

Level of validity in achievement tests for basic subjects for the third year of secondary school, experimental sciences section

مستوى الصدق في الاختبارات التحصيلية للمواد الأساسية للسنة الثالثة ثانوي شعبة العلوم التجريبية.

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ملخص:

ستتعرف من خلال هذا المقال على مدى توفر معيار الصدق في الاختبارات التحصيلية في المواد الأساسية في السنة الثالثة ثانوي شعبة العلوم التجريبية. كما استخدمنا المنهج الإحصائي معتمدين على تحليل محتوى الاختبارات التحصيلية، كما استخدمنا عينة مكونة من 15 اختبار من 15 ثانوية. وتم ذلك باستخدام مجموعة من الأساليب الإحصائية. وقد توصلنا إلى أن الصدق يتوفر في الاختبارات التحصيلية في المواد الدراسية الأساسية للسنة الثالثة ثانوي شعبة العلوم التجريبية بمستوى مقبول. **الكلمات المفتاحية:** الاختبارات التحصيلية، الصدق.

Abstract:

Through this article, we will learn about the availability of the standard of Validity in achievement tests in the basic subjects in the third year of secondary school, the experimental sciences department. We also used the statistical approach based on the analysis of the content of achievement tests, and we used a sample of 15 tests from 15 secondary schools. This was done using a set of statistical methods. We concluded that Validity is available in achievement tests in the basic subjects of the third year of secondary school, the experimental sciences department, at an acceptable level

Keywords: achievement tests, Validity

1-The problem:

Validity expresses the extent to which a test can accurately and objectively measure what it was designed to measure. In achievement tests for basic subjects in the third year of secondary school, the experimental sciences department, which depend on a deep understanding of concepts and applied skills, validity is a pivotal criterion to ensure a fair and correct assessment of students' abilities in these subjects. On this basis, this article came to investigate the level of validity in achievement tests in basic subjects for the third year of secondary school, the experimental sciences department, and to identify the extent to which teachers adhere to the specifications of this criterion in the tests they prepare so that they are valid for use in the evaluation process by subjecting the study sample to analysis in order to answer the following question: What is the extent of validity in achievement tests in basic subjects in the third year of secondary school, the experimental sciences department.

2-The basic hypothesis:

The standard of validity in achievement tests in the basic subjects in the third year of secondary school, experimental sciences section, is available at a high level.

3- Defining procedural concepts:

3-1- Validity:

It means that the test measures what it was designed to measure (Al-Adwani, 2014, 11). The test is valid if it measures the function it claims to measure and does not measure something else instead of it or in addition to it (Malham, 2007, 337). The test that was designed to measure intelligence must measure intelligence and not measure anything else (Al-Huwaidi, 2015, 48). It also means that the test actually measures the ability, trait, direction, or readiness that the test was designed to measure (Ibrahim, 2020, 02).

ω Procedural definition of validity:

By the degree of validity, we mean that the exam actually expresses the ability to measure the level of students in the subject.

3-2- Achievement tests:

They are standardized tests prepared by experts in the field of educational measurement, with a high level of validity and reliability, and have standards. (Ali. 2001. 29)

4- Spatial and temporal framework:

This study was conducted in the state of El Oued and the exact location of the study was determined within the geographical borders of the municipality of El Oued, where there are 15 secondary schools in the geographical vicinity of the municipality of El Oued. Since the study was on the level of validity in achievement tests in some basic subjects for the final sections of the secondary stage, three different subjects were chosen (mathematics, physics and chemistry, natural sciences) for students in the experimental sciences department, so the secondary schools of this state were the spatial framework. Temporally, it was completed in the 2023/2024

academic year, where the first phase was completed, which includes communication, facilitating administrative procedures, and implementing the exploratory study, followed by the second phase, which is implementing the basic study, where we collected data from the specified sample, then the third phase, which is preparing and preparing the data, applying statistical processing, and extracting the results, and we conclude it with a final phase for writing the study report.

5- Methodology:

The scientific method is defined as a set of principles, rules, and guidelines that the researcher must follow from the beginning of the research to its end to reveal the general, essential, and necessary relationships to which the study phenomena are subject (Jilani, 2004, 27) The method represents the scientific method that any student or researcher follows in his study and analysis of a specific phenomenon or to address a specific problem according to specific steps in order to reach certain knowledge about the subject of the study and analysis. (Rahali, 2012, 37) This article aims to know the level of validity of achievement tests in the basic subjects of the final sections of the secondary stage. The experimental sciences department was chosen, as were three different subjects (mathematics, physics and science, natural sciences). Accordingly, we adopted the descriptive approach appropriate for such studies that address the reality of the phenomenon through study and analysis in order to extract the results. (Bouhoush and Al-Dhanibat, 1989, 138) For this study, we relied on the content of the achievement tests and their results, with the determination of the method of analysis that will be explained later.

