# Self-Regulated Learning Strategies for Second Year Pupils Secondary Science and Technology
# (Field study at two secondary schools at Zaouia Labidia Touggourt)

# استراتيجيات التعلم المنظم ذاتيا لدى تلاميذ السنة الثانية ثانوي علوم وتكنولوجيا
# (دراسة ميدانية بثانويتي بلدية الزاوية العابدية بولاية توقرت)

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Receipt date: 2024-04-07 ; Acceptance Date: 2024-04-25

**Abstract**

The objective of this study is to reveal the level of self-regulated learning strategies among second year students, science and technology stream, and to know the statistical significance of the differences in strategies among students in light of gender and class variables. It was based on a sample of 75 male and 80 female students who were chosen in a simple random way. The tool employed was the Self-regulated learning strategies scale used in the study by Hamouda (2020). We followed the descriptive analytical approach. The results showed that there is a real difference between the levels of students' possession of self-regulated learning strategies, and that the majority of them do not have a high level, and there are statistically significant differences attributed to the gender variable and in favor of females. There are no statistically significant differences attributed to the gender variable and in favor of females. There are no statistically significant differences due to the stream variable.

**Keywords:** self-regulated learning, cognitive strategies, metacognitive strategies, resource management strategies, secondary school students, science and technology stream.

**ملخص:** الدراسة هدفت إلى الكشف عن مستوى استراتيجيات التعلم المنظم ذاتيا لدى تلاميذ الثانية ثانوي علوم وتكنولوجيا، ومعرفة الدلالة الإحصائية للفروق في الاستراتيجيات لدى التلاميذ في ضوء متغيري الجنس والشعبة، وكانت على عينة من 75 تلميذا و80 تلميذة اختيروا بطريقة عشوائية بسيطة، أما الأداة المستعملة فهي مقياس استراتيجيات التعلم المنظم ذاتيا المستخدم في دراسة حمودة (2020)، وأتبع المنهج الوصفي التحليلي، وأظهرت النتائج وجود اختلاف حقيقي بين مستويات امتلاك التلاميذ لاستراتيجيات التعلم المنظم ذاتيا، وأن غالبيتهم لا يتميزون بمستوى مرتفع، كما أنه توجد فروق ذات دلالة احصائية تعزى لمتغير الجنس ولصالح الإناث، ولا توجد فروق ذات دلالة احصائية تعزي لمتغير الشعبة.

**الكلمات المفتاحية:** التعلم المنظم ذاتيا، الاستراتيجيات المعرفية، الاستراتيجيات ما وراء المعرفية، استراتيجيات إدارة المصادر، الثانية ثانوي علوم وتكنولوجيا.

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**1- Introduction**

The current era is characterized by a lot of rapid changes and transformations in the scientific and technological fields. In the view of this scientific and technological development, the scientific material delivered to pupils has become very large making it difficult for them to store the delivered information. Hence the difficulties in education which led pupils to be taught how to learn and think have appeared, and this is considered as one of the most important priorities for enabling them to self-learn.

Preparing learners who are able to integrate and play a positive role in the teaching and learning processes requires pedagogical scientists to look for strategies that help learners form and give meaning to what they learn, and do not wait for teachers to provide them with ready solutions to the scientific problems they face.

(Al Anzy, 2008, p.31)

Self-regulated learning is one of the most important methods used to ascertain students' proficiency of the studied information and knowledge because its mechanisms help learners accurately distinguish between the well and less learned subjects, so they organize their studies more actively and effectively. This ultimately led to improve and raise their attainment level which is a goal that educational institutions seek to reach and achieve. (Attayed and Rached, 2007, p.14)

Attention to the contemporary orientation of pupils' learning study and methods is due to the rejection of traditional methods that emphasize the separate processes affecting the learning process and not paying attention to the impact of the context in which it takes place, as well as looking at these processes in an integrated manner and emphasizing this while giving importance to the process and the output at the same time. Therefore, Self-regulated learning is the driving force through which the educational process can be crossed into modernity. (Rashwan, 2006, p.3)

**2- The research problem:**

The Social Knowledge School asserts that learning is not just the process of acquiring information and knowledge; it is an effective and active process, during which the learner builds knowledge and information as well as refining his skills, contributing to the improvement and upgrading of his knowledge production. Thus, the role of the teacher is to provide assistance to the pupil when needed, and it stops as his or her own abilities grow. Educational researchers attach great importance to the process of self-regulation learning, and it is the learner who can be described as active and effective who performs this kind of organization, which is essentially based on self-assessment.

