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Rules of ergonomics and digitization of working life: An exploratory study in the Babylon Health Department

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ABSTRACT

This study seeks to shed light on one of the relatively modern branches of science, "the rules of Ergonomics", which is concerned with the healthy and safe interaction between the human element and other elements, and to analyze the work environment through the proper design of these elements, and the evaluation and analysis of various work activities and functions. The research was based on the idea that the rules of Ergonomics have a significant and effective role in the digitization of work life. The researcher adopted the exploratory study using the questionnaire, the Likert quinquennial scale, and descriptive and statistical methods in quantitative treatment. In the organization under study, which indicates the validity of the hypotheses of the study and in varying proportions, in addition to the researcher providing some necessary recommendations in this regard.

Introduction

The researchers dealt with the perpetuation of scientific knowledge on the basis and rules that some may agree on many of its vocabulary, and among these vocabulary and rules is Ergonomics, which is concerned with studying the relationship between the individual and his work environment in order to perform work more efficiently and reduce cases of fatigue and stress that the individual is exposed to, the environment in which the individual works It is the space in which the individual works, and it includes all machines, machines, equipment, methods of work and organization. The rules of Ergonomics are also related to a number of sciences, including psychology, medicine,

the environment, and others, and in light of this, the research problem was found with the apparent neglect of promoting and applying the rules of Ergonomics in the digitization of work life.

First: Methodology:

- **Statement of the problem**:

To know the problem of the study, it is necessary to ask questions that frame the problem and that stem from the apparent neglect of the use of Ergonomics rules in its dimensions (Materialistic work environment - physical work environment - international standards) in a way that parallels the new intellectual and global structure synchronized with the changing and accelerating digital trends in its modernity and the extent of its impact on Digitizing work life and measuring its effectiveness at the level of (skills development - healthy working conditions). In light of this, the following questions were raised:

1-What is the extent of societal awareness of the importance of using the rules of Ergonomics in digitizing work life?

2-Is there a possibility to apply the rules of Ergonomics in digitizing and developing work life?

3- Will the rules of Ergonomics contribute to creating a qualitative leap for the digitization of work life?

4- Is there an impact of the rules of Ergonomics in the digitization of work life?

- **the importance of studying**

To enhance the importance of research in light of the trends of the new digital world and the modern uses of Ergonomics rules in digitizing work life, it is necessary to work on building scientific rules and foundations that make organizations a fertile ground to keep pace with change in the business world and move towards the digital world in general and the research community in particular and strive to bridge the gap Cognitive and digital with weak attempts and lack of seriousness in managing organizations in a contemporary scientific manner. The research also aims to clarify, measure and test the relationship of correlation and influence and the philosophical analysis of its variables. The researcher used the exploratory study method by adopting a questionnaire and the five-point Likert scale for the purpose of testing the sample, statistical analysis and approval of the results.

- **The study sample**

The researcher relied on a questionnaire that included (20) items and a five-item Likert scale and used descriptive and statistical analysis by adopting the response power matrix, as well as the Spearman's correlation coefficient, rank coefficient, coefficient of determination (R2) and (F) test, and he chose a sample of managers and employees with up to (87) affiliates.

