The Factorial Components of
The Ability To Think Critic To The Supreme Students

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Abstract

Research aims at identifying simple factorial structure of the items that constitute a measure of the ability to think critically of graduate students, as well as a group of items brief (representing factors derived) have the power to measure the ability to think critically with graduate students. The random sample was selected from students and graduate students enrolled for a master's degree and PhD, Faculty of Physical Education at the University of Kafr el-Sheikh, and the Faculties of Physical Education for Girls and Boys, Alexandria University during the academic year 2010/2011 is, consisting of 90 demanded by 60 students stage Masters, 30 students doctoral phase. After presentation of the proposed

scale items 36 an item on the gentlemen experts and based on their views have been deleted seven items, as well as the re-integration and formulation of four items and bringing the number of items 26 items. To calculate honesty factorial scale factor analysis was conducted Using the basic components of hotelling, To extract factors depending on the test Kaiser, After orthogonal rotation, Factors learned where most items saturated 24 an item in terms of ± 0.3 and above have the power to detect the ability to critical thinking among students in studies and they are distributed on four factors are acceptable: first factor: Calendar factor 13 items, second factor: workers understand the rules of logic (8 items),third factor: heuristics factor 5 items,fourth factor: factor doth objective facts 3 items. Also enjoyed the scale factor stability high calculated using coefficient alpha cronbakh reached 0.87 a reliability coefficient confirms confidence in the stability measure, has also been reached and there are significant differences in the ability to think critically of graduate students (Masters, PhD) in favor of students stage Doctorate.

Key words:

Components – Ability to Think Critic – Supreme students.

Introduction:

University Foundation social affect and are affected by the surrounding atmosphere, they are making community on the one hand and its in tool making technical and professional leaders, political and intellectual on the one hand and the responsibility for bringing about change and progress of society, And scientific research essential feature of the University and graduate tool university in enriching scientific research and guidance to serve society issues of social and economic to meet the requirements of comprehensive development as an postgraduate mainstay in preparing

scientific researchers required for the University and other research institutions these researchers are materials which you graduate formation and preparation to become cadres and competencies for various work and scientific research centers, and graduate studies is the human resources industry and scientific personnel and development of the highest level in a continuous process does not stop. Not happen scientific research in a vacuum researcher scientific must be carefully prepared in terms of academic in the field of specialization in addition to the need trained on assets research and methods, in addition to this must be characterized by a researcher of attributes psychological which are among the qualities researchers good researcher man searching for the truth and so it needs to be characterized by patience and perseverance, curiosity and the ability to correct vision and perception Hittite relations linking results with Introduction as a researcher that is characterized by objectivity and not to rush to judgment and the ability to analyze phenomena and their causes and then work on linking and integration and to have the ability the correct perception of the reality of things, and that is characterized by the ability to foresight and thus has the ability to think properly and the use of reason and logic [1,2,3,4,5] and on this basis the scientific research is a kind of investigated access to knowledge [6]. It is noted that the researchers disagree among themselves on the cognitive side thinking represents one of its components, as the researcher's success has to do with the pattern of thinking that is in scientific thinking and creative and critical [7]. And care for critical thinking is the focus of this study, and critical thinking is in the researcher's ability to verify the assumptions and alternatives, using the methods of experimentation and arrived at the facts [8]. The train researchers to use a method of critical thinking is an essential process to address the many changes successive in which we live, because this kind of thinking makes them differentiate and choose between several alternatives and judgment on this alternative chosen without interference to hand self-governance and Select. In light of the above show the importance of trying to reach a scientific method to detect components ability to think critically at graduate students, this kind of thinking, which is described as the finest thinking in order to detect researchers able to look at things around them look objectively without intolerance or jumped to the results as well as their ability to provide arguments and evidence and the evidence to solve the issue or problem before sentencing as it seems the importance of identifying the components global capacity to think critically as well as the identification of a set items brief represent factors learned have validity measure the ability to think critically of graduate students.

Aims:

1- Determine the factorial structure of items that constitute a measure critical thinking among graduate students..

2- A group of items brief (representing factors derived) have the power to measure the ability to think critically with graduate students.

3- To identify the differences in the ability to think critically of graduate students (Masters, Doctoral).

Hypotheses:

1- Candidate items to measure the ability to think critically of graduate students are gathered in the form factors.

2- Learned factors can be represented through a number of items and aggregating expressive power factor on critical thinking among students graduate.

