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	Title of research article
	Ergonomics and Its Role in Improving Quality of Life in the School Environment: A Field Study in Some Primary Schools in the City of Jijel
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Abstract	This research investigates the role of ergonomics in enhancing the quality of life in the school environment, with a particular focus on its physical, psychological, and social dimensions. Ergonomics, as the science of designing systems that optimize the interaction between humans and their surroundings, has increasingly been recognized as essential for improving comfort, performance, and well-being. In this study, a field survey was conducted in three primary schools in the city of Jijel, Algeria. Data were collected using a structured questionnaire administered to a research population of 58 male and female teachers. The results revealed that ergonomic factors such as chair and desk design, classroom lighting, ventilation, and spatial arrangement significantly influence teachers' and students' physical comfort and concentration. Additionally, psychological aspects, including classroom color schemes, noise levels, and the organization of space, were found to have a considerable effect on students' mood, mental health, and motivation. Importantly, the study also highlighted the social benefits of ergonomically informed environments, particularly in fostering positive peer interactions and collaborative learning. These findings suggest that ergonomics should be considered a comprehensive scientific approach for improving school life. The integration of ergonomic principles into educational policies and infrastructure planning is crucial for creating environments that support the physical, psychological, and social needs of learners, thereby ensuring a more inclusive and effective educational experience.
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Introduction:

In our current era, quality of life has become one of the main goals that societies seek to achieve in the school environment, which constitutes a large part of the lives of learners and teachers, as it is considered one of the basic elements that contribute to achieving this goal. Here comes the role of ergonomics, which is defined as the science that studies the interaction of humans with the physical elements in their surrounding environment in order to improve performance and increase well-being. The application of ergonomics principles in the school environment goes beyond merely providing comfortable furniture or suitable facilities; it includes creating an integrated learning environment that supports the physical, psychological, and social health of learners and teachers. Through improving classroom design, providing appropriate teaching tools, and organizing spaces in ways that allow social interaction and cooperation, tangible positive effects can be achieved on quality of life in the school.

First: Study Problem:

Humans strive in their lives to facilitate their daily activities by providing comfort and well-being in all the tools they use, such as food, clothing, furniture, and others. One of the sciences that works to achieve this is ergonomics or human engineering, whose concept appeared in ancient times in logic among the Greeks, especially in Homer's writings on citizenship, and in modern times is considered as the engineering of human activity (Houria, 2024), and is one of the modern sciences that aims to adapt the surrounding environment to human abilities and needs to ensure their comfort and enhance their productive efficiency while reducing the physical and psychological burdens that may affect their performance.

The subject of ergonomics was not limited to a specific environment but infiltrated various environments, whether inside organizations or schools, due to its success in increasing individual productivity simply by providing a suitable and supportive environment for work and adopting its principles. Among the environments that have received great attention in ergonomics is the school environment, as the school is one of the most important social institutions that prepare generations through education and knowledge to contribute to the development and advancement of society. Its role has evolved over time as a result of social changes and scientific progress, facing changes and challenges in its functions, which have taken different dimensions. Its role and importance require the active participation of individuals and social institutions, as it cannot exist in isolation from society and its functions must be planned to achieve the goals of the educational system (Akli, 2024). It forms the main space where students and teachers interact daily, highlighting the urgent need to apply ergonomics principles to improve quality of life within this educational institution, where students and teachers spend long hours learning and working in an environment that may not always be optimally prepared.

The quality of the school environment does not depend only on curricula and teaching methods but also includes the design of classrooms, the provision of chairs and desks appropriate to students' body dimensions, adequate lighting and ventilation, and the provision of recreational spaces that reduce psychological and physical pressure. However, many schools, especially in developing areas, face multiple challenges such as lack of resources and weak awareness of the importance of ergonomics, which leads to negative effects on students' and teachers' health, and sometimes on their academic performance. Hence, the importance of studying the role of ergonomics in improving quality of life within the school environment arises, not only in terms of its impact on individuals' health and comfort but also in enhancing the teaching and learning process.

When researching the school and its role in the educational and pedagogical process, attention often focuses on the teacher and their interaction with the student, taking into account the interrelated elements in this interaction, such as teaching methods, curricula, tools, and working conditions. However, these elements are sometimes studied as secondary variables or addressed in passing without giving them sufficient attention. It is known that experts in work and organizational psychology, as well as human engineers, affirm that achieving comfort, efficiency, and safety in work requires designing the work environment in accordance with human abilities and ensuring that working conditions comply with globally defined standards. Therefore, real development in education and the educational process must be achieved by introducing educational and organizational changes that focus on the human and material aspects. This requires analyzing the strengths and weaknesses of the educational system and identifying areas that need improvement, taking into account the cultural and demographic characteristics of each community and the resources needed by the educational system. This is what ergonomics addresses, as it aims to adapt the environment, systems, and tools to suit

human intellectual and psychological abilities and needs, ensuring comfort, improving efficiency, and reducing physical and psychological burdens. Accordingly, this study came to examine the role of ergonomics in improving quality of life in the school environment, starting from the main research question:

What is the role of ergonomics in improving quality of life in the school environment from the teachers' perspective?