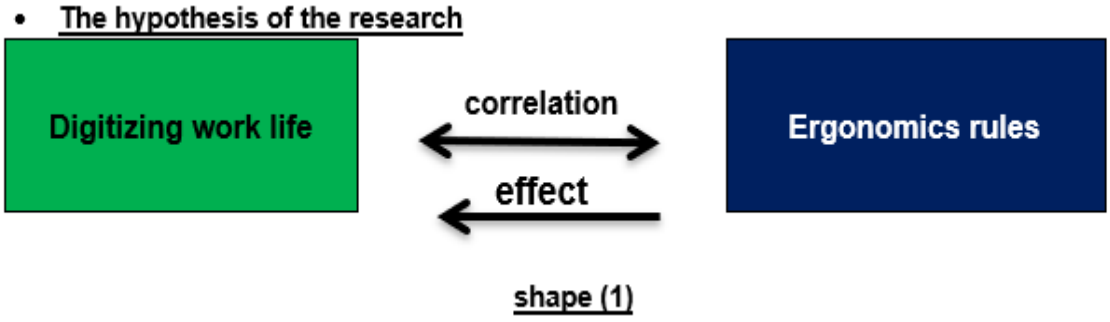
Response force matrix

Category	The value of the weighted arithmetic average is included within the period	The answers to the paragraphs of the questionnaire	The response of the sample members
first	1 to less than 1.8	Strongly disagree	very low
the second	1.8 to less than 2.6	Lack of agreement	Low
the third	From 2.6 to less than 3.4	neutral	Moderate
the fourth	3.4 to less than 4.2	the agreement	high
Fifth	4.2 to 5	strongly agree	very high
The length of the category in the matrix = { (5-1 = 4) \ (highest value taken by the scale = 5) = 0.80 { when the five-point Likert scale was adopted in the study.			

- **Research assumes**

The first main hypothesis ((there is a significant statistically significant correlation between the rules of Ergonomics and the digitization of work life))
The second main hypothesis ((there is a significant and statistically significant effect of the rules of Ergonomics and the digitization of work life)).

- **The hypothesis of the research**



shape (1)

Research hypothesis

Second: the rules of Ergonomics

-The rules of Ergonomics: the scientific study of the engineering relationship between man and his work environment. (Al-Bayati and Muhammad, 2020:7)

-The Materialistic work environment: it is all the environmental conditions surrounding the workplace such as lighting, ventilation, noise, cleanliness, and arrangement of furniture in addition to the auxiliary technical equipment in the workplace. (Aqili,569:2009)

-**The physical work environment:** the influences on the worker's ability to see, hear, and touch appropriately what the work requires. (Najm,2012:304)

- **International Guiding Specifications (ISO) :** Due to the development in labor legislation and regulations to guarantee the rights of workers, the ISO issued a number of technical and guiding specifications to maintain the health and safety of workers in the physical and Materialistic work environment in order to reduce or prevent the risks of mismatch between its physical and intellectual specifications. Therefore, there was a need to issue rules Specifications whose mission is to raise productivity levels and achieve the interests of employers. Indicative specifications include the specification (ISO-6385) and the specification (ISO-10075). (Abd al-Rahman, 2010:250)

The importance of ergonomics rules

The importance of the rules of Ergonomics lies in that they are concerned with the human element by rearranging its capabilities to reduce waste of energies and avoid errors. It works to achieve harmonization between the characteristics and specifications of mental, physical and psychological human resources with the physical and Materialistic work environment variables, where their importance lies: (Abdul Rahman,2010:77)

1-Through a detailed study of mental capabilities and determining the percentage of intelligence, perception, memory, attention and others to determine the tasks and responsibilities that balance those capabilities.

2-Studying the standards of the human body and the natural and physiological capabilities of working individuals to avoid muscle injuries resulting from repetitive movements, in addition to studying the work site and its tools in the light of those standards. (Al-Samman and Mahmoud, 2007:5)

3-Reorganizing work within the rules and specifications of international Ergonomics rules to arrange capabilities within the framework of contemporary business design to reduce the waste of mental human resources within fixed standards.

4-Regulating the behavior of employees and adopting the literature of organizational psychology to determine the origins of work relationships to improve attendance, performance and dealing with others.

5-Determining the way the human mind works to reduce the mental and muscular burden and stress through the structure of the work environment according to the way the human body works to reduce negative effects and reduce pain and fatigue.

6- Achieving compatibility with the work design and its location as it is the important part of it. (Aujan,2019:25)

Third :digitization of working life..

The issue of digitizing work life and improving it has gained the attention of specialists in business administration in general, human resource management, organizational behavior and Ergonomics rules in particular, according to the direction of the study Ergonomics.

The concept of digitization: The Canadian Network for Heritage Information (RCIP) defines the digitization process as "the process through which a digital image (content on the computer) is created from a paper document or a three-dimensional entity. Digitize it in the form of images or text (Ibrahim, 2018:9)

Digitizing work life: It is a set of continuously planned software operations that aim to develop the aspects affecting the work life of employees and their personal lives, such as social integration, capacity development, career growth, participation in decision-making and work-life balance, which in turn contribute to achieving strategic goals related to The technical dimension of the organization, its employees and those who deal with it. (Schniter, 2013:37)

Digitizing work life goals..

