes for the members of society. This process depends on controlling the size and quality of the available material and human resources to reach the maximum possible exploitation in the shortest possible period, and that to achieve the economic and social welfare for the vast majority of members of society (Mahmoud, M.T. 2013, 23).
  - A basic element for stability and human and social development, and it is a comprehensive or partial process continuous development, and it takes different forms that aim to advance the human condition to stability and development according to its needs and economic, social and intellectual capabilities, and is considered the means of the human and his goal. (https://ar.wikipedia.org).
- **Skills:**
  - High ability to perform a reliable kinetic action in a specific field with ease, accuracy, mastery and understanding (Salman, H.M. 2013, 164).

- Something that can be learned, acquired or formed in the learner through simulation and training, so what he learns differs according to the type of material, its nature, its characteristics and the purpose of learning it (Abdel Shafi, R.S. 1997, 87).

- **Manufacturing:**
  - The process of combining various material and non-material inputs in order to manufacture something for consumption (Suleiman, U.A. 2018, 49).
- **Graduation clothing:**
  - Graduation clothing has developed over time and has taken various shapes and colours depending on the university, academic specialization, and academic degree. They can be worn with the appropriate graduation party outfit, as each one expresses the university from which the students are graduating. (https://www.graduationmall.com)
- **Supplements:**
  - Additions or pieces that accompany the main garment, and work to increase its effect, which leads to the beauty of the garment from both the aesthetic and functional aspects (Al-Jawhari, R.A. 2010, 3).
- **Sustainability:**
  - Equilibration of the economic needs of the individual with respect his culture, without disrupting or depleting the natural resources of the environment in which he lives (Ahmed, S.M. 2020, 8).
  - Using natural resources in the best possible way while preserving and maintaining them, and means the continuity of interaction between society and the environment. It is a concept that calls for concern for the future of humanity and preserving the environment that grants continuity to humanity (Al-Fahed, H.S. 2023, 76).
- **Sustainable raw materials:**
  - They are materials that do not harm the environment, and the goal of using them is to reduce the environmental impacts to protect the environment from pollution resulting from production processes, thus improving the product and preserving human health, such as organic cotton, linen, and bamboo fibers (Ahmed, S.M. 2020, 163).

Research hypotheses:

1- There are statistically significant differences among the mean degrees of the female students' in the pre-and post-application for the educational unit to develop the skills of manufacturing graduation clothing and their accessories using sustainable materials, in favor of the post-application.

2- There are statistically significant differences among the mean degrees of the female students' in the pre- and post-application for the achievement test in favor of the post-application.

3- There are statistically significant differences among the mean degrees of the female students' in the pre- and post-application for the skill performance test, in favor of the post-application.

Research methodology:

This research followed the quasi-experimental approach because it achieves the research objectives and verifies the proof of its hypotheses.

Research sample:

The research was applied to (25) female students of the College of Design - Umm Al-Qura University.

Research tools:

1- An achievement test (pre/post) to measure the knowledge included in the educational unit.
2- A skill applied test (pre/post) to measure the skills included in the educational unit.
3- An estimating scale to measure skills and evaluate the results contained in the educational unit for manufacturing graduation clothing and their accessories using sustainable materials.

Research limits:

- **Objective limits:** An educational unit for manufacturing graduation clothing and their accessories using sustainable materials.
- **Time limits:** The educational unit was applied in the year 2022 AD.
- **Spatial boundaries:** The proposed educational unit was applied at the College of Design at- Umm Al-Qura University.

Theoretical framework:

Graduation clothing and their accessories:

- **Graduation clothing:** Traditional academic clothing worn at graduation, and was worn daily by students of some prestigious universities. This clothing consists of a basic garment represented by the gown, and accessories represented by the cap and scarf.
- **Graduation gown:** A black robe that dates back to priests and monks in the Middle Ages, as they represented the clergy of the state.
- **Graduation cap:** A hat that was used in the fourth and fifth centuries to distinguish philosophers and artists from the general public. It adds an aesthetic touch to the garment. It was used by Arab Muslims in Andalusia to place the Qur'an on top of it. Graduation caps have undergone several updates over the years, and the hat

consisting of a circle topped with a square is the most common style. This cap was developed in the fifteenth century, and historians indicate that the square shape on top of the hat indicates the book to give it a scientific appearance. (https://harcourts.com).

- **Graduation scarf:** complementary to graduation clothing, worn over the shoulders, or the upper part of the body and arms, and is usually rectangular, square, or triangular made of cloth, and is used to confirm the affiliation and identity of the graduating university. The scarf has various colours, and takes on various decorations, some of which are printed, and some of which are embroidered, and is made of various materials such as cotton, silk, and wool (Al-Sharif, D.A. 2020, 11).

Graduation clothing and their accessories (cap, scarf) (https://www.jumia.com)

Environmental considerations for sustainable materials:

- Use of sustainable natural resources such as organic fibers.
- The impact of chemical inputs, whether dyes or processed chemicals, to take into account the health effects on workers in textile factories as well as consumers of the final product (hattopadhyay P. K., (2021,76).
- The biodegradability of the fabric and the possibility of recycling.
- Environmental considerations in the production stages, whether in water and energy consumption and sanitary drainage (Topham, J., Anthony N. Landreau & William E. M., 2020,98).

Auxiliary materials used in manufacturing graduation clothing and their accessories:

Fasteners: Tools for closing openings, which facilitate the process of putting on and taking off, also they contribute to raising the aesthetic value of clothing (Mohammed, I.A. 2005, 41).

Fasteners used in graduation clothing and their accessories:

- **Buttons:** A fastening tool, often in a circular shape, with two or four holes for fastening to the clothes (Yassin, H.A. 2011, 85).
- **Buttonholes:** They are made of thread, and consist of two rows of zigzag stitches, and at the end are safety stitches to resist the pressure resulting from use. Buttonholes may be designed longitudinally or transversely in clothing (Maqlan, S.M. 2012, 79).
- **Snaps:** An internal closing tool, consisting of a spherical protrusion and a corresponding cavity, which interlock when pressed together, and are fastened to clothing through sewing or pressing, and are made of plastic or metal (Yassin, H.A. 2011, 85).
- **Zippers:** Available in various types, shapes and colours, and classified according to the type of zipper teeth material ("open-ended plastic zipper, closed-ended plastic zipper"), and may be visible or hidden (Abdel Latif, S. & Mohammed, M. & Abdel Qader, A. 2009, 55).
- **Bands:** One of the oldest fasteners used in clothing, made of woven or non-woven materials, and finished with a sewing line or a small plastic cover, and commonly used in neck openings, waist, and sleeve openings, and may be sewn into the clothing or pressed into it through internal stitching (Al-Rabiah, A.A. 2020, 53).
- **Adhesive tape:** a press-sensitive tape, consisting of two pieces, one of which seems like a hook and has a rough texture, and the other in the form of small, soft-textured loops. They are sewn on the edges of the opening of the garment, and closing and opening are done by pressing on each of them (Tawous, N.M. 2014, 23).

