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Workplace Ergonomics and Academic Staff Performance in College of Education in Umm Al-Qura University in Makkah

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Abstract The relationship between workplace ergonomics (Temperature, furniture arrangement, facilities, lighting, noise, equipment) and academic staff performance in Umm Al-Qura University (UQU) at Makkah is the aim of this study. Study sample consisted of (154) academic staff at the College of Education in UQU. The descriptive relational approach was used to detect the level of workplace ergonomics satisfaction and employee's performance. Moreover, a survey has been used to collect data for formulating) information. At the end of this study, the study concluded that the workplace ergonomics satisfaction level was medium. The performance level of academic staff at the College of Education in UQU, regarding the workplace ergonomics is high. Finally, there is no statistical significance difference regarding the correlation coefficients of workplace ergonomics satisfaction relationship with its dimensions and academic staff performance according to gender.

Keywords: *workplace, ergonomics, performance, academic staff performance*

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1. Introduction

Indoor workplace environment may shape fifty percent of time spent by most people, which by its turn greatly influences their mental status, actions, abilities and performance. Consequently, better outcomes and increased productivity are assumed to be the outcomes of better workplace environment [1].

Over the last decade, the change in organizational work patterns and expectation of employees gave rise to the development of new working practices. The changing nature of work resulted in increasing demand of better workplace as an attractive physical asset that responded to the requirement of creative knowledge workers [2]. In order to achieve this competitive environment, some strategic decisions are required by management to improve performance. Developing a working system that will fit the job to the employee is an example of these decisions. This innovative management strategic decision is known as ergonomics [3].

According to International Ergonomics Association [4] Ergonomics is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system. It is the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

In the higher education sector where most of occupants are knowledge workers; the idea of creating a high-performance workplace is very important, which has been developed in many universities [5].

The ergonomics influence among academic staff in UQU has not been explored, nor discovered yet. Therefore, this study would identify the relationship between workplace ergonomics and academic staff performance at the college of education in UQU in Makkah.

2. Research Problem

For better understanding of the effect of jobs, it is important to learn about links among job performance, people, and situation factors. Job performance is a very considerable factor influencing the profitability of any organization [6]. Therefore, the performance of an employee can be affected by many factors such as colours around, lights combination and sitting arrangement [7].

Ergonomics is known as a science concerned with the fit 'between people and their work. It puts people first, taking account of their capabilities and limitations. Moreover, Hameed and Amjad [1] suggested that an organization could enhance its productivity by improving workplace design. Furthermore, Ergonomics aims at being sure that tasks, equipment, information and environment fit each worker. The level of motivation of an employee is correlated with working environment and commitment

towards his job [8]. Further researches are required to examine the areas of ergonomic in UQU to show how ergonomic impacts work conditions and ultimately influences academic staff performance.

2.1. Research objective

This study aims to examine the relationship between workplace ergonomics (Temperature, furniture arrangement, facilities, lighting, noise, equipment) and academic staff performance in UQU at Makkah.

2.2. Research Questions

The main research questions are:

1. What is the level of workplace ergonomics satisfaction of the academic staff in the College of Education in UQU, from their point of view?
2. What is the performance level of academic staff in the College of Education in UQU related to their environment, from their point of view?
3. Is there any statistically significant correlation at level (α=0.05) for the satisfaction of workplace ergonomics in the College of Education with the performance of academic staff at the UQU?
4. Are there any statistically significant differences at level (α=0.05) between the correlation coefficients of satisfaction relationship of the workplace ergonomics and the performance of academic staff, in the College of Education in UQU due to the (gender, age, and academic rank)?

2.3. Significance of the Study

People are the most valuable resource of an organization, and that the management of people makes a difference to company performance [9]. Since employees are the eventual user of the workplace environment, the employer should consider designing and equipping the workplace settings to suit employee comfort. The physical environment shall be designed to appeal and inspire employee who works within the premise [10]. Recently, the workplace environment has attracted the researchers around the world. To achieve high levels of employee productivity, organizations shall ensure that the workplace environment is conducive to organizational needs facilitating interaction, privacy, formality, informality, functionality and cross-disciplinarily. Consequently, the environment is a tool that can be leveraged to improve business results [11]. Extensive scientific research conducted by Roelofsen [12] has also concluded that improving working environment resulted in a reduction of complaints, absenteeism and an increase in productivity. According to Kroemer [13], office ergonomics hubs human-centred work design which requires understanding employees' capabilities, well-being and preferences.

2.4. Limitations

This study

- has been conducted in the college of education
- has examined the relationship between workplace ergonomics and academic staff performance.
- sampled all the academic staff,
- was conducted in Spring of 2019.

2.5. Definitions

Ergonomics: is the design of the workplace, equipment, machine, tool, product, environment and system, taking into consideration the human's physical, physiological capabilities and optimizing the effectiveness and productivity of work system while assuring the safety, health and wellbeing of the workers [14].

Employees performance: is a group of administration behaviours which express how the employee performs his job with high quality of performance, good implementation, the technical experience of the job, communicational interaction with other organization staff members, and the commitment of the administrative rules which organize his job and [15] upgrade it to better response carefully [16].

3. Literature Review

3.1. Workplace Ergonomics

According to the Occupational Safety and Health Academy [15], ergonomics involves the design of workstations, work practices and workflow to fit the employees' capabilities. It also involves a design that reduces risk factors that may contribute to common work-related injuries and illnesses, such as sprains, strain and cumulative trauma disorders (CTDs).

Ergonomics is also expressed as a holistic approach in which considerations of physical, cognitive, social, organisational, environmental and other relevant factors are considered to enhance the design and evaluation of tasks, jobs, products, environments and systems in order to make them compatible with the needs, abilities and limitations of employees [4]. This new concept also shows that ergonomics is not limited to the improvement of individual employee alone but an improvement in organisational performance at all. Workplace environment may give an impression over the working environment, as one enters the building, it may also boost or decreases staff reaction. The poor productivity, quality, and accidents resulted from human error, are directly attributed to poor ergonomics [17]. This paper highlights on organizational ergonomics and focuses work environment fit considering more precisely the six-environmental factors including temperature, furniture arrangement, facilities, lighting, noise, and equipment.