6- Exploratory study:

The exploratory study is considered the step that precedes the final settlement of the study plan (Abu Alam, 2004, 87) and it is necessary and an important stage in the research that cannot be dispensed with. Through it, and based on it, the path becomes clear to the researcher and he discovers the difficulties that he may encounter in it and the aspects that appear from it that require interpretation. Therefore, he is able to conduct a final review of the steps and procedures of the research, identify the available possibilities, determine the field of study, estimate the time period sufficient to conduct the study and control the subject of the study. Through it, the amendment that is not possible for him after application is also made, and accordingly he is reassured when starting the basic study. (Khalifa, 1984, 76)

Accordingly, we tried to conduct an exploratory study through which we achieved:

- ⦿ We contacted the Directorate of Education for the State of El Oued to provide us with statistics on secondary schools and their distribution and to enable us to conduct the study on the selected secondary schools in order to obtain the tests and answers.
- ⦿ We contacted some teachers of selected subjects (mathematics, physics, chemistry, natural sciences) for the secondary education stage who teach the final year to know the form and content of the achievement tests.

ω Based on that, we determined the method of selecting the sample for the study through a survey sample from the side of the tests and randomness from the side of the answers.

ω We took an idea about the study and identified the difficulties that we might encounter when applying the study, such as not being able to take some tests due to administrative complications and the privacy of the documents, so we tried to expand the scope of the study.

ω Determining the appropriate time period for implementing the basic study and selecting the tests and results of the third semester of the experimental baccalaureate, which we collected after completing the tests and correcting them.

7- Procedures for implementing the study:

After presenting the study scale to the experts and providing us with the necessary modifications, the method of calculating honesty was accurately adjusted, and then we applied the basic study in the field on the study sample at the end of the 2023/2024 academic year. This was done by collecting 15 tests from 15 different high schools in the state of El Oued, and we chose three basic subjects in the third year of high school for the experimental sciences department, namely: natural sciences, physics and chemistry, and mathematics. The arithmetic mean of the students' marks in each test was also calculated. The test models were also collected with their model answers, and these models were presented to the experts to measure honesty.

8- Study community and sample:

8-1- Study community:

In this study, the study community was represented in the achievement tests for the secondary stage of the experimental sciences department in the subjects of (mathematics, physics and chemistry, natural sciences),

8-2- Study sample:

15 secondary schools were selected from the municipality of El Oued using the intentional sample method and one test was selected from each of the basic subjects in each secondary school.

9- Statistical methods:

In this study, a set of statistical methods (arithmetic mean, standard deviation, percentages, t-test and split-half coefficient) were used to analyze the data extracted from the sample and interpret them scientifically and objectively.

These methods helped us analyze the ratios and numbers contained in the tables and enabled us to understand their implications, deduce their meanings and test the validity of the hypotheses.

To facilitate the calculations, we used the SPSS program, as the data can be entered directly by defining the variables and unpacking or summarized in a cross-sectional form or in the form of a frequency table, and we teach the program to deal with it during the statistical analysis processes as if it were raw data in the form of frequencies arranged in a matrix consisting of columns (variables) and rows (cases) (Bouallak, 2009, 86).

10- Presentation, analysis and discussion of the results of the basic hypothesis:

Which states: (Validity is available in achievement tests in the subjects of the third year of secondary school at a high level)

We will test the validity of this hypothesis through 15 tests from different secondary schools in three basic subjects in the third year of secondary school, which are physics, chemistry, mathematics and natural sciences.

□ Method of calculating validity: The exam is presented to three professors in the subject and they are asked to estimate the validity of the content as they carefully review the exam topic and then issue their judgments on the extent to which the exam items are represented as a percentage.