3- There are significant differences in the ability to think critically of graduate students (MA, PhD).

Materials And Methods

Approach:

The researcher used the descriptive (survey) approach.

Sample Research:

A random sample of students and graduate students enrolled for a master's degree or doctorate, Faculty of Physical Education at the University of Kafr el-Sheikh, and the Faculties of Physical Education for Girls and Boys, Alexandria University during the academic year 2010/2011, consisting of 90 students by 60 students stage Masters, 30 students and asked stage doctorate.

Building scale:

In order to prepare the ability to measure critical thinking among graduate students, researchers follow the following steps:

1- Review theoretical frameworks and studies that addressed the issue of the thinking in the field of psychology in general, as well as critical thinking attributes in particular.

2- Review standards and tests and lists Standardization ability to think critically, which include:

- Be wasted thinking test (amended) good preparation Ibrahim Mahmoud.
- California Critical Thinking Skills Test From (A) Facione Peter & Facione Noreen.
- California Critical Thinking Skills Test From (B) Facione Peter & Facione Noreen.
- California Critical Thinking Disposition Inventory (CCTDI) Watson Glaser Critical Thinking Appraisal.
- Cornell Critical Thinking Appraisal.
- List of critical personal attributes preparation Farouk Osman.

The preparation of the initial image of the scale:

Included the first picture of the scale of 37 items were formulated in the light of the review of standards and tests and lists the previous one hand and in the light of the perception the theoretical concept and

the skills and attributes critical thinking graduate students in the current study on the other hand, has been proposed items on the number five 5 experts in the field of sports psychology and measurement and evaluation and research of faculty members at universities Kafr El-Sheikh, Alexandria, Banha. In order to determine the accuracy of the items scale in the expression of the ability to think critically to graduate students after introducing them to this concept and skills and clarity of the items in terms of the wording has been applying the same image on a limited sample of the original community of research and outside the research sample core composed of ten students and graduate students were asked to answer to the terms of the scale and writing observation, especially with regard to items and instructions clearly and the expression of these items for their beliefs and attitudes toward the ability to think critically and in the light of these actions has been re-drafting and deletion of some items.

Results And Discussion

Scientific transactions of the scale:

Validity scale:

scale has been found through all of:

-Validity arbitrators: the purpose of the scale on Gentlemen experts noted them and has identified researchers percentage of 80% to accept the item and based on expert opinions have been deleted seven items, as well as the reintegration and drafting four items, bringing the number of items 26 items.

-Validity configuration hypothesis: or what is sometimes called honestly concept is one of the types of honesty by which they can know how to measure the test to impose a certain configuration or a particular attribute[10].In this current study was important to verify the authenticity of the ability to think critically in measuring features put forward by researchers in their perception of the oretical concept, and to achieve that, the researchers studied sincerity configuration hypothesis of scale on the sample (n = 9) through the study of Factorial Validity a of the best types of honesty traded[11] Through factor analysis to scale items considering that the purpose of the factor analysis is the interpretation of the correlations seen between the variables in the light of the minimal number of factors[12]. This has been factor analysis of items scale manner principal components set by Hotelling using the software package Statistical Social Sciences (SPSS), has been chosen method basic components as one of the most analytical methods factorial accuracy and advantages of the most important possibility to derive maximum variation per worker and thus summed up correlation matrix of variables in the least number of factors[13].Prior to the factor analysis was prepared matrix correlations between items scale, To reach the building simple factorial matrix correlations were analyzed previous analysis globally using the basic components of Hotellling principal components using litmus Henry Kaiser proposed Gutman a touchstone stop

derive factors that at least the underlying latent root the correct one[14].The stake depending on Cattell saw characterized by stability and provocation in the case of whether the number of matrix between variables 20 to 30 variable[15].In light of the above were extracted 6 factors directly, then conducted perpendicular orthogonal rotation way alvarimax concluded 6 orthogonal factors underlying root increases when the right one as the underlying roots ranged between (8.10, 1.21),as contrast ratio ranged factors between (31.15, 4.65), while the contrast ratio kidneys that have been extracted from the matrix is 84.2% this indicates Safwat Ernest Faraj[15] that whenever factorial high contrast ratio whenever we were in front of more important factors.

Table (1):

Distribution tie to the sum of the squares saturation factors before and after the orthogonal rotation.

