

The effect of the Idea filtering strategy in second grade middle school female students for the subject of science in their productive habits of the mind

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Abstract

The current research aims to identify The effect of the Idea filtering strategy in second grade middle school female students for the subject of science in their productive habits of the mind. The researchers adopted the experimental approach and experimental design with partial control in the two groups (experimental group and control group). The research experiment was applied to a sample of middle school second graders, in the basic school (shohadaa Gisir Al aimaafor Girls) of the Directorate of Baghdad Education/First Rusafa for the academic year (2021/2022), which was chosen intentionally. The number of female students in the research sample was (70) students, (35) students for the experimental group, which will study according to the strategy of Idea filtering, and (35) students for the control group, which will study according to the usual method. The two research groups were rewarded in the following variables: (chronological age in months) – Intelligence test (RVN) – The previous information test) After the two researchers determined the scientific subject that they will study for the students of the experimental and control research groups, the chapters are (Chapter Seven, Eighth, Ninth, and Tenth) of the science subject to be taught to students of the second grade, middleschool for the academic year (2021/2022), where the two researchers formulated (201) behavioral goals classified according to the four levels of Bloom) in the cognitive field (recall – comprehension – application – analysis). The two researchers also prepared daily teaching plans, which reached (24) plans for the experimental group according to the strategy of Idea filtering and (24) plans for the control group according to the usual method. The two researchers used a research tool to measure the habits of the mind produced, where the researchers adopted a scale The habits of the mind produced by (Muhammad Kamal) Iraq, and it consists of (30) paragraphs. To verify its face validity , the paragraphs of the scale were presented to a group of specialized arbitrators. To verify the validity of the construction, a correlation coefficient was adopted (Pearson) and its stability was verified by the two researchers using the equation (Alpha-Cronbach). To analyze the results, the data were collected and then processed statistically through the statistical group (SPSS). In light of the results of the research, the two researchers concluded that teaching by adopting the strategy of Idea filtering makes the student the focus of the educational process as a result of their effective participation in teaching.

First: Problem of the research:

Despite the scientific and technological development in our current era in various areas of life, teaching in our schools to this day is still in the usual way, especially in science, as the teacher teaches the material to the student as a question and answer and the student memorizes and narrates in order to pass the final test successfully.

That teaching in a question-and-answer manner may prevent the development of the productive habits of the mind by students and the failure to discover new ways to solve problems and mental openness in materials, especially science, as well as may cancel the planning aspect of life, that the normal teaching methods no longer meet the student's need, which is limited to listening and reception without interaction with the content of the material.

From the foregoing, the researchers experimented with the strategy of Idea filtering in the teaching of science, which may contribute to raising the level of habits of the mind for female students, as the problem of study was identified in the following question:

What is The effect of the Idea filtering strategy in second grade middle school female students for the subject of science

In their productive habits of the mind

Second: Importance of Research:

Teaching strategies have advanced considerably due to the progress of science and knowledge, and the reliance of these sciences on teaching strategies, which has given a change in their contribution by increasing the means of understanding between teachers and students. Teaching strategies that do their part to bring this understanding closer if it is better used and employed, as it should be to achieve the desired goals in the best

possible way, and to achieve increased cognitive understanding between the teacher and the student. (Abu Shreikh,2008, pp. 7-8)

One of the strategies of active learning is the strategy of Idea filtering, and the importance of the strategy of Idea filtering as one of the strategies of active learning contributes to attracting the attention of students and exciting their motivation and gives