3.2. Temperature

Good room temperature increases productivity and reduces workers stress. It plays a notable and effective role in the workplace environment. Effective temperature indicates how hot or cold our environment really makes us feel [18]. High temperature can affect employee's performance, particularly those one depending on cognitive, physical, and perceptual duties [19].

3.3. Furniture Arrangement

In organizations, where workplace situations are monotonous and arduous, health conditions especially neck, shoulder, backbone and hands are the major problems that employee experience is his/ her work [20]. Sitting arrangement or comfortable furniture in a workplace has a serious impact on user's health [21].

3.4. Facilities

Workplace facilities affect employees work and his satisfaction. They play a vital role in the workplace environment. Employee facilities should be clean, well maintained and attractively presented [22].

3.5. Lighting

To build a comfortable workplace design, lightning has a critical role. It can affect the performance of employees depending upon its condition [23].

3.6. Noise

Noise as the unwanted sound is the most common complaint in offices workplace. The level of noise greater than 85dB has a negative impact on the performance and proved to be a strategic indicator for performance improvement [24].

3.7. Equipment

Office equipment such as computers, printers, photocopiers, plotters, etc have increasingly become the basic job tools for enhanced performance in the corporate world [25].

3.8. Performance of Employees'

The outcome of a person or group work in an organization at a time which reflects how well they reach a job qualification in order to achieve organization's goal is known by performance. Many factors could influence employee's job performance including but not limited to equipment, physical work environment, meaningful work, standard operating procedures, a reward for good or bad systems, performance expectancy, feedback on performance, in addition to knowledge, skills and attitudes [26]. Every organization seeks highly performing individuals in order to ensure competitive advantage and achievement of corporate goals. Therefore, high employee performance is considered one of the critical determinants of the level of organizational productivity and accomplishments [27].

3.9. Literature Review

Gensler [28] showed how well-designed office is key element for improving employee performance in random and representative sample of 2,013 office workers in all staff and management strata in the U.S. The survey findings suggested that businesses that ignore the design and layout of their workplaces failed to optimize the optimum value of their human capital. Moreover, the survey conclusion demonstrated a link between the physical office and work processes such as innovation, collaboration, and creativity. The results showed that overwhelmingly importance of good workplace design for employee satisfaction.

Hameed and Amjad [1] studied the impact of office design on employees' productivity. The main objective of his study is to find out the relationship between office design and productivity. For this purpose, a sample of 21 out of 31 bank branches in Abbottabad, Pakistan, was taken to conduct the study. Sample size was a number of 105 employees in these 21 branches. Primary data was collected through a structured questionnaire. The observation was also used to collect information about office design. The findings of this study showed that office design is very vital in terms of increasing employees" productivity. Comfortable and ergonomic office design motivates the employees and increases their performance substantially.

Amir [29] measured the impact of office environment on employee's performance level in the private sector of Pakistan. The cross-sectional primary data with a sample size of 94 have been collected through verified questionnaire from employees of different private organizations of Pakistan.

Findings of the research showed that there is a strong positive significant relationship between the performance of private sector office employees and the environmental elements.

Bridger [30] studied how to increase productivity as office design business leaders are being urged to take more account of the links between good workplace design and improved business performance. According to the findings of this new research, the impact of office design on business performance, expressed the revolution taking place nowadays in the office environment, as the traditional workspace leaves a space for social and interactive engagement. The report showed that office design influences a range of critical factors to business performance, including staff attraction, motivation, retention, staff satisfaction, knowledge, skills of staff, innovation and creativity, responsiveness to business and technological change, customer attraction and retention.

Newsham, Brand et al [31] studied the link between indoor environment conditions and organizational productivity. Questionnaire data were collected from 95 workstations at an open-plan office building in Michigan, USA. The physical measurements encompassed thermal, lighting, acoustic variables, furniture dimensions, and an assessment of potential exterior view. Results confirmed the important role of window access at the desk in relation with lighting, particularly through its effect on the satisfaction with outside view.

According to Carmen [32], the workplace design considerations include thermal comfort which indicates the right combination of temperature, airflow and humidity. A combination of these elements is required for physical comfort in the workplace. Good indoor environmental quality starts with a well-designed lighting system, which involves more than just providing windows and incandescent lighting. Lighting has enormous potentials for influencing occupant perception of the interior space.

4. Study Methodology

The descriptive relational approach was used to detect the level of workplace ergonomics satisfaction, employee's performance at the College of Education in UQU, according to academic staff point of view.

4.1. Study Population

The study population consists of (298) academic staff at College of Education in UQU, from the records of human resources department, during the second semester of (1439/1440) academic year.

4.2. Study Sample

The study sample consists of (154) academic staff by (52%) of study population at the College of Education in UQU, since study population size is relatively small, as shown in Table 1.

Table 1. Distribution of study respondents

IV &Levels of it	Frequency	%
Gender		
Male	73	47.4
Female	81	52.6
Total	154	100
Age		
From 26 to 35 years	36	23.4
From 36 to 45 years	61	39.6
From 46 to 60 years	57	37.0
Total	154	100
Academic Rank		
Instructor	32	20.8
Assistant Professor	63	40.9
Associate Professor	35	22.7
Professor	24	15.6
Total	154	100.0

4.3. Data Collection Instruments

In order to achieve study objectives; the following two instruments were used:

4.3.1. Academic Staff Satisfaction of Workplace Ergonomics at the College of Education in UQU

In order to observe the satisfaction of workplace ergonomics at College of Education in UQU, according the academic staff point of views; a special instrument was developed in this study by reviewing the previous studies, such as [33]. The instrument in its initial copy consisted of (25) questions divided into over five dimensions: temperature s between (1) and (5), furniture arrangement between (6) and (10), facilities between (11) and (15), lighting between (16) and (20), and finally the noise between (21) and (25). (Appendix A).

a. Content Validity.

