
Effectiveness of Electronic mind mapping by using smart board in constructive perception with intermediate second year students of Physics

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Summary of research

*The research aims to identify Effectiveness of Electronic mind mapping strategy by using smart board in constructive perception with intermediate schools second year students of Physics For realization of this research the experiment carried out on intermediate schools second year students of Hurr Riyahi School as sample for research and randomly 27 intermediate and high schools of Educational directorate of Diwanayah province were selected including computer lab and smart board, the research sample contains on (54) students, (27) students in each group and both groups are equal, to prove the research hypothesis both scholars prepared constructive perception scale towards physics subject (33 passage) it was realized by their faithfulness, realization and application after end of experiment, the results led to a statistical significant difference between intermediate grades constructive perception scale towards physics between experimental group students and blank group students and experimental group students. In the light of research results both scholars concluded the Effectiveness of Electronic mind mapping in teaching physics methods with **intermediate second year students**.*

The research problem

The research problem represents the collection and perception of physics subject mainly with most of the students as the concepts are counted in abstract concepts and how the student receive these concepts is a significant element in the process of learning and apprehension, both scholars have observed through their experience in teaching physics and with the help of opinions of colleagues who are experts in teaching physics subject through a study carried out by the scholars that the reasons of approaching gradually attributable to some students dealing with the contents at the same level of importance, as well as students depends on readymade summaries which keep them away from thinking process specially realizing the new concept based on earlier concept, in addition to this the ability of students to

summarize the ideas become weak and turn them into shapes and symbols which make easy the perception process and lead to store and strengthen in long term memory and unorganized the information deeply in the brain. Some have expressed that the decrease in the level of achievement goes to applied traditional teachings methods, either in terms of mental electronic map strategy using smart board then their answers are no and they did not use it previously.

Scholars noted that they have no idea how to improve the quality and develop the constructive perception of students. Both scholars observed that the most of study plans prepared by the teachers who are dependable on traditional teaching methods as well as behavioral purposes depend on memorizing.

As some educational studies and research pointed out in the field of physics teaching discovered by the scholar as study (Jabar, 2013) and Study (Al Nabhan, 2013) the decrease in the level of achievement due to not applying modern teachings methods as well as a large number of students are not equipped appropriately to think as it stressed on need for their teaching thinking skills in addition to discuss on other issues such as non using of computers and electronic programs in teaching as well as there is need to bring scientific and technological revolution and new technology how to engage them.

Therefore both scholars suggested the teaching of physics according to electronic mind mapping using smart board which may contribute in the development of constructive perception and increase in attainment of physics with intermediate schools second year students of Physics.

And thus both scholars fix the research problem with following question:

What is the Effectiveness of Electronic mind mapping by using smart board in constructive perception with intermediate second year students of Physics?

Importance of research: Importance of research can be summarized with following points:

1- Importance of electronic mind mapping as strategy in teaching physics at secondary level which may contribute in the development of constructive perception and increase in attainment of physics subject.

2- The current research may help to review contents of physics subject at secondary level and draft the concepts on the basis of electronic mind mapping strategy.

Objective of Research: The current research aims to identify the effectiveness of Electronic mind mapping by using smart board in

constructive perception with intermediate second year students through answering the following questions:

1- What is the Effectiveness of Electronic mind mapping in constructive perception with intermediate second year students?

Research hypothesis: to achieve the goals of research and answer the research question both scholars set up following null hypothesis:

1. There is no concept statistical difference at concept level of (0.05) between experimental group students level average who are studying using electronic mind mapping strategy and average of blank experiment group of students who are studying in normal way in constructive perception.

Research limits: The current research can be determined as below:

1- Second year students of secondary and high schools of Educational directorate of Qadisiyya/ Diwanayah province.

2- Second year academic course for the year 2015-2016.

3- Four last chapters from Al Fizia Book for second year intermediate 6th edition, 2014.

4- To use electronic mind mapping strategy through software (iMindMap9).

Definition of terminologies:

1- **Effectiveness:** Scholars define: The expected effect occurs at teaching research sample using electronic mind mapping strategy using smart board and measure at constructive perception scale levels in physics subject to group of experimental students and blank experimental students of this research.

2- **Electronic mind mapping:** defined by (Buzan, 2016): It is a tool for visual thinking it can be applied to all learning functions specially memorizing, learning, creativity and analysis and draft through a process that involves a

distinguished group of images, colours and words, and this technique colors your thoughts using key words that make ready the brain to spark more ideas. (Buzan, 2016, P: 32).

