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Learning Styles according to the Model of Felder & Silverman and its Relationship with Mathematical Self-perceived Efficacy to Students of the College of Education for Pure Sciences - Ibn Al-Haitham

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Abstract: ***This research aims toknow the learning styles according to the model of Felder and Silverman and its relationship to effectively self- perceived mathematicalamong students of the Faculty of Education Pure Sciences - Ibn al-Haytham. By answering the following questions: 1. What are the preferred methods of learning among students in the mathematics department according to the model Felder and Silverman? 2. What is the mathematicalself-perceived levelof the students at the Department of Mathematics effectiveness level? 3. What is the relationship between learning styles according to the Felder model and Silverman and the effectiveness of mathematical self-perceived of the students of the Department of Mathematics? The research sample consisted of 80 male and female students from the fourth grade students in the Department of Mathematics in the College of Education Pure Sciences - Ibn al-Haytham for the academic year 2015/2016. As for the two tools the first search tools is a measure of learning methods developed by (Felder and Silverman, 1988) Translation (Al-Zubaidi, 2015) which consisted of 44 items distributed on four areas: (practical - Contemplative) - (sensory - intuitive) - (optical -pronunciation) - (sequential - total).And the second tool and is a measure of the effectiveness of sports self-perceived, which consists of a paragraph (30), were reliability and validity account and conducted statistical analyzes to calculate the difficulty and ease transactions. After the use of appropriate statistical methods to analyze the results, the results indicated that (1) 37.5% of the students have more than one level indicating no preference for any style of learning. (2) 30% of the students' own (visual - verbal)method (3) 16.25% of the students' own (sensory - intuitive)method. (4) 11.25% of the students' own (sequential - total)method. (5) 5% of the students' own (practical - Contemplative)method. (6) Students did not prefer any of the styles (intuitive - verbal - total). (7) the students in grade IV Department of Mathematics in the College of Education Pure Sciences / Ibn al-Haytham students have aware of the effectiveness of mathmatics. (8) There is no relationship between the learning styles according to the model Felder and Silverman and the effectiveness of sports self-conscious of the students of the Department of Mathematics Therefore, the researcher recommends that students should be aware of the methods and activities that are compatible with their learning methods, as well as the development of their perceived mathematical effectiveness to enhance their ability to solve any mathematical task, no matter how difficult and flexible it may be.In the light of the results of the research, a number of proposals were developed.***

Keywords: Learning styles, Model of Felder & Silverman ,perceived efficacy ,mathematical self-perceived

1. Research Problem

Despite recent studies and the continued pursuit of researchers which are specialized in curricula and teaching methods to reach students to the best solutions for the advancement of education and learning, but we still note keen many of the teachers to follow the traditional methods of education, ignoring the appropriate methods of learning styles of their students that they like and that will may work on the development of cognitive method, which is in turn the basis for raising the level of academic achievement.

Hence, the research problem is determined by answering the following questions:

1) What are the preferred methods of learning among students in the mathematics department according to the model Felder and Silverman?
2) What is the level of mathmatical self-conscious students at the Department of Mathematics effectiveness level?
3) What is the relationship between learning styles according to the model Felder and Silverman and the effectiveness of sports self-conscious of the students of the Department of Mathematics?

2. Significance of Research

Under the modern trends of concentration of educational process on the learner and how his thinking, and employ subject to interest of the learner that led to the necessity of choosing teaching methods tune with how to learn.

And there is no different than two in individual differences between educated and how to teach them and the way they think, and so we cannot ignore these differences in the class room and dealing with learners at the same level, ignoring the needs of others, so it is necessary to pay attention to those needs that are basic requirement when developing and implementing any curriculum.
And mentioned (tabshi, 2013:1), so that preparing teacher on effectiveness of scientific knowledge for teaching material of the most recent trends in teacher formation programs before and during the service and is the basis of the successful teacher teaching performance and to improve the educational process as a whole .
So can determine the importance of research in being:

- May help educators train students-teachers in academic preparation for the teaching profession in order to focus

on the need to take into account students learning methods when teaching.