Sub-questions:

- To what extent do environmental components (such as lighting, ventilation, chair and desk design) affect students' comfort and concentration in the classroom?
- How do the psychological and social dimensions associated with ergonomics (such as classroom colors, shared spaces, and noise) contribute to supporting interaction, social relationships, and psychological quality of life?

Main Hypothesis:

Ergonomics has a statistically significant role in improving quality of life within the school environment as perceived by students.

Sub-hypotheses:

- There is a statistically significant relationship between the quality of school environment components and students' feelings of comfort and concentration.
- The psychological and social dimensions associated with ergonomics contribute to improving students' psychological state and social relationships within the school.

Second: Importance of the Study

The importance of the current study lies in:

- Improving academic performance: Through applying ergonomics principles, a comfortable and suitable study environment can be provided, which enhances learners' focus and ability to learn, thus improving academic performance.
- Enhancing physical health: Ergonomics concerns the design of study furniture and facilities that suit the needs of learners and teachers, reducing problems of strain and physical injuries that may result from inappropriate use of furniture or equipment.
- Improving mental health: A comfortable and suitable school environment contributes to reducing stress and anxiety levels among learners and teachers, enhancing general mental health, and creating a positive learning atmosphere.
- Encouraging social interaction between learners and teachers, enhancing the spirit of cooperation and belonging.
- Raising satisfaction levels: A school environment improved according to ergonomics principles contributes to raising satisfaction levels among learners and teachers, positively reflecting on their overall educational experience.

- Meeting different needs: Ergonomics contributes to designing educational environments that meet the needs of different learners, including those with special needs, enhancing equality of opportunity in education.

Third: Objectives of the Study

- Ergonomics principles should be considered when designing school facilities, especially classrooms.
- Training teachers and administrators on the importance of ergonomics and how to apply it in classrooms.
- Conducting periodic evaluations of the school learning environment to ensure it complies with ergonomics principles and contributes to improving quality of life.
- Ergonomics plays a role in improving the academic performance of students in the school environment.
- Ergonomics plays a role in improving the mental health of students in the school environment.
- Ergonomics plays a role in enhancing the social interaction of students in the school environment.

Fourth: Defining the Concepts of the Study

1. Ergonomics:

1.1 The Concept of Ergonomics

It is a scientific branch based on various other scientific fields such as anatomy, physiology, psychology, engineering, and statistics to ensure that design enhances people's abilities and reduces its negative effects.

The term ergonomics, or human engineering, or human factors, is used interchangeably. Human engineering or workplace engineering is often used in relation to the physical aspects of the environment such as workstations and control panels, while the term human factors is often used for the broader system in which people work.

Ergonomics is the process of applying scientific knowledge and techniques to design and modify the school environment to be compatible with the abilities and needs of learners and teachers.

1.2 Objectives of Ergonomics

Ergonomics aims to maintain and improve health and safety and achieve effectiveness in the design of machines, equipment, and tools, ensuring the following:

1. Improving the performance of the working individual by increasing speed, accuracy, and safety.
2. Reducing human energy consumption and causes of human strain.
3. Reducing training costs.
4. Reducing work accidents resulting from human errors.
5. Detecting occupational diseases, especially chronic ones, due to practicing certain professions.

6. Helping individuals adapt to technical and practical changes imposed by new working conditions, especially technological changes.
7. Improving comfort indicators and increasing satisfaction among workers in performing tasks.

2. Quality of Life:

John Alexander (1994) defined quality of life as: “Going beyond providing the necessities of life, comfort methods must be provided, meaning it must go beyond necessary needs to luxury needs that bring a person joy and happiness in life” (Al-Ajmi, 2015, p. 16).

As for Abdel-Moati (2005), he defines it as: “The advancement of the level of material and social services provided to members of society and moving toward a lifestyle characterized by luxury. This type of life can only be achieved by a wealthy society, one that has managed to solve all the living problems of the majority of its inhabitants” (Sulaf, 2015, p. 225).

Quality of life is the overall level of well-being of individuals and communities, and includes material, psychological, social, and environmental aspects. It is also defined as the balance between health, comfort, and satisfaction with life.

2. School Environment:

Dietrich and Bailey (1996) define it as: “A comprehensive structure composed of culture, the physical building, the organizational structure, social relationships, and individuals’ behaviors.” Meskel and Hoy indicate that the school environment is: “A set of internal characteristics that distinguish one school from another and affect the behavior of individuals who interact within it” (Abdel Nasser Ahmed Mohamed Azzam, 2013, p. 258).

The school environment is all the conditions and factors that affect the experience of learners and teachers within the school. This environment includes the physical, psychological, and social elements that form the framework for educational work.

