

The relationship of scientific mindfulness among students of the fourth science with their achievement in physics

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Abstract

The current research aims to reveal the relationship between the mindfulness scientific of the fourth scientific students and their achievement of physics. The descriptive research method was used, and the research sample consisted of (751) male and female students were selected by stratified random method from the fourth scientific grade students in government secondary schools in Baghdad governorate for the academic year 2020-2021. An eight-dimensional measure of mindfulness scientific was built, and each dimension included four items, for which answer alternatives were developed according to Likert scale, which are (it applies to me to a large degree, applies to me to a moderate degree, does not apply to me), and scores were given (0,1,2) respectively, thus, the degree of the scale ranges between (0-64) degrees, and with a theoretical average of (32) degrees. An achievement test of the physics material consisting of 30 objective and essay paragraphs was constructed. The psychometric properties of the two tools were verified. My research tools applied to the specified sample at the end of the first academic course of the 2020/2021 academic year. After analyzing the results, it became clear that there was a strong and positive relationship between mindfulness scientific and academic achievement in physics. In the light of the results of the research, a number of recommendations and suggestions were made.

Keywords: Mindfulness scientific, achievement in physics.

Introduction

Research and studies affirms specialized in this field, which recommend the need to keep abreast of the rapid practical and educational developments that the world has witnessed in recent years in the midst of the emergence of twenty-first century skills and the adoption of modern curricula in accordance with international standards, especially in general science curricula, in particular physics, it is one of the sciences that depends on scientific thinking in its methodology and style, and the purpose of its teaching lies in providing learners with basic knowledge, and in acquiring students with the necessary skills that make them able to understand natural phenomena, develop their thinking and increase learners' awareness of what is going on around them and their knowledge of the developments of science, and from here, vigilance has become Scientific is one of the ways to achieve these goals, as it is a skill of the twenty-first century and is highly related to the ability to acquire information, which is related to their academic achievement.

Research problem

The research started from the feeling of weakness in the students' mindfulness scientific in addition to weakness in the achievement of physics, and this was evident through the results of the opinion poll for (20) male and female teachers of physics in the province of Baghdad, which showed that 85% of them agreed that there is a great difficulty In the students' acceptance of physics, which leads to a somewhat significant weakness in the achievement of this subject, 99% of the exploratory sample did not hear about mindfulness scientific and how to develop or measure it among their students, and they do not believe that the textbook cares about it or includes it.

Which generated a question about the reason for students' non-acceptance of physics, and measuring the degree of employing their mental skills and the degree of their mindfulness scientific in searching for and acquiring information, and given the scarcity of studies that dealt with the relationship of the variable of mindfulness scientific

with the variable of achievement, the researchers decided to conduct the current research to answer the following question:

What does the mindfulness scientific of the fourth grade students have to do with their achievement of physics?

Research importance:

Mindfulness scientific focuses on the aspects that link science with society, its problems and challenges that an individual can face from the early stages of building and developing his information, social progress in our time depends on scientific progress, the advanced nations are the nations that have been able to achieve progress in the field of science and knowledge, where science has been able to develop skills, scientific trends and scientific thinking of individuals.

Since the science of physics is one of the basic scientific components, "Al-Bawie 1987" stated that physics is a science that helps learners to understand the phenomena of nature surrounding them and increase their ability to subject them to measurement and appreciation, and to develop relations between physics as a science and between production and consumption processes, as well as understanding the function performed by this science In Industrial Society and in the Advancement of Human Civilization (Al-Bowie 1987, 37)

And because of the importance of mindfulness scientific as one of the skills of the twenty-first century important for students and one of the way to raise their creativity and innovation, solve their problems, self-direction, social interaction, increase their culture and adapt them to the academic environment with all its resources and challenges, and commitment to duties, activities and flexibility that are commensurate with the changes, pressures and difficulties that obstacles that can affect their ability and levels of scientific performance. (Arnaut et al., 2019:21)

In addition to prediction, discovery and other functions included in modern educational goals and seeks to achieve, which is one of the most important functions of mindfulness scientific (Rajami, 2017: 31).

And since the fourth grade occupies the science of special importance in education, as we can consider it the actual start of specialization in the scientific study, so it is necessary to shed light on the students of this grade.

Hence the importance of the current research.

Research aim: The current research aims to identify the level of mindfulness scientific for students of the fourth scientific grade and its relationship to their academic achievement in physics.

By answering the following questions:

- 1- What is the level of mindfulness scientific for students of the fourth scientific?
- 2- What is the level of achievement of physics for the fourth scientific students?
- 3- What is the relationship of mindfulness scientific among students of the fourth scientific to their achievement of physics?

