

## **Setting up an item bank in methods and techniques of teaching physical education for students of Faculty of Physical Education, Sadat City University**

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### **Abstract :-**

The aim of the study was to set up an item bank in the subject of teaching methods for students of the Faculty of Physical Education, Sadat City University. The researcher chose (457) students of the second year of the bachelor's stage for the academic year 2017/2018 at the Faculty of Physical Education, Sadat City University. They were divided into (304) males and (153) females. The number of members of the basic research sample was (417) and the number of the exploratory sample was (40). Method: the researcher used the descriptive method due to its relevance to the nature of this research. Results: An item bank has been extracted for the teaching methods subject., the application of the item bank in the subject of teaching methods, putting the item bank in the subject of teaching methods in light of the specification table, the bank includes objective and essay questions, as well as knowledge levels, with the percentages mentioned in the specification table.

**Keywords:** item bank, methods and techniques of teaching, students of Faculty of Physical Education .

### **Introduction to the research:**

The issue of evaluation occupies a large area in the map of educational reform globally, and this change is described as a shift from Assessment Culture to Testing Culture.

Education in general and university education in particular during the past two decades have witnessed a radical reform movement represented in the introduction of new concepts such as the concept of multiple evaluation or alternative evaluation to help the graduate that face the challenges imposed by the twenty-first century. This reform called for a review of the traditional evaluation process.

### **Rashid Al-Dosari (2004)**

mentions that evaluation and system and methods has become of great importance to the advanced evaluation processes and methods in directing and advancing the educational course, and in determining the extent to which the educational system achieves its desired goals (4:57).

**Mussio, J.J. adds. Greer, R. N & (2000):** Tests in general, and achievement tests in particular, play an important role in the educational process, and With the growing interest in learning assessment programs in the world, the demand for honest and consistent achievement tests designed for educational curricula, to be used by teachers, has increased (22:67).

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According to “**Sabri Ismail and Moheb Mahmoud**” (2008): Item banking provides a large number of items in a particular study content. These items have specific characteristics, and are used in constructing various achievement tests according to what the evaluation process aims at. (6:49)

And **Salah El-Din Allam** (2005) believes that there are several definitions of what a question bank is. Some researchers define an item banking as “any set of question items, and some define it as a “relatively large set of test questions that can be obtained easily.” A third group defines it as “a set of test items organized and indexed on the basis of their content and standard characteristics: difficulty, reliability, and honesty.” In fact, the question bank can be defined based on the purpose of its uses (5: 67).

**Anzaldua** (2002) sees the necessity of introducing good items in this bank, and a good item is an item that is well built and its content is correct, and represents a certain level of difficulty, and cognitive complexities (13: 182).

The question bank is defined as: a safe place in which a variety of questions of different levels are placed to estimate a specific ability and it is easy to withdraw or add a group or a number of different standardized questions that have distinct and known psychometric properties, such as: the coefficient of ease and difficulty, and coefficient of discrimination, as well as the validity and stability of the items, which are classified according to the units of the course and according to the

mental and cognitive levels that are required to be performed while answering them, in a way that is somewhat similar to the organization and indexing of books. This classification enables us to know each question, the objective it measures, and the domain to which each question belongs. The questions are stored in the memory of a computer according to a pre-prepared program, and they are calibrated using certain models and using special programs (2: 52).

### **Second, the research problem:**

Through the researcher’s work as a faculty member at the Faculty of Physical Education, University of Sadat City, he found shortcomings in the use of the paper-and-pencil method in the tests, which include the instability of the evaluation, the slow extraction of results, the absence of feedback and the slowness in making appropriate decisions, in addition to an increase in the percentage of errors resulting from the use of applicators or examiners. In addition to the failure to cope with technological development in teaching methods, assessment systems, methods and testing tools.

Therefore, this research was designed to face the previous problems and contribute to building an item banking that is useful in storing a large number of questions that form for the user ready-made and various question banks represented in the following types of questions. This is what prompted the researcher to design a question bank in the subject of Teaching Methods.

**Third:** The importance of the research:

1- Providing a battery (Item banking) to measure the level of achievement for students of the Faculty of Physical Education, Sadat City University in the subject of Teaching Methods so that it can be used in estimating the students on the battery as a whole, which would help in studying the achievement of students.

2- Building collection batteries for codified teaching methods and standardization allows the following:

- Consistency of the tests in their material, style and objectives.
- Contribute to standardization .

**Fourth: Research Objective:**

**The research aims to:**

Building an item banking in the subject of teaching methods for students of the Faculty of Physical Education, Sadat City University.

**Fifth: the research hypotheses**

The researcher formulated his hypothesis in the form of questions:

1- Is it possible to design a question bank in the subject of teaching methods?

**Sixth: Search terms:**

**1- Question Bank:**

It is an integrated system that allows questions to be called from the Item Pool fully automated, according

to general and special statistical specifications that ensure the formation of more than one test image with the same specifications in a particular study subject, and the questions are at a high degree of honesty, stability and ability to distinguish ( 20: 80).

**Search procedures:**

**First: Research Methodology:**

The researcher used the descriptive method due to its relevance to the nature of this research.

**Second: Society and research sample:-**

The research community represents the students of the second year of the bachelor's stage for the academic year 2017/2018 at the Faculty of Physical Education, Sadat City University, whose number is (457), divided into (304) males and (153) females, and the number of members of the basic research sample was (417). The number of the exploratory sample was (40), and the following table shows the distribution of the sample members under consideration for the basic and exploratory study.

**The moderation of the sample distribution**

**Table (1)**  
**The mean, median, and standard deviation and the modulus of torsion of the research sample is n = 457**

Sample	(N)	Variables	Measuring unit	Mean	Median	standard deviation	modulus of torsion
the basic	417	chronological age	Year	18.18	18.00	1.02	0.17
		intelligence	Degree	86.85	88.00	7.82	0.15-
Exploratory	40	chronological age	Year	18.18	18.00	1.08	0.16
		intelligence	Degree	85.44	88.00	8.72	0.29-

It is clear from the table that the homogeneity of the sample members was limited to ( $\pm 3$ ), which indicates the moderation of the sample distribution.

### Third: Data collection tools

#### Steps to design an item bank:

For the research, 281 test items were prepared in the subject of teaching methods, based on the table of specifications for the subject of teaching methods prepared after analyzing the content of the curriculum of the subject of teaching, linking the contents of the common topics on the other hand and the mental levels measured by the test items, and showing the description of the course.