Smart board: defined by (Mahdi, 2015): It is a touch screen whiteboard which control all computer applications and run multimedia files managing the lessons delivered by the teacher. (Mahdi, 2015, page no 181)

Procedural definition for electronic mind mapping using smart board:

It is software that uses images, colours, and symbols and it is one of the active learning strategies and effective tools to boost the memory and regain the information and produce new creative ideas, the scholars used the smart board to help the students in setting their physic information orderly in regular basis, the students sketch it through software, helping them to build the knowledge, understanding, setting ideas and achievement of physic subject and constructive perception.

3. **The constructive perception:** Defined by (Tu'mah, 2014) It is giving of image, colour, vision and meaning to sensory data resulting from previous and current experience and moving step by step into awareness and understanding plus other perceptions for perfection into the overall emotional and unconscious thoughts to produce formation of new ideas through mental perception regulations to reach upon the brain, and reflects on the facts with indirect shapes. (Tu'mah, 2014, P 19) Theoretical definition of constructive perception: the scholars followed the definition of (Tu'mah, 2014).

Procedural definition of constructive perception: It is giving of vision and meaning to sensory data resulting from previous and current experience of physic subject and

measured at overall level received by the respondent in result of his answer on constructive perception scale prepared by the scholars for this purpose.

Theoretical background

Education is facing major challenges as a result of what the world is witnessing the developments in various fields and a flood of information stunningly, till its became characteristics of the era in that we are living, which is making the educators to rethink in education systems and methods in front of this exploitation of knowledge, information and technology to create largest amount of innovations and research for best methods and techniques that will provide support to achieve the education objectives and curriculum through presenting miscellaneous teaching methods and learning styles, these developments will contribute in raising the scientific and educational level, and the significant elements that the teacher should follow in all stages of teaching and which have a clear impact on learning and academic achievement, it is the teaching method used by the teacher in classroom, a good method that will open the doors and provide many opportunities for students to take advantage from them, through the optimal use to their senses, and that will highlight their activities in front of them and allow them freedom of expression and independence of opinion, and encourages them to think, and raise their interest, orientation, and motivation to affirmative action, self-effectiveness and effective participation in the lesson. (Nasr Ullah 2004, Page 208), And some standards for selecting the teaching strategy has connection with thinking of all its kinds, as most of the educators agreed that the education for thinking or teaching of thinking skills is important goal for the Education goals and the teacher has to do everything what he can in

order to provide the thinking opportunities to his students, so the educators started the reconsideration in effectiveness of teaching methods and used strategies in schools as a reaction to what happened in recent years in education field and research for a private teaching strategies to achieve the educational goals. (AL Heela 2002, Page no: 188)

That the enrichment of human brain research in recent times has led to the emergence of new educational systems with beginning of the third millennium based on the harmonious learning with brain or to brain, This system of learning will have its effectiveness related to the education system policies and the use of technology, and some of the scientists suggesting that there are strategies the concord with the research for meaning, attention and perception, and those strategies are planning organizations and mind mapping (Mahmood, 2006, Page no 292,284). If planning organizations considered one of the educational strategies that reduce the gap between what is happening in the mind of the student and what you are teaching in the classroom, when the mind bump into new information, either it will be appropriate with them to find thinking patterns or modifies its build current fashioning so configured the meaning of these information, hence the graphical organizations considers visual perceptions which illustrate how the brain organizes these information. (Qarni, 2011, page no 7), The mental mapping considered one of the modern strategies that can be applied in this area, as defined by the Buzan "it is a wonderful tool to organize think which is very simple," The easiest way to enter information and connected to the brain and restore these information (Buzan, 2009, 12).

Studies also suggest that there is a differentiation between both sides of the brain, the right side is the brain specialist for innovative thinking and

Interstitial thinking and Visual spatial intelligence and visualization and colors, while the left side of the brain is to deal with the language, logic, analysis and sequential linear thinking, by looking mind map, we find that it combines right and left side of the brain, so it is considered one of the modern strategies that help to improve the efficiency of the link between the two sides of the brain, this means the brain has been put at the top position, and brain will turn during the learning process between two sides (Ambo Sayeedi and Balooshi, 2015, page 475), Also, the mind map is the best way to store information in the brain, and its invoking, which is way of the effective creativity for codification of notes, and a distinctive tool for the memory which is allowing to organize the facts and thoughts in the same way as work by mind, and more effective compared to using traditional methods to codification of notes, and the best way to interrogate ideas, (Bozan, 2009, Page no 6), The work of mind mapping is not limited to students, scholars and educative personalities, may be using these strategies by teachers, professors and lecturers for connecting their ideas at the time of delivering lectures and lessons in form of planned and compelling and targeted to arouse students' thinking which helps them to improve and develop their scientific level, (Al Asadi and Masoodi, 2014, page no 95), There are two types of mind maps in terms of implementation and those are paper map and electronic map, firs one which has to implement manually by using pen, paper and colors, and there should be a teacher or student to design manually, as well as its presentation and it is difficult to make amendments to it, and now the electronic mind map which is the best method and more professional, which saves time and be implemented through software can installed on a computer, and there are many software that provide major jobs, which allows to draw mind