An opportunity for them to present diverse ideas in order to reach creative ideas and motivate them to participate effectively by expressing opinions and producing and generating ideas freely away from criticism. (AmbuSaidi and Hosniya,2016, p. 58). They may also generate habits of mind. Mental habits are based on the existence of educational constants that should be focused on their development and transformation. A Repetitive behavior and a fixed curriculum in the lives of students. Thus, habits of mind are a retreat in some aspects of the philosophy of John Dewey, which was adopted by American education in the twentieth century, that philosophy that believes in change in everything, so that there are no educational constants in it, and the only constant is change. (Al-Turahi and Kazem, 2018, p. 15), that the results of ordinary education are concerned with the number of questions that the student can answer, but when teaching the habits of the mind, we care about how the student acts when he is unable to answer the questions, as the habits of the mind are used by the man when he faces questions and problems for which he does not have a ready solution, and the attention is focused on developing the student's abilities to produce knowledge instead of reproducing it, as well as developing his abilities in critical thinking, investigation, flexibility and learning through the views of others, and the decisive trait is not to obtain information, but to know how to act on it. (Schwein,2014, p. 13)

Educators point to the need to work on instilling habits of mind in the brains of students and dedicate them to serve them and make them an integral part of their daily behavior system, taking into account and achieving the thinking patterns of their brain sovereignty in order to create a generation capable of confronting advanced information and digital technology. (Al-Sabab,2018, p. 23)

Third: Aim of the Research The research aims to identify:

The effect of the strategy of Idea filtering for second-grade middle school female students for the subject of science in their productive habits of the mind

Fourth: Hypothesis of the Research:

There is no statistically significant difference at the level of (0.05) between the average grades of the experimental group students who study according to the strategy of idea filtering of the ideas and the average grades of the students of the control group at the level of the regular method at the level of habits of the mind a Productive.

Fifth: Limitation of the Research:

- 1- Time limits: The course for the academic year 2021/2022.
- 2- Spatial boundaries: Second grade middle school female students in government middle schools for girls affiliated with the Baghdad Directorate of Education/First Rusafa.
- 3- Objective limits: Biology in the book of science for the second grade middle school : (Chapter 7: Simple organisms) (Chapter 8: Kingdom of Plants) (Chapter 9: Kingdom of Animals) (Chapter 10: Environment and its Components)
- 4- Human boundaries: Second-grade female students in government middle schools for girls affiliated with the Baghdad Directorate of Education/ Rusafa 1.

Sixth: Definition of Definition Terms:

The **strategy of idea filtering** is defined by (AmbuSaeedi and Hosniya 2016) " A strategy is based on the idea of giving a request a Various ideas about the scientific phenomenon presented in a lesson during a process e Brainstorming and then they sift a The ideas they presented according to a To standards or arbitrations set by a For a former teacher a To reach a Thicket T Specific that can be employed and a Invested in the phenomenon presented". (Mbu SaeedJ and Hosniya,2016, p. 58)

- The procedural definition of the strategy of Idea filtering "is one of the strategies based on the structural theory and active learning that the two researchers used in implementing the steps of the lesson of the experimental group. The two researchers distributed the students to cooperative groups consisting of (3-4) female students. The two researchers distributed a paper (A4) to the groups on which the suppression of a idea filtering is drawn, and then the idea is presented after explaining the subject. The students are asked to filter the ideas and answers to reach specific and candidate ideas, and then the ideas are discussed until we reach the correct answers."

Habits of Mind: Defined by Costa & Kallick (2004) It is the tendency of the individual to behave in a smart way when faced with a problem, when the answer or solution is not found in his cognitive structure as the problem may be in the form of a puzzle, or an ambiguous situation. (Nofal, 2008, p. 67)

Because the two researchers chose the habits of the productive mind, they were defined.

Productive habits of mind (Marzano 2000)"are behaviors used by thinkers, critics and self-organizers that enable individuals to control their behaviors and processes in thinking as well as help them learn any experience they may need in the future." (Marzano et al.,2000, pp. 17-18)

The two researchers adopted the definition (Marzano 2000) Theoretical definition of the habits of the mind productive "are behaviors used by thinkers, critics and self-organizers that enable individuals to control their behaviors and processes in thinking as well as help them learn any experience they may need in the future."

- The procedural definition of the two researchers "are recurring mental patterns in the student that employ his attitudes and tendencies to choose the best behaviors that he deems appropriate to face all situations in his life. It is expressed by the total grades obtained by the student in answering on the scale of the productive habits of the mind according to his fields, which are self-regulation, critical thinking and creative thinking."