### The stage of building the base of the items bank, upon which the rest of the items will be graded.

1. Preparing the test specification table and presenting it to the experts.
2. Preparing items distributed among the educational units.
3. Presenting the items to the experts to express their opinion.

#### a) The stage of preparing and assembling paragraphs:

#### This stage included the following steps:

- 1- Analyzing the content of the measurement and evaluation curriculum, and building a table of specifications.

**Table (2)**  
**Test specification table for test scores**

N	Cognitive levels Subject	Cognitive levels								Total %100
		knowledge (remembering) %	understanding %	Application %	top levels %	producti Know	Producti knowi	producti knowi	producti Knowi	
1.	school physical education	%1	%5	%1	%1	%1	%1	%0	%1	%11
2.	Teaching methods and techniques	%1	%1	%1	%1	%1	%1	%1	%1	%8
3.	Methods of teaching physical education	%1	%7	%8	%2	%1	%7	%4	%3	%33
4.	physical education lesson	%1	%5	%1	%3	%1	%1	%2	%1	%15
5.	Components, forms and methods of applied practice	%1	%7	%9	%3	%1	%5	%3	%4	%33
Total		%30		%30		%20		%20		%100

Through Table (2) of the specifications of the test according to the test scores - the formulation of 281 paragraphs and their presentation to three arbitrators, attached (1), specialists with experience, two with a master's degree in assessment and evaluation, while the third with a

master's degree in teaching methods, where they were asked to express their opinion In the paragraphs and suggesting any appropriate amendments, in order to ensure the apparent validity of the test, and the arbitrators expressed their opinions that were taken into consideration.

**Table (3)**  
**Number of final statements after expert opinion poll n=3**

N	Axes	items in its initial form	items numbers in its initial form	paraphrasing the number	excluded vocabulary	items in its final form	items numbers in its final form
1	school physical education	50	50:1	8	-	50	50:1
2	Teaching methods and techniques	62	113:51	6	-	62	113:51
3	Methods of teaching physical education	58	171:114	26	-	58	171:114
4	physical education lesson	59	240:181	4	9	50	221:181
5	Components, forms and methods of applied practice	61	300 : 240	19	-	61	: 221 281

Table (3) shows the number of vocabulary items after presentation to experts for each axis, before and after presentation to experts.

**Fifth: The first exploratory study:** The exploratory study was conducted during the period from 1/2/2018 to 8/2/2018 on a sample of the exploratory study, which numbered

(40) students, and the aim of this study was:

**Calculating the scientific transactions of the item bank in the subject of measurement and evaluation.**

1- Content validity. The researcher presented the scale's expressions to the

experts previously referred to in Table (3) in order to express his opinion.

2- The validity of the internal consistency and the value of the

difficulty coefficient, the discrimination coefficient, was calculated.

