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Diversified education among students of science departments/physics branch in the faculties of basic education

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Abstract---The current research aims to know the diverse education of students of science departments/physics branch in the faculties of basic education. Distributed according to the variables of grade and gender, where the second stage was (113) male and female students, and the number of (52) male and (61) students, and the third stage was (104) and the number of (47) male and female (57) female, and the researchers used the descriptive approach as The most appropriate approaches to study the correlational relationships between variables in describing and analyzing the phenomenon studied, the researchers conducted a statistical treatment using the T-test. Diversified education according to the gender variable (males - females). The researchers recommended paying attention to the development of diversified education among students at all stages of their learning, through the physics curriculum and training university teachers to use Strategies, methods and educational programs that will develop students' skills in diverse education.

Keywords---diverse education, students science departments, physics branch.

Introduction

The research problem

The problem of the research is that the teachers follow the usual method that does not take into account the differences between students and treat them as if they are at the same level of abilities and capabilities, and turned their minds into

a semi-vessel filled with information and facts by rote memorization and repeating what is said to him, which became his role merely as a passive recipient of that information whose fate is Forgetting, because it is based on one type of interaction, which is limited to the teacher, and the role of the student is limited to listening and receiving knowledge without interacting with its content, and the student is not given enough time to think, research, discover, produce solutions or generate ideas, as well as his inability to employ knowledge in Solving problems by applying them in new situations, which made the students judge physics subjects as surrounded by some kind of confusion and similarity and they find it difficult to understand and understand.

While learners differ in many characteristics, abilities, tendencies and interests, and these differences are a mainstay in determining the current and future mental and performance levels of individuals. Every individual is different by himself and cannot be similar in all the characteristics and abilities to others. Each individual possesses his own kind and types of intelligence that no one else possesses, as well as a diversity of talents and different traits. (Al -Kubaisi, 19: 2007) The learners differ in choosing their favorite learning patterns for them. Some of them learn what is in the visual or auditory and motor field (pumice, 2011 33). In light of this difference, the usual educational methods and methods of education meet the needs, interest, preparations, and stimulating their talents. And to enhance and enhance their mental abilities, which requires presenting the academic content in more than one way and strategy in one lesson to meet the needs of the largest possible number of learners and their tendencies and interests, and this is what we call forbidden education. Appropriate strategies that help learners to reach the desired goals, represented by finding the learner, the free thinker, who writes his knowledge and cultural inventory, equipped with experiences presented on the basis of logical reasoning. It does not happen by itself that he does not need to follow the methods and strategies of his speech. Therefore, the problem of the current research was crystallized through the following question: What is the diversified education for students of science departments/physics branch in the faculties of basic education in each type of diversified education?

The importance of research

In their literature, educators emphasized the individual differences between students and the need to take them into account when developing any educational programme. However, the traditional school today is still based on study materials and classrooms that include a group of students. Educators still point out that wastage in the educational process, dropout of students, frustration that afflicts some, and boredom of the superior among them is mostly due to the school's inability to take into account individual differences, characteristics, needs, abilities and capabilities of learners (Nashwan, 2002: 5).

The importance of diversified education lies in engaging learners in learning and positively affecting their attitudes towards themselves and their peers and makes their interest last for a longer period due to their preoccupation with activities and interaction with them and leads to an increase in what they learn or the learner's benefits from in his life and practical applications as it increases the learner's

integration in Work and makes learning fun and joyful, and one of the social relations between learners, and it develops realism in mastering work, as well as increases self-confidence and expression of opinion. Diversified education aims to maximize each student's growth and achieve individual success by responding to diverse learning needs and students will choose the method that best suits them allowing them to learn the most. (Enas,21:2019)

The idea of diversifying education began to take its place since 1989, when the Document on the Rights of the Child was announced, and then in 1990 at the World Conference on Education, which was held in Jomtien, followed by the Dakar Conference in (2000) that recommended education for excellence and distinction for all. The recommendations of those conferences focused on taking into account the differences Between learners and that students learn in different ways and that it is necessary to diversify curricula and teaching methods so that all learners can obtain an education that is compatible with their characteristics and achieves the maximum degree of success and achievement for each of them within the framework of their potentials and abilities (Kojk et al., 12: 2008).

From the foregoing, the importance of the current research becomes clear in:

1. The importance of diversified education as it is a modern strategy that will make the learner the focus of the educational process and enable him to have an integrated awareness of scientific information.
2. It will help science teachers in the College of Basic Education to learn how to use diverse education in teaching science subjects.