				
Buttons	**Snap**	**Zipper**	**Velcro**	**Bands**
https://ar.alie xpress.com https://ar.jianu ofashion.com https://blogs. entej.com https://www.am azon.eg https://ar.dhgate.com				

- Decorative tapes: used to make buttonholes or roses or are fastened in an aesthetic way to decorate different parts of clothes. Tapes are characterized by various surface properties, with various lengths, widths and many formations, and are represented in "piping, satin, lace" tapes (Salam, I.A. & Al-Zaftawi, H. & Shukry, N. & Sedky, M. 2003, 119).
- Threads: The most important auxiliary materials used in sewing clothing, and are spun from natural fibers such as "cotton, silk, linen" or mixed (Al-Rabiah, A.A. 2020, 57).
- **Fuseing materials:** Non-woven fabrics for filling, give a quick result for the shape and texture using an iron, including a woven fuseing fabric used to give the natural shape to the fabric and preserve the type of fabric, and is used to support (collars, cuffs, pockets, necklines, plackets, holes, buttonhole areas, embroidery areas) (Ali, L.S. 2009, 20).

		
(https://eprintp.com) Satin tape	Sewing threads (https://merdan.sa)	Viselin (https://bluefalcon-est.com)

Research Procedures:

Design an educational unit to develop female students' skills in manufacturing graduation clothing and their accessories using sustainable materials.

Objectives of the educational unit:

A- Cognitive objectives:

• Identifying the graduation clothing and their accessories.
• Determine the requirements for graduation clothing and their accessories.
• Mention materials for manufacturing graduation clothing and their accessories.

B- Skill objectives:

• Select basic and auxiliary materials for manufacturing graduation clothing and their accessories.
• Draw the basic pattern of the graduation gown and cap.
• Perfecting the stages of manufacturing the graduation gown and cap in a logical sequence.
• Accepts and applies the instructions given to her.

Determine the topics included in the educational unit:

A- Theoretical topics:

- Graduation clothing and their accessories.
- Requirements for graduation clothing and their accessories.
- Materials used in manufacturing graduation clothing and their accessories.

B- Practical topics:

- Drawing the basic pattern of the graduation gown.
- Drawing the basic pattern of the graduation cap.
- Manufacturing the graduation gown according to the manufacturing stages.

Selecting and organizing of the content:

In light of the objectives of the educational unit, the scientific content was selected and organized in a logical manner to help female students to complete the information theoretically and practically.

Timetable for the educational unit:

Table (1) Timetable for the content of the proposed educational unit

	Educational unit content	Educational means	Teaching methods	Time taken
Theoretical content	- Graduation clothing and their accessories. - Requirements of designing the graduation clothing and their accessories. - Materials used in manufacturing graduation clothing and their accessories.	Computer Data display device	Discussion	1 hour
Practical content	- Drawing the basic pattern of the graduation gown. - Drawing the basic pattern of the graduation cap. Manufacturing the graduation gown and cap according to the manufacturing stages.	Computer Data display device	Practical Statement	5 hours

Arbitration of the educational unit:

The educational unit was presented to a group of specialized professors to ensure the correctness of the scientific aspect, verify the validity and formulation of the objectives and their clarity, and the logical sequence of the educational unit. Some modifications were made and some objectives were reformulated based on the opinions of the arbitrators.

Building educational unit tools:

Designing the achievement test:

The researcher designed the achievement test, which is considered the tool used to measure knowledge and concepts in a course or group of courses (Abu Hatab and Sadiq, 2000 AD), and the achievement test contained 40 questions.

Correcting the achievement test:

The researcher corrected the achievement test according to the correction key, which is an answer model containing number of the correct answer for each question, where the degrees were distributed among the questions at the rate of one degree for each correct answer, meaning that the sum for the achievement test degrees was 40 degree.

Designing the skill test:

The researcher designed the skills test to determine the effectiveness of the skills included in the educational unit, where the applied tests are used as an objective means to estimate the efficiency with which the process tasks are performed (Abu Hatab and Sadiq, 2000 AD).

Estimating scale:

The researcher designed the estimating scale to evaluate the skill test, as it was presented to a group of specialized professors, in order to verify the veracity of its content and proposed items, and to express an opinion on the suitability of these items to the content. They had some opinions and suggestions, which the researcher took into account in the estimating scale.

The estimating scale contained a triple estimating scale, and the researcher took into account the logical sequence when dividing the scale and correction was carried out by three raters by placing a mark (✓) in front of the rating that applies to the item in the scale. The marks that were placed were translated into degrees; two degrees were assigned for accurate performance, one for somewhat accurate performance, and zero for inaccurate performance.

Applied framework:

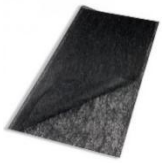
Choosing the design of graduation clothing and their accessories:

The graduation clothing consists of a wide gown with a triangular neckline, two shoulder lines, wide fitted sleeves, and a placket closed by buttons and buttonholes. Its length reaches to the ankle, and a cylindrical hat topped with a square design, and a long scarf with two triangular edges.

Graduation clothing and their accessories
https://patternsew.blogspot.com

Select basic and auxiliary materials for manufacturing graduation clothing and their accessories:

Table (2) Select basic and auxiliary materials for manufacturing graduation clothing and their accessories

Basic materials	Auxiliary materials			
Black organic cotton fabric, 120cm wide.	Viselin black adhesive, width 120cm	Black cotton sewing thread	Black plastic rounded buttons	- Brand Label - Care Instructions Label - Size Label
				

Taking body measurements of size (38):

Table (3) Taking body measurements of size (38)

S	measurement	cm	S	measurement	cm
1	Chest circumference	90	**5**	Arm length	60
2	Waist circumference	65	**6**	Upper arm circumference	35
3	Hip circumference	98	**7**	Wrist circumference	18
4	Shoulder length	12	**8**	Front length	42.5

Pattern drawing of the graduation gown and cap:

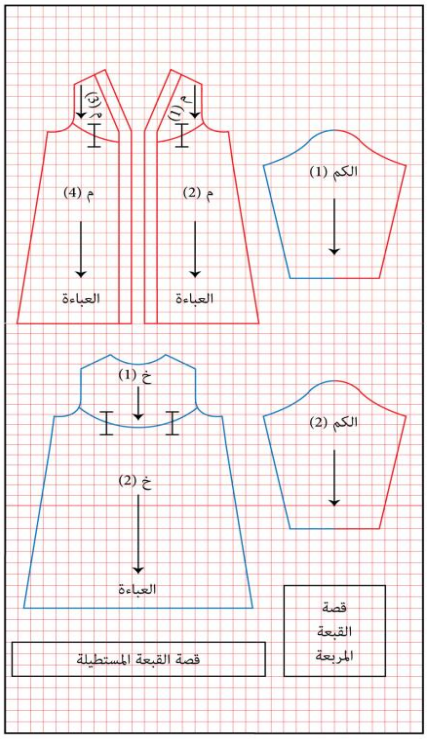
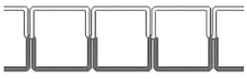
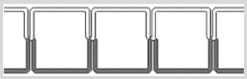
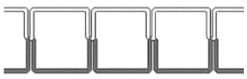


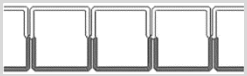
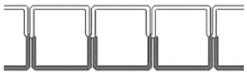
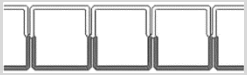
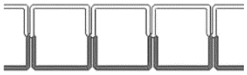
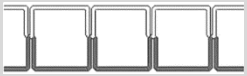
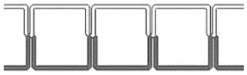
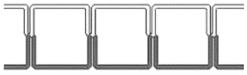
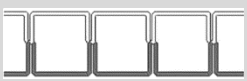
Figure (1) Pattern drawing of the graduation gown and cap

Manufacturing stages:

The manufacturing stages were arranged as follows: (aligning the fabric, interlocking the pattern elements, taking marks, preparing, sewing, ironing, and inspection).