Fifth: Previous Studies

1. **Study by Ben Zineb Zineb and Dhaifallah Habiba (2024):** *Applications of Ergonomics in the Inclusive School Environment for People with Special Needs – A Field Study on the School Environment for People with Mild Disabilities.*
The study aimed to identify the various ergonomic applications in integrating people with special needs, specifically those with mild intellectual disabilities, in mainstream schools. The study sample consisted of 50 members of the school’s pedagogical team in the Wilaya of Médéa. To achieve the study’s objectives, the researchers developed a tool to measure the extent to which safety requirements are applied in the school environment, using the descriptive analytical approach. The tool consisted of 36 items distributed over four dimensions: the external space dimension, the classroom dimension, the general school facilities dimension, and the assistive technological equipment dimension. The psychometric properties of the tool were verified on a pilot sample of 10 members of the pedagogical team, and the results showed high validity and reliability, allowing its application to the main sample. The study found that ergonomics standards related to safety and security are applied in schools integrating students with intellectual disabilities, while ergonomics application in classroom design and organization as well as in the design of public-school facilities was below average. Recommendations included the need to consider all standards and measures that align with children with intellectual disabilities when designing the school environment, to integrate them with their peers without the school environment becoming an obstacle to their participation in classroom and extracurricular activities, ensuring safety, comfort in use, and quality in daily life—especially for individuals with special needs.

2. **Study by Barakat Amina and Bouattit Djellal Eddine (2023):** *The Role of Physical Space Design in the Quality of Life of Students.*

The scope of ergonomic intervention in educational institutions varies between design ergonomics, which seeks to adapt the school environment to the morphological aspect of the learner, and cognitive ergonomics, which focuses on cognitive processes. This study highlights the importance of improving students' quality of life through the application of ergonomics in the educational process, particularly in the design of school spaces, to achieve efficiency, improve academic achievement, and enhance the quality of education. The study conducted an analytical review of theoretical literature and previous studies conducted in the Algerian context. The results showed that most educational institutions in Algeria suffer from poor design of school equipment and poor design of the physical space of classrooms, which negatively affects students' quality of life and academic performance. Students often find themselves in the same type of school and classroom setup, year after year, studying all subjects in the same room. This affects their satisfaction and comfort, creating aversion to a school environment that lacks good standards. Therefore, it is necessary to ensure scientific compatibility between the learner and their educational environment by taking into account the learner's psychological capabilities to create balance and psychological stability in line with the student's diverse and growing needs. Improving the design of the school environment and achieving suitable physical conditions can only be achieved by assessing the situation and improving it according to the ergonomic approach.

3. **Study by Ouans Yasmina (2018):** *Teachers' and Students' Opinions about the Algerian School Space: An Ergonomic Reading of Three Primary Schools in Tizi Ouzou.* The study aimed to identify teachers' and students' opinions about Algerian school space through an ergonomic reading of three primary schools in Tizi Ouzou. The descriptive analytical method was used, and the study sample consisted of 208 individuals divided into two groups: the first group included 169 fifth-grade students, while the second group included 39 primary school teachers. Two questionnaires were applied—one on school equipment and another on school architectural design. Data analysis relied on appropriate statistical tools, including the SPSS software package and the Chi-square test. The study concluded:

- The school equipment used in Algerian primary schools does not meet ergonomic design standards that ensure students' safety and health.
- The architectural design of Algerian primary schools does not meet ergonomic design standards that ensure students' safety and health.

4. **Study by Taher Ben Abdelrahman and Sid Amr Shinoun (2022):** *The Reality of School Environment Ergonomics: An Evaluative Study of a Sample of Primary Schools in Constantine.*

The study sought to reveal the reality of school environment ergonomics from the perspective of a sample of primary school teachers in the Wilaya of Constantine. Using the descriptive method, the researchers developed a tool to measure teachers' attitudes toward school environment ergonomics, which included 24 items, and applied it to a purposive sample of 47 teachers. Results showed that school environment ergonomics reached the required level from the teachers' perspective, across the areas of school building ergonomics, classroom ergonomics, physical condition ergonomics, and teaching aids ergonomics, with varying percentages. No statistically significant differences were found in teachers' attitudes based on gender or age.

5. **Study by Flouja Belhadj (2021):** *The Importance of School Architectural Space, Classroom, and Playground in Achieving Students' Psychological Health - A Field Study from the Perspective of Primary School Teachers.*

The study aimed to identify the importance of school architectural space in achieving students' psychological health from teachers' perspectives. The study sample consisted of 120 primary school teachers from six primary schools in the Wilaya of Tizi Ouzou. The study found that school architectural space is important for students' psychological well-being, as it is the space where children

spend long periods. The school's location contributes to students' psychological health, as do classroom and playground size, according to teachers. These factors play an active role in students' psychological well-being due to their impact on children's behavior and their psychological and school adjustment.

Sixth: Study Methodological Procedures

1. Study Fields:

1.1 Spatial field: The study tool was applied to a group of primary schools in the Wilaya of Jijel, specifically in the Jijel municipality. The schools were Ayad Mouloud Primary School, Zaghbib Mohamed Primary School, and Makhlouf El-Hussein Primary School.