maps and determine its shape and bifurcation and spaces forms, fonts, colors, etc. (Shawaheen and Badandi, 2010, page no, 37-38). The employment of a modern technological techniques in teaching and its usage for to improvement of teaching on an ongoing basis to get till satisfaction of the students in most of the skills and achieving educational goals, and perhaps one of the most contemporary teaching skills are proficiency to use and employ smart blackboard for the benefit of subject matter and teaching by teacher if available better educational services, and flexibility in using and controlling method of lesson which will make a major impact on teaching and learning, as well as the renewal and change and get out of the routine, which is often overshadowed our teaching performance (Emron, 2010, P:2), (Dahlan, 2014) Study confirmed that there is big impact for the use of smart blackboard in raising the achievement level for students, due to the adoption of teaching by using smart blackboard helps to increase the students' attention and turn the classroom into a scientific and likable cultural field which will transfer the method of scientific subject into interesting and attractive, which will make understanding and comprehension process easiest, and the flexible way in which smart board is used in teaching, which can absorption the group of effectiveness of resources ,tools and activities in an interesting context, and all these elements combine to achieve the desired goals of teaching, (Dahlan, 2014 Page no: 156), as well as (Tungprapa, 2015) indicated of possibility to create a electronic mind mapping with currently available technology, The electronic mind mapping contribute in development and stimulate thinking and grasp the relationships that lead to understand faster and better than trying to understand all verbal clarification, in addition to that is preparing a supportive strategy of higher

efficiency in teaching, and significantly enhanced, motivation and creativity memory among the students. (Tungprapa, 2015 P:803). While (Buzan, 2010) describes that the usage of a large blackboard or a graph or screen, through it the teacher able to sketch out during explanation of the lesson, and teacher enables to maintain a perfect balance between the free auto-talk on the one hand and to provide a clear and well presentation on other hand, as it enables the teacher to distribute time properly during the lesson, (Buzan, 2010, P:268), (Al-Harthy, 2009) point out that the use of mind mapping in teaching that would make the teaching process interesting and stimulating to learn, fun and effective at the same time, so the teacher can use smart blackboard for drawing a electronic map gradually with the progress of the lesson, which it will gives students a clear and integrated view of the lesson and build an organizational structure for the new knowledge, and puts it in the right place at the mental structure of the learner, as well as the gradual construction of the map which draws the students and brings focus their thinking to the lesson. (Al-Harthy, 2009, P:283), As electronic mind mapping considered one of the active learning strategies and effective tools to enhance memory and retrieval of information and generate new unfamiliar innovative ideas, where works in the same steps that works out of the human mind which will helps to activate and use both sides of the brain and ordering the information in a way to helps the mind to read and remember information instead of traditional linear thinking to study the problems and make strategies in a non-linear method and it has been prepared through software, (Abdul Razzaq, 2012, P:49). And considered one of the most successful means of preservation and retrieval depending on imagination and activations dramatically by using images and colors and writing, electronic

mind mapping helps the teacher to draw mind maps of a high standard, and in form of contributing to improving the teaching-learning process, (Qateet, 2011, page:242), A study (Abdel Mun'em, 2015) revealed that the electronic mind mapping have a standard of efficiency in acquisition of educational technology concepts, the researcher believes that the reason is because the electronic mind mapping have an impact on students, because it contains color, photographs and drawings as an alternative supportive for words, which will increase motivation of teacher towards the strategies, and this encourage to the students to obtained new ideas and opinions and make lessons more spontaneous and creatively, and enjoyable for either a student or a teacher, and this will help learner to get education technology concepts with easily, it's also a tool which stimulate creativity and stimulate the mind. (Abdul Mun'em, 2015, p: 147), Buzan also considered that the mind mapping which designed through software program specialized to work greatly on the class between editorial and creative aspects of the thinking process, which grants the flow to all free ideas without interference. (Buzan, 2010, p: 355).

The relationship between thinking and memory considered closely related to the degree in which discrimination is difficult by talking about the cognitive system in information processing, memory and previous influential experiences of experiments on individual's ability to deal with impetus environment and its processing and understanding, and giving the meaning through knowledge of information coding process. (Al Utom and others, 2009, P: 22).