The aim of the research

The current research aims to know (diverse education among students of science departments in the faculties of basic education / physics branch in the faculties of basic education

The limits of the research

The current research is determined by:

- 1) Human limits: students of the Department of Science, Physics Branch (second and third stage).
- 2) Spatial boundaries: colleges of basic education in Iraq, except for the Kurdistan region.
- 3) Time limits: 2021-2022.
- 4) Cognitive limits: The researcher is limited to identifying the diverse education among students of the Department of Science, Physics Branch (second and third stage) in the faculties of Basic Education.

Define terminology

First: Diversified education: defined by Al-Laqani and Al-Jamal, 2003: "This method depends on diversity, as there are individual differences between students of one semester, which means that the teacher's reliance on one method does not

necessarily lead to everyone learning the same amount and type. Hence, a teacher is required to use many methods, in order to provide a variety of educational situations, suitable for the largest possible number of students" (Al-Laqani and Al-Jamal, 2003: 93).

The researchers defined it procedurally: a modern educational strategy centered around the student and takes into account the diversity and difference between students in one semester. Diversified education can take different forms and educational methods, such as teaching according to the theory of multiple intelligences, teaching according to learners' styles, and cooperative learning. A teacher who works according to the principles of diversified education can differentiate between objectives, content and output. Flexibility and mutual respect are among the most important foundations of this type of education.

Theoretical background and previous studies

First Axis: Diversified Education

Diversified education is due to the ideas of the scientist Roger Sebbi in the field of functions of the two hemispheres of the human brain, where the right side is characterized as creative, emotional, and holistic, while the left side is characterized as logical, analytical, sequential and mathematical (Abu Jadu and Muhammad 2007:34). He also sees that there is an integrative nature of the two hemispheres of the brain and that they do not work in isolation from each other, but rather work as a highly integrated system, especially when two different types of information are presented, any of which corresponds to a specific hemisphere, then a distribution of the processing and processing burden occurs between them, so it can be said that the performance of the individual is dominated by In general, the employment of the two Korean hemispheres of the brain: Caskey, 1989, Guerratte, 1990, Pearson, 1991, Belger, 1993, quilty, 1999, agree with this integrative trend, as they found that the eye despite its control On the reverse visual field, it also sends information indirectly to the other hemisphere and then raises it to both hemispheres and is treated differently according to the type of any of them. Therefore, most individuals may respond to situations by integrating the processes of the two hemispheres together depending on the variables of different situations (Nawfal and Muhammad 26 :2011)

Diversified education is a comprehensive approach to education through which it can guide those in charge of the educational process in all aspects of their work, plan, and implement for it various methods of content, processes and outputs. Through their expectations, and responses to students' differences in terms of readiness, interest and aspects of how to learn. It is thus a continuous process; To know students' needs and interests, and use that knowledge to guide the learning process. Tomlinson,1999,1)

The educational foundations upon which diverse education is based

Diversified education depends on many educational foundations, including:

- ❖ The teacher is a coordinator and facilitator of the educational process, not an authoritarian who gives orders to be implemented.
- ❖ The student is the center of the educational process, and the primary goal of teaching is the learning of all students.
- ❖ Focusing on the main ideas is more important than many details that do not add scientific value to the student.
- ❖ One of the aims of teaching is to help the student understand and form meaning.
- ❖ Continuous assessment is a means of discovering students' needs, abilities and tendencies and identifying differences between them to guide teaching to match these differences.
- ❖ Encouraging cooperative learning according to the required work, despite their differences in abilities, tendencies, and tendencies. (Kojk et al. 2008:37).

Objectives of Diversified Education

There are multiple objectives of diversified education that can be clarified by the following points:

- 1) Develop tasks that challenge the abilities of each student.
- 2) Developing educational activities based on important topics and skills and developing learning methods.
- 3) Taking into account the educational levels and needs of learners.
- 4) Providing opportunities for all students to work according to a variety of teaching methods.
- 5) Compatibility with the curriculum standards and requirements for each student. (Heacox, 2000,11)

Forms of Diversified Education

Diversified education takes many forms, including:

- 1) Teaching according to the theory of multiple intelligences: It means that the teacher presents his lesson according to the students' preferences and their various intelligences.
- 2) Teaching according to learners' patterns: Some educational psychologists classify learners' patterns into auditory, visual and kinesthetic, and some add a sensory pattern, and teaching according to these patterns is similar to teaching according to multiple intelligences, meaning that the student receives an education commensurate with his own abilities.
- 3) Cooperative education: Cooperative learning can be counted as diversified education if the teacher takes care of organizing the tasks and distributing them according to the interests of the students and representing their preferred accusations (Obeidat and Abu Al-Sameed, 2007, p. 120).