2.1 Time field: Every study has its own time field, linked to the period in which the study was conducted and the expected time to complete it and obtain results. The time frame for this study, both theoretical and practical, was divided into stages:

- Preparing the theoretical framework of the study.
- Preparing the practical framework of the study, which included:
 - Conducting a preliminary survey of the selected primary schools.
 - Defining the sample.
 - Building and setting the main axes of the questionnaire, then finalizing its design and validation.
 - Distributing the questionnaires to the teachers of the selected schools.

The steps of this stage were as follows:

- a. **Questionnaire distribution and collection:** After finalizing and validating the questionnaire, it was printed in 58 copies to be distributed to the sample of primary school teachers. Distribution lasted 20 days, coinciding with the evaluation of students' achievements, which hindered the easy collection of responses due to teachers' academic commitments.
- b. **Data entry:** This stage involved entering the data using the statistical analysis package, extracting tables, and verifying the validity and reliability of the study.
- c. Data analysis and discussion of final results.

3.1 Human field: Defining the study population is an essential step in research. In the current study, the population consisted of the teaching staff of a group of male and female primary school teachers, totaling 58 teachers: 16 from Ayad Mouloud Primary School, 14 from Zaghbib Mohamed Primary School, and 28 from Makhlouf El-Hussein Primary School.

2. Study Method:

The study adopted the descriptive analytical method in line with the nature of the topic.

3. Study Sample:

A simple random sample was used, defined as a method of selecting samples randomly from the population, where each member has the same chance of being selected. This method provides an unbiased representation of the population and is one of the most common data collection methods because it is simple and yields unbiased conclusions. The sample consisted of 58 teachers from the selected primary schools.

4. Study Data Collection Tools:

In any study, regardless of its type, the researcher needs methodological tools to collect data. In this study, the researchers used a questionnaire as the data collection tool. A full survey of the teachers was conducted, ensuring accurate and correct answers and capturing all teachers' opinions.

• Psychometric Properties of the Study Tool:

Validity and reliability.

Validity coefficient – Cronbach's Alpha – Number of items

0.884 – .782 – 19

From the table above, we note that the Cronbach's Alpha coefficient for the scale consisting of (19) items reached (0.782), which is considered a good indicator of the instrument's reliability, as this value indicates a high degree of internal consistency between the scale's items. Since the value falls within the statistically acceptable range (greater than 0.70), this indicates that the instrument has acceptable reliability that can be depended on for measurement.

Table: Distribution of sample members according to the gender variable

Options	Frequency	Percentage
Male	28	48.3
Female	30	51.7
Total	58	100.0

From the table above, we note that the distribution of the sample members by gender shows a relative balance between males and females, with a slight predominance of females, whose number reached (30), representing (51.7%) of the total sample, compared to (28) males at (48.3%). This closeness in distribution indicates a relatively balanced representation of both genders within the sample, which enhances the objectivity of the results and provides a suitable basis for comparing opinions or attitudes based on this demographic variable. These results also indicate the predominance of females in the educational field, as teaching is one of the professions that females tend to pursue more, unlike males, who often tend toward freelance or economic and administrative professions.

Table 2: Distribution of sample members according to age group

Options	Frequency	Percentage
25–30 years	23	39.7
31–36 years	21	36.2
37–42 years	8	13.8
43 years+	6	10.3
Total	58	100.0

From the table above, we note that the most represented age group in the sample is (25–30 years) at (39.7%), followed by the (31–36 years) group at (36.2%), which reflects the predominance of the younger age group in the age distribution. The groups (37–42 years) and (43 years and above) recorded lower percentages, at (13.8%) and (10.3%), respectively. This distribution indicates that the majority of respondents belong to professionally active age groups who are engaged in the realities of educational work, which may positively affect the accuracy of their evaluation of the studied variables. These results have a positive reflection on the educational system and the teaching process itself, as younger teachers are characterized by high mental flexibility and a strong willingness to learn and adopt modern teaching methods, especially regarding the use of technology and active curricula. Moreover, the age proximity between them and learners facilitates communication and enhances mutual understanding, creating a more interactive and comfortable classroom environment. In addition, younger teachers possess vitality and energy, making them more capable of engaging in educational and field activities.

Table 3: Distribution of sample members according to marital status

Options	Frequency	Percentage
Single	11	19.0
Married	41	70.7
Divorced	4	6.9
Widow	2	3.4
Total	58	100.0

It is clear from the table that most of the sample members belong to the married category, with a percentage of (70.7%), which reflects a relative social stability in the sample composition. In contrast, the percentage of singles was (19.0%), while the percentages of divorced and widowed individuals were low, at (6.9%) and (3.4%), respectively. This distribution indicates that the majority category in the sample may have more experience and stability, which may be reflected in their opinions and behaviors within the work or study environment. This result also indicates that the sample members have experience in dealing with children, as the majority are married, which helps them perform the academic teaching role optimally.