(El Jarah, 2010, p.333)

Abidin (2006) noted that the concept of self-regulated learning goes in line with the recent educational trends which emphasizes that being aware of what is just learned by the pupil is not a sufficient indicator to reach the level of quality education, and that self-regulated learning requires a high level of awareness of the needed methods and strategies to achieve this. The benefits of this type of learning are not only to improve and enhance the pupil's academic and educational performance, but also to evaluate and assess the learning processes and making the necessary changes to achieve the desired objectives. (Abidin, 2006, p.17)

Self-regulated learning is of great value. It plays an important and essential role in the pupils' scientific and practical life, as it generally leads to a rise in their achievements in all their tasks and in their academic tasks in particular. Adopting and using self-regulated learning strategies will lead to their integration into the content of the materials they learn, resulting in knowledge acquisition, decision-making and social

skills. In adittion, self-regulated learning plays an important role in developing the judgement capacity and acting independently, resulting in self-assurance.

(El Haylate, 2015, p.365)

The problem of the current study is highlighted according to all the above as well as the critical importance of self-regulated learning of the learning process in the light of the significant technological, scientific and educational changes, in order to learn about the level of self-regulated learning strategies among second year pupils of secondary school (Experimental Sciences, Engineering Process, Management and Economics) in Zaouia Labidia Touggourt through the following questions:

**The research questions:**

The current questions can be formulated as follows:

1- What is the level of the possession of self-regulated learning strategies among second year pupils of secondary school science and technology?
   From which we get the following sub-questions:
   a- What is the level of the possession of the cognitive strategies among second year pupils of secondary school science and technology?
   b- What is the level of the possession of the beyond-cognitive strategies among second year pupils of secondary school science and technology?
   c- What is the level of the possession of the resource management among second year pupils of secondary school science and technology?
2- Are there statistically significant differences in the self-regulated learning strategies among second year pupils of secondary school science and technology attributable to the gender variable?
3- Are there statistical differences in the self-regulated learning strategies among second year pupils of secondary school science and technology attributable to the streams variables?

**The research hypothesis:**

1- The majority of second year science and technology pupils of secondary school have a high level of self-regulated learning strategies.
   The following sub-hypothesis are included in the above:
   a- The majority of second year science and technology pupils of secondary school have a high level of cognitive strategies.
   b- The majority of second year science and technology pupils of secondary school have a high level of the beyond-cognitive strategies.
   c- The majority of second year science and technology pupils of secondary school have a high level of resource management strategies.
2- There are statistically significant differences in the self-regulated learning strategies among second year pupils of secondary school science and technology attributable to the gender variable.
3- There are statistical differences in the self-regulated learning strategies among second year pupils of secondary school science and technology attributable to the streams variables.

**3-The research objectives:**

This research paper aims to:

- Identify the level of self-regulated learning strategies among second year science and technology pupils of secondary school.

- Knowing the significance of differences in self-regulated learning strategies of second year science and technology pupils, by gender, and stream (Experimental science, Engineering Process, Management and economic)
- Access to scientific and practical proposals, which may contribute to the development of self-regulated learning strategies among students in educational institutions.

**4- Importance of the study:**

**a- Practical importance**

1- The results of this study may help teachers train pupils in self-organized learning in educational institutions.
2- This study may interest researchers in researching, investigating and conducting further studies on the same or other variables due to the few studies which have addressed this subject within the limits of the researchers' science.
3- The contribution to the establishment of future experimental studies proposing the development of indicative, preventive, developmental and curative programmes through which pupils are trained in self-regulated learning strategies.

**b- Theoretical importance:**

1- This study is expected to add new knowledge to theoretical literature on the subject.
2- Work within modern educational trends that advocate the adoption of self-regulated learning in teaching and keeping pace with latest and modern developments.
3- The results of this study are expected to help the education sector, interested persons, parents, specialists and decision makers in planning and constructive guidance for pupils.

**5- The study limits:**

**Time limits:** the study was applied in the first trimester of the school year 2022/ 2023 (November and December)

**Place limits:** the study was applied in the two secondary schools of Zaouia Labidia Touggourt.

**Topic limits:** the study was limited to "The level of the the self-organised learning strategies among second year science and technology pupils".

**Samlpe:** Second year science and technology pupils.

**6- Previous studies**

**a- Arab studies**

The study of (Fatima Hilmi Hassan, 1995), which aimed to determine the correlation between self-regulated learning strategies and the educational attainment. And whether a pupil's gender influences different strategies**.** The study was applied on a sample group of 135 pupils male and 135 pupils females of the second preparatory grade in the city of Zakazik in Egypt. The results showed an existence of a statistically significant correlation between self-regulated learning strategies and educational attainment, and that females were more used for male strategies on the scale as a whole on the organization, transformation, listening and seeking help from others.

The study of (Lotfi Abdelbasset Ibrahim, 1996) which aims to determine the relationship of self-organised learning with the educational attainment. It was applied on a sample of 120 pupils (male and female) of the first secondary grade

in Menoufiya governorate in Egypt. The results indicated that there was no correlation between the components of self-regulated learning and educational attainment in Arabic, English and mathematics subjects, and the coefficients' values between self-effectiveness and attainment in Arabic and English are not statistically relevant. The results also indicated the superiority of females over males in the overall degree of self-regulated learning and in the following dimensions of self-regulated learning: regular review, selection of solutions, automatic motivation, preparation of lessons, finding and searching for information.