The second axis: previous studies

Study (Nasr, 2013)

- Study title: Knowing the effectiveness of using differentiated instruction in developing the reading and writing skills of second-grade students in the Arabic language course.
- The aim of the study: To know the effectiveness of using differentiated education in developing the reading and writing skills of second-grade students in the Arabic language course.
- The study was conducted in Palestine.
- Study sample: The study included (70) male and female students divided into two groups, male and female.
- School stage: second year
- Sample type: males and females.
- Study aids: Cronbach's alpha coefficient, t-test. split halves , statistical analysis of variance
- Results of the study: There are statistically significant differences at the level (0.05) between the average scores of students in the experimental group and the average scores of their peers in the control group in favor of the experimental group.

Research Methodology and Procedures

To achieve the goal of the study, the researcher took a set of practical measures that will be clarified in this chapter, as follows:

Research Methodology

The research method includes a set of research procedures carried out by the researcher in an integrated and sequential manner to describe the phenomenon in question, based on the collection and classification of facts and data, their processing and analysis, sufficient and accurate analysis to derive their implications and reach results or generalizations about the phenomenon or topic. (Atiya, 2010: 138). The researchers used the descriptive approach as the most appropriate method for studying the correlational relationships between variables in describing and analyzing the phenomenon being studied

The research community

All individuals, people and things who represent the subject of the problem, or it is all the elements related to the problem of the study that the researcher seeks to generalize the results of his study on. (Muhammad, 2012: 47). The research community included students from the science departments/physics branch of five faculties of basic education in the universities (Sumer, Maysan, Al-Mustansiriya, Wasit, Babylon) for the second and third stages of the academic year (2021-2022), totaling (1086), and as in Table (1).

Table (1): The research community distributed by university, college and stage and gender

Total	Third stage			Second stage			College	University	T
	Total	Female	Male	Total	Female	Male			
312	141	83	58	171	98	73	Basic Education	Misaan	1
133	54	30	24	79	50	29	Basic Education	Babel	2
160	83	51	32	77	40	37	Basic Education	Al mustanser iyah	3
319	164	91	73	155	93	62	Basic Education	Wasit	4
165	82	44	38	83	49	34	Basic Education	Sumar	5
1089	524	299	225	565	330	235	total summation		

The research sample

the selection of representative individuals from the community list, and it also means a sub-group of the community, which is a very important step, because the possibility of correctly generalizing the results to the community depends on the extent of the integrity of the sample and that the "sound sample is the representative sample of the community from which it was chosen" (Abu Allam, 2011: 142-149)

The research sample was represented by students of the faculties of basic education at the universities of Sumer, Maysan and Wasit, by random drawing, the second and third stage students were selected, whose number is (217) male and female, distributed according to the variables of grade and gender, and the percentages of their selection were (24%) males, and (28%) Females from the second stage, (22%) males, and (26%) females from the third stage, in proportion to the distribution of students in the total community, as in Table (2).

Table (2): the research sample distributed by university, college, stage and gender

Total	Third stage			Second stage			College	University	T
	Total	Female	Male	Total	Female	Male			
70	37	20	17	33	18	15	Basic Education	Misan	1
69	32	17	15	37	20	17	Basic Education	Sumar	2
78	35	20	15	43	23	20	Basic Education	Wasir	3
217	104	57	47	113	61	52	total summation		

The search tool

Diversified Education Scale: The researcher relied on building the Diversified Education Scale according to the following steps:

- 1) Determining the objective of the scale: The scale aims to measure the diverse education variable among students of science departments/physics branch in the faculties of basic education for the academic year 2021-2022.
- 2) Drafting the paragraphs of the scale:

The current research requires a measurement of the diversified education among the students of the research sample, and for the purpose of formulating the paragraphs of the scale, the researcher did the following:-

- 1) Examining a number of previous studies that dealt with a variety of education, including a study (Fleming & Bonwell, 2002).
- 2) The literature dealing with diverse education.

(49) Annex (2) paragraphs were formulated, distributed into four types, as in Table (3).

Table (3): Paragraphs of the Diversified Education Scale according to its four types

its sequence	The number of its paragraphs	the pattern	T
15-1	15	visual learning style	1
28-16	13	auditory learning style	2
38-29	10	kinesthetic learning style	3
49-39	11	written learning style	4
	49	Total	

Answer alternatives and correction method

After the scale items were formulated, a criterion was set to correct the answers, as the researcher used three alternatives to estimate the answers to the scale items, which are (always, sometimes, rarely), and, as the scale is corrected as follows (3, 2, 1), respectively, where The highest score on the scale is (147) and the lowest is (49).