Table (1): Average percentages of validity in tests in physics and chemistry

Tests	First teacher	Second teacher	Third teacher	Percentag of validity
Test1	75	75	80	76,67
Test2	72	70	74	72
Test3	53	55	54	54
Test4	71	72	75	72,66
Test5	91	94	92	92,33
Test6	65	67	72	68
Test7	82	81	80	81
Test8	68	64	67	66,33
Test9	92	89	90	90,33
Test10	67	68	65	66,66
Test11	72	70	64	68,66
Test12	80	78	77	78,33
Test13	64	71	70	68,33
Test14	50	54	55	53
Test15	64	61	67	64
Total	71,53	71,60	72,20	71,11

From the table above, it is clear to us that the overall average of the degree of validity of the arbitrators in the total tests in physics and chemistry reached 71.11%, which is not a very high percentage, but it is acceptable.

We also noticed from the table that there are some degrees of validity in some tests that are very low, such as in tests No. 3 and 14, where the degree of validity in these two tests reached 54% and 53%, respectively.

We also noticed that there are tests with a very high degree of validity, such as tests No. 5 and 9, where the degree of validity in them reached 92.33% and 90.33%, respectively.

It is also clear to us from the table that there are some tests in which we recorded a relatively high degree of validity that exceeds the overall average, such as in tests No. 1 and 12, where we recorded a degree of validity in them of 76.67% and 78.33%.

We also noticed that the percentage of validity in test No. 7 was high, reaching 81%, which is above average, while the percentage of honesty in tests 6, 8, 11, and 13 was slightly below the arithmetic average, and in test No. 15 it reached 64%, which is relatively far from the general average.

Comparing the percentage of validity between the three professors, we noticed in general a clear convergence between all professors in all tests, with some differences recorded between the professors' estimates in the first test, as we noticed that the second and third professors were identical in the percentage, while the first professor's estimate was 5% higher than theirs, which is not a high percentage, as it constitutes a difference of only one point in the evaluation, which is a very acceptable difference.

We also noticed a difference of 5% between the first professor and the third professor in test No. 14, which is only one point.

We note that the highest difference in the evaluation we recorded in test No. 11 between the first professor and the third professor, which reached 8%, i.e. a difference of less than two points out of 20, which is also an acceptable difference, as the difference should not exceed 3 points between the two professors, which we did not notice in any test, indicating the great convergence between the professors in the evaluation process, which increases our confidence in this tool. Through all of this, we can say that the achievement tests in physics and chemistry have an acceptable degree of validity.

Table (2): Average percentages of validity in tests in mathematics

Tests	First teacher	Second teacher	Third teacher	Percentag of validity
1 Test	83	85	82	83,33
Test2	79	78	81	79,33
Test3	85	85	84	84,67
Test4	84	82	81	82,33
Test5	68	69	78	71,67
Test6	85	82	72	79,67
Test7	86	87	88	87,00
Test8	89	81	78	82,67
Test9	95	96	95	95,33
Test10	88	86	84	86,00
Test11	84	85	84	84,33
Test12	84	84	82	83,33
Test13	84	87	80	83,67
Test14	65	71	62	66,00
Test15	62	64	65	63,67
Total	81,40	81,46	79,73	80,87

From the table above, it is clear to us that the overall average of the degree of validity in all tests in mathematics reached 80.87%, which is a high percentage.

We also noticed from the table that there are some degrees of validity in some tests that are very low, such as in tests No. 14 and 15, where the degree of validity in these two tests reached 66.00% and 63.67%, respectively.

We also noticed that the degree of validity in some tests was very high, such as tests No. 7 and 9, where the degree of honesty in them reached 87.00% and 95.33%, respectively.

It is also clear to us from the table that there are some tests in which we recorded a relatively high degree of validity that exceeds the overall average, such as in tests No. 1 and 3, 10 and 11, 12, and 13, where we recorded a degree of validity ranging between 83% and 86%.

We also noticed that the percentage of validity in tests 8 and 4 was slightly higher than the general average, and we also noticed that the percentage of honesty in tests 2 and 6 was slightly lower than the general average, while it was much lower in test 5, but reasonable, as it reached 71.67%.

As for the comparison between the professors' evaluations in the same test, we recorded the highest difference in test 6, where it reached 13%, or 2.6 points, which is an acceptable difference as long as it is less than 3 points. We recorded a difference of 10% in test 5, or 2 points out of 20. We recorded a difference of 11% in test 8, or 2.2 points. We recorded a difference of 9% in test 14, and we recorded a difference of 7% in test 13, or 1.4 points.

While the differences in the rest of the tests were small, i.e. all less than 1.5 points, which means that they are acceptable differences in general and confirm the great convergence between the professors in the evaluation.

