

## **The Relationship of the Academic Buoyancy of the Fifth Scientific Students to Their Achievement of Physics and Their Motivation to Learn it**

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### **Abstract**

The current research aims to uncover the relationship between the academic buoyancy of the fifth scientific students in their achievement of physics and their motivation to learn it. The research sample consisting of (814) students were chosen by the stratified random method from fifth-grade scientific students in government secondary schools in the Baghdad governorate center. An achievement test consisting of (30) objective and essay items was built, and a ready-made academic buoyancy scale and a ready-made measure of motivation to learn physics were used, and the psychometric properties of the tools were verified.

The research tools were applied to the selected sample at the end of the first academic year of the academic year 2020/2021. After analyzing the results, it became clear that there is a strong and positive relationship between academic buoyancy and academic achievement and between academic buoyancy and the drive to learn physics. In light of the research results, many recommendations and proposals were presented.

**Keywords:** Academic Buoyancy, Academic Achievement, Motivation To Learn Physics.

### **Introduction**

From the review of specialized research and studies, it became clear that there is a set of obstacles and challenges that stand in the way of the student and are considered a hindrance and a barrier in front of him to face academic challenges and appear through his constant concern about his inability to complete the exams on time, or his inability to pass the exams and obtain high grades, In addition to his uncertainty about his ability to complete the work entrusted to them well and avoid failure.

The concept of academic buoyancy came as part of positive psychology, which is concerned with studying and determining how students face the daily academic difficulties they face, which has a relationship to their academic achievement.

### **Research problem**

The research started from the feeling that there is difficulty in learning physics, and this was evidenced by the results of a survey of 25 physics teachers and specialist supervisors in the Baghdad governorate center, As 88% of them agreed that they find it difficult to teach physics to middle school students, and 90% of them do not feel satisfied with their students' achievement and find it low compared to their effort in teaching and that 95% of them attribute the students' weakness in achievement to their low motivation to learn physics. Knowledge of the sample with the term academic buoyancy at 100%, but they believe that the circumstances surrounding students generate frustration, which affects their academic achievement.

Thus, a question is born about why students do not accept the subject of physics, which may be because they are living a critical period in their developmental stages, which is the middle adolescence stage, as many problems and difficulties appear at this stage that shock their inclinations. And their attitudes, desires, and needs, as well as the challenges of daily academic life, obstacles, and special controls, such as their low grades, their level of stress, and their low self-confidence, which leads to a decrease in their performance levels. And reducing motivation and

interaction. (Halim, p. 288, 2019) Given the scarcity of studies that have dealt with the relationship of the academic buoyancy variable to the achievement and motivation variable for learning, the researchers decided to do his current research to answer the following question:

**What is the relationship of the academic buoyancy of the fifth science students to their achievement of physics and their motivation to learn it?**

#### **The Importance of the research**

Academic buoyancy focuses on the positive aspects by which the student overcomes the daily troubles he faces as it is related to his efforts to deal with the problems, tribulations, and difficulties that he faces during the educational process and facing them, and then moving from a state of failure to success and excellence.

Some studies have shown the effect of academic buoyancy on student behavior (such as class participation, perseverance, enjoyment of the task, and students' aspirations), as well as an impact on the goals of the ideal personality (Martin & Liem, 2010) to advance the educational process, the attention of those in charge of the educational process should be drawn to the importance of the academic buoyancy variable when formulating and shaping the content of the academic curricula in general and physics in particular because the school subjects lack content that develops the students' advancement and helps them face the academic problems and challenges and then reach the facts and knowledge. (Halim, 2019: 281).

Many educators have been interested in studying motivation, which is one of the important and influential elements in education, as it works to make the student behave effectively when learning the subject matter, and to practice various educational activities to achieve the required educational goals, and affect the type of practices that the teacher performs during The learning process, and it has been linked to the achievement process, As there are motives that facilitate the learning process and are closely related to it, such as the drive to learn, which represents the learner's desire for knowledge, curiosity, a tendency towards exploration and the desire to learn about the environment around him (Huit, p. 7, 1998).

