

Metacognition strategies and their relationship to self-efficacy among third year secondary students (A field study in some secondary schools in the state of Ghardaia)

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Abstract: This research paper aimed to verify the existence of a correlation between metacognitive strategies and self-efficacy among third-year secondary students, and proceeded from the following hypotheses: 1) the degree of use of metacognitive strategies by third-year secondary students is high, 2) the degree of self-efficacy among secondary school students The third year of secondary school is high, 3) There is a correlation between metacognitive strategies and self-efficacy among third year secondary school students.

The descriptive correlative approach was adopted and applied to a simple random sample of 150 students from the third year of secondary school in the state of Ghardaia. The two measures (metacognitive strategies and self-efficacy) were used.

The study reached a number of results that emphasize the importance of students' use of metacognitive strategies in their knowledge life and personal affairs, the high self-efficacy they have, and the existence of a statistically significant correlation between metacognitive strategies and self-efficacy among third-year secondary school students.

Keywords: Metacognition strategies, Self-efficacy, Third year secondary students.

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1- Introduction:

The field of psychology and education sciences in general witnessed a remarkable transformation in the last quarter of the twentieth century on studies related to the field of learning and education. After educational scientists had focused most of their attention on the principles of the behavioral school in explaining the processes of teaching and learning, they focused on the cognitive school

The behavioral school views the learning process as observational and measurable responses, and strengthened through practice and reinforcement, whereas the cognitive school sees this process as a sum of many internal mental processes, expressed by the learner's ability to foresight and to aware the information provided, absorb it, and retrieve it and use in similar situations.

It was necessary to think of a new philosophy for the development of the teaching and learning processes, aimed at changing the way of thinking of the student from the first stages of his learning to ensure the formation of a generation capable of sound scientific thinking, capable of criticism and innovation, away from memorization, indoctrination and programming of minds, able to learn how to strive for himself. The information, how he learns it, when and how he employs it and invests it in what is beneficial to his cognitive daily life in general, and in other words, the learner is able to move from the form of receiving information to the form of building and processing it, and discovering the relationships between phenomena, in order to deepen the understanding and interpretation of one phenomenon with the aim of developing his scientific competence, so that he can move from the stage of cognition, to the stage of metacognition, and deepening in understanding and interpretation, and exploring the dimensions of the phenomenon and inferring it through an organized scientific methodology of research and investigation (Tahani Al-Rifai Said, 2009)

The concept of metacognition is one of the contemporary concepts that have recently entered the fields of cognitive psychology and educational psychology, and perhaps John Flavell was one of the first to use this concept at the end of the seventies of the last century. He derived it through research on memory processes. Students with learning difficulties are often not fully aware of what they should learn, and they act without awareness of strategies, skills, and cognitive methods that must be followed in the learning process (Flavell, 1976)

Ferla, Valcke, & Schuyten indicate that metacognition includes a self-organizing aspect of the learner. Students who possess high metacognitive strategies and skills are the most effective in organizing their learning, motivating their motivation towards learning, and have a high ability to control learning processes and identify what learning problems need from them, as well as the ability to compatibility and harmony in different life situations (Ferla, Valcke, & Schuyten, 2008)

Among the concepts related to the above, we find self-efficacy as the most prominent concepts presented by Bandura in an attempt to confirm the role of social and cognitive factors in the achievement of learning among students. Subjectivity is the main key to the driving forces behind the behavior of the individual or the learner, because human behavior depends mainly on what the individual believes about himself, his effectiveness, expectations and behavioral skills required for successful interaction with various life events (Bandura, 1977)

From the above, the importance of research is evident in the relationship between each of the strategies of metacognition and self-efficacy, and hence this study came to try to research, highlight and investigate this relationship.

1.1- The problem of the study:

Recent educational research indicates that metacognition is the key to effective academic achievement for students, but from another angle, classroom practice studies have found that few students learn and use metacognitive strategies, which in turn facilitate the self-learning process (Wilson & Conyers, 2016).

