Women's College
For Arts, Science and Education
Home Economics Department

Thesis submitted for requirement of MSc
(Home Economics- Textile and Clothing Department)
Entitled:

"Implementing of Six Sigma Process Improvement Frame Work in Production and Properties of Protective Garment Against Foul Weathering"

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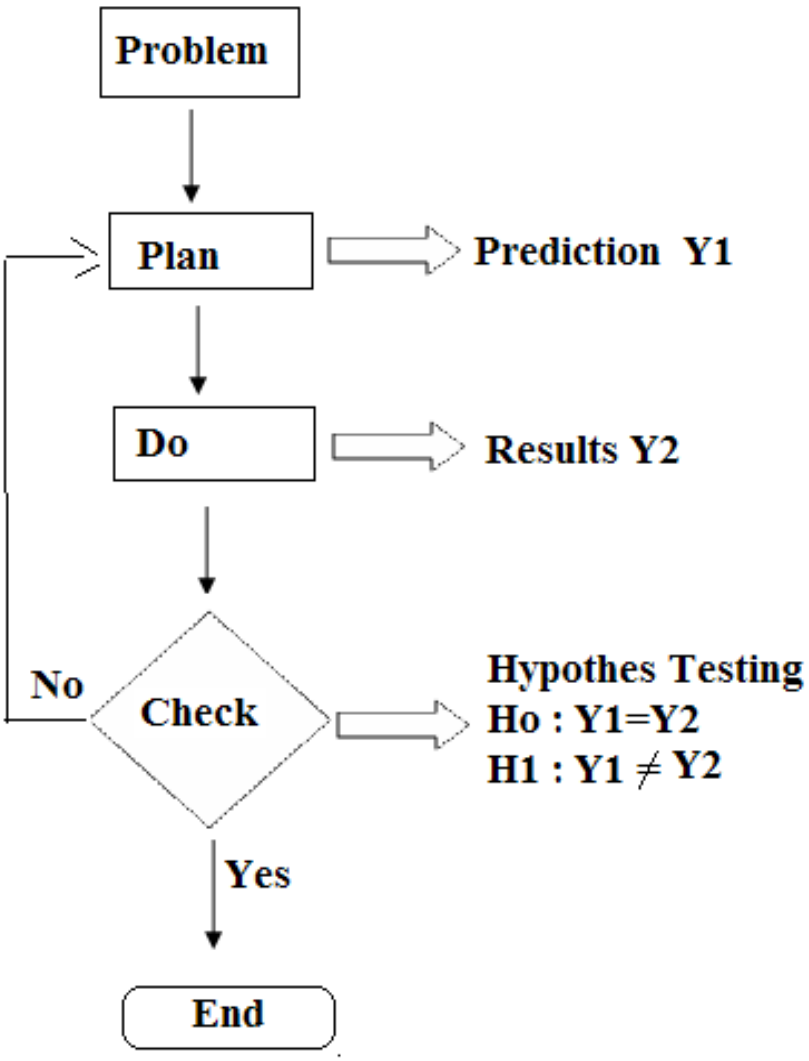
Finally, I would like to dedicate this work to ***My Father, My Mother, My Sisters and My Brothers***

The Plan work

The following chart shows the steps of this thesis:



i- Defining the problem

H_0 - Clothing that intended for protection doesn't achieve the sufficient protection, performance and the required comfort.
H_1- Composite protective fabric (two and /or three plies), might achieve the required comfort against the bad weathering hazardous.

ii- Solving the problem

To solve the previous problem we made the following plan:

1- Constructing (two, and /or three plies), fabric to test its ability to be used.

2- Using different weaving construction fabric in making the previous fabric.

3- Making experimental testing to estimate:

1- The clothing comfort level,
2- The Fabric Sewability index, and
3- The Fabric Performance index.

4- We can expect from this plan a distinguish improvement in the performance, sewability, and comfort properties.

5-The result of the testing was evaluated by the expectation in (4) by using the Hypothesis testing.

6-According to the result of the evaluation of the Hypothesis testing we can judge on the proposed plan if it work or not, and as in the above chart that if the zero assumption,"H_0", that would mean the agreement of the expectation with the result, and the working of the plan, and in the rejecting the zero assumption and accepting the alternative assumption H_1 , i.e.:

$$H_1 : Y_1 \neq Y_2$$

And that would mean the suggested plan isn't suitable and we should change it.

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The Equations

1- The temperature differences between the exterior of the clothing and the skin (T_{ext} - T_i) divided by the temperature change of the exterior surface (T_{ext} - T_i) as shown below:

$$E = (T_{ext} - T_{skin}) / (T_{ext} - T_i) \quad (24)$$

2- **Pareto priority index**

$$PPI = \frac{\text{Savings} \times \text{probability of success}}{\text{Cost} \times \text{time to completion (years)}} \quad (39)$$

3- For the median calculation

$$X = 3.5 - \frac{Fi - 0.5}{f_i} \quad (69)$$

4- The water permeability index

$$\text{Multiple layer \% MVP} = \frac{\text{T-shirt \% MVP}}{100} \times \frac{\text{fleece \% MVP}}{100} \times \frac{\text{lining \% MVP}}{100} \times \text{outer fabric \% MVP} \quad (86)$$

5- **water vapour permeability**

(+) ive relative correlation = $\boldsymbol{б_I / б_{max}}$

(-) ive relative correlation = $\boldsymbol{б_{min} / бi}$

(92)

6. composite fabric comfort modulus can calculated as follows:

$$\text{"CFCM"} = (A_i / A_{max}). 10^2$$

7- Value is calculated by the following equation:-

$$\textbf{Value} = \frac{\textbf{Quality}}{\textbf{Price}}$$

(110)

8- Marking efficiency

$$Z\ \% = \frac{\text{Pattern Area}}{\text{Fabric Area}}$$

List of tables