**Table (4)**  
**Difficulty and discrimination coefficients for each of the test items n=40**

Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients
1.	* 0.667	* 0.333	51.	* 0.667	* 0.333	101.	* 0.667	* 0.333	151.	* 0.667	0.889
2.	* 0.667	* 0.333	52.	* 0.356	* 0.644	102.	* 0.644	* 0.356	152.	* 0.667	* 0.356
3.	* 0.644	* 0.356	53.	* 0.356	* 0.644	103.	0.889	0.111	153.	0.884	0.822
4.	* 0.400	* 0.600	54.	* 0.667	* 0.333	104.	0.867	0.133	154.	* 0.622	* 0.333
5.	* 0.444	* 0.556	55.	* 0.667	* 0.333	105.	* 0.444	* 0.556	155.	* 0.644	* 0.333
6.	* 0.422	* 0.578	56.	* 0.667	* 0.333	106.	* 0.644	* 0.356	156.	* 0.578	* 0.333
7.	0.133	0.867	57.	0.884	0.156	107.	* 0.622	* 0.378	157.	0.133	* 0.333
8.	0.178	0.822	58.	* 0.622	* 0.378	108.	* 0.600	* 0.400	158.	* 0.600	* 0.333
9.	0.111	0.889	59.	* 0.644	* 0.356	109.	* 0.444	* 0.556	159.	* 0.667	* 0.333
10.	0.156	0.884	60.	* 0.578	* 0.422	110.	* 0.489	* 0.511	160.	* 0.667	* 0.333
11.	* 0.667	* 0.333	61.	0.133	0.867	111.	* 0.667	* 0.333	161.	0.200	* 0.333
12.	* 0.644	* 0.356	62.	* 0.600	* 0.400	112.	* 0.622	* 0.378	162.	0.111	* 0.333
13.	* 0.444	* 0.556	63.	* 0.667	* 0.333	113.	0.156	0.844	163.	* 0.444	* 0.356
14.	0.800	0.200	64.	* 0.667	* 0.333	114.	* 0.667	* 0.333	164.	0.800	* 0.333
15.	0.822	0.178	65.	0.200	* 0.800	115.	0.800	0.200	165.	0.822	0.178
16.	* 0.467	* 0.533	66.	0.111	0.889	116.	* 0.400	* 0.600	166.	* 0.467	* 0.533
17.	* 0.622	* 0.378	67.	* 0.644	* 0.356	117.	* 0.578	* 0.422	167.	* 0.622	* 0.378
18.	* 0.422	* 0.578	68.	0.178	0.822	118.	* 0.667	* 0.333	168.	* 0.422	* 0.578
19.	* 0.884	0.156	69.	* 0.667	* 0.333	119.	0.133	0.867	169.	* 0.884	0.156
20.	* 0.467	* 0.533	70.	* 0.667	* 0.333	120.	* 0.667	* 0.333	170.	* 0.467	* 0.533
21.	* 0.489	* 0.511	71.	* 0.667	* 0.333	121.	* 0.644	* 0.356	171.	* 0.489	* 0.511
22.	* 0.578	* 0.422	72.	* 0.667	* 0.333	122.	0.889*	0.111	172.	* 0.578	* 0.422
23.	* 0.556	* 0.444	73.	* 0.667	* 0.333	123.	0.867	0.133	173.	* 0.556	* 0.444
24.	* 0.622	* 0.378	74.	* 0.667	* 0.333	124.	* 0.444	* 0.556	174.	* 0.622	* 0.378
25.	* 0.467	* 0.533	75.	* 0.667	* 0.333	125.	* 0.644	* 0.356	175.	* 0.467	* 0.533
26.	* 0.622	* 0.378	76.	* 0.667	* 0.333	126.	* 0.622	* 0.378	176.	* 0.622	* 0.378
27.	* 0.667	* 0.333	77.	* 0.667	* 0.333	127.	* 0.600	* 0.400	177.	* 0.667	* 0.333
28.	* 0.489	* 0.511	78.	* 0.644	* 0.356	128.	* 0.444	* 0.556	178.	* 0.489	* 0.511
29.	* 0.667	* 0.333	79.	* 0.667	* 0.333	129.	* 0.489	* 0.511	179.	* 0.667	* 0.333
30.	0.822	0.178	80.	* 0.667	* 0.333	130.	* 0.667	* 0.333	180.	0.822	0.178
31.	* 0.600	* 0.400	81.	* 0.667	* 0.333	131.	* 0.622	* 0.378	181.	* 0.600	* 0.400
32.	* 0.533	* 0.467	82.	* 0.644	* 0.356	132.	* 0.667	* 0.333	182.	* 0.533	* 0.467
33.	* 0.444	* 0.556	83.	* 0.644	* 0.356	133.	* 0.644	* 0.356	183.	* 0.444	* 0.556
34.	* 0.644	* 0.356	84.	* 0.667	* 0.333	134.	0.178	0.822	184.	* 0.644	* 0.356
35.	* 0.667	* 0.333	85.	* 0.667	* 0.333	135.	* 0.622	* 0.378	185.	* 0.667	* 0.333
36.	* 0.622	* 0.378	86.	* 0.667	* 0.333	136.	* 0.600	* 0.400	186.	* 0.622	* 0.378
37.	* 0.400	* 0.600	87.	* 0.667	* 0.333	137.	* 0.644	* 0.356	187.	* 0.400	* 0.600
38.	* 0.578	* 0.422	88.	* 0.644	* 0.356	138.	* 0.667	* 0.333	188.	* 0.578	* 0.422
39.	* 0.467	* 0.533	89.	* 0.667	* 0.333	139.	0.200	0.800	189.	* 0.467	* 0.533
40.	* 0.489	* 0.511	90.	* 0.667	* 0.333	140.	* 0.667	* 0.333	190.	* 0.667	* 0.400
41.	* 0.578	* 0.422	91.	* 0.600	* 0.400	141.	* 0.667	* 0.333	191.	* 0.600	* 0.556
42.	* 0.556	* 0.444	92.	* 0.578	* 0.422	142.	0.111	0.889	192.	* 0.578	* 0.511
43.	* 0.622	* 0.378	93.	0.844	0.156	143.	* 0.667	* 0.333	193.	0.844	* 0.333
44.	* 0.467	* 0.533	94.	* 0.667	* 0.333	144.	* 0.644	* 0.356	194.	* 0.667	* 0.378
45.	* 0.622	* 0.378	95.	* 0.667	* 0.333	145.	* 0.667	* 0.333	195.	* 0.667	* 0.333
46.	* 0.667	* 0.333	96.	* 0.667	* 0.333	146.	* 0.644	* 0.356	196.	* 0.667	* 0.356
47.	* 0.489	* 0.511	97.	* 0.667	* 0.333	147.	* 0.644	* 0.356	197.	* 0.667	0.822
48.	* 0.667	* 0.333	98.	* 0.667	* 0.333	148.	* 0.667	* 0.333	198.	* 0.667	* 0.378
49.	0.822	0.178	99.	* 0.644	* 0.356	149.	0.178	0.822	199.	* 0.644	* 0.400
50.	* 0.600	* 0.400	100.	* 0.667	* 0.333	150.	* 0.667	* 0.333	200.	* 0.667	* 0.378

Continue table (4)

## Difficulty and discrimination coefficients for each of the test items n=40

Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients	Item number	discrimination coefficients	Difficulty coefficients
201.	* 0.467	* 0.533	221.	* 0.667	* 0.333	241.	0.867	0.133	261.	0.822	0.178
202.	* 0.622	* 0.378	222.	* 0.600	* 0.400	242.	* 0.444	* 0.556	262.	* 0.467	* 0.533
203.	* 0.489	* 0.511	223.	* 0.667	* 0.333	243.	* 0.644	* 0.356	263.	* 0.622	* 0.378
204.	* 0.667	* 0.333	224.	* 0.600	* 0.400	244.	0.867	0.133	264.	* 0.622	* 0.333
205.	0.822	0.178	225.	* 0.533	* 0.467	245.	* 0.444	* 0.556	265.	* 0.644	* 0.333
206.	* 0.600	* 0.400	226.	* 0.444	* 0.556	246.	* 0.667	* 0.333	266.	* 0.578	* 0.333
207.	* 0.533	* 0.467	227.	* 0.644	* 0.356	247.	* 0.644	* 0.356	267.	0.133	* 0.333
208.	* 0.444	* 0.556	228.	* 0.667	* 0.333	248.	* 0.644	* 0.356	268.	* 0.600	* 0.333
209.	* 0.644	* 0.356	229.	* 0.622	* 0.378	249.	* 0.667	* 0.333	269.	* 0.667	* 0.333
210.	* 0.667	* 0.333	230.	* 0.400	* 0.600	250.	* 0.667	* 0.333	270.	* 0.667	* 0.333
211.	* 0.622	* 0.378	231.	* 0.578	* 0.422	251.	* 0.667	* 0.333	271.	0.200	* 0.333
212.	* 0.400	* 0.600	232.	* 0.467	* 0.533	252.	* 0.667	* 0.333	272.	0.111	* 0.333
213.	* 0.578	* 0.422	233.	* 0.489	* 0.511	253.	* 0.644	* 0.356	273.	* 0.444	* 0.356
214.	* 0.467	* 0.378	234.	* 0.667	* 0.333	254.	* 0.667	* 0.333	274.	* 0.667	* 0.333
215.	0.822	0.178	235.	0.200	0.800	255.	* 0.667	* 0.333	275.	0.111	0.889
216.	* 0.467	* 0.533	236.	0.111	0.889	256.	* 0.600	* 0.400	276.	* 0.667	* 0.333
217.	* 0.622	* 0.378	237.	* 0.644	* 0.356	257.	* 0.578	* 0.422	277.	* 0.644	* 0.356
218.	* 0.422	* 0.578	238.	0.178	0.822	258.	0.844	0.156	278.	* 0.667	* 0.333
219.	* 0.884	0.156	239.	* 0.667	* 0.333	259.	* 0.667	* 0.333	279.	* 0.644	* 0.356
220.	* 0.467	* 0.533	240.	* 0.667	* 0.333	260.	* 0.667	* 0.333	280.	* 0.644	* 0.356
									281.		