Table (4) shows the manufacturing stages

S	Operations	Stitch	S-Type
1	Trimming the outer edges of elements of the graduation gown and cap		
2	Sewing the two cuts of the front of the gown	 Closed stitch 301	
3	Sewing the two cuts of the back of the gown	 Closed stitch 301	
4	Sewing the placket of the gown	 Closed stitch 301	
5	Sewing the shoulder lines	 Closed stitch 301	

S	Operations	Stitch	S-Type
6	Sewing the inner sleeve lines	 Closed stitch 301	
7	Sewing the sleeve flaps	 Closed stitch 301	
8	Sewing the two lines separating the front and back of the gown	 Closed stitch 301	
9	Sewing the sleeves with the armpit seams	 Closed stitch 301	
10	Sewing the neckline piping tape	 Closed stitch 301	
11	Sewing the gown hemline	 Closed stitch 301	
12	Sewing placket buttons of the gown		
13	Sewing placket buttonholes of the gown		
14	Sewing the separating line of the cylindrical cut of the cap	 Closed stitch 301	
15	Sewing the lining with the square cut of the cap	 Closed stitch 301	
16	Sewing the cylindrical cut with the square cut	 Closed stitch 301	

S	Operations	Stitch	S-Type
17	Finishing the excess threads of the graduation gown and cap	---	
18	Final ironing of the graduation gown	---	
19	Final inspection of the graduation gown and cap	---	

Sincerity and Reliability:

The sincerity and reliability of the achievement test:

1- Sincerity:

The issue of test sincerity relates to what the test measures and to what extent it succeeds in measuring it. **The logical sincerity:**

The achievement test was presented to an arbitration commission of the specialized professors in order to ensure the ease and clarity of the test phrases, the association of objectives with test questions. The arbitrators unanimously agreed on the validity of the achievement test for the application with presenting some proposals, and the following has been modified according to their proposals:

- Reduce the number of questions.
- Taking into account the ease and clarity of wording.

2- Reliability:

Reliability means that the test is coordinated in the results it gives; the reliability coefficient of the achievement test was calculated in the following ways:

A- Reliability using Split-half method:

The reliability of the achievement test was confirmed using the split-half method, and the reliability coefficient value was 0.786 - 0.918 for the achievement test as whole, which is a significant value at the 0.01 level because this value is close to the whole one, which indicates the reliability of the achievement test.

B- Reliability of Alpha coefficient:

It was found that the Alpha coefficient = 0.855 for the achievement test as whole, which is a high value, and this is evidence of the reliability of the achievement test at the 0.01 level, as the value is close to the whole one.

Table (5) Reliability of the achievement test

Reliability of the achievement test	Alpha coefficient		Split-half	
	Correlation values	Sig.	Correlation values	Sig.
	0.855	0.01	0.786 – 0.918	0.01

The sincerity and reliability of the skill applied test:

1- Sincerity:

The logical sincerity: the test has been presented to a group of specialized professors, and they all approved the validity of the test for applying.

2- Reliability:

Reliability of the arbitrators

The reliability coefficient of the arbitrators can be obtained by calculating the correlation coefficient among the degrees given by two or more arbitrators to the same individuals or to the same tests. In other words, each examinee gets two or more degrees from correcting one test.

The correction was done by three of the professor arbitrators, and that is done by using the estimating scale in the evaluation process, and each arbitrator performed the evaluation process alone.

The correlation coefficient was calculated among the three degrees set by the arbitrators (X, Y, and Z) for the post-applied test using the rank correlation coefficient for each sample separately, and the following table shows that:

Table (6) Correlation coefficient among the arbitrators for the skill test

Arbitrators	Front	Back	Sleeve	Placket	Cap	The estimating scale as whole
X, Y	0.740	0.842	0.956	0.701	0.761	0.819
X, Z	0.824	0.713	0.781	0.924	0.924	0.850
Y,Z	0.918	0.890	0.752	0.803	0.803	0.738

It is clear from the table that the values of the correlation coefficients among the arbitrators are high, and all values are significant at the level of 0.01 because they are close to the whole one, which indicates the reliability of the applied test that measures the skill performance, and also indicates the reliability of the estimating scale , which is the tool for correcting the skill test.

Results of research:

The first hypothesis:

"There are statistically significant differences among the mean degrees of the female students' in the pre-and post-application for the educational unit to develop the skills of manufacturing graduation clothing and their accessories using sustainable materials, in favor of the post-application".

To verify this hypothesis, the (**t**) test was applied; and the following table shows that:

Table (7) significance of the differences among the mean degrees of the female students in the pre-and post-application for the educational unit to develop the skills of manufacturing graduation clothing and their accessories using sustainable materials

Effectiveness	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	28.968	3.324	25	24	56.065	0.01 In favor of the post- application
Post-application	132.796	11.498				

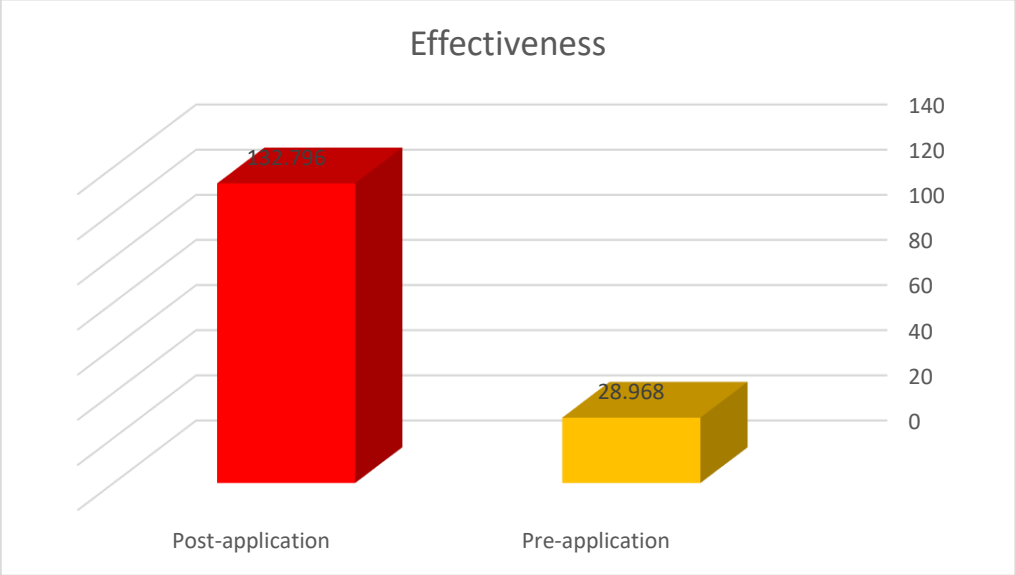


Chart (2) the differences among the mean degrees of the female students in the pre-and post-application for the educational unit to develop the skills of manufacturing graduation clothing and their accessories using sustainable materials

From table (7) and chart (2), it is clear that: the value of " **t** " equals "**56.065**", and it is statistically significant at the level 0.01, where the mean degrees of the female students in the post- application was "132.796", while the mean degrees of the female students in the pre-application was "28.968", which Indicating that there are real differences between the two applications in favor of the post-application, also it indicates that The effectiveness of the educational unit to develop female students' skills in manufacturing graduation clothing and their accessories using sustainable materials..