For his part, Zimmerman stresses that there are differences between students, while some are self-motivated to learn, others still have difficulty in understanding and academic

achievement, and when the light is shed on self-regulation of learning, we find that individuals who use metacognitive strategies can regulate their own cognitive behaviors, which increases their self-efficacy for learning and confidence. With the Self (Zimmerman, 2002)

Self-efficacy is one of the most prominent concepts that Bandura presented in an attempt to confirm the role of social and cognitive factors in creating learning for learners, and Bishaf (1974) believes that self-efficacy is closely related to the individual's concept of himself, because the self represents the center of the personality around which it gathers. All other systems, which are the individual's style of life, the creative self is able to achieve its goals through the individual's awareness of his self-efficacy that was formed as a result of interaction with others, and its dynamism with some other factors such as motivation, level of ambition and self-confidence (Bischof, 1970)

It was mentioned in the official bulletin of the National Education of the People's Democratic Republic of Algeria (special issue) on January 27, 2008 AD corresponding to Muharram 19, 1429 AH, "Law No. 04/08 of Muharram 15, 1429 AH corresponding to January 23, 2008 AD", which includes the directive law National, Chapter Two School Tasks: Article No. (04): In the field of education, the school shall ensure quality education that ensures the full, harmonious and balanced development of the students' personality by enabling them to acquire a general cultural level as well as sufficient theoretical and applied knowledge in order to integrate into the knowledge society. The school shall, in particular, do the following:

Ensuring students' acquisition of knowledge in various fields of educational materials and their control over intellectual and methodological knowledge tools in order to facilitate learning processes and preparation for practical life.

Enriching the general culture of students by deepening the learning processes of a scientific, literary and artistic nature, constantly adapting them to social, cultural and professional technological developments.

Developing students' mental, psychological and physical abilities, as well as their communication abilities and the use of various forms of expression, including linguistic, artistic, symbolic and physical.

Providing students with appropriate, solid and permanent competencies that can be employed with insight in real communication situations to solve problems, allowing students to learn for life and participate effectively in social, cultural and economic life, as well as adapt to changes.

Article No. (06) stated: "...Reinvesting and employing the acquired knowledge and skills, and constantly adapting to the development of crafts and professions, as well as to economic, scientific and technological changes.." (Algerian Ministry of National Education, 2008)

Based on the above, the importance of the relationship between each of the strategies of metacognition and self-efficacy becomes clear. This study will attempt to verify this relationship and clarify its nature, and the extent of its importance, by answering the following questions:

- 1.1.1 What is the degree of third-year secondary school students' use of metacognitive strategies?
- 1.1.2 What is the degree of self-efficacy among third year secondary school students?
- 1.1.3 Is there a correlation between metacognition strategies and self-efficacy among third year secondary students?

1.2- Study Hypothesis:

Based on the problem of the study and based on the above-mentioned psychological literature from research and studies related to our topic, the following hypotheses were put forward:

- 1.2.1 The degree of third-year secondary school students' use of metacognitive strategies is high.

1.2.2 The degree of self-efficacy among third year secondary school students is high.

1.2.3 There is a correlation between metacognitive strategies and self-efficacy among third year secondary school students.

1.3- Procedural definition of the study concepts

1.3.1. Procedural definition of metacognitive strategies:

The researcher adopted the definition of Germen, C and Paul Syr (1998) for the concept of metacognitive strategies: they are thinking about learning, understanding the conditions that contribute to its improvement, organizing and planning its activities, controlling and self-evaluating it. These conditions represent the steps or procedures that the learner uses before, during and after the learning process. In order to reach the maximum degree of control over his thought processes and adjust them to achieve their goal, our study aims at the following metacognitive strategies:

Self-questioning strategy: it is a set of questions that the learner sets for himself before, during and after the learning process, and they are related to the topic to be learned, which develops his awareness of thinking processes.

The strategy of thinking out loud (audible): It is represented by the individual describing his thinking out loud while learning, in order to avoid random search for ideas, but rather to quickly reach the right thinking.

K.W.L.H strategy: It means that the learner asks four questions about the subject of learning:

K: to denote the word (know), what do I know about the subject?

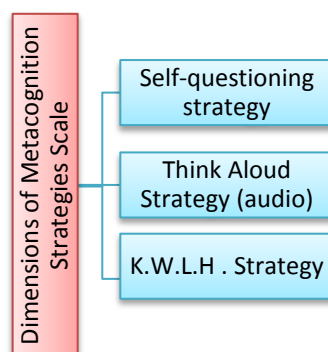
W: to denote the word (Want), what do I want to learn from the topic studied?