The Content of the workplace ergonomics according the academic staff point of views at College of Education in UQU, was verified by distributing it on a group of arbitrators that contain three academics with high academic ranks (Associate Professor & Assistant Professor) who have the experience and competence in the field of Educational administration in UQU (Appendix B), in order to give their opinions about the accuracy and validity of instrument content.

All the arbitrators comments and suggestions were taken into consideration (Appendix C); where the language formulation of the following ten items were modified: (3, 4) in the temperature dimension, (6, 8 &10) in the furniture arrangement dimension, items (11, 14) in the facilities dimension, (16, 20) in the lighting dimension, and article (23) in the noise dimension. Where it appears in the initial study instrument form, while the following fifteen items are kept without modification: (1, 2 &5) in the temperature dimension, (7, 9) in the furniture arrangement dimension, (12, 13 &15) in the facilities dimension, (17, 18, 19) in the lighting dimension, and (21, 22, 24 & 25) in the noise dimension, where it appears in the initial study instrument form.

Therefore, the number of instrument items are kept in its final form after the arbitration to contain (25) items, which were distributed and spread over the following (5) dimensions: temperature dimension items between (1) and (5), furniture arrangement, items between (6) and (10), facilities dimension, items between (11) and (15), then lighting dimension , items between (16) and (20), and finally noise dimension which has five items between (21) and (25). (Appendix D)

b. Instrument Formulation Validity

Study instrument was implemented on pilot sample that consisted of (20) employees at the College of Education in UQU from outside the targeted study sample, in order to calculate the Corrected Correlation Coefficients values for items relationship with the study instrument and its dimensions; where the Corrected Correlation Coefficients values for the temperature items and its dimension were between (0.44) and (0.87) in study instrument between (0.42) and (0.68), while the Corrected Correlation Coefficients values for the furniture arrangement items and its dimension were between (0.74) and (0.87) with study instrument between (0.83) and (0.73), and the Corrected Correlation Coefficients values for the facilities items and its dimension were between (0.57) and (0.85) with study instrument between (0.51) and (0.75), but the Corrected Correlation Coefficients values for the lighting items and its dimension were between (0.62) and (0.81) with study instrument between (0.48) and (0.67), and finally the Corrected Correlation Coefficients values for the noise items and its dimension were between (0.88) and (0.94) with study instrument between (0.71) and (0.76). As shown in (Appendix E) and noticed from the above values; the formulation validity that Corrected Correlation Coefficients values for the item's relationship with the study instrument and its dimensions weren't below the criterion (0.20), which verify the quality and validity of study items instrument formulation. [34]

Pearson Correlation Coefficients were calculated for the study instrument relationship with its dimensions, where its value ranged between (0.75) and (0.82), in addition to calculating the Pearson Intra-Correlation Coefficients for the dimension relationship with each other, where its value ranged between (0.41) and (0.68), as shown in (Appendix F).

c. Study Instrument Reliability

For the purposes of calculating the internal consistency of study instrument and its dimensions, Cronbach's Alpha (α) formula was used on the first test data of the pilot sample, where its instrument value amounted to (0.95) and its instrument dimensions' values ranged between (0.85) and (0.97), For the purpose of calculating the consistency of repetition, the Test-Retest method of the study instrument and its dimensions has been used with an interval of two weeks between the first and second tests; Pearson Correlation Coefficient of the relationship between the first and second tests of the pilot sample, where its value of the instrument amounted to (0.81) and its instrument dimensions' values ranged between (0.82) and (0.86), as shown in (Appendix g).

d. Instrument Correction Criterion

The final form of satisfaction level instrument of workplace ergonomics consisted of twenty-five questions ranged by the Likert fifth instruments, which include five degrees [strongly agree and given at the correction instrument (5), agree and given at the correction instrument (4), neutral and given at the correction instrument (3), disagree and given at the correction instrument (2), and finally strongly disagree and given at the correction instrument (1)],

4.3.2. Performance Instrument

In order to detect the performance level of academic staff regarding their environment, a special instrument was developed for this study by viewing the previous studies related to the performance of employees such as [35,36], and the instrument in its initial form consisted of six items (Appendix H).

The Validity & Reliability Indications of academic staff Performance Instrument.

a. Content Validity

The Content of the academic staff performance level instrument at College of Education in UQU, was verified by distributing it on a group of arbitrators that contain three academics with high academic ranks (Associate Professor & Assistant Professor) who have the experience and competence in the field of Educational administration in UQU (Appendix B), in order to give their opinions about the accuracy and validity of instrument content.

All the arbitrators comments and suggestions were taken into consideration (Appendix I); where the items (4 & 6) were deleted, as shown in the initial form of study instrument and added the items (5, 6 & 7) as shown in the final form of study instrument, four items (1, 2, 3, 5) are kept without modification as shown in the initial form of study instrument, therefore the number of instrument items at its final form, after the arbitration to become seven items (Appendix J).

b. Instrument Formulation Validity

Study instrument was implemented on pilot sample that consists of (20) employees at the College of Education in UQU from outside the targeted study sample, in order to calculate the corrected correlation coefficients for the items relationship with the study instrument; where the corrected correlation coefficients values for the relationship of instrument questions with the instrument ranged between (0.69) and (0.88), as shown in (Appendix K). It noticed from above values, related to the instrument formulation Validity that corrected correlation coefficients values for the items relationship with the study instrument wasn't below the criterion (0.20), which verify the quality and Validity of study items instrument formulation [34].

c. Study Instrument Reliability

For the purposes of calculating the internal consistency of study instrument, Cronbach's Alpha (α) formula was used by depending on the first test data of the pilot sample, where its instrument value amounted to (0.94), and for the purpose of calculating the consistency of repetition through the Test-Retest method of the study instrument, with an interval of two weeks between the first and second tests; Pearson Correlation Coefficient of the relationship between the first and second tests of the pilot sample, where its value of the instrument amounted to (0.87).

d. Instrument Correction Criterion

The performance level instrument in its final form consist of seven questions that will be answered by the Likert fifth instruments, which include five degrees [strongly agree and given at the correction instrument (5), agree and given at the correction instrument (4), neutral and given at the correction instrument (3), disagree and given at the correction instrument (2), and finally strongly disagree and given at the correction instrument (1).