It is clear from Table (4) that the coefficients of difficulty ranged between (0.38 and 0.68) with an average of (0.58), and in general, most of the items are characterized by a moderate degree of difficulty, while the coefficients of discrimination ranged between (0.16 and 0.51), with

an average of (0.37) All were positive and fall within the acceptable range.

**Scale stability:**

To achieve the stability of the scale, the researcher used the (cronbach alpha) coefficient, and the result of calculating the stability coefficients was as follows:

Table (5)

## Alpha values for the items

Item	Axis	Mean	Standard deviation	Alpha Value
1	school physical education	27.400	0.427	0.564
2	Teaching methods and techniques	27.514	0.460	0.579
3	Methods of teaching physical education	30.686	0.439	0.684
4	physical education lesson	24.800	0.457	0.786
5	Components, forms and methods of applied practice	17.829	0.441	0.799
	the total as a whole	25.645	2.223	0.678

The tabular value of "t" at the 0.05 level of significance is 0.276

The results of the table indicate that the reliability coefficient of the item bank ranged between (.564 - 799.), which indicates that the items has a high degree of stability.

**Sixth: The steps and stages of establishing an item bank:**

1- Examination and analysis of the course description to determine the indicators achieved in the content of the measurement and evaluation book for the second year in the Faculty of Physical Education, through which the items will be developed.

2- The researcher reviewed the studies and theories that dealt with the concept of item banks and how to build them.

3- Determine the dimensions and components of the scale:

A list of dimensions was reached for the collection battery, the measurement and evaluation material, and the main dimensions were analyzed into its components. In light of this, the following components were identified:

- School physical education.
- Teaching methods and techniques.
- Methods of teaching physical education.
- Physical education lesson.
- Components, forms and methods of applied practice.

4- Preparing the test vocabulary for the dimensions of academic achievement for the subject of teaching methods in light of the course description. The researcher used a group of experts in preparing and developing the test item, using

the items included in the standards, attachment (1).

5- Arbitration of questions and table of specifications by a number of professors. Attachment No. (2)

The arbitrators were also asked to write any notes they deem appropriate, whether by modifying or deleting inappropriate items, or any appropriate suggestions for improving items. The arbitration results recommended the following:

- Simplifying the formulation of some item to be more suitable for the target sample.
- Suggesting the use of some words so that the question has only one specific correct answer.
- The arbitrators agreed on the quality of the items in general and its suitability for measuring the goal that was set to measure it.

After making the modifications suggested by the arbitrators, the items that the opinion settled on are the ones that make up the initial form of the achievement scale for the teaching methods, the subject that the current research seeks to gradually. And their number was (281) in relation to the achievement scale for the subject of quantitative teaching methods.

- The amendments were made in light of the observations and suggestions of the arbitrators.

The test items were reached before the arbitration in its early stages and after the arbitration and the proposed amendments were made, as well as the items that were applied exploratory and the numbers of the items that were not applied .The first



picture of the number of items before the arbitration, attachment (2).

Items were formulated in its final form for application to the survey sample of (281) items of the type (multiple choice, true and false), and after the application and deletion of inappropriate items, the number reached (246) items Which measures the achievement of the subject of verbal teaching methods and students respond by choosing the correct answer.

7- Distribution of the scale vocabulary on the sub-components included in the scale.

- School physical education.
- Teaching methods and techniques.
- Methods of teaching physical education.
- Physical education lesson.
- Components, forms and methods of applied practice.

#### **Seventh: Technical procedures for designing the bank:**

- Three equivalent test images were made, according to the map (Table 3). After preparing the test images, they were applied to the research sample for the purpose of rationing the battery items in preparation for its entry into the battery item bank.

Distribution of the achievement scale vocabulary for the subject of teaching methods for research on several test images whereas the aim of the current research aims to withdraw several equivalent test images for use in evaluating students; A fairly large number of items have been built to

allow for different test images to be drawn.

- The following was taken into account in the composition of the survey Taking into account the presence of a number of common items among the test images for the necessity of statistical analysis in the light of the theory of response to the item represented in the Rush model using the WINSTEPS program.

- Distribution of test items in its final form on the various test images. Attachment (3) shows the distribution of vocabulary for each scale on the different test images.

#### **The application instructions are formulated to include:**

- The purpose of the application.
- Items Answering Instructions.
- A solved example showing how to answer the vocabulary of each scale.

#### **Printing the exams in its initial form for arbitration:**

After preparing the initial form of the measurements, it was presented to a group of arbitrators who are specialists in the field of measurement and evaluation.

#### **Eighth: The second exploratory study:**

The second exploratory study was conducted from 20/2/2018 to 30/2/2018 on a sample of the pilot study, which numbered (40) students, and the aim of this study was:

Experimenting with the test items by applying it to the exploratory sample, which numbered (40) male and female students of the second year in the academic year (2017/2018) at the Faculty of Physical Education in Sadat.

**The items was tested exploratory in order to find out:**

- Clarity of instructions.
- Clarity of wording.
- Suitability of alternatives.
- The tests are free of grammatical and typing errors.
- Problems related to the application so that they can be corrected before applying to the basic grading sample.
- Calculating the time required to answer each test picture; The time required to answer each test image was calculated, as the application of the test image took approximately (120) minutes; and this time was enough for everyone exposed to a test image to try to answer all its items.