Factors	The underlying root		The percentage of variation factors	
	Before recycling	after recycling	Before recycling	after recycling
first factor	9.03	7.97	34.73	30.65
second factor	5.23	5.45	20.12	20.96
third factor	3.89	4.18	14.96	16.08
fourth factor	1.54	1.59	5.92	6.12
fifth factor	1.17	1.36	4.51	5.23
sixth factor	1.02	1.35	3.92	5.19
Total	21.9	21.9	84.2	84.2

It is a table 1 and private distribution tie for the sum of squares saturation factors before recycling orthogonal and several clear convergence numerical sum of the squares saturation each factor of six factors after recycling them before recycling, which confirms the impact of the importance of recycling to achieve global operating on the convergence of the numerical values of the sum of the squares saturation factors[16].To determine the identity of the worker is required to soak him three items hash at least, and to calculate the statistical significance of the factors orthogonal been extracted equation Burt and Banks[15]. to calculate the standard errors of the factors the six learned in order to confirm the presence of these factors or lack thereof, has reached error values standard six factors respectively as follows 0.251, 0.256, 0.260, 0.265, 0.271, 0.276.According to the conditions of admission factors Guided building standards simplex has been accepted by four factors of the six factors learned a in the order they are received in the matrix global orthogonal first, second, third and fourth factors, while rejected fifth and sixth factor to the lack of conditions for the admission factor as the touchstone substantial Group> 3 saturation the material, as well as eliminated the phrase 1, 2 and became the standard in its final component of 24 items.

The following explanation of these factors:
1- Interpretation of first factor:

Table (2): Saturation values measure the first factor items

Item numbers	Single	Saturation	Common
13	The ability to evaluate issues	0.986	0.98
15	I accept results that gain to	0.981	0.98
14	I can make final judgments	0.979	0.98
9	I can test the validity of the results and discussions in an objective way that calendar	0.948	0.92
8	I can investigate the accuracy and note the facts that relate to the discussion topics	0.944	0.93
17	I can distinguish between opinion and fact	0.913	0.93
11	I tend to open up to new ideas and the trend towards it	0.885	0.96
10	The ability to in-depth observation	0.971	0.79
16	The ability to distinguish between bias and objectivity	0.650	0.86
19	I can judge the results in a logical way that	0.463	0.85
18	Possessed the ability to make decision	0.439	0.84
21	Possessed the ability to understand and analysis and synthesis	0.349	0.81
22	I can distinguish between the correct logic is correct	0.342	0.83

The Table 2 that saturation items measure the first factor reached 13 items, including four mean value and nine items with saturation major numbers 13, 15.14, 9, 8, 7, 11, 10, 16 are arranged according to values saturation The worker and represent 34.6% of the total number of items subject to analysis and dealing with these items ability researcher on calendar topics and discussions in an objective manner with the ability to differentiate between opinion and fact, as well as the credibility or reasonableness of the terms or representations other and can be named this factor calendar.

Table (3): Values saturation items measure the second factor

Item numbers	Single	Saturation	Common
25	The ability to logical reasoning and avoid common mistakes	0.921	0.90
23	Possessed the ability to develop reasonable assumptions when solving problems	0.901	0.91
24	Interested rational logic in thinking	0.861	0.80
20	Has the ability to bind variables	0.844	0.76
22	I can distinguish between the correct logic and reasoning is correct	0.843	0.83
21	Possessed the ability to understand and analysis and synthesis	0.765	0.81
19	can judge the results in a logical way that	0.718	0.85
26	The ability to draw relationships between the given facts	0.585	0.60

The Table 3 that saturation items scale factor second hit 8 items with saturation major numbers 25, 23, 24, 20, 22.21, 19, 26 are arranged according to values saturation the worker and represent30.8% of the total number for items subject to analysis and spin the meanings of these items about the ability of the researcher to logical reasoning and avoid common mistakes with the ability to develop reasonable assumptions when solving problems as well as pampering logical whether these results tracking provided afforded first so-called this factor to understand the rules of logic.

Table (4):

Values saturation items measure the third factor

Item numbers	Single	Saturation	Common
6	has the ability to infer to reach generalizations	0.984	0.98
7	has the ability to detect errors	0.980	0.97
5	has the ability to organize and creativity	0.963	0.94
3	has the ability to accept the views of others	0.816	0.67
4	has the ability to take different directions to solve problems	0.749	0.59

The Table 4 that saturation items scale factor third hit 5 items with saturation major figures 6,7,5,3,4 are arranged according to values saturation the worker and represent 19.2% of the total number of items subject to analysis It is clear for these items it deals with the ability to infer access to generalizations and deduce the proofs which meanings are uncertain by assuming the truth of these introductions and this factor can be named by a factor of heuristics.