4.4. Study Variables

The questionnaire included the following variables:

A. Independent Variables; which are represented in the following:

1. Gender, with two categories: (Male, Female).
2. Age, with three levels (26-35 years, 36-45 years, 46-60 years).
3. Academic rank, with four levels (teacher, assistant professor, associate professor, professor).

B. Dependent Variables; which are represented in the following:

1. The satisfaction level of workplace ergonomics among the academic staff at the College of Education in UQU.
2. The performance level of academic staff regarding their environment at the College of Education in UQU

4.5. Statistical Analysis

Statistical analyses were done on the study data by using the Statistical Package for Social Sciences (SPSS).

5. Discussion of the Results

First: results related to the first question of the study: "What is the level of workplace ergonomics satisfaction among the academic staff at the College of Education in UQU, from their point of view?"

To answer this question, the arithmetic means, and standard deviations were calculated for the workplace ergonomics satisfaction, and its dimensions at the College of Education in UQU, according to the academic staff point of view, regarding the order of workplace ergonomics dimensions, as shown in Table 2.

Table 2. Arithmetic means and standard deviations for the workplace ergonomics satisfaction, and its dimensions, from the academic staff points of view, in a descending order

Rank	ID	Workplace ergonomics and its Dimensions	Mean	Std. Dev.	Degree
1	5	Noise	3.82	0.92	High
2	3	Facilities	3.75	0.77	High
3	4	Lighting	3.39	0.72	average
4	2	Furniture Arrangement	3.26	0.89	average
5	1	Temperature	3.08	1.00	average
Whole Instrument			3.46	0.68	average

Table 2 shows that the workplace ergonomics satisfaction level, and its dimensions at the College of Education in UQU, according the academic staff point of view was average, where the workplace ergonomics dimensions came according to the following order: noise dimension came first within high satisfaction level, then facilities dimension came second within also a high satisfaction level, the lighting dimension ranked third within an average satisfaction level, the furniture arrangement dimension came in fourth place within also an average satisfaction level, and finally, the temperature dimension came in the last place within also an average satisfaction level. This can be explained that the faculty office is in a quiet place, therefore, they can complete their daily tasks easily. Moreover, the researcher explained that temperature came in the last level because the temperature is cold in the education college which may bother some of them. This finding is consistent with Gensler study [28] which found the importance of good workplace design for employee satisfaction. On the other hand, this result differs from Newsham, Brand et al [31] study as their results confirmed the important role of window access at the desk in satisfaction with lighting, particularly through its effect on satisfaction with outside view**.**

Second: results related to the second question of the study: "What is the performance level of academic staff at the College of Education in UQU regarding their environment, according the academic staff point of view?"

To answer this question; the arithmetic means, and standard deviations were calculated for the performance level of academic staff, at the College of Education in UQU and its questions from the academic staff point of view, as shown in Table 3.

Table 3 shows that the performance level of academic staff at the College of Education in UQU, according the academic staff point of view, was high according to the classification criterion of arithmetic means and classified within the following two satisfaction levels: high for questions number (7, 6, 4, 5, 1, 2) according to the occurrence, and moderate for question number (3). This can be explained that the university administration tries to provide a good working environment for its members. This finding is consistent with [37].

Third: results related to the third study question: "Is there a statistically significant correlation at level (α=0.05) for the satisfaction of workplace ergonomics at College of Education with the performance of academic staff at the UQU?"

To answer this question; Pearson Correlation Coefficients were calculated for the satisfaction relationship of workplace, Is there a statistically significance correlation at level (α=0.05) for the satisfaction of workplace ergonomics at College of Education with the academic staff performance in UQU?, and its dimensions with the performance of academic staff at the College of Education in UQU, according the academic staff point of view, as shown in Table 4.

Table 4 shows that Pearson Correlation Coefficients for the satisfaction relationship of the workplace environment, and its dimensions with the performance of academic staff at the College of Education in UQU, from their point of view have been classified according to the criterion [38], as follows:

- Statistically significant high positive relationships at level (α = 0.05); two correlations out of six between the satisfaction of workplace ergonomics and its noise dimension, on the one side and the academic staff performance on the other side, at the College of Education in UQU, from their academic staff point of view.
- Statistically significant average positive relationships at level (α=0.05); four correlations out of six between the satisfaction of workplace ergonomics dimensions (temperature, furniture arrangement, facilities, lighting), on the one side and the academic staff performance on the other side, at the College of Education in UQU, from the academic staff point of view.

This also can be explained that the university administration tries to provide a good working environment for its members.

Fourth: results related to the fourth study question: " Are there any statistically significant differences at level (α=0.05) between the correlation coefficients of satisfaction relationship about the workplace ergonomics and the performance of academic staff, at the College of Education in UQU due to the (gender, age, and academic rank)?''

To answer the fourth question of the study; Pearson Correlation Coefficients was calculated for the satisfaction relationship of workplace ergonomics and its dimensions with the academic staff performance, at the College of Education in UQU, from their points of view according to gender, then convert it to the corresponding Fisher's Z values, and then reveal the statistical significance of equation difference results between the two Fisher's Z values of the Correlation Coefficients of workplace ergonomics satisfaction relationship and its dimensions with the academic staff performance, at the College of Education in UQU, from the academic staff points of view according to gender, as shown in Table 5.

Table 5 shows that there is no statistically significant difference at level (α = 0.05) between Fisher's Z values, for the Correlation Coefficients of workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance at the College of Education in UQU, from the academic staff point of view according to gender.