Research limits: is determined by the current search:

1. Students of the fourth scientific grade in public middle and secondary day schools in Baghdad governorate for the academic year 2020-2021.
2. Physics book for the fourth scientific class.

Defining terms

Mindfulness scientific defined him:

(Arnaut et al., 2019): It is "the student's ability to be aware of the academic experiences in real time without making judgments, accepting himself as it is, regulating momentary attention, orientation towards the present, sensory

awareness of the changes that occur in the environment and the context around him, and managing feelings, thoughts, negative automatic emotions, and change Automatic behavior by being open to new ideas, modern theories and different opinions, accepting constructive criticism and love of curiosity, which improves performance and reduces tension, negative thoughts and future anxiety and enhances patience and endurance in the face of challenges and difficulties facing it with confidence, flexibility and firmness, and make wise decisions in a timely manner and adhere to standards Ethics in academic performance and scientific activity” (Arnaut et al., 2019: 24).

-The researchers define it procedurally as the ability of the fourth-grade scientific student to use the highest level of concentration he possesses at a particular moment and to focus it on a problem. Measured by the total score obtained through his performance on the scale prepared for this purpose.

. The achievement is defined by:

(Al-Saadi, 2020) as: “The degree that the learner achieves, or the level of success that he achieves, or what he reaches in the subject of an advanced level in the educational field” (Al-Saadi, 2020: 17).

The researchers define it procedurally: the final result achieved by the fourth-grade scientific student in the research sample on the achievement test for the physics subject prepared by the researcher for this purpose.

Theoretical background and previous studies

First: Theoretical background: Here is some theoretical information about the research variables

1- Mindfulness scientific

Vigilance is a feature that exists in the personalities of individuals, as it requires great abilities of awareness and perception, the vigilant person is a conscious person who is present with all his senses, his mind, and himself with the present universe, thus the vigilant person does not experience wandering, frustration or flight, as the vigilant personality in modern psychology is characterized by the ability to focus continuously, in addition to the individual's ability to maintain focused attention in long periods of time, and during this time the person tries to reveal what is going on around him of events and situations. (Matthews 2017, p.45-47)

(1995, Oldham) defined the vigilant personality as "the personality that possesses a high degree of attention, as it monitors everything around it, and has strong will, and this is what makes it feel capable of confronting various life events, and realizing the extent of danger if others direct it towards it." (P: 94), 1995, Oldham)

Mindfulness scientific is the monitoring of everything new in a field, through continuous and regular analysis of scientific production and tracking of all technological developments taking place in the field.

In the field of education, mindfulness scientific is concerned with knowing scientific innovations and modern curricula and monitoring all scientific manifestations such as forums, symposia, accessing websites and accessing restricted information, and this shows the very important and necessary role that mindfulness scientific plays in the educational process.

The benefit of establishing a system for mindfulness scientific in any institution can be summarized as:

- 1- Clarify the areas of activity of any institution: it enables it to know the mechanism of improvement and development.
- 2- Monitoring and forecasting changes: making the organization ready and closely informed of changes.
- 3- Collecting information: as a tool for development, and adding values.
- 4- Moving from a state of waiting to a state of vigilance and readiness.
- 5- Moving from an organized activity or work to an activity that is more organized or planned.

Here the responsibility lies with each of the actors in the educational process - ie, collective action for priorities. Quoted from (Rajmi, 2017: 63).

By applying the mindfulness scientific scale to fourth-grade scientific students, the researchers will try to reveal the ability of the research sample of students at the level of their mindfulness scientific, and is there a significant difference between the level of mindfulness scientific for male and female students.

2- Achievement:

Academic achievement is one of the most complex educational concepts due to the participation of many different processes and factors in it, scholastic, personal, social, and economic, and it is one of the most areas that give the opportunity to reveal students' abilities and develop their talents and ambitions. (Hamdan, 1996: 65).

Achievement is an important topic in the mental processes that the learner performs, the result of which is his achievement of a higher academic rank and his transition from one stage to another, achievement has a strong connection with learning, but learning is broader than achievement, it includes all changes and actions that occur in the learner's performance within the educational situation, it also includes learners' acquisition of experiences, scientific information, values, habits and desired and undesirable goals, while academic achievement is linked to the desired goals of learning outcomes. (Al-Salih, 2004: 26).

Methods of Measuring Achievement: The approved method for determining the achievement level is the test that can give an indication in light of the group of grades that students obtain at the end of the school year, or at the end of the first or second semester, after he succeeds in passing the tests and exams. (Al-Ahmad and Mona, 2010: 180).