To know the effect size, the Eta equation was applied: t = value of (t) = 56.065, df = degrees of freedom = 24.

$$n^2 = \frac{t^2}{t^2 + df} = 0.99$$

By calculating the effect size, it was found that $n^2 = 0.99$

$$d = \frac{2\sqrt{n^2}}{\sqrt{1-n^2}} = 19.8$$

The effect size is determined whether it is large, medium, or small as follows:
0.2 = small effect size
0.5 = medium effect size
0.8 = large effect size
This means that the effect size is large, and thus **the first hypothesis has been verified.**

The second hypothesis:

"There are statistically significant differences among the mean degrees of the female students' in the pre- and post-application for the achievement test in favor of the post-application".

To verify this hypothesis, the (**t**) test was applied; and the following table shows that:

Table (8) significance of the differences among the mean degrees of the female students in the pre- and post-application for the achievement test

The achievement test	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	6.392	1.204	25	24	25.315	0.01 In favor of the post- application
Post-application	37.558	3.225				

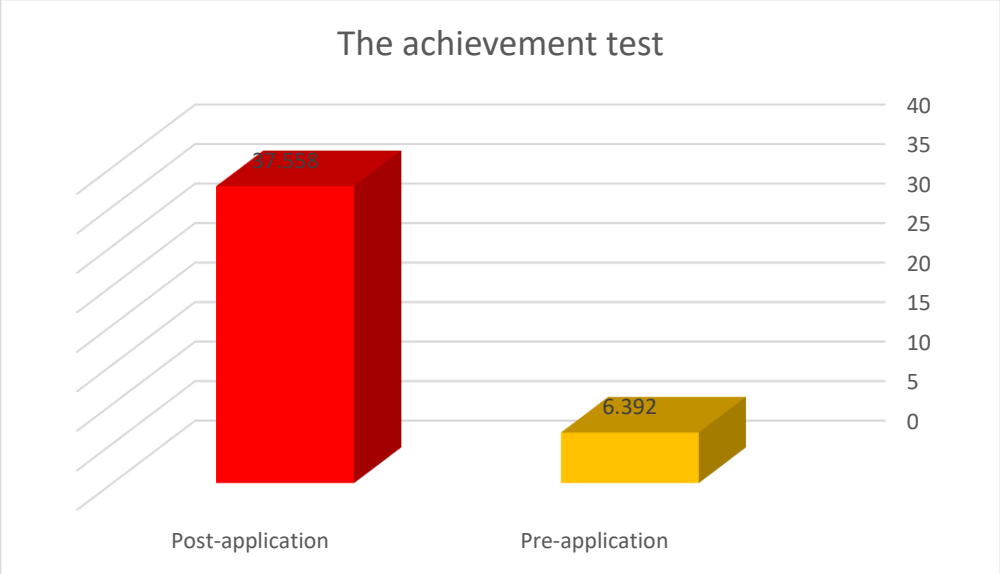


Chart (3) the differences among the mean degrees of the female students in the pre- and post-application for the achievement test

From table (8) and chart (3), it is clear that: the value of " **t** " equals "**25.315**" **for the achievement test**, and it is a statistically significant at the level 0.01 in favor of the post-test, where the mean degrees of the female students in the post- application was "37.558", while the mean degrees of the female students in the pre-application was "6.392", and thus **the second hypothesis has been verified.**

The third hypothesis:

"There are statistically significant differences among the mean degrees of the female students' in the pre- and post-application for the skill performance test, in favor of the post-application".

To verify this hypothesis, the (**t**) test was applied; and the following tables show that:

Table (9) significance of the differences among the mean degrees of the female students' in the pre- and post-application for Front cut "1"

Front cut "1"	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	3.314	0.861	25	24	10.118	0.01 In favor of the post- application
Post-application	12.638	1.405				

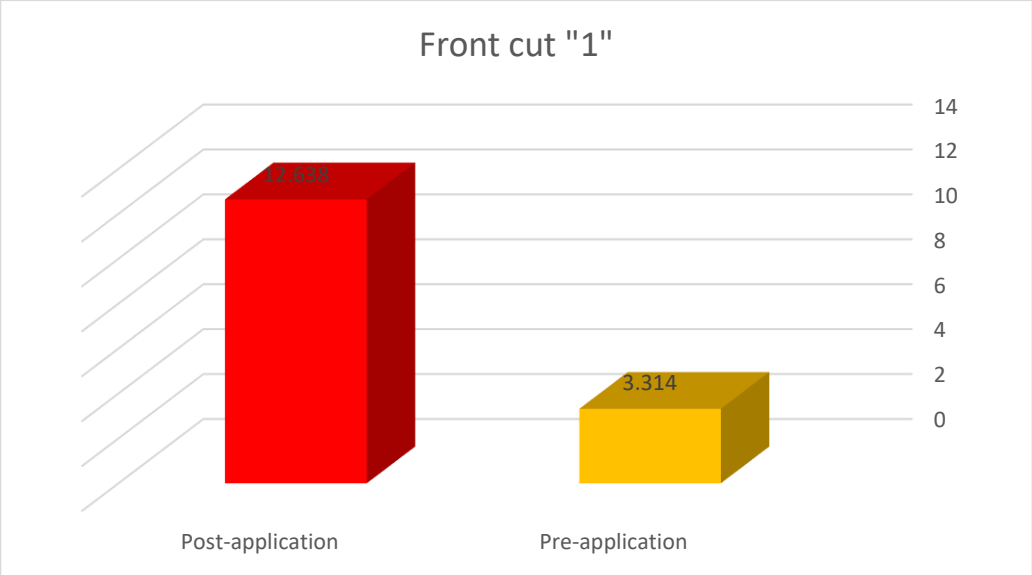


Chart (4) the differences among the mean degrees of the female students' in the pre- and post-application for Front cut "1"

From table (9) and chart (4), it is clear that: the value of " **t** " equals "**10.118**" **for Front cut "1"**, and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "12.638", while the mean degrees of the female students in the pre- application was "3.314".