L: to denote the word (Learn), which is an evaluation question to show the degree of learning already?

H: to denote the word (How) How can I learn more?

An individual is considered a user of metacognitive strategies if he obtains a score equal to or greater than the average, i.e. a score (78) in the metacognitive strategies scale used in this study (Ahmadi, 2012)

Figure No: (1) shows the dimensions of the Metacognition Strategies scale

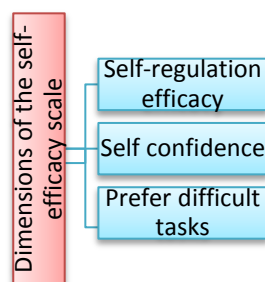


Source: Prepared by the researcher (2020)

1.3.2. Procedural definition of self-efficacy:

The researcher adopted Bandura's definition as a procedural definition of self-efficacy, which he considers individuals' beliefs about their abilities to perform a specific activity with a certain level of control over events that affect their lives and control how the individual feels, his thinking, his motivation and his behavior, and the researcher tries in this study to highlight the concept of self-efficacy. Through the scale of self-efficacy with its three dimensions: (the effectiveness of self-regulation, self-confidence, preference for difficult tasks), and self-efficacy in this study is determined by the degree that the individual will obtain in the scale of self-efficacy used in this study.

Figure No: (2) shows the dimensions of the self-efficacy scale



Source: Prepared by the researcher (2020)

1.3.3. Procedural definition of third year secondary students:

The group of male and female students studying in secondary school in different disciplines (literary, scientific, technical), they are 18-21 years old.

2- Method and Tools:**2.1- Study Methodology:**

The researcher has adopted the descriptive correlative approach, which is based on studying the phenomenon in its current situation without changing or modifying and researching its circumstances to highlight the relationships and causes.

Study Procedures: The procedures for the initial application of the study were carried out at Sheikh Ammi Said High School in the state of Ghardaia, in the period between November 08-17, 2020, after which it was agreed with the principals of the schools concerned with the study on the date of the basic application, and that was as follows:

- Sheikh Ammi Said High School: 11/15/2020
- Ramadan Hammoud High School: 11/16/2020
- Imam Aflah bin Abdul Wahhab High School: 11/17/2020

2.2- Study population:

The study population available in the current study is the students of the third year of secondary school in the state of Ghardaia, where the students of the third year were chosen as (the third year of secondary) as an indicator and a feature of the final competencies of the student at the end of the secondary education stage before university graduation, to indicate the extent to which the student represents his knowledge and gains and their application. In his scientific and practical life, by considering all the acquired learning and competencies, along the entire educational path from preparatory to secondary, as the success achieved after all this educational path is attributed to several reasons, including the effectiveness and efficiency of curricula, courses and various classroom activities, and the extent The ability of the teacher and his mastery of teaching strategies and his mastery of the subject matter, and the learner by measuring the degree of his self-efficacy, and the extent of his knowledge and use of metacognitive strategies.

We can enumerate some of those competencies that it is hoped to have among the learner at the secondary stage, as stated in the official bulletin of national education, of the Algerian Republic, Issue No. IV of January 27, 2008 AD corresponding to Muharram 19, 1429 AH, "Law No. 04/08 of 15 Muharram 1429 AH corresponding to January 23, 2008 AD, "Chapter IV: General and Technological Secondary Education, Article (53): ... General and technological secondary education, in addition to continuing to achieve the general objectives of basic education, aims to achieve the following tasks:

Enhancing and deepening the acquired knowledge in various fields of educational materials.

Develop the methods and capabilities of individual work and team work, as well as developing the skills of analysis, summarization, inference, judgment, communication and assuming responsibilities.