- Emphasize on the importance of learning methods according to Felder and silverman model paradigm in determining the preferred method among students and make learning more effective by easily selecting appropriate activities to teaching methods and learning styles.
- Build a measure of self perceived effectiveness of mathematics.
- This research may benefit students by highlighting the factors that lead to more effective self conscious about mathematics.
- May help current research interest in the development of effective self perceived mathematical learners through enhanced confidence of learners in their ability to learn and themselves and flexibility in dealing with difficult tasks and definitely go after learning of mathematics information and applied in new situations.
- Increase the importance of the outputs of the Faculty of education, by taking into account the diversity of needs of fourth grade students according to the different learning styles

Research objectives

Current research aims to identify

- To know the favorite learning styles for math students according to Felder and slverman model.
- To measure the level of effectiveness of self perceived mathematical level among students in t
- To find the relationship between learning methods according to the model, of Felder and slverman for the mathematical mathematics students.

Limitation of Research

Current research is determined by the fourth grade students in the Math Department in the College of Education Sciences/alhaithemen-Baghdad University, academic year (2015-2016

Research Terms

First: learning methods: Learning Style: It defined by **Felder& Brent, 2005)**

As cognitive, emotional and psychological characteristics, which represent a relatively stable indicators on how to recognize the learner's learning environment and interact with them and respond to them. , P.51(Felder * Brent, 2005)

The theoretical definition: the definition adopted by the researcher (Felder * Brent, 2005) methods of learning being addressed in their search learning methods according to the model Veldr and Silverman

Procedural definition

Fourth grade in the Department of Mathematics in the College of Education Pure Sciences - Ibn al-Haytham students group responses on a scale of learning methods developed by (Feldr and Silverman, 1988) which expressed in degrees of the students.

Second-Perceived Self- Efficacy: It defined by BANADURA, 1997) as the evaluation of the person to his capabilities to solve the mathematical questions successfully (Pajares,1996;p.325).

Perceived self-efficacy:

Defined (AL- Zayat, 2001): ' it's the belief of the individual level of effectiveness or potential capabilities, and what is involved in emotional and cognitive mental, physiological sensory neuron, to address attitudes, tasks or problems and the Academy and influence events of accomplished under existing environmental determinants. (Al-Zayat, 2001:83)

The Theoretical Definition

Self-efficacy can be defined according to the perceived mathematical theory of Pandora (1988) individual assessment of his ability to accomplish a task successfully sports and aware of its flexibility in dealing with difficult and complex mathematical tasks and possibility of mainstream sports in new knowledge.

Procedural Definition

Evaluation of the fourth grade students in the Math Department in the College of Education Sciences — alhazen to their ability to accomplish the task successfully and mathematical understanding resilience in dealing with difficult and complex mathematical tasks and possibility of mainstream sports knowledge in new situations, as measured by the degree to which get very effective measure perceived this research on sports

3. Theoretical Background

First: learning styles:

The learning styles have anyone represent the preferred way to organize information and experiences (Mahmoud, 2001:99). And pointing (Badawi, 2010, 54) in the event of a contradiction between the methods of learning the most students in the class and teacher's teaching method and result in the lack of attention to the lesson material and loss of enthusiasm toward her and thus to study problems and a clear decline in their performances.