Improving the digitization of work life must stem from the main objectives of the organization in general, which contributes to strengthening its capacity and achieving better levels of performance and seeking to focus on the point of arrival with new scientific methods that are commensurate with the actual need for it and the future vision that it seeks to achieve within the available capabilities and provide new possibilities material, moral and human with a strategic vision, and some of these goals can be identified, which represent the views of researchers, which differed according to the

specialization and the administrative and intellectual school to which he belongs It was between (Al-Salam,2009:351) and (Al-Maghrabi,2004:6), that the most prominent goals that human resources management seeks to achieve through developing the digitization of work life can be summarized:

1-Making the work environment a source of attraction for good workers and helping to increase the workers' affiliation with the organization and not migrating to other organizations.

2- Increasing the employees' affiliation and loyalty, achieving integration and interaction between the organization's goals and objectives, and reducing the number, size and type of accidents to the lowest possible level.

3-Increase the confidence of employees.

4- Participation in solving technical problems.

5- Increase job satisfaction.

6-Increasing organizational effectiveness.

7- Contribute to providing a more flexible, loyal and motivated workforce.

The relationship of Ergonomics rules to digitizing work life..

The working conditions in the past were very harsh, as the working hours were long and often the work was done in unhealthy conditions, and there was no interest and consideration for the impact of these conditions on the human being, and improving the digitization of working life does not come in isolation from the rules of Ergonomics, as the rules of Ergonomics are concerned with all With regard to the human aspect of work equipment and its environment, therefore, the rules of Ergonomics always seek to improve the work environment and improve the method and quality of work performance, as the improvement process will result in job satisfaction. Therefore, the rules of Ergonomics are concerned with studying the suitability of things to people instead of people to things, as well as the design of equipment and the design of workplaces and the resulting high level of suitability to ensure the safety and comfort of the worker and thus increase his productivity. In addition to what was mentioned, the rules of Ergonomics studies the aspect of providing comfort to humans and studying the scientific methods and methods that guarantee him safety in his use of products and that would avoid accidents, mistakes, common uses and harm from these uses because the cost of treating these damages is often high. Finally, the current research studies the possibility of Applying the rules of Ergonomics in improving the digitization of work life, on the basis of which the researcher will conduct the experiment in order to prove his humble point of view in applying the rules of Ergonomics according to international standards (ISO).

Fourth, the practical aspect

1-Descriptive and statistical analysis of the questionnaire:

Descriptive analysis.. (rules of Ergonomics)

It is concluded from Table (2) that the value of the weighted arithmetic mean of the independent dimension of the Materialistic work environment amounted to (3.6200), which is within the category between (from 3.4 to less than 4.2) in the matrix of response strength of the sample members, to establish that the level of importance of the sample's answers to all paragraphs The Materialistic work environment tended towards agreement with a high response level and with a standard deviation of (0.7524), which shows the homogeneity of the sample answers regarding the Materialistic work environment paragraphs, and the relative importance of the Materialistic work environment constituted (72.40%), which shows the agreement of more than two thirds

of the study sample on the importance of environment paragraphs. Material work for its contribution to the promotion and application of Ergonomics rules in the Babil Health Department in re-designing work stations and office surfaces in a manner that achieves complete comfort and occupational safety at work and avoidance of musculoskeletal injuries as well as the design and selection of devices and manual and electronic equipment to suit the capabilities and capabilities of workers and arrange them according to For their movements and their internal arrangement within the principles and rules governed by the ability to move and maneuver. It is also inferred from Table (2) that the levels of importance of the independent sub-dimensions within the Materialistic work environment were distributed among the highest response level achieved by the dimension (designs of devices and manual and electronic equipment) among all dimensions of the physical work environment with a weighted arithmetic average of (3.9057) and a standard deviation (0.63159).), and a relative importance that constituted (78.11%) to confirm that the agreement of most of the study sample members on the importance of the designs of manual and electronic devices and equipment in the Babylon Health Department. Table (2) documents that the dimension (workers movements and internal arrangement) has achieved the lowest level of response among all dimensions of the Materialistic work environment, as its weighted arithmetic mean value reached (3.4571) and the standard deviation was (0.84729), and the relative importance formed (69.14). %). It is also inferred from Table (2) that the importance levels of the independent sub-dimensions within the Materialistic work environment were distributed among the highest response level achieved by the dimension (temperature and humidity) among all dimensions of the Materialistic work environment with a weighted mean of (3.9679) and a standard deviation (0.77598), The relative importance was (79.36%) to confirm that the agreement of most of the study sample members on the need to pay attention to the high temperature and humidity in the Babylon Health Department.