Awareness of the mental processes is cognitive function in learning, thinking, memory and creativity, which gives cognitive process the

meaning of different sensory stimuli which comes into brain, but all the sensory stimuli doesn't obtained great importance but through the cognitive process, through the lookout for these stimuli and its organization then explanation at specially related to brain and nervous system level (Yousuf, 2011, P:75), for consciousness particularly has close relationship with the learner's behavior in terms of interaction and response to the environment of the educational position as perceived by the senses, and therefore, the learner's behavior depends on consciousness situation which surrounded us, if the educational situation starts to raise multiple learner's senses by using different methods and techniques of teaching, in order to guide the learner's focus towards learning, meaning that consciousness is a base for learning events (Mahdi, 2015, P:47), Recent studies have suggested for foreign representations rules, both the perception and concept interaction being the mainly driving force in solving the problems and inferences, if foreign representations leads such as charts, preliminary layouts, maps, drawings, concessional roles in conclusion of operations, solving the problem and understanding, as well as to reduce working memory burden through providing the external symbols of the elements that must be kept in mind and maintains all of the elements in the brain differently and processes on which its going on, (Ahmed, 2008, P:19). The constants which are stocked in mind from sizes and shapes and colors are all tools to help the mind to cognition and explanation, if the main prospective for the constructive perception process and its success requires intelligence and thinking in integrating sensory information with stored knowledge process. (Sternberg, 2012, P;138), As well as studies and literature indicates that there is a consensus among psychologists, that the perception

process to try to understand the world around us by interpreting the information, and its analyze in the brain, means ability to interpretation and encoding, storage, analysis and response when they are needed, and this is what is happening in construction perception, (Tu'mah, 2014, P:5).

The top - low effects (constructive perception) considered inherent effects in high levels of structural visual processes and impose their impact on lower levels, generally and at present time recognized that both past experience and intentions, expectations and attention of perceived person make impact on visual perception and called it top effects – and down effects because of the underlying belief in inherent at the top of the structure of the visual impact of operations and imposition its impact at lowest levels of structural, from other side, it is believed that the top-low impact sources - lie down in the lower levels within the visual structural and immune from the top effects levels. (Peterson, 2006, P:13).

Constructive perception process based on the processing of stimulation from top to bottom in accordance with prior knowledge and previous motivation and experiences, several studies suggests that the majority of the information that reaches into the brain from the outside world its source is visual, and visual perception constitute the bulk of the information in perception processes which practiced by the individual daily, not but the visual information overcome on information from other sensory channels, (Al Utoom, 2012, P:102, 108). (Nahas, 2012) pointed on the importance of visual perception and its effective role in visual thinking and improves the functioning of the brain, without this brain separated from sensory experience, and connects abstract concepts with all the colors and shapes of visual experiences, and can develop and enhance visual perception through using techniques and modern teaching

methods in the classroom such as maps and electronic mind mappings thus can take advantage from strengths of visual thinking, which supports and develop creativity sensor. (Nahas, 2012, P: 38).

Research procedures and requirements:

For verification of hypothesis research should followed below procedures:

Firstly: Method of Research

To achieve research's goal, both scholars used experimental design with two commensurate groups (experimental and blank experimental), and experimental group is the group that exposed its students to be independent variable (electronic mind mapping by using smart board), and blank experimental group is the group that teaches its students routine way, and for the subject physics constructive perception is variable depended which is measured by a scale prepared by both scholars for the purposes of current research to learn about the effectiveness of variable independent.

Secondly: Community and Research Sample

Community defined the Current research for intermediate second class students in government morning upper primary and high schools in Qadisiyah province for the academic year (2015 - 2016), which contains a computer lab and smart board in number of (27) schools by the Statistics Planning Directorate under General Directorate for Qadisiyah Educational, as both scholar randomly (by draw) among Hurr Riyahi School which includes three sections for intermediate second class, and chose them two sections randomly (by draw) to represent section (a) group of experimental and section (b) blank experimental group, and both scholars remove failed students because they have studied topics themselves, which could adversely or positively affect in research results, as the 7 students failed, among them six students in section (a) and one student in section (b) so total number of

students undergoing the experience are 54 students in the two groups ,(27) students are

from the experimental group and 27 students from blank experimental group.

Third: Equality of two groups’ research

Both groups are equal in variations (age in months, intelligence (mental capacity), physic first course level, constructive perception scales towards physic subject and previous information in physics) a t-test was conducted as the results were unfamiliar statistically, as explained in the table no (1).