And raising the motivation to learn after overcoming setbacks makes students enjoy the learning process, and this thus leads to them carrying out their duties on time and opens the way for them to ask scientific questions and contribute to opening the door for discussion in the classroom and thus leads to an increase in academic achievement.

And because physics will be the common factor in most university majors in the future, so obtaining high achievement grades in this subject has become an urgent requirement for students, parents, teachers, and all those interested in the educational process, and to raise the student's level of achievement in the subject of physics, one must ensure the level of his motivation to learn and float. Academician has.

#### **The objective of the research**

The current research aims to identify the level of academic buoyancy of the fifth scientific students and its relationship to their academic achievement of physics and their motivation to learn it.

By answering the following question: What is the relationship of the academic buoyancy of the fifth scientific students to their achievement of physics and their motivation to learn it?

#### **Research limits**

The current research is determined by:

1. Fifth-grade scientific students in governmental daytime middle and high schools in the Baghdad governorate center for the academic year 2020-2021.
2. Physics book for the fifth grade

#### **Defining terminology**

**1- Academic buoyancy** defined by: (Datu & Yuen, 2018). "The student's ability to deal with everyday academic problems encountered in school that are closely related to academic performance and academic achievement (Datu & Yuen, p. 207, 2018). - The researchers define it procedurally as "the scientific ability of the fifth-grade student to overcome the academic difficulties that he faces, and it is measured by the total score obtained by answering the scale that was used for this purpose."

**2- The achievement** defined by: (Al-Jalali, 2011). as "the actual performance level of the student in the academic field resulting from the process of cognitive mental activity and is evidenced by the student's answers to a set of achievement tests" (Al-Jalali, p. 25, 2011).

**The researchers define it procedurally** as the extent to which the fifth scientific students acquire the research sample of information and physical cognitive experiences during the first semester, and it is measured by the total grades that they obtain in the achievement test prepared for this purpose.

**Motivation to learn as defined by:** Al-Sayyid (2002) "is the group of feelings that push the learner to engage in learning activities that lead to the attainment of the desired goals" (Al-Sayed, 2001-2002).

**The motivation to learn physics** is defined as a procedural "group of feelings that push the fifth scientific student to engage in learning activities that lead to achieving the desired goals and is measured by the total degree obtained by answering the paragraphs of the special scale."

#### **Theoretical background and previous studies**

**First: A theoretical background:** The following is some theoretical information about the research variables:

##### **1- Academic buoyancy**

Academic buoyancy as a concept of positive psychology focuses on how students can face the daily academic difficulties that they encounter during their learning path, which is called academic advancement in some sources (Martin & Marsh, 2008a, 54).

Martin (Martin, 2007). separated the dimensions of the theoretical model explaining the academic buoyancy variable into four main dimensions: the cognitive adaptive dimensions, the behavioral adaptive dimensions, the cognitive non-adaptive dimensions, and the behavioral non-adaptive dimensions (Martin, p. 414, 2007).

Then Martin & Marsh (2008B) considered academic buoyancy to be a one-dimensional component, and Martin and Marsh built its scale from only four components, as many researchers such as Bowen (2010), Putwain, et. al., 2012 relied on it (Carrington, 2013), (kendrick, 2017), (Victoriano, 2016).

The researchers will try to reveal the students 'ability of the research sample to face academic challenges and is there a significant difference between the level of academic buoyancy of male and female students.

##### **2- Achievement**

If academic achievement is evidenced by knowledge or skill that the learner acquires as a result of studying a specific subject or educational unit (Al-Qamish, p. 2, 2001). The tests that the teacher conducts on his students throughout the school year must measure academic achievement because the goal of preparing achievement tests is to measure the extent to which the student understands some knowledge, concepts, and skills related to the school subjects at a specific time or the end of a certain educational period, as academic achievement indicates the situation The current performance of the learner and what he has learned or what he has already acquired in terms of knowledge and skills under this program, there is a point of convergence between academic achievement and building knowledge and concepts (Allam, p. 305, 2006).

The achievement tests and tests are among the most common methods of evaluating learning outcomes to correct and determine the amount of cognitive,

emotional, and psychomotor goals achieved for good achievement tests to perform their functions as fully as possible, and there are two basic purposes that the achievement tests seek, namely:

-Helping students to determine the degree to which teaching objectives could be achieved.