Table 4: Distribution of sample members according to grade level

Options	Frequency	Percentage
First grade	21	36.2
Second grade	17	29.3
Third grade	4	6.9
Fourth grade	16	27.6
Total	58	100.0

From the table above, we note that the most represented grade level in the sample is first grade at (36.2%), followed by second grade at (29.3%), then fourth grade at (27.6%). Third grade came last with only (6.9%). This

distribution shows a focus on the early grade levels, which may reflect the study's interest in younger age groups and the impact of surrounding conditions such as classroom environment and desk and chair design.

Table 5: Extent of sample members' knowledge of the concept of ergonomics

Options	Frequency	Percentage
Yes	54	93.1
No	4	6.9
Total	58	100.0

It appears from the table that a very large percentage of the sample members have previously heard of "ergonomics," at (93.1%), compared to a very small percentage (6.9%) who have not. This indicates a noticeable prevalence of the concept among the sample, which is a positive indicator reflecting initial awareness of the importance of this field related to adapting tools and environments to human capabilities, especially in educational contexts.

Table 6: Sample members' opinion on the impact of desk and chair design on concentration

Options	Frequency	Percentage
Yes	44	75.9
No	14	24.1
Total	58	100.0

The table above shows that the majority of the sample members (75.9%) believe that the design of desks and chairs in school affects their concentration during lessons, while (24.1%) think otherwise. This result reflects a high awareness of the importance of the physical dimension of the classroom environment in supporting concentration and attention during the educational process. It also indicates the potential need to reconsider the design of school furniture in line with ergonomic principles to improve student comfort and performance. The design of desks and chairs in schools is a direct factor affecting teachers' concentration during lessons, as providing comfortable furniture that complies with ergonomic principles contributes to improving posture and reducing physical strain, thus enhancing the ability to focus and pay attention. Inappropriate design of desks and chairs, whether for students or teachers, can lead to back, neck, or shoulder pain, which distracts the teacher and negatively affects performance in class. Providing a functional and organized desk also makes it easier for the teacher to arrange their tools and preparations and reduces daily stressors, which positively reflects on their overall mood and professional motivation in the long run. This is confirmed by the theory of human dimensions (Anthropometry), which deals with studying human body measurements (height, shoulder width, eye level, leg length...) to design chairs, desks, and boards with the aim of adapting school furniture to the varying body sizes of learners and teachers, thus reducing health problems resulting from incorrect sitting.

Table 7: Availability of appropriate lighting inside classrooms

Options	Frequency	Percentage
Yes	46	79.3
No	12	20.7

Options	Frequency	Percentage
Total	58	100.0

From the table above, we note that the majority of the sample members (79.3%) believe that classrooms provide appropriate lighting, compared to (20.7%) who think otherwise. This result indicates general satisfaction with lighting conditions within the classroom environment, which is a key factor in enhancing attention and visual comfort during the educational process and may positively affect students' academic achievement. This is in line with Cognitive Load Theory, which focuses on designing learning environments that reduce excessive mental effort. In the ergonomic context, this translates into simplifying the organization of the visual space (colors, boards, lighting...) to reduce mental distraction and increase concentration and attention.

Table 8: Feeling physical fatigue due to prolonged sitting

Options	Frequency	Percentage
Yes	50	86.2
No	8	13.8
Total	58	100.0

It is clear from the table that a large percentage of the sample members (86.2%) suffer from physical fatigue such as back or neck pain due to prolonged sitting, while only a small percentage (13.8%) do not feel this. This result reflects the need to review the design of chairs and seating positions in classrooms within the framework of ergonomics to reduce negative physical effects and enhance students' comfort and physical health. This is confirmed by the results of Table 6. Prolonged sitting has direct negative effects on teachers' physical health, leading to distraction and, consequently, reduced performance and weaker student achievement.

Table 9: Proposed modifications to the school environment to improve academic performance

Options	Frequency	Percentage
Improve quality of desks/chairs	27	46.6
Improve lighting	7	12.1
Reduce noise inside classrooms	20	34.5
Provide sufficient break periods	4	6.9
Total	58	100.0

It appears from the table that the most requested modification by the sample members is "improving the quality of desks and chairs" at (46.6%), followed by "reducing noise inside classrooms" at (34.5%), then "improving lighting" at (12.1%), and finally "providing sufficient break periods" at (6.9%). These results clarify that school furniture and classroom quietness are priorities in the eyes of the respondents, requiring measures to improve these aspects in order to provide a stimulating and comfortable educational environment. The results of the table show that providing suitable school furniture greatly contributes to the teacher's comfort,

enabling them to deliver lessons with a high degree of focus and attention, as sitting posture is a decisive factor in performing tasks without fatigue or health problems caused by incorrect sitting. On the other hand, the availability of quietness in the classroom and the absence of noise sources facilitates the smooth running of lessons without the need to exert extra effort to control students or manage chaos, which reduces time wastage and enhances the effectiveness of the educational process. The Functional Comfort Theory confirms that physical comfort affects mental and emotional performance and calls for designing educational spaces to ensure good ventilation, natural lighting, noise control, and comfortable furniture, thereby enhancing attention and participation in class.