The models that addressed learning methods:

There are a large number of diverse learning styles and models used for diagnosing learning styles below are some of these techniques are explained in table (1)

Table 1: Some samples of learning styles

Description	style	الأنموذج	ت
Emotional in this method the student assumes that the indicative value of something that the student on this method by evaluating its achievements according to his outbursts, and not based on rational reasoning**.**	Emotional	Karl 1972	
Thinker suggests that thinking might help clarify the meanings of things, it is rational to engage student thinking and what happens to him is classified into categories**.** Intuitive intuition refers to the odds you take things, and presumably a student with an intuitive method to be fashion conscious correlates exactly with the intuitive realizes what they see and what they feel in some way integrated College	Thinker		
he sensory sensations demonstrate what things, and that the student understands fashion conscious sensuality, but it might not diagnose what felt and cannot classify things into categories, although the student understands but allows the sensations that occur without forcing or adjust	The sensory sensations		
Intuitive intuition refers to the odds you take things, and presumably a student with an intuitive method to be fashion conscious correlates exactly with the intuitive realizes what they see and what they feel in some way integrated way	Intuitive		
Its elements: sound, light, temperature, design	Environmental	Dan wadan **1979**	**.2**
Elements of motivation, perseverance, responsibility, the structure	emotional		
Its elements: self, pair, group and team, maturity, diversification	social		
Its elements: perception (Visual, auditory, motor), time, movement	Bodily		
Components: analytical, totalitarian-brain, burst/meditation	psycological		
0Featuring this technique owners ability and desire to find meaning and use Parallels and similarities in the description of integrated ideas, as well as connect them to new ideas by previous experiences, and tend to use evidence and proofs in their learning	Deep	Alnostil Entwistle 1981	**.3**
Bodied distinguishes remember some facts on a subject, and related questions in this thread, and rely on their studies on specific curricula and clear instructions, save and logical method to access the facts in detail**.**	Not deep		
And recognizes unable to organize their study times to negative attitudes towards study lessons, learning foreign wedavaithm for success only, and always trying to get some tips and pointers of the teacher in the learning situation	Strategist		
This method features ability to resolve situations and problems that require one answer 0 and these individuals usually relatively soft, and prefer to deal with things if compared with other, usually narrow interests tend to specialize in natural and engineering sciences	Zeiss	KolbKolb, 1984	**.4**
Featuring this method by using sensory experiences and contemplative observation, as well as extensive mental concerns, see attitudes from many angles, and performing better in situations that require the production of many ideas particularly brainstorming and parking are also effective sympathy with others, interested in the study of Humanities and arts	Far thinking		
Featuring this method by using abstract concepts and contemplative observation, as well as their ability to develop theoretical models together with inductive, understand divergent observations and information in an integrated manner, and not interested in the practical application of ideas, tend to specialize in science and mathematics	conceptual		
Featuring this method by using sensory experiences and experimentation and their ability to execute plans and testing and integration into new experiences and problem solving by trial and error, dependent on other information, tend to study technical and process areas	adaptively		
And owners of this method believe that school learning is going towards other ends mainly getting a job, and their goal is to accomplish the requirements of academic content through memorization and recall**0.**	Not deep	Biggs ,1987	**.5**
This owners method features Interior and real understanding of what they learn, and the ability of interpretation and analysis, summary and care about and understand the course and absorbed, and linking theoretical ideas everyday life experiences, they have serious concerns about the study	depp		
The focus of this method to get the highest score and not on a mission to study, and are characterized by their ownership of good study skills and organization time and effort	achievement		
And owners of this method are learning through experimentation and work in groups in Exchange for learning abstract thinking and individual work	Practical-reflective	Felder and Silverman Felder and Silverman, 1988	**.6**
And learning here through sensory or Visual thinking with orientation towards the facts and concepts in Exchange for abstract thinking and orientation towards theory and beyond on 0	Sensory-intuitive		
Tend to the Visual Forms of art from photos and diagrams for verbal and written explanations	Verbal-Visual		
And learning here through sequential minute steps against totalitarian or thinking of position	Sequential- total		

Felder and Silverman,1988; pp (674-681) (63-58), 2010, (Badawi)

Exemplar learning methods of Silverrman and Felder:
Richard Felder and Linda slverman had put in the late 1980s model for describing learning styles which was reviewed by fielder in 2002 and the four dimensions bipolar: practical – sensory-intuitive/meditative/optic – sequential-verbal/totally. (Badawi, 2010, 64)

Silverman put this model for many reasons some of them are: to know different learning methods, and provide a good basis for teachers to design the learning process and that would address the needs of their students.