Table (1): Results of t-test for Equality of two groups’ eduction

statistica l sign at (0.05) level	T		Freedo m level	Standa rd deviati on	Arithmeti cal average	Numb er of sampl e studen ts	Group	Equality
	Tabula te	comput ed						
unfamili ar statistica lly	2.01	0.098	52	10.80	31.444	27	Experimen tal	First course
				11.31	31.148	27	Blank	
unfamili ar statistica lly	2.01	0.74	52	6.65	168.85	27	Experimen tal	Age (in months)
				5.48	170.07	27	Blank	
unfamili ar statistica lly	2.01	0.039	52	11.08	32.81	27	Experimen tal	Intelligenc e
				9.68	32.70	27	Blank	
unfamili ar statistica lly	2.01	1.223	52	4.649	71.925	27	Experimen tal	Constructi ve perception
				4.915	70.333	27	Blank	
unfamili ar statistica lly	2.01	1.246	52	3.0759	10.667	27	Experimen tal	Previous informatio n
				1.7767	9.8148	27	Blank	

Fourth: Research tool

Both scholars prepared constructive perception scale towards physics subject (33 passages) with its final shape and it was realized by their faithfulness, realization and application after end of experiment. The calculation software SPSS and Excel sheet were used to examine t-test of two independent samples, chi square test, Pearson correlation coefficient, paragraphs difficulty coefficient, distinguish coefficient, effectiveness of wrong alternatives and Cronbach's Alpha coefficient, n2.

Fifth: Preparation of daily lesson plans

16 lesson plans have been prepared for each group (experimental and blank) in the light of four chapters of Al Fizia Book prescribed for secondary second year students for the academic year (2015-2016) and behavioral purposes, as the experimental group plan included subject presentation and carrying out the experiments using electronic mind mapping software through smart board, however the lesson plans of blank experiment group studied according to ordinary method consists of daily lesson plan vocabulary. To make sure the efficiency of lesson plans a modal consists of group of panel specialized in the field of teaching physics and teaching methods has been presented, and it has been modified in the light of their opinions to take its final shape.

Fifth: Applying of experiment (1)

The experimental group students studied (sixth, seventh, eight and ninth) chapters of Al Fizia Book prescribed for secondary second year students for a period of eight weeks in two sessions weekly using electronic mind mapping software (imindmap9/Ulimate) and blank experimental students group studied the same subject with same teacher at same place in same period but in ordinary method.

Review of research results and explanation

First; Ascertaining of null hypothesis as stated below:

1. There is no concept statistical difference at concept level of (0.05) between experimental group students level average who are studying using electronic mind mapping strategy and average of blank experiment group of students who are studying in normal way in constructive perception.

To realize the hypothesis reality both scholars conducted arithmetical average and standard deviations test for both students group levels (experiential and blank experimental) in distance constructive perception scales as explained in table no (2).

1- The scholar (**Mustafa Lafta**) was assigned to apply experiment on both groups

2. As the results revealed there is significant concept statistical difference between constructive perception medium levels of physics between experimental group students and blank experiment group of students and in favour of experimental group students, as the average levels of experimental group students is (76.074) the standard deviations is (4.64) while the average levels of blank experimental group students is (71.370) the standard deviation is (5.62), using t-test for two independent samples, it is clear that there is concept statistical difference at (0.05) level, as the value of t computed at (3.355) is it larger than the value of t tabulate (2.01) after freedom level (52) as explained in table no (2).

Table (2) t-test results to know the concept difference between average levels of experimental and blank groups in physic constructive perception scale:

t-Tabulate	t-computed	Freedom level	Standard deviation	Arithmetical average	Number	Group
2.01	3.355	52	4.64	76.074	27	Experimental
			5.62	71.370	27	Blank

Like this the first null hypothesis is rejected and alternative is accepted, it means the experimental group students who studied using electronic mind mapping outperform than blank experimental students group who studied through traditional teaching methods in constructive perception of physics. In the light of results both scholars concluded the Effectiveness of Electronic mind mapping by using smart board in teaching physic subject and constructive perception with intermediate second year students.

Recommendations

Bases on research results and conclusions the both scholars recommended the following:

1. To follow electronic mind mapping strategy using smart boar in teaching
2. To train teachers for using it through sessions involving them in teaching physic subject in secondary and high schools.

Proposals

Concluding this research both scholars suggests the following:

1. To conduct similar studies for electronic mind mapping strategy using smart boar in teaching rest of subject material at other study level.
2. To conduct other study to know the effectiveness of electronic mind mapping strategy by using smart board in other variables, such as (creative thinking, lateral thinking and mental capacity).

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