Table (10) significance of the differences among the mean degrees of the female students' in the pre- and post-application for Front cut "2"

Front cut "2"	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	4.031	0.953	25	24	13.629	0.01 In favor of the post- application
Post-application	16.085	2.022				

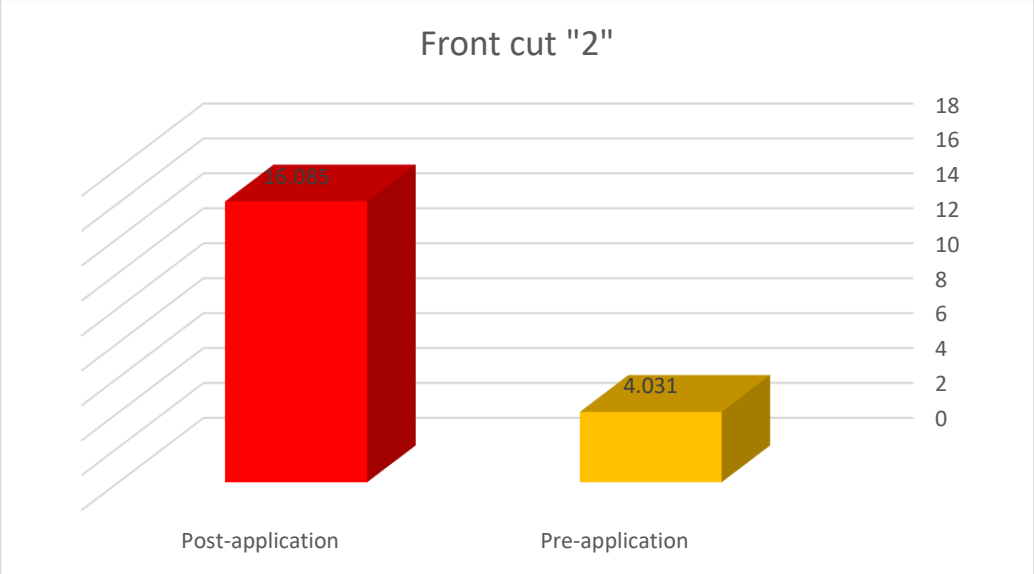


Chart (5) the differences among the mean degrees of the female students' in the pre- and post-application for the Front cut "2"

From table (10) and chart (5), it is clear that: the value of " **t** " equals "**13.629**" **for Front cut "2"**, and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "16.085", while the mean degrees of the female students in the pre- application was "4.031".

Table (11) significance of the differences among the mean degrees of the female students' in the pre- and post-application for Back cut "1"

Back cut "1"	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	**2.145**	**0.443**	**25**	**24**	**8.331**	**0.01 In favor of the post- application**
Post-application	**10.103**	**1.181**				

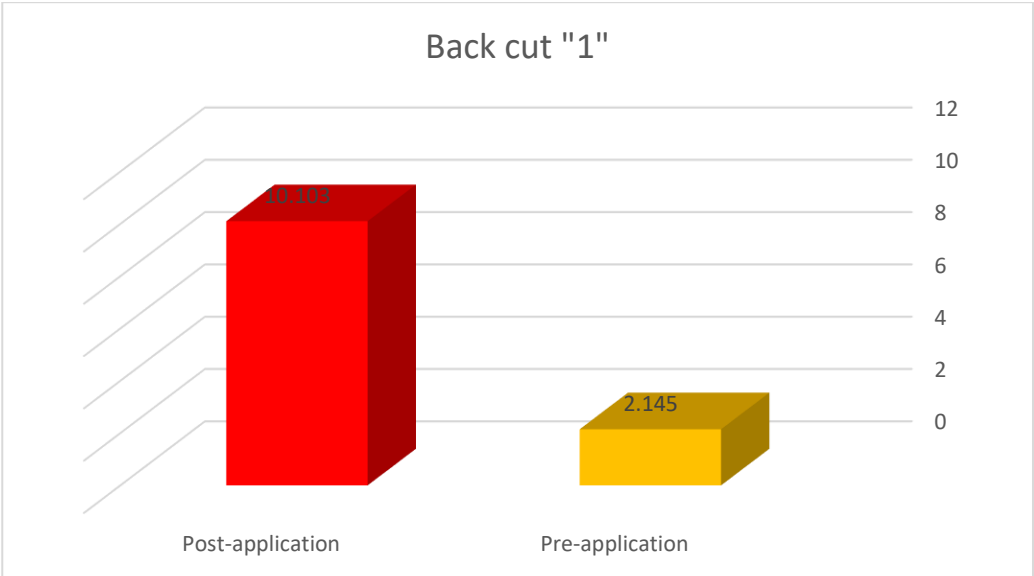


Chart (6) the differences among the mean degrees of the female students' in the pre- and post-application for Back cut "1"

From table (11) and chart (6), it is clear that: the value of " **t** " equals "**8.331**" **for Back cut "1"**, and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "10.103", while the mean degrees of the female students in the pre- application was "2.145".

Table (12) significance of the differences among the mean degrees of the female students' in the pre- and post-application for Back cut "2"

Back cut "2"	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	3.059	0.695	25	24	11.527	0.01 In favor of the post- application
Post-application	13.466	1.379				

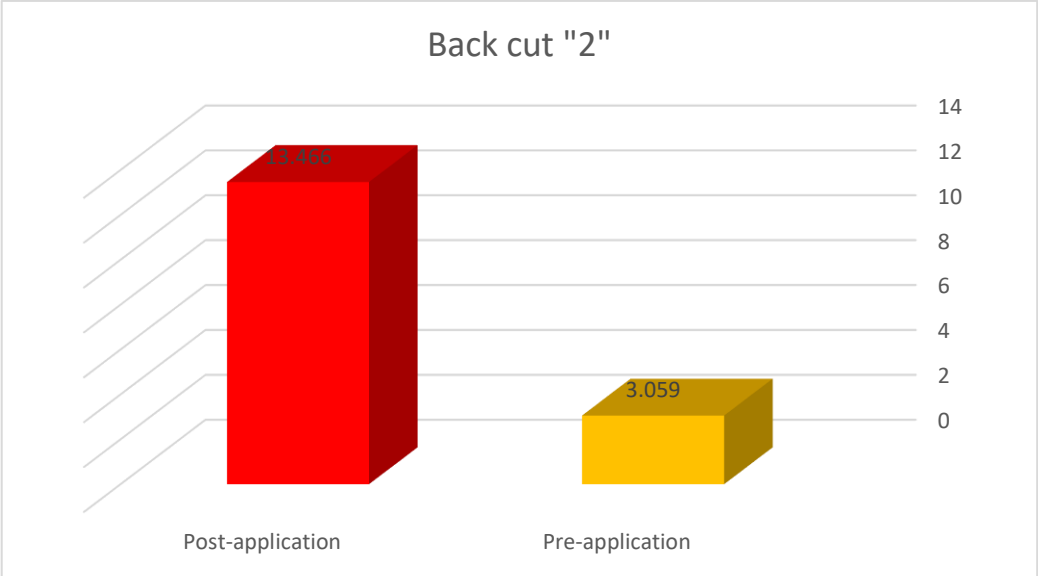


Chart (7) the differences among the mean degrees of the female students' in the pre- and post-application for Back cut "2"

From table (12) and chart (7), it is clear that: the value of " **t** " equals "**11.527**" **for Back cut "2"**, and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "13.466", while the mean degrees of the female students in the pre- application was "3.059".