Pearson Correlation Coefficients was also calculated for the satisfaction relationship of workplace ergonomics, and its dimensions with the academic staff performance at the College of Education in UQU, from their point of view according to age, and then convert it to the corresponding Fisher's Z values, and then reveal the statistical

significance of equation statistical results V between Fisher's Z values of the correlation coefficients for workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance at the College of Education in UQU, from the academic staff point of view according to age, as shown in Table 6.

Table 3. Arithmetic means and standard deviations for the performance of academic staff

Rank	ID	Academic staff Performance	Mean	Std. Dev.	Degree
1	7	My workplace environment affects my productivity	3.88	0.95	High
2	6	My workplace environment enhances my motivation	3.79	0.97	High
3	4	My workplace environment encourages me to work efficiently	3.78	0.97	High
4	5	My workplace environment boosts my creativity	3.77	1.00	High
5	1	My workplace environment helps me to complete my daily tasks easily	3.75	1.04	High
6	2	My workplace environment helps me to complete my daily tasks on time	3.75	1.05	High
7	3	I am satisfied with my workplace environment	3.42	1.15	Moderate
Whole Instrument			3.73	0.87	High

Table 4. Pearson Correlation Coefficients values for the satisfaction relationship of workplace ergonomics, and its dimensions with the performance of academic staff.

Correlation Between	Academic staff Performance	
	ρ^*	Classification of Correlation Power
Temperature	0.363	average
Furniture Arrangement	0.445	average
Facilities	0.467	average
Lighting	0.410	average
Noise	0.521	High
Workplace Environment	0.557	High

* $p \leq 0.05$.

Table 5. Equation difference results between the two Fisher's Z values of the Correlation Coefficients of workplace ergonomics satisfaction relationship and its dimensions with the academic staff performance.

	Gender	Academic staff Performance			Diff. in Z	Sig.
		ρ*	N	Fisher's Z		
Temperature	Male	0.46	73	0.49	0.26	0.80
	Female	0.42	81	0.45		
Furniture Arrangement	Male	0.39	73	0.41	-1.09	0.27
	Female	0.53	81	0.59		
Facilities	Male	0.38	73	0.40	-1.27	0.20
	Female	0.54	81	0.61		
Lighting	Male	0.46	73	0.50	0.60	0.55
	Female	0.38	81	0.40		
Noise	Male	0.48	73	0.52	-0.75	0.46
	Female	0.56	81	0.64		
Workplace Environment	Male	0.54	73	0.61	-0.73	0.46
	Female	0.62	81	0.73		

* $p \leq 0.05$.

Table 6. Statistical results V between Fisher's Z values of the correlation coefficients for workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance according to age

Correlation between	Age	Academic staff Performance			V Statistic	Sig.
		ρ	N	Fisher's Z		
Temperature	From 26 to 35 years	0.23	36	0.23	3.37	0.19
	From 36 to 45 years	0.29*	61	0.30		
	From 46 to 60 years	0.53*	57	0.58		
Furniture Arrangement	From 26 to 35 years	0.13	36	0.13	5.73	0.06
	From 36 to 45 years	0.51*	61	0.57		
	From 46 to 60 years	0.56*	57	0.63		
Facilities	From 26 to 35 years	0.24	36	0.24	4.12	0.13
	From 36 to 45 years	0.54*	61	0.60		
	From 46 to 60 years	0.59*	57	0.67		
Lighting	From 26 to 35 years	0.13	36	0.13	6.16*	0.05
	From 36 to 45 years	0.48*	61	0.52		
	From 46 to 60 years	0.59*	57	0.67		
Noise	From 26 to 35 years	0.50*	36	0.55	0.13	0.94
	From 36 to 45 years	0.55*	61	0.61		
	From 46 to 60 years	0.56*	57	0.63		
Workplace Environment	From 26 to 35 years	0.36*	36	0.37	4.38	0.11
	From 36 to 45 years	0.60*	61	0.69		
	From 46 to 60 years	0.68*	57	0.83		

* $p \leq 0.05$.

Table 6 shows that there is no statistically significant differences at level (α = 0.05) between Fisher's Z values of correlation coefficients for the workplace ergonomics satisfaction relationship, and its dimensions (temperature, furniture arrangement, facilities, noise) with the academic staff at the College of Education in UQU, from the academic staff point of view according to age, except for the presence of statistically significant differences at the level (α = 0.05) between Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics dimension (lighting) with the academic staff performance at the College of Education in UQU, from the academic staff point of view according to age; and to identify for any of the age groups were statistically significance according to the statistical results V; the equation of difference was used between the two values of Fisher's Z for all Correlation Coefficients of the workplace ergonomics (lighting) satisfaction relationship with the academic staff performance, at the College of Education in UQU from their point of view according to age, as shown in Table 7.

Table 7 shows the presence of statistically significant difference at level (α = 0.05) between the two Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics dimension (lighting) with the academic staff performance at the College of Education in UQU, from the academic staff point of view according to age, in favour of the relationship between them among academic staff with the two age groups [36-45 years, 46-60 years] respectively, compared with the employees of age group [26-35 years].

Pearson Correlation Coefficients was also calculated for the satisfaction relationship of workplace ergonomics, and its dimensions with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank, and then convert it to the corresponding Fisher's Z values, and then reveal the statistical significance of equation statistical results V between Fisher's Z values of the Correlation Coefficients for workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank, as shown in Table 8.

Table 7. Results of difference equation between Fisher's Z values for all correlation coefficients of workplace ergonomics (lighting) satisfaction relationship with academic staff performance from their point of view due to age

Correlation between	Age	Academic staff Performance			Diff. in Z	Sig.
		ρ	N	Fisher's Z		
Lighting	From 26 to 35 years	0.13	63	0.13	-2.70*	0.01
	From 36 to 45 years	0.48*	212	0.52		
	From 26 to 35 years	0.13	63	0.13	-3.29*	0.00
	From 46 to 60 years	0.59*	97	0.67		
	From 36 to 45 years	0.48*	212	0.52	-1.19	0.23
	From 46 to 60 years	0.59*	97	0.67		

* $p \leq 0.05$.