-Helping the teacher understand students as individuals. (Abu Al-Hija, p. 178, 2001).

Good achievement tests must have the following four characteristics:

**Objectivity:** the results of the evaluation are not affected by the subjective or personal factors of the corrector, and therefore the subject's score does not depend on who is correcting.

**-Validity:** The test can measure the thing that was put to measure it, which is called the validity of the test.

**-Reliability:** It is that the test gives the same results if the test is repeated and the same thing is measured several times in a row and similar circumstances.

**-Ease of use and comprehensiveness of the goals to be measured and evaluated** (Zaghloul, p. 325, 2002).

**Types of achievement tests:** Achievement tests can be classified as follows:

1 - Oral tests

2 - Written tests, which in turn are divided into two types: -

A - Essay

B - objective

Each type includes several subtypes, each with its characteristics, characteristics, and indications for use that differ from one another. A good teacher can use the appropriate type for students according to criteria based on the students' mental level, the type of subject matter, the time available for the evaluation process, as well as the type of evaluation and its goal. The researcher will prepare the achievement test of the written type – objective – multiple choice and issues because it is the most appropriate to measure the level of achievement of the fifth middle school students.

## **2- The motivation to learn**

The topic of motivation is one of the most important topics of psychology, and the most indicative, whether at the theoretical or practical level, it is not possible to solve psychological problems without paying attention to the motives of the organism that play the vital role in determining its behavior in quantity and quality, The legacy of experimental psychology related to the processes of remembering and learning cognitive processes, and most aspects of human behavior are based on assumptions related to the principles of motivation in psychology, as they help to better understand and interpret the behavior of the organism so that it can be predicted and controlled in the future. He and other people through his study of the motives of human behavior.

It has already been mentioned (Abu Allam, 1986) that the key to controlling and controlling the behavior of the learner and guiding him lies in understanding his motivation. Therefore, much of the teachers' work is focused on stimulating the motivation of their students as it represents the energy that contributes to directing students' behavior and activity towards achieving a specific goal in the environment that Surrounding them, and the failure of teachers and their failure is almost due to their poor ability to understand the role that motivation plays in the learning and teaching processes. Understanding this role and how to benefit from it increases students' interest in the lesson, their interest in it, and their desire for it (Abu Allam, p. 40, 1986).

(Al-Azirjawi, 1991) indicates that the student's learning problems and frustrations are the teacher's inability to stimulate the students' motivation for the lesson. Achieving understanding, mastery, practice, and success in the lesson is one of the learner's strongest motivations and the source of internal counseling for the learner (Azirjawi, p. 46, 1991).

Many specialists interpreted motivation and developed several theories for it that talked about motivation in general and learning motivation in particular, and among the most important of these theories are the most prominent trends in The field of educational psychology includes the following: -

- a. Behavioral direction
  - b. Human direction
  - c. Cognitive direction
  - d. Social trend
- Second: Previous Studies:

**Second: previous studies**

Study (2013, Martin): This study was conducted in Australia, the study sample consisted of (918) high school students, and the study used the academic buoyancy scale prepared by (Martin & March 2008) and the motivation and participation scale 2008 numbers), Christenson & Martin). The study found a correlation between academic buoyancy and academic flexibility.

**Research methodology and procedures:**

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

**Second: Determining the research community:** The current research community has been defined by all students of the scientific fifth in preparatory and secondary schools of the six directorates of public education in the Baghdad Governorate Center for the academic year (2020-2021).

**Third: The research sample:** Several secondary and preparatory schools for girls and boys were visited within the six general directorates in the Baghdad governorate center, and the selection of schools was taken into account of the students 'similar social and cultural level. Schools of distinguished and outstanding students were excluded from the sample.

It was agreed with the physics teachers who completed the teaching of the three semesters of the scheduled physics textbooks, and randomly (50-100) students were selected according to the number of students in each school.