**Ninth: Ranking the Academic Achievement Scale for Teaching Methods:**

**1-Preparing data for analysis**

After completing the previous steps and making the appropriate modifications, follow these steps:

- **Applying the five test images to the grading sample**, taking into account the presence of common item between these images for the necessity of statistical analysis.
- **Data encoding:** a symbol was specified for each item of the test images, taking into account that the common items were given the same symbols.
- **Preparing the input files** for each test image and entering data related to

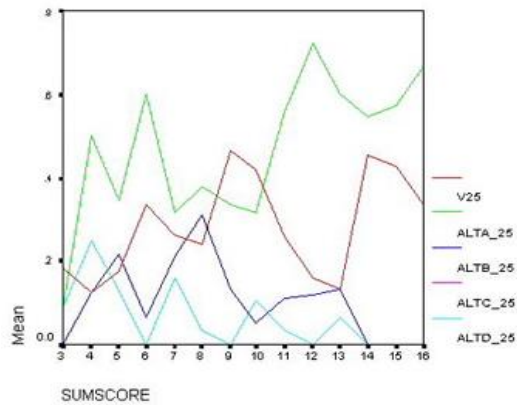
the performance of the (basic) grading sample members on the different items on the computer using the computer program Statistical Packages of Social Science (SPSS).

- **Correcting vocabulary** using the SPSS computer program, then linking the files into a one single file.

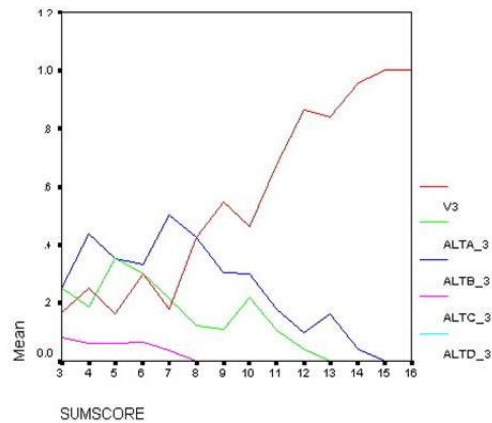
**- Graphical Item Analysis (GIA)**

Graphical Item Analysis provides an initial insight that helps identify good and unsuitable items for measurement bases. This is based on the fact that the percentage of students who choose the correct answer is supposed to increase with the increase in the total score, and the percentage of students who choose the incorrect alternatives is supposed to decrease with the increase in the total score. In light of this, the higher rate of students who choose the correct answer with the increase in the total score, the red line in the graph represents the correct answer, and the other colored lines represent the incorrect alternatives, the better the discriminatory power of the item, and the higher the quality of the item. On the other hand, items of lower quality will show a decrease in the proportion of students choosing the correct alternative with an increase in the total score or a higher percentage of students choosing distractions (incorrect alternatives) with a higher overall score. (Batenburg & Loros, 2000)

The following figure (2) shows a general model for a good item and a lower quality item (unsuitable).



lower quality item (unsuitable)



Good item (suitable )

### A general form of a good item and a less quality item (unsuitable)

#### (2) Analysis of readiness scale data using WINSTEPS program

The data were analyzed according to a Rasch model using the computer program WINSTEPS in order to identify and exclude data that are inappropriate for the objective measurement bases and the grading of different vocabulary.

#### This is done through the following steps:

- Delete the perfect and zero statements.
- Elimination of results from individuals who do not fit the criteria for measurement.
- Elimination of inaccurate items (inappropriate to the bases of objective measurement) in its gradation on the subject of the measurement.

#### The procedures for analyzing and grading the metrics included:

Building and grading the research tools and determining the corresponding estimates for each raw score on each:

- A component of collecting components
- A test image of the fifth images that make up each component.
- Storing items on the computer (the collection battery question bank)

#### The application of the bank in the final form to the experimental research sample .

The researcher applied the bank in the final form to the basic sample in the period from the main research sample to answer it from 1/3/2018 until 5/3/2018 .

#### Tenth: The statistical method used

The researcher used the statistical program (SPSS) to treat the data statistically, and he used the statistical methods that achieve the objectives and questions of the research, as he used the following treatments:

- mean - median - standard deviation - skewness - correlation

coefficient - coefficient of difficulty  
 - coefficient of distinction - alpha.

- The researcher used the statistical program (WINSTEPS) to analyze the data based on the theoretical basis of the Rasch model using a program - estimating items difficulties - the researcher used the equation  $(\text{manf}) = 5 \text{ logit} + 50$ .

### **Presentation and discussion of the results:**

#### **1- The results of analyzing and grading the items of the test images that make up the collection bank for the subject of teaching methods**

It included the presentation and discussion of the steps and results of the analysis reached to obtain:

- Final grading of the vocabulary of each of the five pictures that make up the bank according to its difficulty, using the Rasch model as one of the response theory models for the vocabulary.

In order to answer the question, what is the grading of the vocabulary difficulties of each test image of the measurement and evaluation subject scale?

Each test image was re-analyzed with the total bank for the achievement scale for the teaching methods subject, considering the items of each picture as common items with the bank as a whole, after deleting the individuals and items inappropriate for the basis of objective measurement.

**The following is a presentation of the results of answering the research questions.**

#### **Results of answering the first question:**

The second research question states:

1. What is the design of a question bank in the subject of Teaching Methods?

**Below are the results of this analysis in detail:**

#### **- Delete complete and zero data**

The WINSTEPS program automatically excludes the data for each individual who obtained a perfect (final) or zero score on the items that he performed, and also excludes the data for each item that the sample members agreed to answer, whether true or false, as it is considered outside the scope of the measurement.

The initial analysis of the data in the current study did not result in the exclusion of any individual, or any item according to this criterion.

#### **Deleting the answer of individuals who do not fit the criteria for measurement**

After performing the initial analysis of the data using WINSTEPS software, individuals who exceeded the statistical fit criteria ( $\pm 2$ ) provided by WINSTEPS were identified and deleted; Exceeding the threshold ( $+2$ ) means that the individual's response pattern is different from what is expected of him. This may be due to haste, neglect or resorting to guesswork. Exceeding the threshold ( $-2$ ) means that the individual's response pattern is unrealistically consistent. This may be due to slowness, extreme caution, or resorting to fraud. The number of individuals who were omitted in light of these criteria reached 31 students.

#### **-Deletion of inaccurate items (inappropriate to the foundations of objective measurement) in its**

### gradation on the continuum of the achievement variable for the subject of teaching methods

The data was re-analyzed after deleting the scores of individuals who did not fit the foundations of the objective measurement, in order to identify and delete the items that exceeded the statistical relevance criteria (+2.5) provided by the WINSTEPS program. Exceeding the threshold (+2.5) of the appropriateness

scale means a defect in the wording of the word, or that it defines another variable that is different from the variable defined in the rest of the items.

The following table (11) includes a summary of the results of analyzing the achievement scale data for the teaching methods subject according to the steps that were followed in grading the test vocabulary.