Table (13) significance of the differences among the mean degrees of the female students' in the pre- and post-application for the Sleeve

The Sleeve	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	4.119	0.808	25	24	12.052	0.01 In favor of the post- application
Post-application	18.525	2.034				

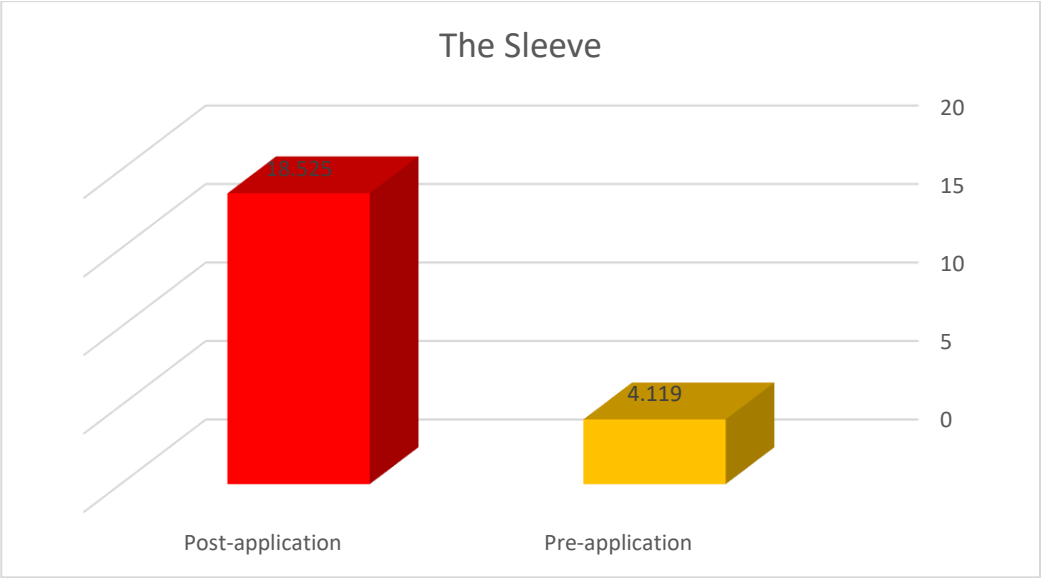


Chart (8) the differences among the mean degrees of the female students' in the pre- and post-application for the Sleeve

From table (13) and chart (8), it is clear that: the value of " **t** " equals "**12.052**" **for the Sleeve**, and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "18.525", while the mean degrees of the female students in the pre- application was "4.119".

Table (14) significance of the differences among the mean degrees of the female students' in the pre- and post-application for the Placket

The Placket	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	**2.091**	**0.552**	**25**	**24**	**7.169**	**0.01 In favor of the post- application**
Post-application	**10.370**	**1.011**				

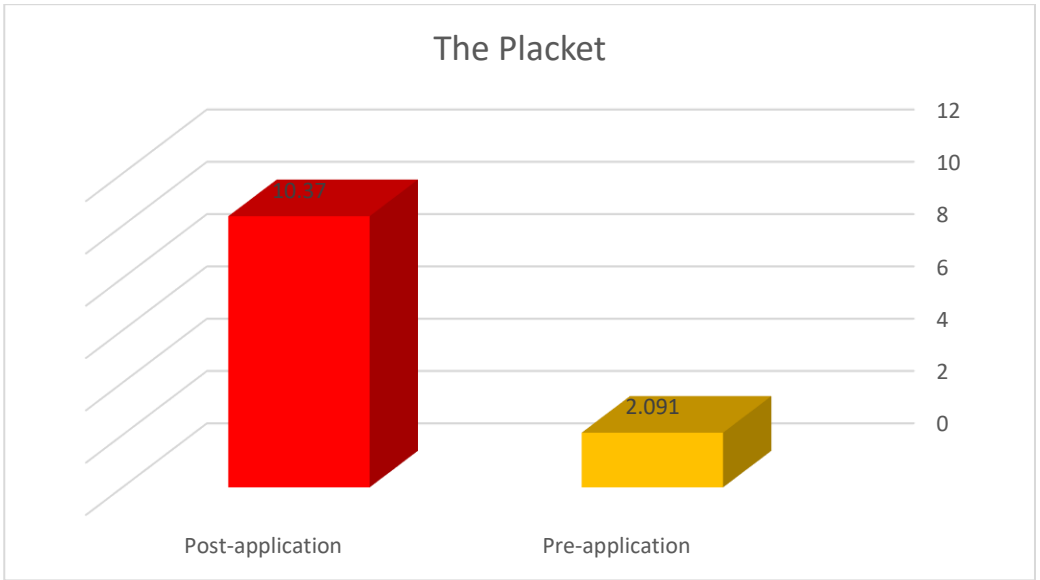


Chart (9) the differences among the mean degrees of the female students' in the pre- and post-application for the Placket

From table (14) and chart (9), it is clear that: the value of " **t** " equals "**7.169**" **for the Placket** , and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "10.370", while the mean degrees of the female students in the pre- application was "2.091".

Table (15) significance of the differences among the mean degrees of the female students' in the pre- and post-application for the Cap

The Cap	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	3.817	0.768	25	24	9.972	0.01 In favor of the post- application
Post-application	14.051	1.293				

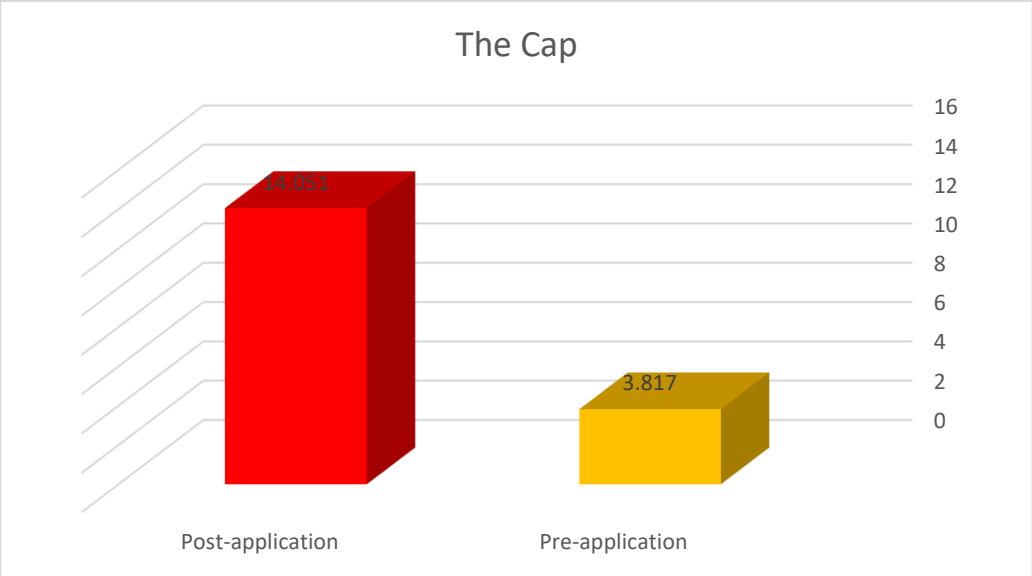


Chart (10) the differences among the mean degrees of the female students' in the pre- and post-application for the Cap

From table (15) and chart (10), it is clear that: the value of " **t** " equals "**9.972**" **for the Cap** , and it is statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "14.051", while the mean degrees of the female students in the pre- application was "3.817".