**Fourth: Research tools:** To achieve the research objectives, it required the use of three tools to measure academic buoyancy, achievement, and motivation to learn physics which are as follows:

**1- Choosing an academic buoyometer:** After the researcher reviewed the literature and previous studies related to academic buoyancy, the researcher adopted the buoyancy scale (Abdin, 2018). To ensure its validity of application on the Iraqi environment to suit students and take into account the age difference, as well as the suitability of the paragraphs in the final form. All experts agreed on the validity of the scale with a slight modification of the paragraphs linguistically, and deleting one paragraph, and reducing the number of answer alternatives from five alternatives to only three (agree, not Sure, not agree).

To ensure the stability of the scale, it was applied to a random pilot sample from the research community and not from its sample, as it consisted of (100) students from the research community, and by using the Fakronbach equation (0.810). Thus, the scale became in its final form consisting of (21) paragraphs, of which (7) were revealing paragraphs with three alternatives to the answer. Scores were given to the paragraphs (2,1,0). The overall scale for the scale is (0\_42), with a mean of (21), and is ready for application.

**2- Building the achievement test:** One of the requirements of the current research is to build a test to measure the students 'academic achievement. (30) paragraphs were prepared with (27) objective paragraphs of the multiple-choice type with (4) alternatives, one of which represents the correct answer, and (3) essay-type paragraphs. 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 distinction and difficulty coefficients were calculated for the objective and essay items of the test, and the effectiveness of the wrong alternatives for the objective paragraphs, and the test results were calculated using the Fakronbach equation and it was equal to (0.810). Which is a good stability coefficient.

Thus, the final version of the test consists of 30 items with a total score ranging between (0-40) and a hypothetical average (20).

#### **A measure of learning motivation towards physics**

After the researcher reviewed the literature and previous studies related to motivation towards learning, the researcher adopted the motivation scale (Al-Tahan, 2003). To ensure its validity for application, suitability for students, and taking into account the age difference, as well as the suitability of the paragraphs in the final form. All experts agreed on the validity of the scale with a slight modification of the paragraphs linguistically.

By applying the scale to a random pilot sample from the research community and not from its sample consisting of (100) male and female students, the reliability of the scale was calculated using the Fakronbach equation equal to (0.869). This indicates that the scale has a high value, which indicates the harmony of the paragraphs of the scale among themselves, and thus the scale became in its final form consisting of 33 paragraphs of which (6) revealing paragraphs were given scores for the paragraphs (2,1,0), and the revealing paragraphs, their scores were (0, Thus, the total score of the scale will be (0\_66), with arithmetic mean (33).

**Application of the final test and measures:** The research tools were applied as follows:

A- It was agreed with the school administrations and made sure that they had completed the vocabulary of the first course. The exam was determined according to the students 'time and told them that it was a comprehensive exam. The exam was conducted on the specified date for each school, starting from (2/9/2021 - 2/17/2021). The achievement test is present in schools, and the researchers made sure to be present during the achievement test to avoid cheating

B- Due to the conditions of curfew and the Corona pandemic crisis, both the academic buoyancy scale and the motivation scale were converted to an electronic test using ((Google form), where it was agreed with the schools to distribute the two scales' links through groups for each school with an emphasis on all students who participated in the achievement test to answer The two scales are electronic, and the period is open until 3/6/2021.

1- After the exams were completed for each school, the papers were collected and corrected for each school separately and arranged in special lists.

2- Through the Excel tables ( ) for electronic tests, the students' answers were corrected and the total score of each student was extracted and arranged according to the schools.

3- The students 'score lists are arranged according to schools, with each student having three marks on the (achievement test, academic buoyancy measure, motivation to learn physics scale) and the grades of students who did not complete all three tests were excluded.

**Sixth: statistical means:** The Spss statistical bag was used and the following statistical methods:

1- The Alpha Cronbach equation:

2- Factor for calculating the difficulty of objective and essay paragraphs: 3- The formula for calculating the distinction of the substantive and essay paragraphs:

4- Pearson correlation coefficient equation.