**Table (11)**  
**Summary of the results of the analysis of the achievement scale data for the subject of teaching methods n=417**

Analysis	Number of items	Number of individuals	Average ratings		Estimated stability coefficient	
			To difficulty	To ability	To difficulty	To ability
First analysis before deletion	281	417	0.000	0.72-	0.96	0.85
The second analysis after deleting individuals	281	417	0.000	0.59-	0.97	0.86
The third analysis after deleting the vocabulary	246	386	0.000	0.48-	0.97	0.86

#### It is worth mentioning here that:

- Increasing the value of the stability of estimates for both individuals and items after deleting individuals and items that are not suitable for the objective measurement bases, which indicates the accuracy of the grading.
- There are a number of items that were deleted for not being suitable for the objective measurement bases, which exceeded the criteria of statistical appropriateness provided by the WINSTEPS program. The results

of the graphic analysis of the items showed that they have problems, some of which are defects in discrimination, and others represent problems with some alternatives.

- Many of the items appropriate to the foundations of objective measurement showed appropriate graphs expressing appropriateness of both the distinction and the alternatives.

The previous agreement between the results of the graphical analysis of the

vocabulary and the results of the statistical analysis as provided by the WINSTEPS program is a positive indication of the efficiency of the appropriateness criteria of the WINSTEPS program, which helps the test preparer to verify the validity and efficiency of his tools.

This agrees with what studies and literature advocate for the necessity of using the Rasch model as an essential part of the test building system because it provides objectivity in the measurement and provides vocabulary sincerity in its definition of the variable subject to measurement (one-dimensional). ((Anzaldúa, Ric M.:2002 .)

#### **-Final grading of the achievement scale items for the teaching methods subject**

To obtain the final grading of the achievement scale items for the Teaching Methods course, the following steps were taken:

A- Re-analyze the data for the third time after deleting the inappropriate words with the aim of:

- Scaling the items according to one common scale with one common zero according to its difficulty with the logit and the formation of the final grading of the items of the overall scale .

- Calculate the ability ratings corresponding to each potential college score on the overall scale.

B - Converting the estimates of difficulty and ability from the (logite) to the (manf) unit using the following linear transformation equation:  $Manf = 5 \text{ logite} + 50$  .

The following table (12) includes the final grading of the achievement scale items for the teaching methods subject, arranged according to its difficulty in the units Logit and Manf, in addition to the standard error estimated in the units Logit and Manf, after deleting individuals and items that are inappropriate for the foundations of objective measurement.

**Table (12)**

**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
L1	249	-3.17	34.15	0.24	1.2
G26	195	-2.21	38.95	0.17	0.85
C1	19	-1.95	40.25	0.06	0.3
G33	202	-1.89	40.55	0.16	0.8
B26	63	-1.83	40.85	0.16	0.8
B29	66	-1.83	40.85	0.16	0.8
A2	2	-1.73	41.35	0.16	0.8
E37	141	-1.66	41.7	0.16	0.8
G42	211	-1.63	41.85	0.15	0.75

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
C16	45	-1.61	41.95	0.05	0.25
A34	34	-1.58	42.1	0.15	0.75
A16	16	-1.53	42.35	0.15	0.75
A48	48	-1.49	42.55	0.15	0.75
B3	54	-1.45	42.75	0.16	0.8
C11	36	-1.41	42.95	0.05	0.25
B30	67	-1.4	43	0.15	0.75
C2	20	-1.37	43.15	0.05	0.25
C5	23	-1.34	43.3	0.05	0.25
A14	14	-1.3	43.5	0.15	0.75
B32	69	-1.3	43.5	0.15	0.75
A17	17	-1.19	44.05	0.15	0.75
D9	89	-1.18	44.1	0.15	0.75
A12	12	-1.15	44.25	0.15	0.75
A11	11	-1.1	44.5	0.15	0.75
A15	15	-1.1	44.5	0.15	0.75
C12	37	-1.1	44.5	0.05	0.25
L14	253	-1.04	44.8	0.14	0.7
H16	224	-1.03	44.85	0.14	0.7
C8	26	-1.02	44.9	0.05	0.25
G36	205	-1	45	0.14	0.7
A5	5	-0.97	45.15	0.15	0.75
D41	107	-0.97	45.15	0.14	0.7
A6	6	-0.95	45.25	0.15	0.75
E20	128	-0.9	45.5	0.14	0.7
B37	74	-0.87	45.65	0.15	0.75
B36	73	-0.85	45.75	0.15	0.75
A7	7	-0.84	45.8	0.15	0.75
C4	22	-0.82	45.9	0.05	0.25
L50	280	-0.82	45.9	0.14	0.7
G40	209	-0.81	45.95	0.14	0.7
H43	241	-0.8	46	0.14	0.7
C13	38	-0.78	46.1	0.05	0.25
H37	235	-0.78	46.1	0.14	0.7
E47	146	-0.74	46.3	0.14	0.7

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
D10	90	-0.71	46.45	0.14	0.7
G32	201	-0.69	46.55	0.14	0.7
L25	264	-0.69	46.55	0.14	0.7
D7	87	-0.67	46.65	0.14	0.7
F34	174	-0.67	46.65	0.14	0.7
H1	217	-0.66	46.7	0.14	0.7
A9	9	-0.65	46.75	0.15	0.75
D43	109	-0.63	46.85	0.14	0.7
H26	229	-0.63	46.85	0.14	0.7
B27	64	-0.61	46.95	0.15	0.75
B35	72	-0.61	46.95	0.15	0.75
H15	223	-0.61	46.95	0.14	0.7
C7	25	-0.6	47	0.05	0.25
D51	117	-0.59	47.05	0.14	0.7
G19	193	-0.59	47.05	0.14	0.7
C10	28	-0.58	47.1	0.05	0.25
E40	144	-0.58	47.1	0.14	0.7
L15	254	-0.58	47.1	0.14	0.7
B40	77	-0.57	47.15	0.15	0.75
E26	134	-0.56	47.2	0.14	0.7
E16	124	-0.54	47.3	0.14	0.7
G1	184	-0.54	47.3	0.14	0.7
L39	274	-0.54	47.3	0.14	0.7
D26	97	-0.53	47.35	0.14	0.7
E17	125	-0.52	47.4	0.14	0.7
C18	47	-0.51	47.45	0.05	0.25
D45	111	-0.51	47.45	0.14	0.7
D28	99	-0.49	47.55	0.14	0.7
C3	21	-0.48	47.6	0.05	0.25
E46	145	-0.48	47.6	0.14	0.7
F6	156	-0.48	47.6	0.14	0.7
G27	196	-0.48	47.6	0.14	0.7
A4	4	-0.46	47.7	0.15	0.75
F4	154	-0.46	47.7	0.14	0.7