Table (16) significance of the differences among the mean degrees of the female students' in the pre- and post-application for "The total sum of the skill test"

Sum of the skill test	Mean "M"	Std. Deviation	N	Degrees of freedom "df"	Value of (t)	Sig. & its direction
Pre-application	22.576	2.991	25	24	47.392	0.01 In favor of the post- application
Post-application	95.238	7.425				

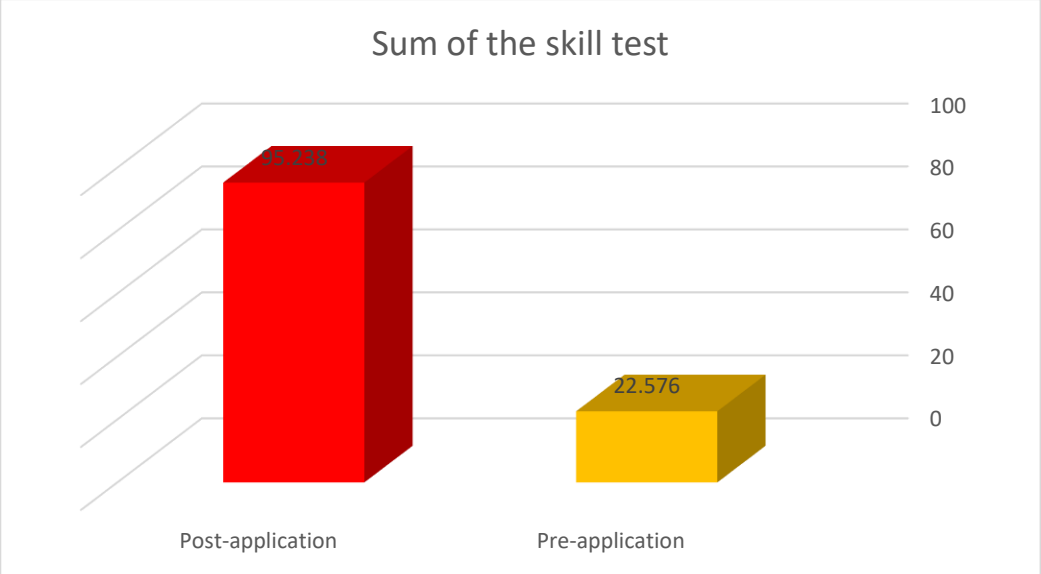


Chart (11) the differences among the mean degrees of the female students' in the pre- and post-application for "The total sum of the skill test"

From table (16) and chart (11), it is clear that: the value of " **t** " equals "**47.392**" **for The total sum of the skill test**, and it is a statistically significant at the level 0.01in favor of the post-test, where the mean degrees of the female students in the post- application was "95.238", while the mean degrees of the female students in the pre- application was "22.576", and thus **the third hypothesis has been verified.**

Research recommendations:

1- Preparing training courses for female graduates in manufacturing graduation clothing and their accessories to provide them with the necessary skills to meet the requirements of the local labour market.
2- Encouraging female students of Graduate Studies to conduct scientific studies in the field of sustainable functional clothing.
3- Designing smart applications to teach pattern drawing and manufacturing stages for basic clothing for men, women and children to provide non-specialized female graduates with sewing skills that enable them to establish small projects.

Conclusion:

The results revealed that there were statistically significant differences between the average scores of the female students in the pre- and post-application of the educational unit on manufacturing graduation clothes and accessories in favor of the post-application, and that there were statistically significant differences between the average scores of the female students in the pre- and post-application of the skill performance test in favor of the post-application.

References:

1- **Abdel Latif, S. & Mohammed, M. & Abdel Qader, A. (2009)**: **"Slip sewings in the clothing industry"**, Alam Al-Kutub, Cairo.
2- **Abdel Shafi, R.S. (1997)**: **"The effectiveness of a proposed program to develop the necessary spelling skills for students in the second cycle of Elementary education among students of the Faculty of Education (Department of Arabic Language)"**, Educational Journal, Faculty of Education in Sohag, South Valley University, Issue (12).
3- **Abdo, B.H. & Sanusi, A.M. & Ismail, H.S. (2020)**: **"Technology supporting the production of furniture from recycled materials"**, published research, Journal of Architecture, Arts and Humanities Sciences, Volume (5), Issue (22).
4- **Abu Hamda, H.M. & Ali, R.M. (2022)**: **"The effectiveness of a training program for technical education students to develop their skills in the ready-made clothing industry to meet the needs of the labour market"**, Journal of Research in the Fields of Specific Education, Minya University, Volume (8), Issue (42).
5- **Abu Hatab, F. & Sadek, A. (2000)**: **"Educational Psychology"**, Anglo-Egyptian Library, Edition (5), Cairo.
6- **Ahmed, D.S. (2023)**: **"The effectiveness of a proposed educational unit to operate specialized sewing machines (waistband assembly machine) for students of the Department of Clothing and Textiles"**, Scientific Journal of the College of Specific Education, Volume (10), Issue (36).
7- **Ahmed, S.M. (2020)** : **"Using environmentally friendly materials to achieve sustainability in the ready-made clothing industry"**, Journal of Architecture, Arts and Humanities Sciences, Volume (5), Issue (22).
8- **Al-Fahed, H.S. (2023)**: **"Adapting creative techniques to combine fabrics in design on the mannequin to enhance sustainable development"**, unpublished Doctoral Thesis, College of Arts and Design, Qassim University.
9- **Al-Hasani, A.S. (2023)**: **"Designing and producing clothes for female workers at universities in light of modern functional, aesthetic and textile requirements according to the rules of ergonomics"**, Scientific Journal of Specific Education Sciences, Issue (18).
10- **Ali, L.S. (2009)**: **"The effect of machine embroidery techniques on the appearance of satin fabrics"**, Journal of Specific Education Research, Issue (14).
11- **Al-Jawhari, R.A. (2010)**: **"Printing and embroidering itamin as an introduction to decorating clothing accessories to suit university students"**, Journal of Specific Education Research, Issue (6), Mansoura University.
12- **Al-Rabiah, A.A. (2020)**: **"Designing functional clothing for women who sleep after childbirth according to technical specifications"**, unpublished Master's Thesis, College of Design, Qassim University.
13- **Al-Sharif, D.A. (2020)**: **"A sustainable design vision for the cultural heritage in the Hijaz region using the golden sector in the digitally printed scarf"**, Journal of Specific Education Research, Issue (59).
14- **Al-Sheikh, A.M. & Kamel, S.A. & Najm Al-Din, A.H. & Al-Barbari, A.F. (2023)**: **"Benefiting from ultrasonic sewing in designing processed sportswear"**, Journal of Architecture, Arts and Humanities Sciences, Volume (12), Issue (12).
15- **Anwar, S.F. & Ali, D.N. (2020)**: **"The effectiveness of a proposed educational unit "fiber-optic-supported 3D crochet" in the course of home decoration works and decorations for female students of home economics"**, Journal of Specific and Technological Education, Kafr El-Sheikh University, Volume (18), Issue (7).
16- **Asim, H.A. (2021)**: **"The effectiveness of a proposed educational unit using hybrid education for the machinery and equipment course for second-year students - Department of Clothing and Textiles"**, Journal of Research in the Fields of Specific Education, Volume (7), Issue (32).
17- **El-Badry, M. & El-Sayed, S. & Hussein, O. (2018)**: **"The effectiveness of a proposed educational unit using hypermedia to build a sample model for men's knitted outerwear according to the customer's specifications"**, Scientific Journal of the Faculty of Specific Education, Volume (5), Issue (14), Menoufia University.
18- **Elbanhawy, R.K. (2010)**: **"A guidance program to enrich the aesthetic values of women's clothing and their accessories using hand printing and embroidery"**, unpublished Master's Thesis, Faculty of Home Economics, Menoufia University.
19- **hattopadhyay P. K., (2021) : "The Complete Book on Jute & Coir Products (with Cultivation & Processing)"** . Applied Sciences, Universidad Autónoma de San Luis Potosí, UASLP.
20- **Hussein, M.A. & Abu El Naga, H.E. (2022)**: **"The effect of mixing industrial hemp as an environmentally friendly material with cotton in the production of jeans"**, Journal of Architecture, Arts and Humanities sciences, Volume (7), Issue (37).
21- **Issa, Y.M. (2014)**: **Foundations of Fashion and Fashion Design**, Alam Al-Kutub, Cairo.
22- **Mahmoud, M.T. (2013)**: "**Human Resources and Local Community Development**", Modern University Office for Publishing and Distribution, Alexandria.