Scale validity

It means that the scale honestly measures what it was developed for. The validity coefficient of any scale or test shows the extent of its validity to measure the missing trait or characteristic.

Virtual validity

- a) Virtual honesty is the measurement of the apparent face of the test or scale in terms of what it is designed to measure and is achieved through the opinions of experts, arbitrators and specialists (Al-Sulaiti, 62:2021).To verify this, the scale was presented in its initial form, which amounted to (49)

items, to a group of experts and arbitrators, specializing in teaching methods and measurement.

- b) Structure validity: It is also known as the validity of the hypothetical configuration, and it expresses the degree to which the measuring instrument accurately measures the structure or the theoretical characteristic that it was designed to measure (Al-Awadi, 2020: 70). The construct validity of the scale was extracted by applying the scale again for the purpose of statistical analysis of the scale items to find the discriminatory power of the clauses, the correlation of the clause's degree with the total score of the scale, and finding the relation of the clause's score with the total score of the domain to which it belongs, as well as finding the relationship of the sum of each field to the total as shown Below is the second exploratory experiment.

The first exploratory sample

The researcher applied the scale to a random sample consisting of (30) male and female students (other than the final research sample) from the students of the Department of Science in the College of Basic Education / University of Babylon on Thursday, 6/1/2022 for the purpose of verifying the clarity of the scale's instructions. The appropriateness of the method of answering the scale completely and the students' inquiries and determining the time required to answer the scale, and it was found that the instructions are clear and understandable to the students and the time taken to answer ranged between (30-35) minutes from the calculation of the first within five students and the last five students from handing them the answer sheets.

The second survey sample

The scale was applied to the researcher for the second time on a random sample (other than the research sample) of (100) male and female students from the Department of Science in the College of Basic Education / University of Babylon on Thursday, 6/1/2022, as in Table (4), to calculate Statistical analysis of the scale items and knowledge of psychometric properties.

The process of statistical analysis of the scale items is of a high degree of importance, because of its benefits that help us to come up with effective and highly efficient measurement tools that measure the characteristics and traits accurately, and develop the items of the scale to the extent that they make a significant contribution to what is measured by that scale (Majid and Yassin, 2012: 30)

Table (4): The second exploratory experiment sample according to the educational stage and gender

total ummation	Third stage			Second stage			Section	University
	Total	Female	Male	Total	Female	Male		
100	43	24	19	57	35	22	Science	Babil

After correcting the students' answers, their scores were arranged in descending order from the highest degree to the lowest degree, then a higher group was chosen that contained the highest (27%) of the students' answers, totaling (27) forms, and a lower group containing the lowest (27%) of the students' answers. (27) forms to represent the lower group, a research that included the upper and lower groups (54) male students.

The exploratory application of the Diversified Education Scale: Through which the following were calculated:

- ❖ It was found that the average that the students took to answer (30-35) minutes.
- ❖ The researcher calculated the discriminatory power for each item of the scale using the t-test for two independent samples, and found that the arithmetic mean of the upper group ranged between (2.963, representing a high value, 2.444, representing a minimum value), while the standard deviation ranged between (0.747, representing a value). As for the lower group, the values of the arithmetic mean ranged between (2.407) as the highest value and (1.963) as the lowest value. As for the standard deviation, its values ranged between (0.813 as the highest value and 0.392 as the lowest value) and thus appeared The paragraphs of the scale are distinct and acceptable in terms of their discriminatory ability, and therefore none of them were deleted with statistical significance at the level of (0.05) because the calculated T-value is greater than the tabular value of (1.98) with a degree of freedom (26).

Presentation and interpretation of results

First, show the results

Table (5): Arithmetic mean, standard deviation, and hypothetical mean of the research sample scores in the Diversified Education Scale and their calculated and tabulated (t) values

The indication is at the level of (0,05)	Freedom Degree	The tow t values		hypothetical mean	Standard deviation	SMA	Sample volume
		Tabular	Calculated				
statistically significant	216	1.65	1.995	98	26.65	98.33	217

Table (6)

Indication	T value		hypothetical mean	hypothetical mean	Standard deviation	SMA	Diverse learning styles
	Tabular	Calculated					
Significant	1.98	7.835	216	30	9.19	25.11	visual style
Significant	1.98	3.024	216	28	10.97	30.25	auditory mode
Non significant	1.98	0.116	216	20	3.51	20.02	Kinetic style

cant							
Signifi cant	1.98	10.633	216	20	4.13	22.98	reading/writing style

It is evident from Table (5) that the calculated T-value amounted to (1.995), which is greater than the tabular value of (1.65) at a significance level of (0.05) and a degree of freedom (216), and this means that there are statistically significant differences between the level of diverse education among students of science departments a sample. The current research, and the researcher attributes this result to the fact that students use various learning styles, and this is the result of the curricula, tiring teaching methods, activities and experiments that they work in laboratories all helped in developing those styles for them, as well as the students' previous experiences, and what they were accustomed to in their learning stages. The previous ones had grown these educational patterns, and made them rely on them in their learning.