Preparing students to continue studying or higher training (Algerian Ministry of National Education, 2008)

2.3- Study sample:

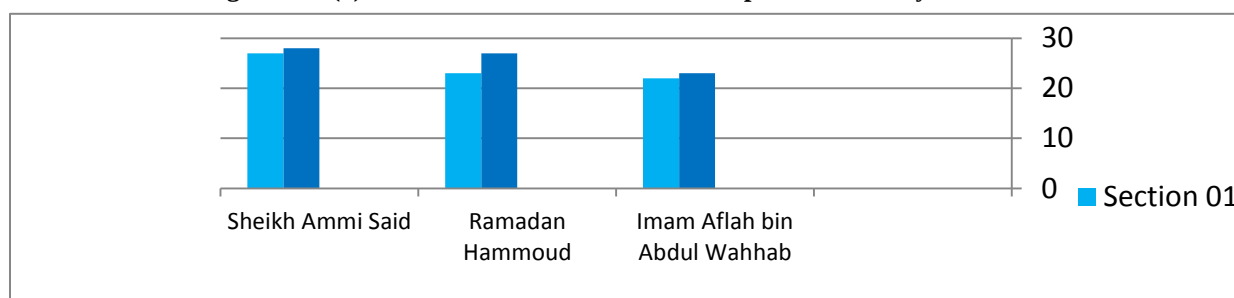
The study sample was represented by some 150 students in the third year of secondary school in the state of Ghardaia, and it was chosen by simple random sampling method as shown in the following table:

Table No. (1): Distribution of the sample to secondary schools

	High school	Section 01	Section 02	The total
1	Sheikh Ammi Said	28	27	55
2	Ramadan Hammoud	23	27	50
3	Imam Aflah bin Abdul Wahhab	22	23	45
	The total sample of the study			150

Source: Prepared by the researcher (2020)

Figure No. (3) shows the distribution of the sample to secondary schools



Source: Prepared by the researcher (2020)

2.4- Limitations of the Study:

2.4.1. Human field: The sample selected for this study was a group of third year secondary school students in the state of Ghardaia.

2.4.2. Domain: The study included 03 secondary schools in the municipality of Ghardaia, the state of Ghardaia (the northern south of the Algerian desert), which are: Sheikh Ammi Said High School, Ramadan Hammoud High School, and Imam Aflah bin Abdel Wahhab High School.

2.4.3. Time scope: This study was applied during the academic year 2020-2021, as the actual period of application extended from 10/08/2020 to 11/17/20.

2.5- Study tools:

2.5.1. Metacognitive Strategies Scale:

Khawla Ahmadi (2012) built a scale of metacognitive strategies to calculate the degree of students' use of metacognitive strategies. It was specially designed for the Algerian environment. The scale includes (26) phrases. Its dimensions were distributed into three main strategies. Strategy of thinking aloud (10 statements), self-questioning strategy (12 statements), K.W.L.H strategy (04 statements), and the criteria of validity and reliability were highly confirmed as follows: (Ahmadi, 2012, pp. 10-117)

Scale stability: The stability of the scale was calculated using the Alpha Cronbach equation, as it reached (0.86), which is a strong coefficient, which indicates that the scale is stable.

Scale validity: The validity of the scale was calculated through the correlation coefficients between the degree of each item and the total score of the metacognitive strategies scale, and it turned out that the correlation coefficients for most of the items are significant and positive, some are significant at the level of (0.05) and others are significant at the level of (0.01), which is a high result that proves the validity of the scale.

2.5.2. Self-efficacy scale:

This scale was prepared by Kim & Park (2000) to measure general self-efficacy G S E in light of Bandura's theory of self-efficacy. , and (07 statements) to measure self-confidence, and (05 statements) to measure the preference for difficult tasks, as the scale authors Kim and Park (2000) indicate here that it has a high degree of validity and reliability:

Scale stability: by calculating Cronbach's alpha coefficient and the half-segmentation method, the values of the stability coefficients were limited between (0.66, 0.74) for the dimensions of the scale, and between (0.73, 0.86) for the scale as a whole, which indicates that the scale has a high degree of stability in all its components.

Scale validity: the internal consistency of the scale: This was verified by calculating the correlation coefficient between the statements and the total score of the sub-scale to which they belong: the values of the correlation coefficients of the phrases with the total score of the dimension to which they belong were statistically significant at the level (0.01) and this confirms that the phrases have a high degree From internal consistency in measuring self-efficacy (Abde EL-Qadir & Abu Hashem, 2007)

2.6- Statistical Methods and Techniques:

The researcher in the statistical field of the study used the spss program (v:20), and also adopted the following statistical treatment methods:

Descriptive statistics methods: frequencies, percentages, arithmetic averages, standard deviation.

Inferential statistics methods: Pearson's correlation coefficient, multiple correlation equation, t-test for the significance of differences between means.