Seventh: Theoretical framework

Idea Filtering Strategy

The strategy of idea filtering is one of the strategies of structural theory.

It's a strategy Based on a Various ideas about the scientific phenomenon presented in a lesson during a process a Brainstorming and then they sift e And filter the ideas they presented according to a Standards or tribunals setformallythe teacher a to reach a certain ideas that can be employed and invested in the phenomenon at hand. This strategy allows the emergence of all ideas for students, and uses freedom of thought, and is used to generate ideas to address a specific topic or problem. Mostly it is used during the presentation of the lesson, the teacher can use it at the beginning to attract the attention of the students towards the lesson and arouse their motivation. (Ambo Saidi and Al Hosanieh, 2016, p. 58)

Steps to implement the strategy of Idea filtering :

- 1- Ateacher prepares a Brainstorming question who would like to presente To arequeste And do a brainstorming process for him toa Bid a Their answers and extract a set of Thoughts they ask And related to that question.
 - 2- The teacher asks the students to form cooperative groups, then distributes a paper (A4) to each group, and asks them to draw a shape (funnel with the cup) for each group in the given paper.
 - 3- The teacher asks them to put the ideas and answers generated from the process of brainstorming, which they agree on in the upper part of a to suppress the form of a decree in a paper they have, then be practical a to brainstorm the question prepared by ateacher on the subject of the lesson.
 - 4- After the completion of the brainstorming process, and the applicant has put their answers and ideas in the upper part of the suppression, the teacher requests a to request a to conduct a screening process for those ideas and nominate a Answers and ideas, the lower part of the suppression according to what I specify.
 - 5- The teacher discusses What they came up with in Ideas and filteredideas .
- (AMbu Saidi andHosniya, 2016, p. 59)

Advantages of the strategy of Idea filtering:

- 1- It increases activity, interaction and cooperation among students
- 2- It encourages the generation of ideas, the acquisition of understanding, the consolidation of information and its retention.
- 3- It Develops students' self-confidence, express their opinion, respect the opinions of others, and make decisions.
- 4- Its costs are low, and its implementation does not require the availability of devices or materials.
- 5- It works to treat students' fear and reduce hesitation, anxiety, shyness, introversion and lack of participation.

(Zarkani, 2018, p. 10)

Habits of Mind

Theories of the habits of mind: The theory of the mind is one of the theories of modernity in the science of the same knowledge, as the beginnings of the first of the decade of the seventies of the twentieth century by the world of the American Steven Kofi when he launched the concept of the habits of the mind of the seven most effective people. Kost and Kalik say that the ideas contained in the habits of a mind at Year 1982 When we started exchanging a Talk about a Behaviors a Smart e And then a Thrived when we conducted human experiences e With classroom practitioners until we discovered in the course of our work a Daily With a Students andaEmployees that heretoK need e Names aBehaviors that one of us expects from the other and agree to call them the name (habits of the mind) Because behaviors require discipline The mind is practiced so that it becomes a normal way of working towards more attentive and intelligent actions. (Pumice and Tamimi, 2015, p. 63)

The concept of habits of mind is derived from a large theoretical framework consisting of a set of cognitive theories, the most important of which are intelligence theories, the theory of emotional intelligence, information models, metacognitive models, cognitive patterns, structural models, social learning theory, and finally the results of brain research. (Al-Sabb, 2018, p. 137)

One of the characteristics of mental habit theory is that it focuses on the transfer of intelligence from the theoretical level to the practical level. Rather, it introduces a new concept of intelligence, which focuses on the

ability to produce, employ and use knowledge in a timely and appropriate manner and distinguishes between this ability and the ability to retrieve knowledge or the ability to acquire it in isolation from the application. (Al-Harthy, 2002, p. 8)

Formation of mental habit

A habit is learned very early in an individual's life, as it helps in the management of a The Active Routine and the Active Complex as a Learn it needs at the beginning a set of cognitive processes starting from the process of attention, knowledge, repetition and practice.