**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
L30	269	-0.46	47.7	0.14	0.7
H14	222	-0.44	47.8	0.14	0.7
L29	268	-0.44	47.8	0.14	0.7
A18	18	-0.43	47.85	0.15	0.75
F15	165	-0.42	47.9	0.14	0.7
F42	178	-0.42	47.9	0.14	0.7
H27	230	-0.42	47.9	0.14	0.7
H36	234	-0.4	48	0.14	0.7
H42	240	-0.4	48	0.14	0.7
F32	172	-0.38	48.1	0.14	0.7
F12	162	-0.36	48.2	0.14	0.7
F48	180	-0.36	48.2	0.14	0.7
A29	29	-0.33	48.35	0.15	0.75
B34	71	-0.32	48.4	0.15	0.75
D42	108	-0.31	48.45	0.14	0.7
E21	129	-0.3	48.5	0.14	0.7
B47	80	-0.28	48.6	0.15	0.75
H35	233	-0.27	48.65	0.14	0.7
A40	40	-0.26	48.7	0.15	0.75
B5	56	-0.25	48.75	0.15	0.75
L22	261	-0.24	48.8	0.14	0.7
C6	24	-0.23	48.85	0.05	0.25
F33	173	-0.23	48.85	0.15	0.75
H34	232	-0.23	48.85	0.14	0.7
G41	210	-0.22	48.9	0.14	0.7
B41	78	-0.21	48.95	0.15	0.75
D25	96	-0.21	48.95	0.14	0.7
H13	221	-0.21	48.95	0.14	0.7
F43	179	-0.19	49.05	0.15	0.75
F7	157	-0.15	49.25	0.15	0.75
F11	161	-0.15	49.25	0.15	0.75
F29	169	-0.15	49.25	0.15	0.75
D6	86	-0.14	49.3	0.14	0.7
D36	102	-0.14	49.3	0.14	0.7

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
C9	27	-0.11	49.45	0.05	0.25
A3	3	-0.1	49.5	0.15	0.75
A49	49	-0.1	49.5	0.15	0.75
D44	110	-0.1	49.5	0.14	0.7
G48	213	-0.1	49.5	0.14	0.7
B48	81	-0.09	49.55	0.15	0.75
E3	120	-0.08	49.6	0.14	0.7
E22	130	-0.08	49.6	0.14	0.7
B39	76	-0.07	49.65	0.15	0.75
F2	152	-0.06	49.7	0.15	0.75
D49	115	-0.04	49.8	0.14	0.7
H38	236	-0.04	49.8	0.14	0.7
L47	277	-0.04	49.8	0.14	0.7
D24	95	-0.02	49.9	0.15	0.75
E15	123	-0.02	49.9	0.14	0.7
B1	52	0	50	0.15	0.75
D34	100	0	50	0.15	0.75
L18	257	0	50	0.14	0.7
E31	139	0.02	50.1	0.14	0.7
A41	41	0.03	50.15	0.15	0.75
F1	151	0.03	50.15	0.15	0.75
D35	101	0.04	50.2	0.15	0.75
L26	265	0.04	50.2	0.14	0.7
F39	175	0.05	50.25	0.15	0.75
B6	57	0.07	50.35	0.15	0.75
E2	119	0.08	50.4	0.14	0.7
G2	185	0.09	50.45	0.15	0.75
G38	207	0.09	50.45	0.15	0.75
H24	227	0.1	50.5	0.14	0.7
H40	238	0.1	50.5	0.14	0.7
L20	259	0.1	50.5	0.14	0.7
F17	167	0.12	50.6	0.15	0.75
D5	85	0.13	50.65	0.15	0.75

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
B12	58	0.14	50.7	0.16	0.8
F9	159	0.14	50.7	0.15	0.75
F51	183	0.14	50.7	0.15	0.75
H44	242	0.14	50.7	0.14	0.7
L28	267	0.14	50.7	0.14	0.7
A10	10	0.15	50.75	0.15	0.75
L51	281	0.16	50.8	0.14	0.7
E5	122	0.17	50.85	0.15	0.75
F41	177	0.18	50.9	0.15	0.75
B42	79	0.19	50.95	0.16	0.8
H48	246	0.2	51	0.14	0.7
A8	8	0.22	51.1	0.16	0.8
L16	255	0.22	51.1	0.14	0.7
A13	13	0.25	51.25	0.16	0.8
F8	158	0.25	51.25	0.15	0.75
F18	168	0.27	51.35	0.15	0.75
H25	228	0.28	51.4	0.14	0.7
L38	273	0.28	51.4	0.14	0.7
B49	82	0.29	51.45	0.16	0.8
E4	121	0.3	51.5	0.15	0.75
E19	127	0.3	51.5	0.15	0.75
H22	225	0.32	51.6	0.14	0.7
L23	262	0.36	51.8	0.14	0.7
G30	199	0.37	51.85	0.15	0.75
G34	203	0.39	51.95	0.15	0.75
B15	61	0.42	52.1	0.16	0.8
D23	94	0.42	52.1	0.15	0.75
D37	103	0.42	52.1	0.15	0.75
G16	190	0.42	52.1	0.15	0.75
G4	187	0.44	52.2	0.15	0.75
E24	132	0.45	52.25	0.15	0.75
E29	137	0.45	52.25	0.15	0.75
G29	198	0.49	52.45	0.15	0.75
D50	116	0.5	52.5	0.15	0.75
L2	250	0.53	52.65	0.15	0.75