3- Results and Discussion

3.1- Presentation of the results of the study:

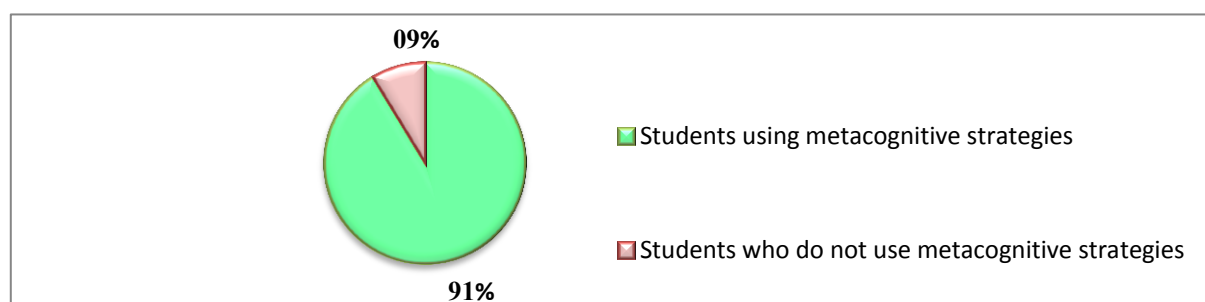
3.1.1. Presentation of the results of the first hypothesis: The degree of third-year secondary school students' use of metacognitive strategies is high.

Table No. (2) Percentage of the sample students' use of metacognitive strategies

The sample		used metacognitive strategies	
		Frequency	percentage
1	Students using metacognitive strategies	137	91%
2	Students who do not use metacognitive strategies	13	09 %

Source: Prepared by the researcher (2020)

Figure No. (4) Percentage of sample pupils' use of metacognitive strategies



Source: Prepared by the researcher (2020)

We note from Table No. (2) and Figure No. (4) that the percentage of students using metacognitive strategies is very high, as the percentage was estimated (91%), while the percentage of students who did not use them did not exceed (09%).

Table No. (3) Percentage of third-year secondary school students using the dimensions of the metacognitive strategies scale

	The Strategy	N 150	The ratio %	Rank
1	Self-questioning	64	% 42	1
2	Think out loud	39	% 26	3
3	K.W.L.H	47	% 31	2

Source: Prepared by the researcher (2020)

It is clear from the results of Table No. (3) that the order of strategies is as follows: First, the number of students who use the self-questioning strategy was estimated at (64), at a rate of (42%). Secondly, the K.W.L.H strategy, as the number of students was estimated at (47), at a rate of (31%). Third, the thinking out loud strategy, as the number of students was estimated at (39), at a rate of (26%).

3.1.2. Presentation of the results of the second hypothesis: The degree of self-efficacy among third year secondary school students is high.

Table No. (4): Calculation of the arithmetic mean and the hypothetic mean of the self-efficacy scale.

N	ddl	The hypothetical mean of the scale	The arithmetic mean of the pupils	Average difference	Standard deviation	T	Sig. (bilateral)
150	149	84	103,28	19,280	17,579	13,433	,000

Source: Prepared by the researcher (2020)

Table No. (4) shows that the hypothetical mean of the scale is (84), and the arithmetic mean of the students' scores on the effectiveness scale is (103.28), while the difference between the two means is (19.28), and the standard deviation is (17.579), while the t-test is (13.433), and the level of significance (.000), and since the students' arithmetic mean exceeds the hypothetical arithmetic mean of the scale by a difference of (19.28), the hypothesis has been verified and indicates that the students' self-efficacy is high.

3.1.3. Presentation of the results of the third hypothesis: There is a correlation between metacognitive strategies and self-efficacy among third year secondary school students.

To verify its validity, the "Pearson" correlation coefficient was used to examine the correlation between the scores obtained by the respondents on the two scales of metacognition strategies and self-efficacy, where we obtained the following results:

Table No. (5): Pearson's correlation coefficient between metacognition strategies and self-efficacy.

variable	Sample	Correlation coefficient	level Decision	Significance
Metacognition Strategies	150	.946**	0.01	Function
Self-efficacy				

Source: Prepared by the researcher (2020)

Table No. (6): Results of the Pearson correlation coefficient between metacognition strategies and self-efficacy according to the spss program.