(Alfaro, 2004) confirms as stated in (Nofal, 2008) that mental habits indicate a productive workers a Positive and in return may indicate a negative workers, but that habits of mind suggest the practice of creative ways to employ thinking. (Nofal, 2008, p. 66)

The mental habit arises after a One of the instincts of one aspect of the behavior we direct a To him by enticement aOr by pure chance aAnd by tradition, then this behavior is repeated by our will again, and after a A It was aDisease not easy at the beginning and in which the person makes attention and high effort and try and a line and a great deal of conscience a A After a period it becomes closer to a Behavior a AMe Which is performed quickly anda Mastery and skill . (Al-Abadi, 2018, p. 61)

Stages of mental habit formation:

- 1- Reflection:** At this stage, the person thinks about the thing and focuses his attention on it, and this may be due to curiosity or its importance to him.
- 2- Recording:** Once you think and link it to all other files that are of the same type.
- 3- Repetition:** At this stage, the individual decides to repeat the same behavior with the same feelings, whether positive or negative.
- 4- Storage:** Because of the frequency of recording, the idea becomes stronger and the mind stores it deeply in its files and puts it in front of the individual whenever he encounters a situation of the same type. If the person wants to get rid of the behavior, he will find it more difficult because it is stored deeply in the files of the subconscious mind.
- 5- Habit:** Because of the constant repetition and going through the previous steps, the human mind believes that this habit is an important part of the individual's behavior. (Al-Ragboi, 2015, p. 59)

Marzano's Habits of the productive Mind Theory

Marzano classified education in the Dimensions of Education model into five dimensions:

The first dimension: positive attitudes and perceptions about learning

The second dimension: the integration of knowledge

The third dimension: deepening and refining knowledge

The fourth dimension: the use of knowledge in a meaningful way

The fifth dimension: productive mental habits

(Qatami and Amour, 2005, pp. 119-121)

Productive mind habits have an important role in raising performance efficiency and facilitating creative learning. Therefore, the education curriculum should include explicit and clear teaching of productive mental habits, attitudes and habits of a high level that facilitate learning as the individual becomes more able to control them. Modern educational methods call for productive mental habits as a goal. Head of all stages of learning, as Marazano (2000) sees that weak mental habits usually lead to weak learning, regardless of the individual's level of skill or ability. (Abd al-Wahhab and al-Waleili, 2011, p. 238)

Productive habits of mind fall into three categories:

The first: self-organization, which includes: being aware of your thinking, planning, awareness of the necessary resources and resources, sensitivity to feedback, and the effectiveness of one's actions.

The second: critical thinking, which appears through: accuracy, clarity, openness of mind, restraining impulsivity, taking a position when the situation justifies that, sensitivity to the feelings of others and the level of knowledge.

The third: Innovative thinking and reflected in the following aspects: Integrating into tasks when solutions are not in sight, trying to expand knowledge and capabilities, producing and generating evaluation standards, maintaining and trusting them, and producing new ways of looking at the situation outside the boundaries of accepted traditions. (Salamat, 2010, p. 41)

The two researchers adopted the theory of productive habits of mind (the fifth dimension) of Marzano's model in the dimensions of learning, as it is the most important theory in this field because it works to link the dimensions of learning together from positive trends and perceptions about learning, knowledge integration,

deepening and refinement of knowledge, and the use of knowledge meaningfully, and it encourages the building of a personal Especially for the student, it focuses on a broader education that lasts a lifetime, and the productive habits of mind have a positive impact on the student's behavior in the long term.