Table (2) documents that the dimension (ventilation) has achieved the lowest response level among all dimensions of the physical work environment, as its weighted arithmetic mean value reached (3.8000) and the standard deviation was (0.5927), and the relative importance constituted (76%). Table (2) shows that the value of the weighted arithmetic mean of the independent dimension International Standards (ISO) for measuring human potential reached (4.215), which is within the category between (from 4.2 to 5) in the matrix of response strength of the sample members, which indicates that the level of importance of the sample answers The study on the entirety of the paragraphs of the International Standards (ISO) for measuring human capabilities tended towards agreement with a very high response level and with a standard deviation of (0.300), which shows the presence of homogeneity in the study's responses regarding the paragraphs of the International Standards (ISO) for measuring human potential and the relative importance was (84.30%). Which shows the agreement of most of the study sample members on the importance of the paragraphs of the International Standards (ISO) for measuring human mental and physical capabilities because of their importance in highlighting the differences in those capabilities and working to put the right person in the right place by making a compatibility between the characteristics of individuals and the characteristics of the work assigned to him. It is inferred from Table (2) that the levels of importance of the independent sub-dimensions within the international standards (ISO) for measuring human potentials were distributed among the highest level of response achieved by the dimension (psychological potentials) among all

dimensions of the standards. An international organization (ISO) to measure human potentials with a weighted mean of (4.3444) and a standard deviation (0.17602), and a relative importance of (86.89%) to confirm that the agreement of most of the study sample members on the need to pay attention to psychological potentials within the Babylon Health Department. Table (2) documents that the dimension (physical potential) has achieved the lowest level of response among all dimensions of the international standards (ISO) for measuring human potential, as the weighted arithmetic mean value reached (4.1200) and the standard deviation was (0.35615), and the relative importance It constituted (82.4%).

Table (2)

The level of responses of the study sample to the items (the application of Ergonomics)

No.	Poverty	The average account balance	The standard deviation	Relative importance%	The degree of response
1-	The Materialistic work environment				
	A- Deciding the areas of action and leveling the action of the school and the office	3.4971	0.77896	69.94	High
	B- Decisions of equipment and devices of video and electronics	3.9057	0.63159	78.11	High
	C- The movements of the agents and the internal order	3.4571	0.84729	69.14	High
	Total	3.6742	0.7526	72.40	High
2-	physical working environment				
	A-Degree of heat and humidity	3.9679	0.77598	79.36	High
	b-noise	3.8464	0.58158	76.93	High
	C- Addition and colors	3.9054	0.53217	78.11	High
	d-ventilation	3.8000	0.5927	76	High
	Total	3.8800	0.6206	77.60	High
3-	State criteria for measuring human resources				
	A.The rational possibilities	4.1800	0.36755	83.6	High
	B. Physical facilities	4.1200	0.35615	82.4	High
	C- Psychological possibilities	4.3444	0.17602	86.89	very high
	Total	4.215	0.300	84.30	very high
	Total	3.9230	0.5577	78.1	High

Source: Prepared by the researcher according to the results of hypotheses testing by means of SPSS V25

2- Descriptive and statistical analysis of the questionnaire:

Descriptive analysis..(Digitizing work life)

Table (3)
The level of responses of the study sample to the items (digitizing work life)

No.	independent sub dimensions	weighted arithmetic mean	standard deviation	Relative importance %	response level
1	Salary adequacy and fairness	3.60848	0.15093	60.17	Moderate
2	healthy working conditions	4.0143	0.57859	80.29	high
3	Balance work and life	3.4629	0.49045	69.26	high
4	social integration	3.9629	0.51246	79.26	high
5	Participation in making decisions	4.0116	0.48229	80.23	high
6	Skills improvement and career growth	4.0429	0.50712	80.86	high
7	Job security	4.1657	0.39069	83.31	high
	Total	3.8098	0.44465	76.20	high

Source: Prepared by the researcher according to the results of hypotheses testing by means of SPSS V25

3- The relationship of correlation and influence between the variables of the study

It is inferred from Table (4) that the first main hypothesis is accepted that (there is a significant correlation with statistical significance between the rules of Ergonomics and the digitization of work life) with a confidence percentage (95%), as the calculated Z value reached (6.9194**) and this value is higher than the Z value The tabular value of 1.96 indicates the significance of the relationship, while the value of the correlation coefficient between the two variables is (0.833) to establish that there is a strong direct correlation between the rules of Ergonomics and the digitization of work life. The independent dimension of the International Standards (ISO) for measuring human capabilities recorded the highest correlation coefficient with the digitization of work life, at (0.801), while the independent dimension of the Materialistic work environment recorded the lowest correlation coefficient value with the digitization of work life, at (0.667).