Table 8. Equation statistical results V between Fisher's Z values of the Correlation Coefficients for workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance according to the academic rank

Correlation between	Academic Rank	Academic staff performance			V Statistic	Sig.
		ρ	N	Fisher's Z		
Temperature	Instructor	0.37*	32	0.38	1.82	0.61
	Assistant Professor	0.21	63	0.21		
	Associate Professor	0.41*	35	0.44		
	Professor	0.46*	24	0.50		
Furniture Arrangement	Instructor	0.22	32	0.22	6.36	0.10
	Assistant Professor	0.31*	63	0.33		
	Associate Professor	0.65*	35	0.78		
	Professor	0.54*	24	0.60		
Facilities	Instructor	0.50*	32	0.55	18.65*	0.00
	Assistant Professor	0.17	63	0.17		
	Associate Professor	0.71*	35	0.88		
	Professor	0.80*	24	1.10		
Lighting	Instructor	0.44*	32	0.47	8.62*	0.03
	Assistant Professor	0.19	63	0.19		
	Associate Professor	0.65*	35	0.78		
	Professor	0.59*	24	0.68		
Noise	Instructor	0.73*	32	0.94	5.69	0.13
	Assistant Professor	0.39*	63	0.41		
	Associate Professor	0.57*	35	0.65		
	Professor	0.59*	24	0.68		
Workplace Environment	Instructor	0.57*	32	0.65	8.77*	0.03
	Assistant Professor	0.34*	63	0.36		
	Associate Professor	0.72*	35	0.92		
	Professor	0.72*	24	0.91		

Table 9. Difference equation between Fisher's Z two values for all Correlation Coefficients of the workplace ergonomics dimensions (lighting, facilities) satisfaction relationship with the academic staff performance from their points of view according to the academic rank

Correlation between	Academic Rank	Academic staff Performance			Diff. in Z	Sig.
		ρ	N	Fisher's Z		
Facilities	Instructor	0.50*	32	0.55	1.70	0.09
	Assistant Professor	0.17	63	0.17		
	Instructor	0.50*	32	0.55	-1.27	0.20
	Associate Professor	0.71*	35	0.88		
	Instructor	0.50*	32	0.55	-1.92	0.05
	Professor	0.80*	24	1.10		
	Assistant Professor	0.17	63	0.17	-3.25*	0.00
	Associate Professor	0.71*	35	0.88		
	Assistant Professor	0.17	63	0.17	-3.69*	0.00
	Professor	0.80*	24	1.10		
	Associate Professor	0.71*	35	0.88	-0.80	0.42
	Professor	0.80*	24	1.10		
Lighting	Instructor	0.44*	32	0.47	1.25	0.21
	Assistant Professor	0.19	63	0.19		
	Instructor	0.44*	32	0.47	-1.19	0.23
	Associate Professor	0.65*	35	0.78		
	Instructor	0.44*	32	0.47	-0.72	0.47
	Professor	0.59*	24	0.68		
	Assistant Professor	0.19	63	0.19	-2.69*	0.01
	Associate Professor	0.65*	35	0.78		
	Assistant Professor	0.19	63	0.19	-1.93	0.05
	Professor	0.59*	24	0.68		
	Associate Professor	0.65*	35	0.78	0.35	0.72
	Professor	0.59*	24	0.68		
Workplace Environment	Instructor	0.57*	32	0.65	1.30	0.20
	Assistant Professor	0.34*	63	0.36		
	Instructor	0.57*	32	0.65	-1.04	0.30
	Associate Professor	0.72*	35	0.92		
	Instructor	0.57*	32	0.65	-0.92	0.36
	Professor	0.72*	24	0.91		
	Assistant Professor	0.34*	63	0.36	-2.55*	0.01
	Associate Professor	0.72*	35	0.92		
	Assistant Professor	0.34*	63	0.36	-2.19*	0.03
	Professor	0.72*	24	0.91		
	Associate Professor	0.72*	35	0.92	0.01	0.99
	Professor	0.72*	24	0.91		

* $p \leq 0.05$.

Table 8 shows that there is no statistically significant differences at level ($\alpha = 0.05$) between Fisher's Z values of correlation coefficients for the workplace ergonomics satisfaction relationship, and its dimensions (temperature, furniture arrangement, noise) with the academic staff performance at the College of Education in UQU, from their point of view according to age; except for the presence of statistically significant differences at the level ($\alpha = 0.05$) between Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics dimensions (lighting, facilities) with the academic staff performance at the College of Education in UQU, from their point of view according to age, and to identify for any of the age groups were statistically significance according to the statistical results V; the equation of difference was used between the two values of Fisher's Z for all Correlation Coefficients of the workplace ergonomics dimensions (lighting, facilities) satisfaction relationship with the academic staff performance, at the College of Education in UQU from their point of view according to the academic rank, as shown in Table 9.

Table 9 shows that there is statistically significant difference at level (α=0.05) between the two Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank [Associate Professor, Professor] compared with the academic staff of academic rank [Assistant Professor].

It also show the presence of statistically significant difference at level ($\alpha = 0.05$) between the two Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics (facilities) with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank; in favour of the relationship between them among academic staff of the two academic ranks [Associate Professor, Professor] respectively, compared with the academic staff of academic rank [Assistant Professor], and it also shows the presence of statistically significant difference at level ($\alpha = 0.05$) between the two Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics (lighting) with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank; [Associate Professor], compared with the academic staff of academic rank [Assistant Professor].