23-**Maqlan, S.M. (2012)**: **"Design and implementation of ready-made clothing that is functionally and aesthetically suitable for people with special needs"**, Unpublished Doctoral Thesis, Faculty of Design and Arts, Umm Al-Qura University.
24-**Mohammed, I.A. (2005)**: **"Contribution of clothing to the treatment plan for children with cerebral palsy"**, unpublished Doctoral Thesis, Faculty of Home Economics, Helwan University.
25-**Mohammed, S.A. (2020)**: **"Applying the theory of sustainability in creating contemporary designs for women inspired by the abstract geometric thought of the artist Mondrian"**, unpublished Master's Thesis, Faculty of Applied Arts, Helwan University.
26-**Salam, I.A. & Al-Zaftawi, H. & Shukry, N. & Sedky, M. (2003)**: **"Draping on the mannequin between authenticity and modernity"**, Alam Al-Kutub, Cairo.
27-**Salman, H.M. (2013)**: **"The effect of e-learning on reading skills and innovative thinking among fifth grade primary school students"**, Journal of the College of Basic Education, University of Babylon, Issue (11).
28-**Suleiman, U.A. (2018)**: **"Producing home clothing without a pattern that meets the functional requirements of the product"**, Journal of Specific Education Research, Volume (52), Issue (52).
29-**Tawous, N.M. (2014)**: **"Proposed designs for women's clothing with special needs"**, unpublished Master's Thesis, Faculty of Specific Education, Port Said University.
30-**Topham, J., Anthony N. Landreau & William E. M., (2020) : "Traditional Crafts of Saudi Arabia: Weaving, Jewelry, Costume, Leatherwork, Basketry, Woodwork, Pottery, Metalwork"**. Stacey International Hardcover.
31-**Yassin, H.A. (2011)**: **"The Girl's Guide to Teaching the Principles of Knitting"**, Anglo-Egyptian Library, Cairo.
32-**Youssef, R.A. (2023)**: **"The effectiveness of a training program to develop the skill of draping on the mannequin for graduates of non-specialized colleges"**, International Journal of Design, Volume (13), Issue (3).
33-https://ar.aliexpress.com .
34-https://ar.dhgate.com/product/rhinestone.
35-https://ar.wikipedia.org/wiki
36-https://blogs.entej.com/blog
37-https://bluefalcon- est.com/shop/accessories.
38-https://eprintp.com.
39-https://harcourts.com.
40-https://merdan.sa.
41-https://patternsew.blogspot.com.
42-https://web.archive.org/web.
43-https://www.dictionary.com/browse/effectiveness
44-https://www.dominican.edu/directory/registrar.
45-https://www.graduationmall.com/collections/cap-gown
46-https://www.jumia.com.eg/ar/generic-graduation.
47-https://www.mullenbooks.com/pages/books.
48-https://www.textilbuendnis.com
49-https://www.vision2030.gov.sa.

DOI: https://doi.org/10.35560/jcofarts1604
Samar Mahmoud Abd Elghani Maqlan: The effectiveness of an educational unit to develop female students' skills in manufacturing graduation clothing and accessories using sustainable materials
Al-Academy Journal - Issue 116 -ISSN(Online) 2523-2029 /ISSN(Print) 1819-5229

فاعلية وحدة تعليمية لتنمية مهارات الطالبات في تصنيع ملابس التخرج ومكملاتها باستخدام خامات مستدامة

سمر محمود عبد الغني مقلان[1]

الملخص :

تعتبر الوحدات التعليمية أحد أشكال تطوير المناهج بما يفيد الثورة المعلوماتية الجديدة ، فهي بمثابة تنظيم يخطط له في صورة تتضمن المادة التعليمية والوسائل والأنشطة التعليمية المصاحبة وطرق التدريس ، بالإضافة إلي عملية التقويم ، والتي تؤدي في مجموعها إلي بلوغ الأهداف المرجوة ، ويحتاج ذلك إلي المرور بخبرات يترتب عليها اكتساب المتعلم للمعلومات والمهارات والاتجاهات .

وهدفت الباحثة إلى بناء وحدة تعليمية لتنمية مهارات الطالبات في تصنيع ملابس التخرج ومكملاتها باستخدام خامات مستدامة وقياس فاعليتها .

وأتبع البحث المنهج شبه التجريبي ، وتكونت عينة البحث من (25) من طالبات كلية التصاميم جامعة أم القرى ، وتم تطبيق الوحدة التعليمية في العام الدراسي (2022م) .

وتوصلت النتائج إلى وجود فروق دالة إحصائياً بين متوسطي درجات الطالبات في التطبيق القبلي والبعدي للوحدة التعليمية في تصنيع ملابس التخرج ومكملاتها لصالح التطبيق البعدي ، ووجود فروق دالة إحصائياً بين متوسطي درجات الطالبات في التطبيق القبلي والبعدي لاختبار الأداء المهاري لصالح التطبيق البعدي .

الكلمات المفتاحية: وحدة تعليمية، ملابس التخرج، خامات مستدامة

[1] أستاذ الملابس والنسيج المشارك كلية التصاميم – جامعة أم القرى