Table 10: Impact of ventilation inside the classroom on concentration

Table 10: The Effect of Classroom Ventilation on Concentration Ability

Options	Frequency	Percentage
Yes	54	93.1%
No	4	6.9%
Total	58	100.0%

It is observed from the table that an overwhelming majority of the sample (93.1%) believe that classroom ventilation affects their ability to concentrate, compared to only (6.9%) who disagree. This result indicates a high awareness of the importance of good ventilation inside classrooms, highlighting the role of the physical environment in enhancing learners' mental performance and the necessity of providing healthy ventilation conditions.

Table 11: The Extent of the Impact of Technology Use on Academic Performance

Options	Frequency	Percentage
Yes	43	74.1%
No	15	25.9%
Total	58	100.0%

It is evident from the table that (74.1%) of the sample believe that the use of technology such as interactive whiteboards and computers contributes to improving their academic performance, while (25.9%) expressed an opposing opinion. This result reflects a positive attitude toward integrating technology in education, indicating the need to support this trend by providing appropriate equipment and training teachers on the effective use of these tools.

Table 12: The Effect of Classroom Environment on Teachers' Psychological State

Options	Frequency	Percentage
Yes	52	89.7%
No	6	10.3%

Options	Frequency	Percentage
Total	58	100.0%

The results indicate that most of the sample (89.7%) acknowledge that the classroom environment affects their psychological state, compared to (10.3%) who do not. These findings highlight the importance of environmental factors such as colors, cleanliness, ventilation, and lighting in influencing mood and emotions, which requires educational institutions to consider a balanced and psychologically comfortable classroom environment.

Table 13: Teachers' Satisfaction Level with Green Spaces and School Break Areas

Options	Frequency	Percentage
Satisfied	32	55.2%
Neutral	12	20.7%
Dissatisfied	14	24.1%
Total	58	100.0%

It is clear from the table that more than half of the sample (55.2%) expressed satisfaction with the green spaces and break areas at school, while (24.1%) were dissatisfied and (20.7%) were neutral. This result shows a medium to good level of satisfaction, but also points to the possibility of improving these facilities to provide spaces for rest and physical and mental refreshment during the school day.

Table 14: The Extent to Which the School Provides a Comfortable Environment That Reduces Stress and Psychological Pressure

Options	Frequency	Percentage
Yes	48	82.8%
No	10	17.2%
Total	58	100.0%

It is observed from the table above that the majority of the sample (82.8%) confirmed that their school provides a comfortable environment that helps reduce stress and psychological pressure, while (17.2%) thought otherwise. This result reflects the importance of environmental aspects in supporting learners' psychological comfort, indicating the need to enhance this environment through an integrated school design that takes psychological dimensions into account.

Table 15: Environmental Factors That Contribute to Improving Mental Health in School

Options	Frequency	Percentage
Availability of rest and relaxation areas	9	15.5%

Options	Frequency	Percentage
Calm and comfortable classroom colors	29	50.0%
Reducing overcrowding in classrooms	14	24.1%
Presence of green spaces in school	6	10.3%
Total	58	100.0%

It is evident from the table that the most influential factor in improving mental health according to the sample is “calm and comfortable classroom colors” at (50.0%), followed by “reducing overcrowding in classrooms” at (24.1%), then “availability of rest and relaxation areas” at (15.5%), and finally “presence of green spaces” at (10.3%). These results show an awareness of the importance of color design and open spaces in reducing stress, reinforcing the need for educational planning that takes these details into account.

Table 16: The Effect of Noise Inside the School on Psychological State

Options	Frequency	Percentage
Yes	52	89.7%
No	6	10.3%
Total	58	100.0%

We note that a large proportion of the sample (89.7%) believe that noise inside the school affects their psychological state, while only (10.3%) do not think so. This result confirms that noise is a major source of disturbance and stress, which requires measures to soundproof or reduce sources of disturbance in the school environment to maintain a healthy and psychologically balanced educational setting.

Table 17: The Extent to Which the General Atmosphere in the School Helps Reduce Anxiety and Stress

Options	Frequency	Percentage
Yes	41	70.7%
No	17	29.3%
Total	58	100.0%

It appears from the table that (70.7%) of the sample find that the general atmosphere in the school helps them reduce anxiety and stress, while (29.3%) do not feel that way. This result highlights the importance of the overall school climate in fostering a sense of reassurance and comfort, supporting the idea that the general school atmosphere is as important as its physical components in affecting students' mental health.

Table 18: The Extent to Which Classroom Design Contributes to Interaction with Peers

Options	Frequency	Percentage
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Options	Frequency	Percentage
Yes	42	72.4%
No	16	27.6%
Total	58	100.0%

It is evident from the table that (72.4%) of respondents believe that classroom design helps them interact with peers during lessons, compared to (27.6%) who disagree. This result indicates that the physical space inside the classroom directly affects the quality of social interaction and cooperation among students, calling for classroom designs that facilitate communication and encourage teamwork.