**The Presentation and interpretation of the results:** Since the current research aims to reveal the relationship of academic buoyancy for the fifth scientific students to their achievement of physics and their motivation to learn it

After applying the academic buoyancy scale, achievement test, and motivation scale to learn physics on the research sample, correcting the answer sheets and monitoring the grades, collecting them and organizing them in lists, the scores of the students responding were approved on the academic buoyancy scale, the achievement test and the motivation scale to learn physics only, and the results were as in table (2)

Table (1) Research data

| Variables                   | No  | arithmetic mean | standard deviation |
|-----------------------------|-----|-----------------|--------------------|
| Academic buoyancy           | 814 | 31.4            | 5.094              |
| Achievement                 | 814 | 28.9            | 4.62               |
| Motivation to learn physics | 814 | 49.9            | 9.379              |

It is evident from Table (1) that the research sample obtained a higher average than the hypothetical average in the three tests.

By using the Pearson Correlation Coefficient and through the statistical package (SPSS), the correlation coefficient between the degrees of the total research sample on the academic buoyancy scale and the achievement of the subject of physics and the measure of motivation to learn physics was calculated, and the results were as shown in Table (3)

Table (2) Correlation coefficients between academic buoyancy, motivation to learn physics, and academic achievement

| variables                   | Academic buoyancy                                | motivation to learn physics | achievement |
|-----------------------------|--|-----------------------------|-------------|
|                             | The value of the Pearson correlation coefficient |                             |             |
| Academic buoyancy           | 1  | 8.50                        | 7.80        |
| motivation to learn physics | 8.50   | 1                           | 8.49        |
| achievement                 | 7.80   | 8.49                        | 1           |

It is clear from the table that the correlation coefficients between the three research variables are statistically significant at a significance level of 0.01, and this indicates that there is a positive correlation between the academic buoyancy of students of the fifth scientific research sample and their achievement of physics and their motivation to learn it.

To find the strength of the relationship between academic buoyancy and the research sample's achievement of physics and their motivation to learn it, the value of the correlation coefficients was squared and the results were as in Table (3)

Table (3) the strength of the relationship between academic buoyancy and motivation to learn physics and achievement

|                   |                        |                             |             |
|-------------------|------------------------|-----------------------------|-------------|
| Academic buoyancy |                        | motivation to learn physics | achievement |
|                   | The relationship value | 0.726                       | 0.608       |
|                   | Relationship strength  | strong                      | medium      |

From Table (3), it is clear that the relationship of academic buoyancy for the fifth scientific students with their achievement in physics is moderate.

This result is consistent with the result of the study (Colmiar et al., 2019), where the results of this study showed a direct relationship between academic buoyancy (academic advancement) and academic performance.

The study (Martin, 2014) agrees with the existence of a relationship between academic advancement (academic buoyancy) and each of students' emotional and behavioral cognitive participation and achievement. The researchers explain the strength of this relationship to the fact that students who reach the stage of academic buoyancy have a high ability to overcome difficulties and obstacles and have high self-confidence to pass exams, and thus their academic achievement increases.

The relationship of academic buoyancy of the fifth scientific research sample with their motivation to learn physics is a strong relationship and this result is consistent with the result of the study (bones and Mualla 2020), as the results of this study showed that the level of academic buoyancy and external motivation was medium and that the level of internal motivation was high, and it showed that the internal and external motivation They contributed to explaining (51.4%) of the academic buoyancy according to academic achievement and in favor of the acceptable estimate and differences according to the interaction between gender and academic achievement.

The researchers attribute this result to the fact that students, in general, females and males, have almost the same motivation to learn physics because their main goal is to excel and successfully pass the school stage, but there are some different circumstances on both sides, so there was a slight percentage of difference in favor of females.

### Conclusions

In light of the research results, it was concluded that there is a positive relationship between academic buoyancy and academic achievement in physics and their motivation to learn it.

### Recommendations

Based on the results and conclusions reached, the researchers recommend the following:

A\_ Focusing on the topic of academic buoyancy for students in all academic levels, especially in the secondary stage.

B - Conducting training workshops for all concerned with the educational aspect to discuss the issue of academic buoyancy among students and giving attention to the psychological aspect of students in a manner that is parallel to the scientific aspect, especially in light of the conditions that the world is going through in general and the country in particular.

### Suggestions

To complement this research, the researchers suggest the following:

Conducting studies similar to the current study to reveal the relationship of academic buoyancy in different educational stages and other variables such as (level of ambition, scientific enlightenment, critical thinking, and creative thinking).



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