Discover, 1988) (Felder * Silverman three issues:
1) Aspects of learning style that are important in education.
2) Most preferred learning styles among the learners.

3) The strategies that will reach the learning styles that never fits the traditional teaching methods. (Felder*Silverman,1988: 674)

Self Perceived effectiveness of Sports

Self-efficacy refers to a person's beliefs about their ability to organize and implement practical plans required to accomplish the desired goal, meaning that if I think an individual that possesses the power required to achieve this goal , it tries to achieve these goals. Pandora has developed his theory of perceived self-sufficiency in 1984-1986, indicating that human behavior is largely dependent upon the provisions of the individual and his beliefs and expectations about the adequacy of behavioral skills (Abu Alayan , 2011, 2335)

And mentions (faramawy, 1991) that effectively perceived self indicating sign person and aware of its efficiency and effectiveness, and possesses the ability to deliver, which would define a person's path, and define the behavior in situations requiring high achievement. (Faramawy, 1991, p. 374)

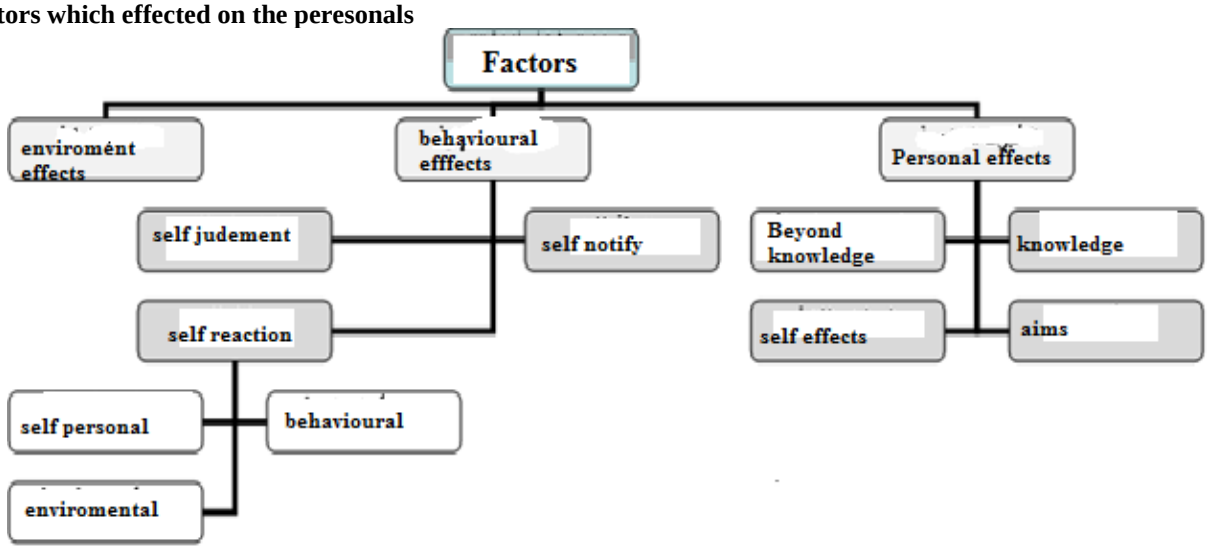
Perceived self-efficacy is a learning task parameters which reflect the range of provisions related to achieve the individual only, but judging by what can be accomplished. It is a self-antennas does not specify just feelings but by the individual calendar for himself what he can do, and perseverance, and the amount of his efforts, and how to deal with tricky positions held by flexibility and the amount of resistance to failure. (Yousef, 2013, 329)

Little (Al-mikhlafi, 2010:485) to growth and continuing self-efficacy depends on what happens on the individual support of others being linked to specific social and environmental conditions.