Table (5):

Values saturation items measure the fourth factor

Item numbers	Single	Saturation	Common
12	has the ability to objectively Monetary	0.914	0.86
16	has the ability to distinguish between bias and objectivity	0.616	0.86
11	Emile openness to new ideas and the trend towards it	0.393	0.96

The Table 5 that saturation items scale factor fourth hit 3 items, including 1 item mean value and the number 2 clause with saturation major numbers 12,16 are arranged according to values saturation the worker and represent 7.7% of the total number of items subject to analysis and it seems that this factor associated most of the items under the researcher's ability to access to the results based on the merits alone away from the influence of the emotional aspects and this factor can be named by a factor doth objective facts.

2- the Reliability of the scale:

Reliability of the scale was calculated on the same above-mentioned honesty was calculated Cronbakh alpha coefficient The value of reliability coefficient 0.87 a reliability coefficient confirms confidence in the reliability of the scale.

Assessing the degree of the scale:

Be answered for each item of the scale according to a sliding scale of three times, namely:

- The answer largely given three degrees.
- Moderately answer given two degrees.
- Answer to a low degree is given by one degree.

The final score of the scale is the sum of all grades phrases 24 and maximum score for measure 72 degrees and the greater the student approaching this limit whenever Del on the severity of the orientation towards the ability to think critically.

Table (6):

Differences in the ability to think critically the graduate students (MA, PhD)

Scale	Masters (N = 60)		Doctorate (N = 30)		value (t)
	Mean	SD±	Mean	SD±	
The ability to think critically	44.02	3.91	56.07	4.18	13.39

*T table value on $p \leq 0.05 = 1.99$, $p \leq 0.01 = 2.63$, SD =standard deviation.

From Table 6 and private differences in the ability to think critically of graduate students (Masters, PhD) is clear and statistically significant differences at the level of 0.01 for the benefit of students doctorate stage a Degree, which was followed by a master's degree and you Doctorate degree mainly on original research for no less than two ends to provide message accepted by the jury and required traffic exam apply a in some universities may be costing the student some advanced studies as determined by the internal regulations and required to leave Doctorate degree to be a task of the scientific value testifies to the student competence profile in its research and studies and represents add new scientific[17]. which requires the researcher to subject the information obtained by the analysis and scrutiny to determine whether they are true, suitability or differ from the information that has already verified or attempt to distinguish between old information which proved its sincerity and new information received. This confirms William Obaid, attributing Afanah [18] that critical thinking is not a general feature enjoyed by all individuals, it is feared appearing before others look may explain aggressiveness are not strong enough to be a critic and swearing reciprocity and believes that his criticism Thematic means that others will meet with harsh criticism can not be a critic, especially those who admire his ideas and touted his proposals and performance. The main skill of critical thinking includes skill consists of

sub-set of skills can be identified and placed on small tasks of image and so long as it is a skill it can Mastery training and has called this skill critical thinker efficient. There are a number of skills which underpin critical thinking when students must be taken into consideration by all parties in the university and in particular the faculty members who are leading the educational process in the university and these skills:

- *Distinction between facts which can be substantiated and claims or allegations value.*
- *The distinction between information and claims and reasons related to the subject and is associated with it.*
- *Determine the level of accuracy of the novel or phrase.*
- *Determine the credibility of the source of the information.*
- *To identify the allegations and vague arguments or data.*
- *To identify unauthorized suggestions.*
- *To identify logical fallacies.*
- *To identify inconsistencies in the path of thinking and reasoning.*
- *Determine the strength of the evidence or the prosecution.*
- *A decision on the subject and build a sound basis for practical action.*
- *To predict what the consequent decision or solution.*

As mentioned Fahim Mustafa [19] that the process of development of critical thinking and enhance thinking independence of the students require stimulate students to grow their skill ask

Conclusion

The Researcher Concludes the Following:

1- Building the ability to measure critical thinking among graduate students designed to measure critical thinking for students and in accordance with the scientific foundations for building standards in the field of psychological measurement and evaluation.