Table 19: The Extent to Which Shared Spaces in the School Support Student Communication

Options	Frequency	Percentage
Yes	32	55.2%
No	26	44.8%
Total	58	100.0%

We note from the table above that more than half of the sample (55.2%) believe that shared spaces in the school, such as courtyards and cafeterias, support student communication, while (44.8%) do not agree. This distribution reflects a divergence of opinions, indicating gaps in the design or management of these spaces and highlighting the need to restructure them to be more conducive to positive social interaction.

Table 20: The Effect of School Environment on Teachers' Social Relationships

Options	Frequency	Percentage
Positive	19	32.8%
Neutral	33	56.9%
Negative	6	10.3%
Total	58	100.0%

It is evident from the table that the majority of the sample adopted a neutral position toward the effect of the school environment on their social relationships at (56.9%), while (32.8%) saw the effect as positive and (10.3%) considered it negative. These results suggest that the current school environment may not play a sufficiently effective role in enhancing social relationships, requiring initiatives that support interaction and communication among students.

Table 21: Suggestions to Improve Social Interaction in School

Options	Frequency	Percentage
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Options	Frequency	Percentage
Providing open spaces for social interaction	12	20.7%
Designing classrooms that support teamwork	16	27.6%
Organizing school activities that enhance student relations	30	51.7%
Total	58	100.0%

The table shows that the most common suggestion among the sample is “organizing school activities that enhance student relations” at (51.7%), followed by “designing classrooms that support teamwork” (27.6%), and then “providing open spaces for social interaction” (20.7%). These results indicate students’ awareness of the importance of interactive activities and spaces designed to foster group communication, calling on schools to intensify activity programs and adapt spaces for social and educational goals.

Table 22: The Extent to Which Classroom and Seating Design Affects Cooperation with Peers

Options	Frequency	Percentage
Yes	32	55.2%
No	26	44.8%
Total	58	100.0%

It is evident from the table that (55.2%) of the sample believe that classroom and seating design affects the possibility of cooperating with peers, while (44.8%) think otherwise. This result points to the importance of classroom interior design in facilitating group interaction and communication among students, confirming the need for flexible organizational models that allow dynamic interaction inside the classroom.

Table 23: Preference for Studying in an Open Environment Compared to Traditional Classrooms

Options	Frequency	Percentage
Yes	37	63.8%
No	21	36.2%
Total	58	100.0%

The table shows that the majority of the sample (63.8%) prefer studying in an open environment rather than traditional classrooms, while (36.2%) prefer the traditional model. This result reflects a growing inclination toward unconstrained educational spaces that allow freedom of movement and offer more psychological comfort and openness, prompting consideration of flexible learning environments in future educational policies.

Seventh: Interpretation of the Study Results:

1. First Sub-Hypothesis:

There is a statistically significant relationship between the application of ergonomics principles within the school and teachers' feelings of comfort and focus.

From the results of the tables related to students' experiences within the classroom environment, it is clear that there is increasing awareness of the impact of ergonomics on comfort and focus. (75.9%) of teachers indicated that the design of seats and desks affects their ability to concentrate, and (86.2%) confirmed that they suffer from physical fatigue due to prolonged sitting, which reflects a shortfall in considering ergonomic dimensions in school furniture. As for lighting and ventilation—two essential elements in environmental ergonomics—(79.3%) expressed satisfaction with the lighting, and (93.1%) confirmed that good ventilation helps with concentration, which reinforces their awareness of the impact of a classroom environment designed according to functional comfort principles.

These results support the hypothesis that applying ergonomics in schools positively affects students' physical and mental comfort, which directly influences their attention quality and academic performance. This result contrasts with the study by Barakat Amina (2023), which found that most educational institutions in the Algerian environment suffer from poor design of their school equipment as well as poor physical design of classrooms. Our study's results also contrast with the study by researcher Ouans Yasmine (2018), which concluded that school equipment in Algerian primary schools does not meet ergonomic design standards that ensure student safety and health.

They are in agreement, however, with the study of Taher Ben Abdelrahman (2022), which concluded that the ergonomics of the school environment meets the required level from teachers' point of view, across several areas: ergonomics of school buildings, classroom ergonomics, ergonomics of physical conditions, and ergonomics of teaching aids, with varying percentages. The study also found no statistically significant differences in the research sample's attitudes toward the reality of school environment ergonomics attributable to variables such as gender or age.

Ergonomics is not limited to seats or lighting but includes the integration between spatial design, work tools, and their suitability to the student's physical and mental characteristics. With (63.8%) of respondents preferring to study in an open environment, there is a clear need for educational spaces to be flexible and adaptable to ergonomic principles to ensure learner comfort and facilitate concentration in a stress-free atmosphere.

Applying ergonomics principles in educational institutions, especially schools, is an important factor in improving the work environment and enhancing teachers' professional quality of life. Ergonomics, which deals with arranging the work environment in line with human physical and psychological capacities and needs, directly contributes to reducing sources of stress and strain, positively impacting teachers' comfort and focus. When classrooms and teachers' offices are designed according to ergonomic standards—lighting, ventilation, comfortable furniture, and suitable technological tools—this leads to reduced physical and mental fatigue and helps teachers perform their duties more efficiently. Providing a supportive and healthy work environment also enhances their job satisfaction and increases their ability to concentrate and engage positively in the teaching process, which in turn improves the quality of education provided to students. Therefore, implementing ergonomics in schools is not a luxury but a necessity to ensure a stimulating and sustainable educational environment.