Table (4)
The results of the first main hypothesis test

dependent / independent		dependent variable	The correlation coefficient between two variables	Z test		Interpretation
				Calculated Z-value	probability value	
Dimensions of the independent variable	Materialistic work environment	Digitizing work life	0.667	**5.5405	0.00	There is a strong direct correlation between the Materialistic work environment and the digitization of work life, and thus the acceptance of the first sub-hypothesis
	physical working environment	Digitizing work life	0.786	**6.5290	0.00	There is a strong direct correlation between the physical work environment and the digitization of work life, and thus the acceptance of the second sub-hypothesis
	International Standards (ISO) for measuring human potential	Digitizing work life	0.801	**6.6536	0.00	There is a strong direct correlation between the international standards (ISO) for measuring human capabilities and the digitization of work life, and thus the acceptance of the third sub-hypothesis
	Ergonomics	Digitizing work life	0.833	**6.9194	0.00	There is a strong direct correlation between Ergonomics and the digitization of work life, and thus the acceptance of the first main hypothesis
	* Significant relationship between the two variables at the level of significance 0.05					

Source: Prepared by the researcher according to the results of hypotheses testing by means of SPSS V25

4- The impact of the dimensions of Ergonomics rules combined in the digitization of work life

Each of Table (5) focuses and according to the results of the statistical analysis program Amos, the acceptance of the second main hypothesis that {there is a significant and statistically significant effect of the rules of Ergonomics in the digitization of work life} which confirms its acceptance with a confidence rate of (95%), and that is starting from the application of the analysis Multiple linear regression to show the impact of the dimensions of Ergonomics sub-bases (design of workstations, office work surfaces and chairs, designs of manual and electronic devices and equipment, staff movements and internal arrangement, temperature and humidity, noise, lighting and colors, ventilation, mental capabilities, physical capabilities, psychological capabilities) Together in the digitization of work life, the calculated F value reached (13.343), which is significant, because it is greater than the tabular F value of (4.0012) at a significant level (0.05), and

the value of the determination coefficient R2 was (69%), which indicates an interpretation ratio) Effect) Dimensions of Ergonomics bases (design of workstations, office work surfaces and chairs, designs of manual and electronic devices and equipment, staff movements and internal arrangement, temperature and humidity, noise, lighting and colors N, ventilation, mental capabilities, physical capabilities, psychological capabilities) combined for the independent variable in digitizing work life, documenting the presence of a clear impact of the rules of Ergonomics in digitizing work life in the Babylon Health Department.

Table (5)

Statistical analysis to test the impact of the dimensions of Ergonomics rules combined in the digitization of work life

Independent coefficient of		dependent variable	determination R2 %	F test		test result
				Calculated F value	probability value	
Dimensions of the independent variable	Design workstations, desks and chairs	digitization of work life	69%	** 13.343	0.00	Acceptance of the second main hypothesis with a confidence of 95%, that is, there is a noticeable effect of Ergonomics In the digitization of work life
	Designs of hand and electronic devices and equipment					
	Staff movements and internal arrangement					
	temperature and humidity					
	the noise					
	Lighting and colors					
	ventilation					
	mental potential					
	physical capabilities					
	Psychological potential					
	There is a noticeable impact of Ergonomics in its independent dimensions (design of workstations, office work surfaces and chairs, designs of manual and electronic devices and equipment, movements of workers and internal arrangement, temperature and humidity, noise, lighting and colors, ventilation, mental capabilities, physical capabilities, psychological capabilities) combined in digitization work life					
	R2 The coefficient of determination is useful in indicating the percentage of interpretation of the independent variable for the dependent variable					
	Tabular F value at a significant level (0.05) = 4.0012					

Source: Prepared by the researcher according to the results of hypotheses testing by means of SPSS V25

Conclusions:

1. It was proven through the statistical analysis of the main variables that there is a significant correlation between their variables.
2. It was proven through the statistical analysis of the main variables that there is an effect relationship for the study and the acceptance of the first main hypothesis in the

direction of (H1).