The achievement tests are divided into four types:

Oral and written tests that consist of (essay and objective tests) as well as performance tests (Abu Fouda and Nagati, 2012: 27-28).

Second: Previous studies: No studies were found that dealt with mindfulness scientific except

- Study of Arnout et al. (2019)

The Saudi study was conducted, and it aimed to determine the level of each of the strategies of self-organized learning and mindfulness scientific and to identify the nature of the relationship between them, among graduate students, and they used the descriptive research method (correlative comparative), and the sample was chosen randomly from graduate students (Masters and Ph.), two scales are self-regulated learning strategies and mindfulness scientific, the following statistical methods were used (mean, standard deviation, t-test, Pearson correlation coefficient, simple regression analysis), and the results showed that there was a correlation at the level (0.001) between self-organized learning strategies and mindfulness scientific, as well as that there were no statistically significant differences between the means Degrees of males and females in the strategies of self-organized learning and mindfulness scientific, while there were statistically significant differences at the level of significance (0.01) in each of the strategies of self-organized learning and mindfulness scientific among graduate students.

❖ Research methodology and procedures

The procedures for selecting the research sample, preparing and applying tools, and defining the statistical methods used in data analysis will be presented, as follows:

First: Choosing the research method: The descriptive relational approach (type of correlational studies) was adopted, as the approach is appropriate to the nature of the research objectives.

Second: Define the research community

The current research community has been identified with all students of the fourth scientific grade in the middle and secondary schools of the six directorates of general education in the province of Baghdad for the academic year (2020-2021).

Third: the research sample

The sample of the study was randomly selected by (50-100) male or female students according to the number of students in each of the schools, which are dominated by the nature of convergence in the social and cultural level of students and the exclusion of the outstanding and distinguished schools from the sample, and the total number of students who underwent the test is (751) represented by with (324) male students and (427) female students.

Fourth: Research tools: In order to achieve the objectives of the research, it required the use of two tools to measure mindfulness scientific and to collect physics. They were prepared as follows:

1-Mindfulness scientific Scale:

After the researchers reviewed the literature and previous studies related to mindfulness scientific, the researchers adopted the definition of (Arnaut et al., 2019). (8) dimensions were derived from it, and each dimension contains (4) items, so that the total items of the scale are (32) items, then the scale was presented with the procedural definition to a group of experts specialized in the field of methods of teaching physics, educational psychology, measurement and evaluation to ensure the appropriateness of the paragraphs and its validity for application to students of the fourth scientific grade, all experts agreed on the validity of the scale with a slight modification to the paragraphs linguistically, and the answer alternatives were only three: (applies to me to a large extent, applies to me to a moderate degree, does not apply to me).

In order to ensure the stability of the scale, it was applied to a random exploratory sample from the research community and not from its sample, as it consisted of (100) male and female students from the research community, using the Alpha Cronbach equation (0.810), and this indicates that the scale has a high value, which indicates the consistency of the scale's paragraphs among them, thus, the scale became in its final form, and scores were given to the paragraphs (2,1,0), and thus the total score of the scale was (0_64) and with an arithmetic average (32) and it was ready to be applied electronically through the Google Form application.

2- Building an achievement test

One of the requirements of the current research is to build a test to measure the students' achievement of the research sample for the subject of physics.

The achievement test was built, with (27) objective paragraphs of the multiple-choice type with (4) alternatives, one of which represents the correct answer, and (3) paragraphs of the essay type. The validity of the test was confirmed by presenting it to the expert committee, and through the exploratory application on 100 students from the research community, the coefficients of distinction and difficulty were calculated for the objective and essay test items, and the effectiveness of the wrong alternatives for the objective items, and the stability of the test was calculated using the Alpha Cronbach equation and was equal to (0.810).), which is a good stability coefficient.

Thus, the test in its final form consisted of 30 paragraphs, with a total score ranging between (0-40) and a hypothetical average (20).

fifth: The applied of the two final research tools: The two research tools were applied as follows:

A- The mindfulness scientific scale was applied electronically to the students through the application of the googel form.

B - The achievement test was applied in person and on paper to the students after they had completed the vocabulary of the first semester, and under the supervision of the researchers.

Sixth: Statistical means: we used the statistical package Spss and the following statistical methods:

- 1- Alpha Cronbach's equation
- 2- The coefficient of calculating the difficulty of the substantive and article paragraphs
- 3- An equation for calculating the distinction of objective and article paragraphs
- 4- Pearson correlation coefficient equation

❖ Presentation and interpretation of results

Since the current research aims to reveal the relationship of mindfulness scientific to the students of the fourth scientific grade with their achievement of the subject of physics.