2. Second Sub-Hypothesis:

The psychological and social dimensions of ergonomics contribute to improving teachers' mental health and social relationships within the school.

The results of the tables related to the school's psychological and social climate showed that the psychological dimensions of ergonomics play a major role in enhancing teachers' psychological well-being. (82.8%) expressed that the school environment is comfortable and reduces stress; (89.7%) stated that the classroom environment affects their mental state; and (70.7%) said that the general atmosphere at school helps reduce anxiety and pressure. Half of the respondents (50.0%) indicated that calm and comfortable classroom colors are among the

most important environmental factors contributing to their mental health, reflecting the importance of psychological ergonomic considerations in designing the educational environment. These results confirm that ergonomics is not limited to physical aspects but extends to psychological and social dimensions, as the organization of spaces, choice of colors, and noise level all affect mood, emotions, and social behavior. (72.4%) noted that classroom design helps them interact with colleagues, while (51.7%) stated that guided activities contribute to strengthening relationships—indicating that a school environment that considers psychological and social ergonomics can actually create a positive climate that enhances belonging and communication among students. Thus, the second hypothesis is clearly supported by the field data. Ergonomics is not limited to the physical aspects of preparing workspaces but also extends to psychological and social dimensions that are pivotal in enhancing the well-being of those working within the school environment. Psychologically, ergonomics helps create a safe and comfortable work environment with fewer causes of stress and mental strain, enabling teachers to maintain emotional balance and boosting their feelings of satisfaction and reassurance while performing their duties. Socially, implementing ergonomic practices that encourage positive interaction—such as designing shared spaces, preparing rest areas, and providing spaces for dialogue and collaboration—helps strengthen professional relationships, building trust and mutual respect among teachers, and improving the overall work climate. Thus, ergonomics is an effective tool for improving teachers' quality of professional life—not only in terms of job performance but also regarding mental health and social cohesion within the school.

General Hypothesis:

Ergonomics has a statistically significant role in improving quality of life within the school environment as perceived by teachers.

The study's results, across various tables, show that teachers have a strong awareness of ergonomics' role in improving different aspects of their lives within the school environment—whether physically, psychologically, or socially. The data indicated that the design of seats and desks, quality of lighting, ventilation, and classroom atmosphere are all factors that directly affect physical comfort and mental focus, which are essential elements of daily quality of life in school. The results also reflected the notable impact of psychological ergonomic dimensions—such as classroom colors, noise levels, and space organization—on students' mood and mental health, confirming the integrated effect of ergonomics in building a healthy and stimulating school environment.

In addition, the study showed that ergonomics also helps improve students' social relationships, as many see that classroom and shared space design aids interaction and communication within the school, and that guided activities supported by a stimulating environment have an effect in establishing positive relationships. Based on this, ergonomics can be considered a comprehensive scientific approach to improving school quality of life by preparing an educational environment suited to the learner's psychological, physical, and social characteristics. Accordingly, the study's general hypothesis finds strong support in the field results, underscoring the importance of integrating ergonomics principles into educational environment policies and planning to enhance the student experience in school.

Conclusion:

School ergonomics is a multidisciplinary applied field aimed at improving the educational environment by adapting it to the physical and psychological characteristics of both learners and teachers. From the study's results, the school environment, as a workplace, can influence teachers' performance quality and enable them to carry out their teaching role at a high level of efficiency and quality. Based on the study's results, the researchers proposed several recommendations, including:

- Provide adequate lighting within the school grounds.
- Review how school furniture (tables and chairs) is manufactured and seek to design it to ensure comfortable seating for both teachers and students.
- Work on ensuring quietness and safety within the school.

- Create a social work environment capable of accommodating relationships among teachers.
- Provide green spaces that help absorb negative energy, fatigue, and exhaustion.

Findings

- Physical ergonomics: The design of desks, chairs, and classroom infrastructure directly influences comfort and concentration, reducing fatigue among students and teachers.
- Environmental ergonomics: Proper lighting, ventilation, and thermal comfort were identified as major contributors to both academic performance and overall well-being.
- Psychological ergonomics: Classroom aesthetics (colors, noise control, spatial organization) play a significant role in shaping mood, reducing stress, and enhancing mental health.
- Social ergonomics: Ergonomic arrangements promote collaboration, positive peer relationships, and teacher-student interaction, improving the school climate.
- Policy implications: The findings underscore the need for ergonomics-based guidelines in school infrastructure design and educational planning to ensure long-term benefits for learners and educators.

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Ethical Considerations

This study was conducted in accordance with academic ethical standards. Participation in the survey was voluntary, and all participants were informed about the purpose of the research. Anonymity and confidentiality of the respondents were strictly maintained. No personal or sensitive data were collected beyond the scope of the study.

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Conflict of Interest

The authors declare no conflict of interest.

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