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
H46	244	0.55	52.75	0.15	0.75
D39	105	0.57	52.85	0.16	0.8
D47	113	0.57	52.85	0.16	0.8
E50	149	0.57	52.85	0.15	0.75
G39	208	0.58	52.9	0.16	0.8
F14	164	0.62	53.1	0.16	0.8
G47	212	0.65	53.25	0.16	0.8
D11	91	0.67	53.35	0.16	0.8
A1	1	0.68	53.4	0.17	0.85
G31	200	0.68	53.4	0.16	0.8
A31	31	0.71	53.55	0.17	0.85
A33	33	0.71	53.55	0.17	0.85
G5	188	0.71	53.55	0.16	0.8
G3	186	0.73	53.65	0.16	0.8
D8	88	0.75	53.75	0.16	0.8
E38	142	0.76	53.8	0.16	0.8
H23	226	0.76	53.8	0.15	0.75
L21	260	0.76	53.8	0.15	0.75
L24	263	0.78	53.9	0.15	0.75
E30	138	0.79	53.95	0.16	0.8
F13	163	0.8	54	0.17	0.85
G49	214	0.81	54.05	0.16	0.8
L4	252	0.81	54.05	0.15	0.75
L19	258	0.83	54.15	0.16	0.8
L49	279	0.83	54.15	0.16	0.8
G17	191	0.84	54.2	0.16	0.8
A43	43	0.85	54.25	0.17	0.85
H39	237	0.86	54.3	0.16	0.8
H45	243	0.86	54.3	0.16	0.8
D38	104	0.88	54.4	0.17	0.85
H33	231	0.91	54.55	0.16	0.8
D40	106	0.97	54.85	0.17	0.85
E39	143	0.97	54.85	0.17	0.85
G37	206	0.97	54.85	0.17	0.85
B4	55	0.98	54.9	0.18	0.9
F49	181	1	55	0.17	0.85

**Follow Table (12)**  
**Scaling the achievement scale difficulties for the teaching methods course n = 417**

item code	item number in the bank	item difficulty with Logit	item difficulty with Manf	standard error with logit	standard error with Manf
L27	266	1.03	55.15	0.16	0.8
F16	166	1.06	55.3	0.17	0.85
B28	65	1.08	55.4	0.18	0.9
E1	118	1.09	55.45	0.17	0.85
H47	245	1.14	55.7	0.17	0.85
F3	153	1.15	55.75	0.18	0.9
F5	155	1.22	56.1	0.18	0.9
L17	256	1.22	56.1	0.17	0.85
D27	98	1.24	56.2	0.18	0.9
B38	75	1.28	56.4	0.19	0.95
F30	170	1.29	56.45	0.18	0.9
L31	270	1.34	56.7	0.17	0.85
F50	182	1.39	56.95	0.19	0.95
E51	150	1.4	57	0.18	0.9
G35	204	1.45	57.25	0.19	0.95
H49	247	1.51	57.55	0.18	0.9
B14	60	1.59	57.95	0.2	1
L32	271	1.63	58.15	0.19	0.95
D48	114	1.64	58.2	0.2	1
F10	160	1.7	58.5	0.21	1.05
F40	176	1.79	58.95	0.21	1.05
E25	133	1.82	59.1	0.21	1.05
G6	189	1.89	59.45	0.22	1.1
H41	239	2.01	60.05	0.21	1.05
B33	70	2.3	61.5	0.25	1.25
L40	275	2.64	63.2	0.26	1.3
D46	112	2.84	64.2	0.3	1.5
D12	92	2.94	64.7	0.31	1.55
E23	131	3.16	65.8	0.35	1.75
B25	62	6.86	84.3	1.84	9.2

It is clear from Table (12) that the items (281) of the total scale appropriate to the foundations of measurement and they cover the degree of difficulty appropriately, as it ranged between (-3.17) and (6.86). It is also noted that there are an appropriate

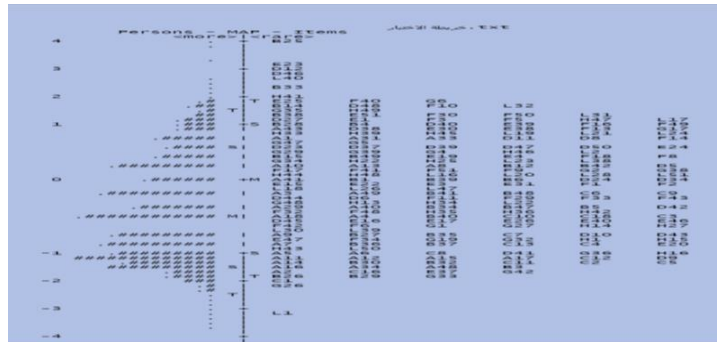
number of items that cover different levels on a continuous range of difficulty.

The standard errors of the difficulty estimates ranged between (0.05) and (1.84) Logit, and these standard errors values are relatively

small, which indicates the accuracy and reliability of the vocabulary difficulties estimates.

In general, it can be said that the small percentage of items that are inappropriate for the Rasch model also indicate the good fit of the data to the

**Figure (6) shows a map of the distribution of items for the teaching methods subject on the scale**



The results agree with the study of **Collie & MARUFF (2003) (17)**

- The study of **(Parshall, et al, 2006.) (24)**. King Saud University (2006) (3)

- The study of (Home, 2007) (20): **Asuni study (2008) (14) Wesnes study (2010 AD) (Wesnes, 2010) (25):**

It is the conversion of tests “used in” to computerized tests characterized by ease of group application, low material cost, short application period, and ease of interpretation from traditional tests, and that there are multiple levels of question banks ranging from banks that are managed manually, or using items cards with the use of the computer Only in analyzing the data and verifying the validity of the vocabulary content, or that the computerized item bank is based on the evaluation of its items on the response models for the item, as in the third level. This higher level of question banks is the most

important in improving the systems and methods of measurement, assessment and examinations; It was not distinguished by the characteristics represented in: economy, flexibility, consistency, and confidentiality” (14).

Thus, the second question has been answered, which states: Is it possible to design a question bank in the subject of Teaching Methods according to the modern theory?

**Conclusions and Recommendations**

**Conclusions**

1- An item bank has been extracted for the teaching methods subject.

2- The application of the item bank in the subject of teaching methods.

3- Putting the item bank in the subject of teaching methods in light of the specification table.

4-The bank includes objective and essay questions, as well as knowledge

levels, with the percentages mentioned in the specification table.

5- The committee to prepare the item bank of those who are qualified in assessment and examinations.

#### **Recommendations**

1- A recommendation to generalize the use of the item bank in the subject of teaching methods and in various courses

2- A recommendation to use the item bank in the subject of teaching methods in preparing test batteries in different capacities.

3- A recommendation to use the item bank in the subject of teaching methods in preparing achievement test batteries in the basic courses that measure performance levels at different grade levels.

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