Perceived self-efficacy depends in part on the individual's perception of itself and the image is developed by an individual and which affect in Stewie effort in performing. (AL-Yousef, 2013:335)

And synthesized (Salem, 2009:137-138) factors that influence the effectiveness of self and cornered her in three sets are personal effects, behavioural effects, environmental effects. As shown in figure (1)

Factors which effected on the peresonals



Research community and its sample

A Community of research consists of students of Mathematics Department in the College of Education Sciences/alhaythmen study of year 2015/2016, (782) students (520) students in the morning, and study (262) students in evening study in the, and as shown in table 2 below:

Table 2: Research community spread over four stages

Total	Evening	Morning	Class
271	**80**	**191**	First
185	**90**	**95**	Second
167	**42**	**125**	Third
159	**50**	**109**	Fourth
282	**262**	**520**	Total

the research sample consisted of fourth grade students after them pure Sciences College of education outcomes – Ibn al-Haytham's (80) students who attend virtually time.

Research tool

1) Measure Learning Styles

The researcher adopted a measure learning styles of felder and Silverman who presented the Iraqi environment and cart (Al-Zubaidi, 2015) and the scale component of (44) paragraph spread over four areas 11 bipolar paragraph for each of the areas (practical-reflective sensory-Visual, verbal-sequential, –) and per paragraph answers(a) and (b) chooses one respondent it gets degrees (1) on the alternative chosen by either (a) or (b) the other alternative gets (0) and collecting degrees each pole and subtract degrees Variant (a) of Variant (b) we get The degree of each individual and confined between (11 + 11) ranging from those degrees to balanced or weak within each of the four dimensions of learning styles.

It is the preferred method as well as treated expats scores ranged between strong (-9-11) or between (+ 9 -+ 11) weight (2) while giving weight (1) in the event as well as treated

expats scores ranged between (-5--7) or between (+ 5 – + 7)) And the preferred method of moderate, if the grading ranged between (-3 to + 3) weight (0) and balanced method.

Felder&Spurlin : 2005 , 103-11
Felder* Spurlin : 2005 , 103-112

2) Measure the Effectiveness of Mathematical Self perceived

The researcher set up self perceived effectiveness of mathematics based on the theoretical literature and previous studies and a number of standards that addressed the effectiveness of self and self-efficiency and effective sports self perceived as study (NET, 2015) and his lesson (FM, 2015) study (Al-Ba'aj, 2011) in the light of the analysis of self-potency definition Pandora shows that includes three dimensions: sports self-confidence, flexibility in dealing with difficult mathematical functions, generalizing mathematical knowledge .

3) Formulation of paragraphs and identify alternatives and weights

(30) paragraph was drafted paragraphs were standard as raw, Supplement (1) have been developed to suit the Iraqi environment and appropriate to undergraduate level. The researcher has developed (4) paragraphs remaining negative paragraphs, all positive

After the completion of the draft standard clauses the researcher identify alternatives to answer and weights the adoption of likert scale design method, putting three-selection in front of each paragraph as comes (applies always, apply to sometimesm do not apply to start) with weights on according to their direction, and fixed weights (1, 2, 3) to the positive paragraphs, and (3, 2, 1) paragraphs.

Learning styles and gauge plate gauge self perceived effectiveness of sports on an exploratory sample consisted of (90) student of math students in the College of Education Sciences-alhaithm , on Wednesday, 30/12/2015 to learn how to understand paragraphs clearly answer help and scales and show that there are no vague paragraphs, and calculate the average time required to answer, have been calculating the overall rate of time to answer and it turns out that the time required to answer (75) minutes.

As the researcher to conduct statistical analysis of the scale..

4. Statistical Analysis of Scale

The discriminatory power of researcher respondents ranking of reconnaissance (90) and adoption rate (50%) To select the two extremes (upper and lower) to ensure meaningful differences between middle high and low groups students grades for each paragraph of the scale, the results showed that differences were a function of all the vertebrae at the level indication (0.05) and the degree of freedom (88) and it came back all paragraphs.