Through all of this, we can say that achievement tests in mathematics have a high degree of validity.

Table (3): Average validity rates in tests in natural sciences

Tests	First teacher	Second teacher	Third teacher	Percentag of validity
1 Test	55	54	56	55
Test2	94	92	90	92
Test3	85	84	85	84,66
Test4	69	68	65	67,33
Test5	59	63	74	65,33
Test6	54	57	56	55,66
Test7	74	72	71	72,33
Test8	67	69	68	68
Test9	82	77	78	79
Test10	64	71	74	69,66
Test11	84	86	85	85
Test12	58	62	71	63,66
Test13	90	86	88	88

Test14	52	54	56	54
Test15	88	90	86	88
Total	71,66	72,33	73,53	72,51

From the table above, it is clear to us that the general average of the degree of validity of the arbitrators in the total tests in the subject of natural sciences reached 72.51%, which is not a very high percentage, but it is acceptable.

We also noticed from the table that there are some degrees of validity in some tests that are very low, as is the case in tests No. 1, 6 and 14, where the degree of validity in these two tests reached 55% and 55.66% and 54% respectively.

We also noticed that there are tests with a very high degree of validity, such as tests No. 2, 13 and 15, where the degree of validity in them reached 92% for test No. 2 and 88.00% for tests 13 and 15. It is also clear to us from the table that there are some tests in which we recorded a relatively high degree of validity that exceeds the general average, as is the case in tests No. 3 and 11, where we recorded a degree of validity in them of 84.66% and 85%. We also noticed that test number 9 was slightly above the general average, while tests number 4, 7, 8, 10 were slightly below the general average.

As for tests number 5 and 12, they were much lower than the general average.

As for comparing the teachers' estimates in the same test, we noticed that the highest difference was in test number 5, where the difference reached 15%, or 3 points, while we recorded a difference of 13% in test number 12, or 2.6 points, while the rest of the tests were only very close, which confirms the reliability of the tool.

Through all of this, we can say that the achievement tests in the natural sciences subject have a high degree of validity.

↔ Discussion of the basic hypothesis:

Which reads: (The validity of achievement tests in the subjects of the third year of secondary school is available at a high level)

Through the results of the three tables, it becomes clear to us that the validity is available in mathematics at a high rate of 80.87%, followed by natural sciences with a validity rate of 72.51%, and finally physics and chemistry with a validity rate of 71.11%. Through these results, it becomes clear to us that there is a very high level of validity in mathematics, while the percentage of validity in natural sciences, physics and chemistry was close and much lower than mathematics, although it is also considered an acceptable level of validity, as it exceeded two-thirds in the third subjects.

11- Summary of the general results of the study:

ω The achievement tests in physics and chemistry have an acceptable degree of validity.

ω The achievement tests in mathematics have a high degree of validity.

ω The achievement tests in natural sciences have an acceptable degree of validity.

Accordingly, it can be said that the validity of the achievement tests in the subjects of the third year of secondary school, experimental sciences section, is available at an acceptable level.

12-Suggestions:

- The necessity of providing validity in designing and constructing achievement tests.
- Proposing the formation of a unified committee at the level of the region or district to standardize questions in achievement tests.

- Establishing question banks to assist the professor in the process of preparing and constructing achievement tests.
- Conducting training courses to improve the level of those responsible for preparing and constructing achievement tests.
- Designing training programs for professors on the process of preparing achievement tests.
- The necessity of teaching professors how to construct achievement tests during their university training.
- Conducting more similar research in various subjects and at all stages and levels.

13-Conclusion:

Educational evaluation is one of the basic pillars of the educational system, as it affects and is affected by all its components. Through it, we issue judgments on its inputs and outputs in light of its objectives, and then make decisions and take practical measures to address weaknesses and enhance strengths to reach satisfactory results.

The achievement test is one of the evaluation tools and one of the criteria that indicate the strength of the educational system, especially in light of the heavy reliance on it in the evaluation process. Through this article, we tried to reveal and identify the level of validity in the achievement tests of the study sample by subjecting them to analysis using the arbitrators' validity tool. In light of the results of this study, it was concluded that the achievement tests of the study sample were valid at an acceptable level in all subjects.

In the end, no matter how important this study is in addressing the dimensions of the subject, there are aspects that we were unable to cover for one reason or another.

We also hope that those who come after us from researchers in the field of educational sciences will pay attention to them.

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