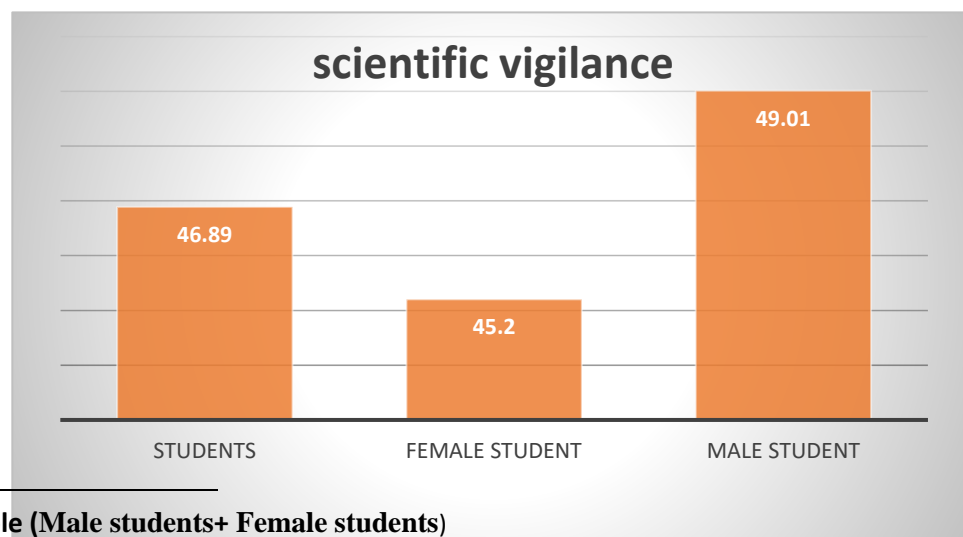
After applying the mindfulness scientific scale and achievement test for physics on the research sample, correcting the answer sheets, monitoring the grades, collecting and organizing them in lists by gender and schools, the results were as follows:

- 1- Regarding the first question, which states ((What is the level of mindfulness scientific for students of the fourth scientific grade?))

After sorting and tabulating the students' scores on the Mindfulness scientific Scale that were unloaded from the link on the Mindfulness scientific Scale, as well as correcting the answer sheets of the students who answered on paper, calculating the averages and standard deviations, as shown in Table (1) and Figure (1)

Table (1) Arithmetic averages of the sample scores on the mindfulness scientific scale

Sample	number	Arithmetic average	Standard deviation
Male students	324	49.01	9.25
Female students	427	45.2	11.19
Students ¹	751	46.89	9



¹ All the sample (Male students+ Female students)

Figure (1) Arithmetic averages of the sample scores on the Mindfulness scientific Scale

The averages from Table (1) and Figure (1) show that the arithmetic mean of the scores of the research sample students on the mindfulness scientific scale is equal to (49.01) and with a standard deviation of (9.25), and that the arithmetic mean of the scores of the research sample students on the mindfulness scientific scale is equal to (45.2) and with a standard deviation (11.19), the arithmetic mean of the scores of the students of the research sample as a whole on the mindfulness scientific scale equals (46.89), with a standard deviation of (9.00).

From comparing the results, we find that the sample of students enjoys higher mindfulness scientific than the sample of female students and a lower level of dispersal, and that the level of mindfulness scientific among male and female students is higher than the hypothetical level of the scale, which is (32), equivalent to 73%. These results differ with the results of the study (Arnout et al., 2019). Which found in her study that the level of mindfulness scientific among university students is average.

The researcher attributes that this good level of mindfulness scientific among the fourth scientific students is due to their positive interaction with the environment rich in technological innovations that allowed them to open up to global cultures at a young age and develop self-confidence, especially among students, for what society allows them to open up to the outside community and rely on themselves through various fields of work and social activities, which gave them the ability to make independent decisions, self-development and keep pace with development, and this is one of the implications and dimensions of mindfulness scientific .

2- To answer the second question, which states ((What is the level of achievement of the fourth scientific students in physics?)) The answer sheets of the students in the research sample were corrected according to the answer key, and the scores were collected and sorted according to schools and students' gender, and the averages and standard deviations were calculated as shown in Table (2)) and Figure (2)

Table (2) The arithmetic averages of the sample scores on the achievement test

	number	Arithmetic average	Standard deviation
Male students	324	29.05	6.33
Female students	427	31.3	3.78
Students ²	751	30.32	5.15

² All the sample (Male students+ Female students)