Correlations			
		metacognition	selfefficacy
metacognition	Pearson Correlation	1	.946**
	Sig. (2-tailed)		.000
	N	150	150
selfefficacy	Pearson Correlation	.946**	1
	Sig. (2-tailed)	.000	
	N	150	150

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Prepared by the researcher (2020)

We note from the results of tables No. (5) and (6) that there is a positive correlation between the meta-cognition strategies and the self-efficacy of the sample members, where the value of the Pearson correlation coefficient was (.946**) at the significance level (0.01), and this In other words, the more the student uses metacognitive strategies, the more he increases his self-efficacy.

3.2- Discussing the results of the study:

3.2.1. Discussing the results of the first hypothesis:

The results of the first hypothesis showed that (91%) of students use metacognitive strategies, while only 09% do not use them, and this indicates that the majority of students employ them, and this is a good factor on students' self-efficacy and the results of this will inevitably be reflected on their achievement And also on improving their interaction with school affairs or outside it, and this result can be attributed to many reasons, including the advanced age stage of secondary school students, as many skills and strategies used by the student clearly emerge, as a result of continuous training in them in previous stages, which enabled him to do at this stage of study and age. , where they have a higher level of knowledge in itself, which is beyond knowledge, so we feel that they have a deeper ability to choose, direct and control their cognitive processes, and this is when they engage in the various situations of their school life.

On the other hand, Khawla's study (2014) confirms that the high percentage of students' use of metacognitive strategies may be due to motivation that supports self-control of mental activity, and the impact of motivation on using metacognitive strategies is evident through the positive outcomes of using metacognitive strategies. In performing tasks (Ahmadi, 2012)

This result is consistent with what was stated by Piaget's theory, where he defined the development of cognitive development, which begins with the stage of sense-kinetics and ends with the stage of abstract operations, the latter starting from the age of 12 years, when the individual moves from the stage of hypothetical logical thinking based on inference and following the steps of scientific thinking in solving various problems. This indicates an increase in the individual's use of more abstract cognitive processes, and the individual's reaching higher levels of thinking than in previous stages (Mcleod, 2018)

It is also worth noting here that the more the individual advances in age, the wider the framework of his cognitive construction, so that the latter affects his use of metacognitive strategies, given the breadth of his cognitive experiences and metacognitive knowledge that develops this use during his turn to various tasks, as with the progression of human age increases His experiences about various tasks and problems and ways to deal with them, which reduces the randomness of thinking, increases control and is able to organize cognitive processes to achieve their goal more effectively, and this is based on previous personal experiences.

Based on the foregoing reading of the results, discussion and analysis, we accept the verification of the first hypothesis.

3.2.2. Discussing the results of the second hypothesis:

The level and degree of self-efficacy varies according to the nature and difficulty of the situation, and the amount of effectiveness is clear when the tasks are arranged according to the level of difficulty.

The degree of self-efficacy is very important because it affects and controls the behavior of the individual and his ability to self-control, no matter how simple or complex the situation is, and because self-efficacy refers to the student's beliefs about himself and his ability to succeed and overcome the various tasks he faces in life (El-aib & Tebaa, 2023), and this result is consistent with the following studies: Study of (Luke Waltham) where individuals who are characterized by a high sense of self-efficacy in specific areas will try to achieve higher levels than their actual level of performance, as well as study of (Fritt and Koniz), which confirmed that self-efficacy is directly and indirectly related to the achievement of cognitive goals in particular (Lechab, 2021, pp. 12-16).

Noman Aftab and others concluded that when self-efficacy is high, the individual gains confidence in his ability to perform behaviors that help him to control conditions and overcome obstacles successfully. The perceived self-efficacy in this case can be considered a form of self-confidence, and there is a relationship There is an inverse between effectiveness

and performance. The higher the expectation of self-efficacy, the more successful and distinguished the performance of the tasks (Noman , Asghar , & Roqia , 2012, p. 540).

We conclude from the discussion of the second hypothesis that students with a high degree of self-efficacy have characteristics such as confidence in success in performing a task, and the existence of a degree of ability, whether physiological, mental or psychological, and that the effectiveness grows through training and the acquisition of various experiences, including cognitive, such as learning strategies in general and metacognitive strategies in general. In particular, the degree of self-efficacy is determined by many factors such as the difficulty of the situation, the amount of effort exerted, and the extent of perseverance of the individual, so that experience is reflected in his behavior in general and academic behavior in particular, and therefore we accept the verification of the second hypothesis.