2- Enjoy the measure genuinely high was estimated using sincerity arbitrators and sincerity configuration hypothesis (honesty factorial) where saturated most of the items 24 an item in terms of (± 0.3 and above) on one or more of the factors learned accepted have the power detection capability critical thinking students graduate they are distributed on four factors are acceptable: first factor Calendar factor 13 items, second factor workers understand the rules of logic 8 items, third factor heuristics factor 5 items, fourth factor: factor doth objective facts 3 items

3- Items learned may saturated in terms of high just one factor of four factors accepted a 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15,17, 20, 23, 24, 25.This refers to the purity of these items in measuring factors saturated, while saturated items numbers 11, 16, 19, 21, 22 on saturated significant factors and are therefore considered unclean items.

4- Enjoy a high scale by a factor of stability was calculated using the Cronbakh alpha coefficient was 0.87, a

reliability coefficient of confidence in the stability of the scale.

5- And there were statistically significant differences at the level of 0.01 in the ability to think critically of graduate students (MA, PhD) for doctoral students stage.

Recommendation: The researcher recommends the following:

1- The importance of using the ability to measure critical thinking among students graduate in its current form because of the high Factorial honesty of its clauses and consistency of the scale transactions.

2- Re-analysis of this research data using multiple global methods to verify the results that have been reached.

3- Conducting similar studies using the ability to measure critical thinking among graduate students at varying levels disciplines and academic levels of the students and for both sexes.

Study of the relationship between the superiority between the student and the ability to think critically so can be guided by the importance of those ability as a Ahuaml excel and achievement.

References

1- Ahmed Abdulkarim safety,2007: Asset methodology for the preparation of scientific research, dar al-fikr al-araby, Cairo,pp:48-75. (in Arabic).

2- Eklas Mohammad Hafeez, Musty Hussein Bahi,2002: methods of scientific research and statistical analysis in the fields of educational, psychological and sports, book publishing center, Cairo,p:44. (in Arabic).

3- Samir Abdul Qadir Gad,2007: scientific research strategy, theses, World Publishing House and distribution, Cairo, p:13. (in Arabic).

4- Soheir Bder Moussa,1982: Scientific Research, Knowledge House in Egypt, Cairo, p:24. (in Arabic).

5- Mohamed Awad Aidy,2007: preparing and writing research, theses, book publishing center, Cairo, pp:29,30.(in Arabic).

6- Abdel Sattar Jabbar Alsamd,2008: scientific research and applications of Mathematical Statistics, candles Culture House, Kuwait,p:15.(in Arabic).

7- Mohammad Hashim Ryan2009: teaching strategies for the development of the intellect, farmer library for publishing and distribution, Kuwait, p:119. (in Arabic).

References

8- Farouk Elsayed Osman,1992: list of critical personal attributes, Journal of Psychology, Issue 22 ,Year 6, the Egyptian General Authority for the book, Cairo, p:20. (in Arabic).

9- Amal sadei, Fuad Abu Hatab,2007: Research Methods and Statistical Analysis Methods in Psychological Science, educational and social, the Anglo-Egyptian Library, Cairo, p:89.(in Arabic).

10- Fuad Elsayed Bahi,1979: Statistical Psychology and measurement of the human mind, i 3, dar al-fikr al-araby, Cairo, p: 554.(in Arabic).

11- Mohamed Sobhy Hassanein,1982: ways to build tests and measurements in physical education (global roads), i 1, the Central university textbooks and teaching aids, Cairo,p:124.(in Arabic).

12- Mahmoud El Sayed Abu Nile,1986: factorial analysis of human intelligence and abilities, study Arab world, Arab Renaissance House, p: 51.(in Arabic).

13- Safwat Ernest Faraj1975: rationing creative abilities tests, unpublished Ph.D. thesis, Faculty of Arts, University of Cairo,p:99.(in Arabic).

14- Safwat Ernest Faraj,1980: factor analysis in the behavioral sciences, Arab Thought House, Cairo,p:344,150,151.(in Arabic).

15- Fuad Elsayed Bahi,1985: numerical ability, dar al-fikr al-araby, Cairo, p:119.(in Arabic).

16- Regulation Act universities and its implementing regulations1992:according to the latest amendments, the seventh edition amended, the General Organization for princely presses, Cairo,p:56,57. (in Arabic).

17-William Abdul, attributing Afanah,2008: thinking and of the school curriculum, library farmer for publication and distribution, Kuwait, 2008. pp: 53 – 55. (in Arabic).

18-Fahim Mustafa,2002: thinking skills in general education, dar al-fikr al-araby, Cairo,p:242.(in Arabic).