Advantages of a student with productive mind habits according to Marzano's point of view:

- 1- Sensitive to feedback.
- 2- Strive for accuracy and honesty.
- 3- Perseverance when his answer does not seem apparent.
- 4- See situations in an unconventional way. (Rugabi, 2018, p. 10)

Eighth: Research Methodology and Procedures

Adopt the experimental approach to studying the variable. The experimental approach is an attempt to control all the basic factors affecting the independent variable or dependent variables in the experiment, except for one factor that the researcher controls and changes in a certain way in order to determine and measure its effect on the dependent variables. (Al-Azzawi, 2008, p. 109)

Experimental Design: To achieve the research, the two researchers adopted an experimental design with partial adjustment from two equal control and experimental groups, a scheme (1).

group	Equivalence	The independent variable	Dependent variable	Post-test
Experimental group	IQ Previous information in science Chronological Age in Months	Idea filtering strategy Ideas.	Productive habits of the mind	Scale of Productive mind Habits
Control group		The usual way.		

Scheme (1) Experimental design of research variables

Research community: The current research community is determined from middleschool students of the second grade, studying in the secondary and intermediate schools of the government affiliated with the directors of Baghdad Education/Al Rasaf for the academic year (2021/2022).

Research sample : The research sample was chosen as the teacher of the shohadaa Gisir Al aimaa for Girls, after it was agreed with the school administration to conduct the experiment. Their number reached (147) students distributed over a quarter of a division, as the selection was made intentionally, the researchers randomly chose two divisions out of (4) divisions to be the sample of the research, as she represented the division (C) The control group that S and F is studying according to the usual method it has reached (38) students and a division (D) A For a trial group a S And F is studying according to the strategy of idea filtering has reached (36) students. Collecting information during the interview of the research sample, it was found that there were (3) students who failed in Division (C) the control group and (1) a student who failed in Division (D) the experimental group, and thus the students who failed were statistically excluded so as not to affect the results of the research, and thus the research sample reached College (70) female students, (35) female students for the experimental group and (35) female students for the control group.

Adjustment procedures

The **internal integrity** of the **experimental design:** The two researchers conducted equalization between the two research groups to control the variables that are related to the research variable, which are: (chronological age in months – previous information test – intelligence) The table below shows the results of equivalence Table (1)

Table (1) Arithmetic means and standard deviations of the experimental and control groups in the parity changes

Parity variables	mean		standard deviation		t-test		Sig At the level of 0.05
	For Group Experimental group	For the control group	For Group Experimental group	For the control group	Calculated	tabular	
Previous information	11.2571	11.4857	2.86298	2.93429	x0.330	2	Not significant 0.05

Age (in months)	160.3429	160.2857	3.5558	3.51109	0.970	2	Not significant 0.05
Intelligence test	31.8000	31.5143	6.31897	9.10194	0.153	2	Not significant 0.05

Research requirements

- 1- Determination of scientific subject : I have identified the scientific subject that will be studied for two groups of students from the textbook of second grade students
- 2- for the academic year (2021/2022) and according to the directives of the Ministry of Education and its work, where I have specified the chapter: (Chapter 7: simple living organisms) (Chapter 8: the Kingdom of Plants) (Chapter 9: the Kingdom of Animals) (Chapter 10: Environment and its components).
- 3- Formulating behavioral purposes: The goal of behavior is to change the desired expected to occur by the behavior of the student, which can be evaluated after the passage of astudent with a specific educational experience. (Mahmoud, 2009, p. 35)

After reviewing the teaching objectives, the two researchers formulated (201) behavioral purposes classified according to the four levels of Bloom (Bloom) in the field of knowledge, which is (remember – assimilation – application - analysis).

They were presented to a group of arbitrators specialized in the field of methods of teaching science, to indicate their views in its formulation, the accuracy of its formulation and the extent of its coverage of the content of the scientific material and to determine the level measured by each paragraph. Accordingly, some behavioral purposes were modified.

- 4- Preparing study plans: Teaching planning is one of the important elements on which the success of the teaching and teaching planning process depends. It helps the teacher to identify and choose the main concepts and ideas suitable for the level of students and makes him able to formulate the goals and choose methods and teaching methods and organize lesson activities. (Al-Hasnawi, 2019, p. 129)

The two researchers (24) prepared a teaching plan for both groups to research the chapters aQuartere For what is concerned with experiment e And a model of these plans was presented to a group of arbitrators in the field of methods of teaching science, to seek their views on the suitability of these plans for the content of the subject and its behavioral purposes if some amendments were made to them to be ready in their final form.