3.2.3. Discussing the results of the third hypothesis:

The results after the study ended with the realization of this hypothesis to confirm the existence of the correlational relationship, and in the same context, we find some studies that agree with this result, including: the study of Marzouk Abdul Majeed Marzouk (1993), the study of Pintrich (1994), the study of Walters and Rosenthal (2000), the study of Eshel and Kohavi (2003) (Ahmadi, 2012)

We can first attribute this result to the effect of the student's use of metacognitive strategies, and this is through the indicator of his self-efficacy and the ideas that he realizes and believes in about his abilities and potentials. Realistic problems, dealing with them and finding solutions to them positively and successfully, which confirms the existence of a dynamic correlation between metacognitive strategies and the student's self-efficacy. (Medjider & Zagh, 2023)

Through this, the importance of meta-knowledge strategies in raising the student's achievement level, stimulating his abilities and cognitive capabilities and moving them with his conscious will for his self-efficacy, as well as the possibility of dealing with and solving problems, especially academic ones, and this fully agrees with the study of Samir Attia (2003) through The effect of metacognitive strategies on academic achievement and improving the level of cognitive achievement, which raises the student's success experiences and enhances his self-confidence, thus increasing the degree of confidence in his abilities, and finally enhancing his self-efficacy.

Bandura also pointed out that when he showed that the sense of self-efficacy is determined in the light of the individual's experience and its suitability to the situation, and this explains self-efficacy and its link to metacognitive strategies, using the latter by the student, so his self-efficacy is automatically enhanced when he uses metacognitive strategies, as can be To emphasize the existence of the correlation between the strategies of metacognition and self-efficacy, through the characteristics that characterize the learner who enjoys high self-efficacy. His effectiveness and achievement, through his better and more serious use of metacognitive strategies, so he sees him monitoring his achievement and strategies and their suitability to the situation and its results and the extent to which they agree with his activity and planning, so he does himself based on this continuous self-evaluation, and his level improves as a result.

On the other hand, Schunk & Zimmerman (1995) study found that self-organized learners in general can be called active learners, as they are highly self-motivated, because they manage their learning adequately and in different ways, and that these learners have a large stock of metacognitive strategies, and they are ready To be used when necessary to reach the desired achievement (Zimmerman, 2002)

As a conclusion to the foregoing, it can be said that the more the student uses metacognitive strategies, the more his self-efficacy is enhanced and his self-confidence deepens in a deeper way.

4- Conclusion

The main objective behind conducting this study was to identify the extent to which students use metacognitive strategies, and to verify the existence of a relationship between them and self-efficacy, among third year secondary students, and the study reached the following results:

The degree of third-year secondary school students' use of metacognitive strategies is high.

The degree of self-efficacy among third year secondary school students is high.

There is a correlation between metacognitive strategies and self-efficacy among third year secondary school students.

We can point out that the value of scientific research does not stop when it shows its results or arrives at finding solutions to the problems it poses, but rather adding to that analysis and highlighting the relationships and finding practical mechanisms, and we can conclude the end of this research paper to:

Work to train teachers, whether in the preparation or qualification stage, through continuous training programs before and during service, on the use of meta-knowledge strategies in teaching different study subjects, because they are automatically transmitted to learners through daily classroom activities.

Paying attention to students' practice of metacognitive strategies, knowing how to properly and correctly use each strategy, and the feasibility of them in the learning process, so that they can employ them more consciously and intentionally in various situations and problems of their daily lives.

Designing programs to develop students' life skills in light of their developmental characteristics, academic needs, the reality of society and its requirements, and the challenges and stakes of the age, by providing modern mechanisms and methods.

The necessity of paying attention to the students' previous knowledge and experiences and working on developing and employing them in similar situations, whether in scientific or practical life, through classroom or extracurricular applications.

Referring to the frameworks and builders of educational curricula and curricula to take care of reaching the student's self-formation (embodies the principle of self-learning and lifelong learning), including teaching him how to apply and control the use of meta-knowledge strategies with an emphasis on taking into account strategy and scientific specialization, even if they are an integrated whole that serves each other each other indirectly.

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