6. Conclusion

- The workplace ergonomics satisfaction level, and its dimensions at the College of Education in UQU, according to academic staff point of view, was average.
- The performance level of academic staff at the College of Education in UQU, from their points of view, was high.
- Statistically significant high positive relationships at level (α=0.05); two correlations out of six between the satisfaction of workplace ergonomics and its noise dimension, on the one side and the academic staff performance on the other side, at the College of Education in UQU, from their academic staff point of view.
- Statistically significant average positive relationships at level (α=0.05); four correlations out of six between the satisfaction of workplace ergonomics dimensions (temperature, furniture arrangement, facilities, lighting), on the one side and the academic staff performance on the other side, at the College of Education in UQU, from the academic staff point of view.
- There is no statistically significant difference at level (α = 0.05) between Fisher's Z values, for the Correlation Coefficients of workplace ergonomics satisfaction relationship, and its dimensions with the academic staff performance at the College of Education in UQU, from the academic staff point of view according to gender.
- There is no of statistically significant differences at level (α = 0.05) between Fisher's Z values of correlation coefficients for the workplace ergonomics satisfaction relationship, and its dimensions (temperature, furniture arrangement, facilities, noise) with the academic staff at the College of Education in UQU, according to academic staff point of view for age from (46-60) and from (36-45).
- There is statistically significant difference at level (α=0.05) between the two Fisher's Z values of the Correlation Coefficients for the satisfaction relationship about workplace ergonomics with the academic staff performance at the College of Education in UQU, from their point of view according to the academic rank; [Associate Professor, Professor], compared with the academic staff of academic rank [Assistant Professor].

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Appendixes

Appendix (A)

The initial form of workplace environment satisfaction instrument at the College of Education in UQU, according to academic staff point of view.

Appendix (B)

List of initial form arbitrators for satisfaction instrument of the workplace environment, according to the academic rank and specialization.

Number	Arbitrators	Academic Ranks	Specialization
1	Dr. Manal Safer	Associate Professor	Educational management
2	Dr. Maha Al-Sharif	Assistant Professor	Educational management
3	Dr. Manal Al-Gammedi	Assistant Professor	Educational management

Appendix (C)

The arbitration process results of satisfaction instrument for the workplace environment at the College of Education in UQU, According to academic staff point of view.

Dimension	Before Judging		After Judging		Result of Judging
	ID	Content of Item	ID	Content of Item	
TEMPERATURE					
	1	The overall temperature of my office is pleasant	1	The overall temperature of my office is pleasant	same
	2	There is a proper ventilation in my office	2	There is a proper ventilation in my office	same
	3	I can control my office temperature any time	3	I can control my office temperature	language
	4	The suitable temperature in my office affects my performance	4	The suitable temperature in my office affects my performance positively	language
	5	The air quality of my office temperature is suitable	5	The air quality of my office temperature is suitable	same
FURNITURE ARRANGEMENT					
	6	My office furniture is good quality	6	My office furniture is high quality	language
	7	My office furniture is flexible to move	7	My office furniture is flexible to move	same
	8	I like my office decoration	8	I am satisfied with my office decoration	language
	9	My office is well organized	9	My office is well organized	same
	10	My office is sufficiently equipped for my work needs	10	My office is sufficiently equipped for my typical needs	language
FACILITIES					
	11	All facilities in my workplace environment are cleaned	11	All facilities in my workplace environment are regularly cleaned	language
	12	My workplace provides all required facilities	12	My workplace provides all required facilities	same
	13	My workplace facilities are well designed	13	My workplace facilities are well designed	same
	14	My workplace provides facilities which care safety	14	My workplace provides facilities which support our research, teaching, learning, and other operations	language
	15	My workplace facilities are easily accessed	15	My workplace facilities are easily accessed	same
LIGHTING					
	16	I don't face any problems of lighting in my office	16	I don't face any problems with lighting in my office	language
	17	Windows in my office provide me natural light	17	Windows in my office provide me natural light	same
	18	My office lighting supports the function	18	My office lighting supports the function	same
	19	My office lighting supports my productivity	19	My office lighting supports my productivity	same
	20	My workspace is provided with efficient lighting	20	My workspace is provided with efficient lighting so I can work easily	language
NOISE					
	21	My work environment is quiet	21	My work environment is quiet	same
	22	My workspace is free from noise distractions	22	My workspace is free from noise distractions	same
	23	My speech privacy	23	I have suitable privacy in my office	language
	24	I have undisturbed time	24	I have undisturbed time	same
	25	The workplace level of noise is low	25	The workplace level of noise is low	same

Appendix (D)

The final form of satisfaction instrument for the workplace environment at the College of Education in UQU, according to academic staff point of view.

Appendix (E)

Corrected Correlation Coefficient values for the satisfaction relationship items of workplace environment instrument and its dimensions.

Dimension and item ID	Content of items of Workplace Environment instrument due to Dimension	Corrected Item-Total Correlation*	
		Dimension	instrument
TEMPERATURE			
1	The overall temperature of my office is pleasant	0.82	0.63
2	There is a proper ventilation in my office	0.87	0.68
3	I can control my office temperature	0.72	0.51
4	The suitable temperature in my office affects my performance positively	0.44	0.42
5	The air quality of my office temperature is suitable	0.82	0.60
FURNITURE ARRANGEMENT			
6	My office furniture is high quality	0.81	0.53
7	My office furniture is flexible to move	0.74	0.58
8	I am satisfied with my office decoration	0.86	0.70
9	My office is well organized	0.82	0.67
10	My office is sufficiently equipped for my typical needs	0.78	0.73
FACILITIES			
11	All facilities in my workplace environment are regularly cleaned	0.57	0.51
12	My workplace provides all required facilities	0.79	0.70
13	My workplace facilities are well designed	0.77	0.68
14	My workplace provides facilities which support our research, teaching, learning, and other operations.	0.85	0.75
15	My workplace facilities are easily accessed	0.66	0.61
LIGHTING			
16	I don't face any problems with lighting in my office	0.69	0.61
17	Windows in my office provide me natural light	0.62	0.48
18	My office lighting supports the function	0.70	0.63
19	My office lighting supports my productivity	0.67	0.48
20	My workspace is provided with efficient lighting so I can work easily	0.81	0.67
NOISE			
21	My work environment is quiet	0.91	0.76
22	My workspace is free from noise distractions	0.92	0.76
23	I have suitable privacy in my office	0.88	0.71
24	I have undisturbed time	0.90	0.73
25	The workplace level of noise is low	0.94	0.76

* $p \leq 0.05$

Appendix (F)

Correlation Coefficients values for satisfaction dimensions relationship of workplace environment with the instrument and satisfaction dimensions of other workplace environments

Correlation among*	Temperature	Furniture Arrangement	Facilities	Lighting	Noise
Furniture Arrangement	0.49				
Facilities	0.43	0.55			
Lighting	0.56	0.44	0.67		
Noise	0.41	0.56	0.68	0.59	
Whole Instrument	0.75	0.78	0.82	0.80	0.82

* $p \leq 0.05$

Appendix (G)

Internal consistency reliability coefficient values and the satisfaction instrument retest of the workplace environment and its dimensions.