3. It has been proven through statistical analysis that there is a significant effect of the main variable (the rules of Ergonomics) on the main and sub-variable (to digitize work life) and the acceptance of hypotheses in the direction of (H1).
4. It has been proven by creating the appropriate atmosphere provided by the researcher for the physical work environment variables (temperature, humidity, noise, lighting, colors and vibration) that these atmospheres have moved the behaviors of workers during the stages of experiment between continuation and stopping towards increasing work productivity and liberating the psychological state and intellectual creativity towards the true affiliation of their existence As employees and support the new organizational culture that seeks to provide better service in accordance with the atmosphere and quality of work life with special standards.
5. The apparent weakness in adopting digital variables in working methods and developing its offices has proven the main feature of that department, despite the world's trend towards building a digital world, especially in light of the current crises (COVID-19).
6. It has been proven through descriptive analysis that there is a relatively medium importance for the use of Ergonomics rules in digitizing work life.

Recommendations:

1. The necessity of benefiting from the results of the study experience prepared by the researcher and the possibility of applying the results of the experiment and study on the ground and benefiting from the results achieved from job satisfaction, loyalty and organizational affiliation.
2. The need to take into account when designing offices that the walls and windows are sound-proof, and to prepare offices and chairs as comfortable as possible.
3. The necessity of adopting modern digital methods and benefiting from automation, especially as we are in the current Corona crisis and the world is heading towards the digital direction of work.
4. The organization in question should pay more attention to each dimension of Ergonomics rules separately due to the importance and benefits of each dimension and to expand the practices of Ergonomics rules by providing information related to the activity required to prevent the employee from being exposed to intellectual fatigue.
5. The need for the management of the organization in question to create the appropriate atmosphere in order to increase productivity, improve intellectual creativity, achieve true belonging and support organizational culture.
6. The organization in question must be keen on training employees to increase their abilities to carry out activities with various tasks and oblige the employee to take a rest between work periods so that its employees are not exposed to physical stress and to prevent injuries.

REFERENCES:

1. Ibrahim, Muhammad, (2018), "Digitization and its role in improving work quality", an exploratory study in the Iraqi Ministry of Health' Master's thesis, Baghdad.
2. Al-Salem, Muayyad Saeed, (2009), "Human Resources Management a Strategic Approach", first edition, Ithraa Publishing and Distribution House, Amman - Jordan.
3. Al-Samman, Thaer Ahmed Saadoun, Mahmoud, Muhammad Naif, (2007), "Ergonomics and its implications for reducing work risks - a field study in the

electronic computer laboratories at the College of Administration and Economics, University of Mosul", research presented to the Seventh Annual International Scientific Conference, Al-Zaytoonah University -Jordan.

4. Schniter, Abdul Rahman Taher and Muhammad, Nasreen Jassem, (2015), "The relationship between the quality of work life and organizational creativity" applied research in the Ministry of Planning, Journal of Economic and Administrative Sciences, Volume 21, Issue 81, 2015.
5. Abdul Rahman, Fouad Youssef, (2010), "The impact of information technology on the compatibility between work design and Ergonomics re-designs", an exploratory study at the Presidency of Al-Mustansiriya University, which is part of obtaining a Ph.D. in Management, College of Administration and Economics, University Al-Mustansiriya.
6. Aqili, Omar Wasfi, (2009), "Contemporary Human Resources Management: A Strategic Dimension", Wael Publishing House, Jordan.
7. Awajan, Dima Mithqal Abd, (2019), "The impact of Ergonomics on organizational energy: the mediating role of the absorption strategy", Master's thesis, case study in Aqaba Port Company, Jordan.
8. Al-Maghraby, Abdel Hamid Abdel Fattah, (2004), "The quality of work life and its impact on the development of job engagement, a field study, Journal of Commercial Studies and Research, Faculty of Commerce, Zagazig University.
9. Najm, Najm Abboud, (2012), "The Study of Work and Ergonomics", first edition, Al-Zaytoonah University of Jordan, Dar Safaa for Printing, Publishing and Distribution, Amman, Jordan.