Honesty:

Validated virtual self-efficacy scale honesty sports after perceived cubits group of arbitrators specializing in education, educational psychology and teaching methods to demonstrate their opinions and suggestions about the validity of the measure and its validity, and did not reject any paragraph of the scale, so check the honesty of the scale. Construction has also been faithfully checking by finding discriminatory power as mentioned in paragraphs

Consistency

Checks of self-efficacy scale alriadaihalmdrkh using cronbach Alpha coefficient equation persistency extracted (0878) this shows the enjoyment scale steadily and after completing the statistical analysis procedures and pointers corrupt final measure honesty (30) paragraph spread over the factors mentioned by Pandora in defined in the light of the opinion of the judges, as shown in the table (3).

Table 3: Self-potency factors represented by paragraphs mathematics

paragraphs which are represented it	*Factors*
10-1	Mathematical -confidence sports
20-11	Flexibility in dealing with difficult mathematical functions 11
30-21	Disseminate mathematical knowledge

For each paragraph three progressive alternatives (applies always, apply to the times, does not apply to start) the student selects what suits him, and includes positive and negative passages where paragraphs (14, 16, 29, 30) other positive and negative paragraphs, extension (1), so the maximum score can get the student is (90) and inferior (30).

Final application:

For the purpose of extracting the current search results applied albahathtan measurements according to learning styles model Feldar and silverman and self-efficacy scale perceived sporting a sample search (80) students and a student of fourth grade Math Department-College of Education Sciences — alhaithemen in Baghdad University on Sunday, 10/4/2016.

Vi: statistical methods

The researcher used a number of statistical methods in the extraction of alsaykomtrih properties of self-efficacy scale perceived and alridet search results:

- One sample t-test.-
- Two independent t-test.-
- Cronbach alpha formula.
- Pearson correlation coefficient.
- The percentage

5. Results and Discussion

This section contains display search results reached in the light of the objectives set and the most important recommendations and proposals. The first objective: identify the preferred learning methods in Mathematics Department students according to model of Felder and silverman:

The results of statistical analysis using duplicates and data percentages:

1) 37.5% of students have more level which shows no preference for any learning style.
2) The style of (Visual-verbal) got on the first level, where the percentage of students who prefer this level 30%.

3) The style of got style (sensory-intuitive) got second place where students who prefer this level 16, 25%.
4) The style of method (macro-sequential) got number three to get preference ratio (11, 254.
5) (practical-reflective) got to fourth place for receiving a percentage of 5% preference.5- the style of the students prefer any of the styles (intuitive – verbal – total)
6) With regard to the degree and the weight of each dimension in each method can be illustrated in the table (4)

Table 4: Weight of each dimension in each method

fair	Medium	strong	Weight	percentage	style
%0	**%1,25**	**%1,25**	Practical	**%5**	Practical-reflective**.**
%0	**%2,5**	**%0**	reflective		
%0	**13,75**	**%2,5**	Sensory	**16,25**	Sensory-intuitive
%0	**%0**	**%0**	intuitive		
1,25	**%13,75**	**%15**	visual	**%30**	Verbal-Visual
%0	**%0**	**%0**	verbal		
%0	**%8,75**	**%1,25**	Sequential	**%11,25**	Sequential -total
%1,25	**%0**	**%0**	total		

The second objective: identify the level of self perceived effectiveness of mathematics among students in the Math Department**:**

The average sample of research degrees (80) students in self-efficacy scale perceived sports (67, 95), standard deviation (6, 29) and is above average this speculation to scale (60), when calculating the difference between the medium indication using one sample t-test calculated t value (10249), is greater than the value of table t (1664), when the level indication (0.05), and the degree of freedom (79), as shown in the table (5).