Instrument and Dimensions	Reliability Statistics		
	Cronbach's α	Stability Index*	N of Items
Temperature	0.89	0.82	5
Furniture Arrangement	0.92	0.83	5
Facilities	0.89	0.86	5
Lighting	0.85	0.83	5
Noise	0.97	0.84	5
Whole Instrument	0.95	0.81	25

* $p \leq 0.05$.

Appendix (H)

The initial form of employees' performance instrument at the College of Education in UQU, according to academic staff point of view.

Appendix (I)

The arbitration process results of employees' performance instrument at the College of Education of UQU, according to academic staff point of view.

Before Judging		After Judging		Result of Judging
ID	Content of Item	ID	Content of Item	
1	My workplace environment helps me to complete my daily tasks easily	1	My workplace environment helps me to complete my daily tasks easily	same
2	My workplace environment helps me to complete my daily tasks on time	2	My workplace environment helps me to complete my daily tasks on time	same
3	I am satisfied with my workplace environment	3	I am satisfied with my workplace environment	same
4	My satisfaction of my workplace environment affects my performance			deleted
5	My workplace environment encourages me to work efficiently	4	My workplace environment encourages me to work efficiently	same
6	Good workplace environment affects my performance			deleted
		5	My workplace environment boosts my creativity	added
		6	My workplace environment enhances my motivation	added
		7	My workplace environment affects my productivity	added

Appendix (J)

The final form of employees' performance instrument at the College of Education in UQU, from the standpoints of employees.

Appendix (K)

Corrected Correlation Coefficients values for the relationship of employees' performance items, at the College of Education in UQU with the instrument.

ID	Content of instrument items of Employees Performance	Corrected Item-Total Correlation*
1	My workplace environment helps me to complete my daily tasks easily	0.69
2	My workplace environment helps me to complete my daily tasks on time	0.69
3	I am satisfied with my workplace environment	0.75
4	My workplace environment encourages me to work efficiently	0.87
5	My workplace environment boosts my creativity	0.88
6	My workplace environment enhances my motivation	0.85
7	My workplace environment affects my productivity	0.87

* $p \leq 0.05$.

Appendix (L)

The arithmetic means for satisfaction items of workplace environment (noise) at the College of Education in UQU, according to academic staff point of view in descending order and its standard deviations.

Rank	ID	Items of Noise	Mean	Std. Dev.	Degree
1	21	My work environment is quiet	3.87	0.94	High
2	22	My workspace is free from noise distractions	3.84	0.98	High
3	25	The workplace level of noise is low	3.82	0.97	High
4	24	I have undisturbed time	3.81	0.97	High
5	23	I have suitable privacy in my office	3.74	1.03	High

Appendix (M)

The arithmetic means for satisfaction items of workplace environment (facilities) at the College of Education in UQU, according to academic staff point of view in descending order and its standard deviations.

Rank	ID	Items of Facilities	Mean	Std. Dev.	Degree
1	11	All facilities in my workplace environment are regularly cleaned	4.21	0.82	High
2	15	My workplace facilities are easily accessed	3.95	0.81	High
3	12	My workplace provides all required facilities	3.59	0.99	Moderate
4	14	My workplace provides facilities which support our research, teaching, learning, and other operations.	3.59	1.03	Moderate
5	13	My workplace facilities are well designed	3.40	0.99	Moderate

Appendix (N)

The arithmetic means for satisfaction items of workplace environment (lighting) at the College of Education in UQU, according to academic staff point of view in descending order and its standard deviations.

Rank	ID	Items of Lighting	Mean	Std. Dev.	Degree
1	19	My office lighting supports my productivity	3.63	0.87	Moderate
2	18	My office lighting supports the function	3.60	0.80	Moderate
3	16	I don't face any problems with lighting in my office	3.49	0.93	Moderate
4	20	My workspace is provided with efficient lighting so I can work easily	3.47	0.85	Moderate
5	17	Windows in my office provide me natural light	2.75	1.10	Moderate

Appendix (O)

The arithmetic means for satisfaction items of workplace environment (furniture's arrangement) at the College of Education in UQU, according to academic staff point of view in descending order and its standard deviations.

Rank	ID	Items of Furniture Arrangement	Mean	Std. Dev.	Degree
1	7	My office furniture is flexible to move	3.38	0.91	Moderate
2	9	My office is well organized	3.34	1.04	Moderate
3	10	My office is sufficiently equipped for my typical needs	3.26	1.08	Moderate
4	6	My office furniture is high quality	3.22	1.02	Moderate
5	8	I am satisfied with my office decoration	3.08	1.05	Moderate

Appendix (P)

The arithmetic means for satisfaction items of workplace environment (temperature) at the College of Education in UQU, according to academic staff point of view in descending order and its standard deviations.

Rank	ID	Items of Temperature	Mean	Std. Dev.	Degree
1	4	The suitable temperature in my office affects my performance positively	3.94	1.05	High
2	5	The air quality of my office temperature is suitable	3.10	1.10	Moderate
3	1	The overall temperature of my office is pleasant	3.06	1.26	Moderate
4	2	There is proper ventilation in my office	2.88	1.24	Moderate
5	3	I can control my office temperature	2.44	1.34	Moderate