Research tool: It is a means for the researcher to collect his data, and the current research has required the preparation of a tool to measure the dependent variable and (the scale of habits of the productive mind).

Scale of produced mind habits:

After reviewing the previous studies and measures that dealt with the scale of the habits of the mind produced, the two researchers adopted the scale of the habits of the mind produced by (Muhammad, 2021, p. 167) according to the Marzano model of the dimensions of learning (the fifth dimension – the habits of the mind produced).

- Description of the scale of productive habits of the mind: It consists of (30) behavioral attitudes in three areas, namely:

The first area: The habits of the ability to self-organize include the following habits:

(Effective planning – sensitivity to feedback - awareness of thinking – awareness of necessary resources and their use – rectification of actions). The scale consists of (10) behavioral attitudes of these habits

The second area: The habits of the ability to think critically include the following habits:

(Curbing impulsivity – clearly seeking – sensitivity to the feelings of others and their level of knowledge – seeking accuracy - taking a position when required – opening the mind) The scale consists of (12) behavioral attitudes to these habits.

The third area: The habits of the ability to think creatively include the following habits:

(Intensive integration in tasks when there are no solution indicators or answers on the horizon – Forming criteria for the student to evaluate with confidence and maintain them – Exceeding the limits of knowledge and capabilities, challenge and expansion – Reaching new methods to see the situation outside the limits recognized in the standard). The scale consists of (8) behavioral attitudes to these habits.

- Scale correction: Alternatives to answering the paragraphs of the scale of productive habits of mind were formulated

(I always do this behavior, I do this behavior sometimes, I never do this behavior) and takes weights (3, 2, 1) in the case of positive formulation, and takes weights (3, 2, 1) in the case of negative formulation. The highest score of the scale shall be (90) degrees and the lowest score of the scale shall be (30) degrees with a hypothetical average of (60) degrees.

- Face Validity: To achieve the validity of the scale, the two researchers adopted: Face validity

The scale was applied exploratoryly:

- The first reconnaissance sample: The scale was applied to the first reconnaissance sample on Sunday (16/1/2022) on a group of second-grade students, average in the (average ship for girls) school of the Directorate of Baghdad Education/ Rusafa I, and their number was (36) students. The purpose of this was to know the clarity of the scale instructions and the extent of understanding the clarity of the scale paragraphs for female students and calculating the time required for the scale, as it was found that the average time taken to answer the scale paragraphs was (42) minutes.
- The second exploratory sample: For the purpose of finding the psychometric properties of the vertebrae of the scale of produced mental habits, the scale was applied to an exploratory sample consisting of (100) students of the second grade, average in (Muthanna mean for girls) on Wednesday (19/1/2022), and it was supervised in cooperation with the school administration.
- Validity of construction: I adopted a correlation coefficient (Pearson) to extract a correlation coefficient between the degree of each paragraph and the total degree of the sample members on the scale of the habits of the mind produced according to its sub-domains.
- Stability of the scale: The formula (Alpha – Cronbach) was adopted to obtain the stability coefficient of the scale for the produced mind habits and the value of the stability coefficient was (0.96) and is considered a good indicator that indicates the consistency of the paragraphs and the stability of the scale paragraphs. Table (2)

Table (2) Stability coefficients for the scale of mental habits produced by the (Alpha-Cronbach) method

scale	Stability coefficient		
Productive habits of the mind	Self-regulation	Critical Thinking:	Creative thinking
	0.87	0.92	0.89
Scale as a whole	0.96		

Experiment application: The experiment was applied in the first course of science for the academic year (2021/2022), and the following procedures were adopted:

- 1- The previous information test was applied to the two research groups on Sunday (21/11/2021).
- 2- The IQ test (Raven) was applied to the two research groups on Wednesday (24/11/2021).
- 3- I applied the measure of the mind habits produced on the first exploratory sample on Sunday (16/1/2022) and applied to the second exploratory sample on Wednesday (19/1/2022) to know the psycho-metric properties of the scale of the produced mind habits. The measure was applied to the research sample on Saturday (22/1/2022).