Table (6): the arithmetic mean, standard deviation, and hypothetical mean of the science departments' students' scores according to the Diversified Learning Scale styles, and the calculated and tabulated T values. It is evident from Table (6) that the calculated T-value for the various learning styles (visual style, auditory style, and reading/writing style) amounting to (7.835, 3.024, 10.633), respectively, is greater than the tabular T-value of (1.98) at the level of significance (0.05). And the degree of freedom (216), which means that there are statistically significant differences between the level of education in various styles (visual style, auditory style, and reading/writing style) among students of science departments/physics branch for the current research sample, and the researcher attributes this result to training students on this Patterns of learning in their previous learning stages and practiced them during their learning, as most education depends on recitation, reading and writing to achieve success.

Table (6) also shows that there are no statistically significant differences at the significance level (0.05) and the degree of freedom (216) in the kinetic pattern, as the calculated T-value was (0.116), which is the lowest tabular T-value of (1.98), and this indicates the weakness of students in The kinesthetic pattern, and the researcher attributes this result to the poor number of students and their training on this type of learning in their previous learning stages, and their reliance on patterns that depend on recitation, reading and writing.

Table (7): Arithmetic mean, standard deviation, and hypothetical mean for the scores of science/physics department students according to the various learning scale patterns according to the academic stage variable, and the calculated and tabulated (t) values

Statistical significance	Tabular T-value	Calculated T- value	Indication level	Freedom Degree	Standard deviation	SMA	N.o of people in the sample	Group
Not statistically significant	1.97	1.010	0.832	215	28.53	99.97	113	The second
					28.17	103.86	104	The third

It is clear from Table (7) that the calculated T-value for the academic stage variable, which amounted to (1.010), which is less than the tabular value of

(1.97), at the level of significance (0.05) and the degree of freedom (215), and this result indicates that there are no statistically significant differences between the level of Diversified education among students of science departments, the sample of the current research, according to the variable of the study stage. on the other.

Table (8): Arithmetic mean, standard deviation, and hypothetical mean of the scores of science/physics department students according to the various learning scale patterns according to the gender variable, and the calculated and tabulated (t) values

Statistical significance	Tabular T-value	Calculated T-value	Indication Level	Freedom Degree	Standard deviation	SMA	N.o of people in the sample	Gender
Not statistically	1.97	0.422	0.906	215	28.34	100.94	99	Male
					28.44	102.58	118	Female

It is clear from the table that the calculated T-value of the gender variable is (0.422), which is less than the tabular value of (1.97) at the level of significance (0.05) and the degree of freedom (215), and this result indicates that there is no difference between the level of diversified education among students of science departments a sample. The current research according to the gender variable, and the researcher attributes this result to the fact that both male and female students have been exposed to the same experiences and learning methods, and that one of them was not trained to the exclusion of the other in this field, and the superiority of one of them did not appear over the other in learning patterns.

Conclusions

In light of the research results, the researchers reached a set of conclusions, as follows:

- 1) The existence of diverse learning among the students of the science departments/physics branch in the faculties of basic education.
- 2) There are no statistically significant differences in the level of diversified education between the second and second stages.
- 3) There are no statistically significant differences in the level of diversified education according to the gender variable (males - females).
- 4) There are no differences in the level of diversified education among students of science departments, the sample of the current research, according to the interaction of the variable of the school stage with gender.

Recommendations

Based on the findings of the researcher, the following recommendations were made:

- 1) Attention to the development of diversified education for students at all stages of their learning, through the physics curriculum.
- 2) Training university teachers on the use of educational strategies, methods and programs that will develop students' skills in diversified education.

- 3) Inclusion in the curricula of basic education faculties of learning diversification skills.

Suggestions

To complement the results of the current research, the researcher suggests the following: Evaluation of undergraduate curricula in faculties of basic education in the light of diversified education skills.

- 1) Conducting other studies that reveal the relationship between diversified education and other relationships among students of basic education faculties.
- 2) Conducting a comparative study between the students of the faculties of basic education and the faculties of education for pure sciences in their levels of diversified education.

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