Table 5: Significance of the difference between the arithmetic average and T value proposition and respondents degrees

Freedom degree	Significant level	T value		Proposed mean	Standard deviation	arithmetic mean	sample	variable
		tabular	calculated					
79	**0,05**	**1,664**	**10.279**	**60**	**3,366**	**67,95**	**80**	Self perceived mathematical calculated effectiveness

Note that the mean effective self perceived sports have higher than average search sample this speculation, demonstrating their ownership of self perceived effectiveness of mathematics.

The fourth objective: identify the link between relationship and effective learning methods areas self perceived sports . To identify the direction and strength of the relationship between learning and self perceived effectiveness of sports, the researcher used Pearson correlation coefficient. Correlation values were as methods (practical-reflective, intuitive visual, sensory-verbal-sequential, – total) are respectively (0021, 0, 17, 0, 16, 0, 03), when compared with the value of the correlation coefficient is equal to table (0.217) significance level (0.05) and the degree of freedom (78). Thus, the calculated values less than indexed this means no correlation between variables.

6. Conclusions

1) Most preferred learning methods students are methods (sensory, Visual)
2) Students didnot preferred either of the methods (intuitive-holistic-verbal).
3) h Aigh percentage of students did not prefer any other level where the proportion (37.5%)
4) The search of effective sample students have high effectiveness of mathematics.
5) There is no correlation between learning methods according to the model of Felder and Silverrman and self perceived effectiveness of sport among students in the sample search.

7. Recommendations

1) The need to diagnose teachers and teachers to their students learning methods preferred for selecting appropriate learning methods to those methods.
2) The need to diversify teaching methods to suit individual differences among learners.
3) Interest in the development of learning methods with learners through attention to appropriate activities.
4) The development of effective self perceived mathematical learners to contribute to the difficulties they face when studying material for mathematics

8. Future Works

1) Conduct a study similar to current research on another non-university stage.
2) A conduct a study to identify the preferred learning styles of the students according to several models of learning styles.
3) A study on the comparison between different models of learning styles and their relationship with the self perceived effectiveness of sports.
4) A study appeared the relationship between self perceived effectiveness of mathematics with other variables

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Appendix 1: Self efficiency mathematical scale

Doesn't apply	sometimes apply paragraph	always apply paragraph	paragraph	ت
			I feel capable of good analysis steps in 2 math activities.	1.
			I feel unable to distinguish between what I can or can't do in math.	2.
			I think I'm qualified and capable in math	3.
			Easily accomplish what I assign its duties in mathematics	4.
			I can learn any subject if focused	5.
			Understand mathematical concepts well	6.
			I have a very high opinion of my math	7.
			draw basic and important points in math	8.
			Understand the information easily without having to	9.
			I trust that my math enable me to succeed in	10.
			Enjoy learning the difficult information even if I made	11.
			I can complete the sporting activities accurately whatever these activities	12.
			The prefermathematical information easy information difficult	13.
			Avoid handling the complex details in mathematics accept the most positive information and ideas	14.
			I find it hard to think of unusual new information	15.
			Use different ways of thinking to meet the challenge of knowledge in mathematics	16.
			I avoid my usual method of dealing with difficult tasks in mathematics	17.
			Enjoy the additional information despite the difficult	18.
			Find a variety of solutions to the problems of learning mathematics that face me	19.
			Looking for new applications for ideas that I have in mathematics	20.
			mathematics knowledge had invested in similar situations I review previous knowledge when facing an uncertain scientific attitude in mathematics	21.
			Use than learn today in future situations I could link what possessed the information between similar	22.
			situations had suitable sports information qualify me to face future positions	23.
			benifit from learn of today in future situations	24.
			I could link what possessed the information between similar situations had suitable sports information qualify me to face future positions	25.
			I trust my ability to recruit local environment sports information	26.
			I have enough information to understand what I'm going to learn	27.
			I get confused when asked to use my knowledge in new situations	28.

4.