Research Results:

- To verify the research hypothesis, which states that "there is no statistically significant difference at the level of (0.05) between the average scores of the experimental group students who will study according to the strategy of Idea filtering and the average scores of the control group students who will study according to the normal method in the scale of the produced habits of the mind. The T-test was adopted for two equal independent samples. The calculated T-value was (2.342) at a significance level of (0.05) and the degree of freedom of (68) is greater than the table value, which is equal to (2). This means that the difference is statistically significant, which indicates a slight superiority of the students of the experimental group compared to the students of the control group in the scale of the habits of the mind produced, thus rejecting the zero hypothesis, table (3).

Table (3) The arithmetic mean, standard deviation, degree of freedom, calculated and tabular T-value of the scores of my experimental and control group in the scale of produced mind habits

group	Number	Mean arithmetic	The standard deviation	degree of Freedom	t-test		Statistical Significance
					Calculated	tabular	
Experimental group	35	73.1143	5.56656	68	2.342.	2	Not significant 0.05
Control group	3.05	69.9429	5.75961				

* To indicate the size of the effect of the independent variable (the strategy of idea filtering) in the dependent variable (the habits of the productive mind), the two researchers adopted the measure of the square of Aeta (η^2) to determine the size of the independent variable ether, as (t^2) the square of the calculated value of (t) and (df) the degree of freedom and then calculate the value of (d), which expresses the size of the effect and relies on statistical methods to calculate the values of (η^2) and (d) Table (4).

Table (4) The size of the effect of an independent variable in the variable (produced mind habits)

The independent variable	Dependent variable	Value (T)	degree of Freedom	Aeta Value (n ²)	Value d.	effect size
Idea filtering	Productive habits of the mind	2.342.	68	0.0746	0.567	Average

the value of (d) was extracted, which reflects the magnitude of the effect size of (0.567) in the sense that the size of the effect is average as indicated by (Kieess 1996) in the gradient set by Table (6).

Table (6) Values of the size of the effect and the amount of the effect

The value of (d) the size of the trace	Amount of effect
0.2	Small
0.5	Average
0.8	large

• **Interpreting the results of the habits of the productive mind measure**

The statistical results indicate that there is an average difference between the experimental group and the control group on the scale of the habits of the productive mind. The results of the research showed that the second-grade students have average habits of critical thinking greater than the habits of creative thinking and then have habits of self-regulation.

- 1- The statistical results indicate that the students of the research sample have productive mind habits in all their fields to an average degree, as (Muhammad, 2021) indicated, that the habits of the productive mind, whether related to self-regulation, critical thinking, or creative thinking, can be found by the student in every school work he does, and the possession of the skills of self-regulation or critical thinking has an effect on his method of acquiring information and knowledge. (Qatami and Amor, 2005, p. 109) and this is confirmed by a study (Sayed, 2018)
- 2- Increasing the motivation and enthusiasm of students towards the lesson and to learn the subject of science and respect the opinions of others, regardless of their dissenting opinions, and discussing opinions to reach the right result.
- 3- Interaction between students through cooperative groups and flexibility in dealing develops them to listen to others and search for everything new to reach the group to a better level as a result of competition between other groups.
- 4- The average effect of the scale helped the students of the experimental group to benefit from their mental abilities through various activities within the classroom. As confirmed by (Al Saadawi, 2016)

Conclusions : In light of the results of the research, the two researchers reached the following conclusions:

- 1- Teaching using the strategy of idea filtering puts students at the center of the educational process as a result of their active participation in the lesson.
- 2- Increasing students' enthusiasm towards learning because of what the strategy of Idea filtering provided to convey their ideas and express them more creatively.

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