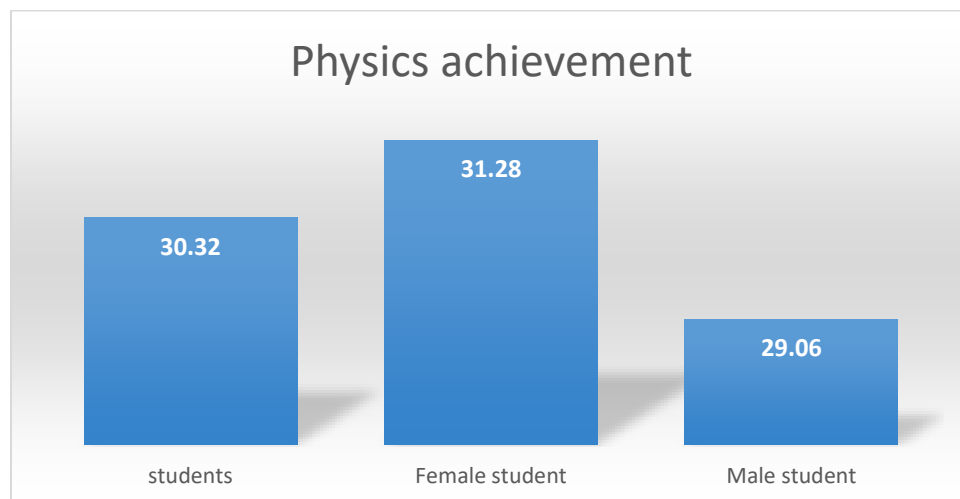


Figure (2) Arithmetic averages of the sample scores on the achievement test

From Table (2) and Figure (2), it appears that the arithmetic mean of the scores of the research sample students on the achievement test is equal to (29.05) and with a standard deviation of (6.33), the arithmetic mean of the scores of the students of the research sample on the mindfulness scientific scale is equal to (31.3) and with a standard deviation of (3.78), the arithmetic mean of the scores of the students of the research sample as a whole on the mindfulness scientific scale is equal to (30.32) and with a standard deviation of (5.15).

By comparing the results, we find that the sample of students enjoys higher mindfulness scientific than the sample of female students and a lower level of dispersal, and that the level of achievement of male and female students is higher than the hypothetical level of the scale (20) which is equivalent to 75%, this result, although good, remains less than the level of ambition for students. parents and teachers, it is noted that the level of female students' achievement is slightly higher than the level of male students' achievement and this is due to the researcher's belief and through her experience in teaching male and female students, that female students are more eager to follow lessons, prepare assignments and extra-curricular activities, and this may be due to the nature of the social environment in which the girl lives and the lack of responsibilities that they She bears it at this age, contrary to what life requires for most males and bears them for burdens at an early age.

To answer the third question, which states: "What is the relationship between mindfulness scientific among students of the fourth science with their achievement of physics?"

The correlation coefficients between the sample scores on the mindfulness scientific scale and the achievement test were calculated using the Pearson correlation coefficient and through the statistical bag (SPSS) and the results were as shown in Table (3)

Table (3) Correlation coefficients between mindfulness scientific and achievement

Sample	The value of the correlation coefficient of mindfulness scientific and achievement	Relationship type

Male students	1** 0.782	high and positive
Female students	2** 0.741	high and positive
Students	3** 0.666	high and positive

It appears from Table (3) that the correlation coefficient between mindfulness scientific and achievement amounted to 0.666, and this coefficient indicates that the relationship between mindfulness scientific and academic achievement is positive and high, but it is still below the level of ambition, and it is an expected relationship because the textbooks, teaching methods used and the methods of evaluation used are still within the framework traditional indoctrination and conservation, and direct tests that do not help the development of thinking and self-development of students, as well as the lack of extra-curricular educational activities that the student should engage in, such as scientific trips, competitions, seminars, exhibitions, etc., which contribute to raising the correlation of variables.

- ❖ **Conclusions:** In light of the research findings, it was concluded that there is a positive relationship between mindfulness scientific and the academic achievement of physics.
- ❖ **Recommendations:** Based on the findings and conclusions reached, the researchers recommend the following:

1-Focus on the mindfulness scientific of students at all levels of education, especially at the secondary level.

2-By conducting training workshops for all those involved in education to discuss the subject of students' mindfulness scientific and give it special attention in light of the rapid information development that the world is going through in general.

- ❖ **Proposals:** To complement this research, researchers suggest the following:

Conducting studies similar to the current study to reveal the relationship of scientific mindfulness at different levels of study and other variables such as (scientific enlightenment, creative thinking and motivation)

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1** Correlation is significant at the 0.01 level

2** Correlation is significant at the 0.01 level

3** Correlation is significant at the 0.01 level

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