The study of (Izat Abdelhamid, 1999) which targeted knowing the impact of motivation components and self-regulated learning strategies on academic output of pupils in Zakazik. It involved 435 pupils and the results showed that the academic attainment has been influenced by both impulse components and self-regulated learning strategies, males have higher degrees than females over all strategies, and there are no gender differences in the dimensions of repetition, mastery, organization and search for help. The Fourth division pupils also have more self-regulated learning strategies than the First Division pupils.

Al-Dabbas (2005) conducted a study aimed at identifying differences in the use of self-regulated learning skills between secondary school pupils of high and low achieving scores (literary and scientific streams) and university students. It involved a sample of 240 secondary school pupils of first year in the region of Balkaa in Jordan and 240 first year students of Balkaa applied university. In this study, a measurement tool was used to measure the skills of such type of learning. Thus, it found that students with high attainment used summarization and organization more when compared to those with low attainment, and students of scientific streams are the most used of remembrance and organization with literary streams. The results also showed that females used strategies more than males and that university students used conceptual maps more than general secondary students.

Rashwan (2005) conducted a study in order to know the relationship of self-regulated learning of gender and academic specialization, and the predictability of such learning strategies through trends towards achievement goals and learners' beliefs among a sample of 142 students (male) and 158 (female) of third year of the faculty of education, university of Qena Egypt. The results of the study showed that there are statistically significant differences between students of scientific and literary streams in favor of scientific ones, and that there are no differences attributable to the student's gender in the level of strategies.

El Jarah (2010) studied the level of components and skills of self-regulated learning of undergraduate students, as well as the differences in the level depending on the gender, academic level and how to identify the relationship between this type of learning and attainment. The sample included (331) of the bachelor’s degree from the university of Yarmok, through adopting a Purdie scale of self-regulated learning in order to achieve the objectives. The findings resulted in a high level of rehearsal and memorizing, differences attributable to gender in favour of males on the components of goal setting and planning. There are also statistically significant differences in attainment between the high and low-level self-regulated learning and the components of goal setting, planning, rehearsal and memorizing for high achievers.

Al-Huseinan (2010) in Saudi Arabia, conducted a study to identify the level of self-regulated learning among 10th graders in the light of the Nietrich model and its relationship to attainment on a random sample of (519) of second and third grades in a group of secondary schools in Riyadh and Qassim regions using a self-regulated learning strategy scale and student academy records to collect data. The results of the study indicated that students had low self-regulated learning strategies, and there was a positive correlation between the high level of having such strategies and students' academic attainment.

The study (Ibrahim, 2012) aimed to reveal the level of self-regulated learning and its relationship to the level of academic self-competence of students in the Upper Galile preparatory stage in Palestine. This included (179) students on which the researcher adopted a measure of self-regulated learning and a measure of academic self-competence of his own preparation. Thus, the results showed that: The self-regulated learning level of the study sample was average, the field of goal setting and planning was the first, the request for social assistance was at the last, and the level of academic self-qualification of the sample was high.

The study of Wissal Hani Salem Al-Omari (2013) was to reveal the degree of acquisition of self-regulated learning components by students at the higher elementary level in the science curriculum of the Irbid First Region, and the difference of these components according to gender, grade of the student and the academic attainment for a sample of (350) students. The researcher used a measure of the components of self-regulated learning and the results confirmed that the degree of having the components (management of learning environment, behavior and search for information) were high, while after (non-adaptive organizational behaviour) were at an average level. There were also differences in the students' degree of the possession of the statistical significance components attributable to the attainment level for those whose attainment was high, and there were no statistically significant differences attributable to gender and grade level.

As for (Jaradat, 2014), he aims to reveal the level of both self-regulated learning and critical thinking, and whether they differ according to gender, student specialization and knowledge of the relationship between them. This was on a sample of (180) male students and (170) female students of secondary education in the governorate of Jerash while they were chosen in an accessible manner using the self-regulated measure of Ahmed (2007). The results showed a low level of self-regulated learning, a moderate level of critical thinking, and a positive and statistically significant correlation between all self-organizing skills of learning and critical thinking.

**b- Foreign Studies**

Tanrisven and Dilmac (2013) conducted a study in the Turkish city of Istanbul to identify the predictive relationship between the human values of secondary school students in Turkey and their beliefs towards motivation for learning and self-regulated learning strategies. The study included a sample of (794) students from secondary education, randomly selected from six (6) secondary schools using self-regulation measures, motivation for learning, and human values. The results showed that students had a moderate level of self-regulated learning skills and strategies, while their human values were an important factor of motivation beliefs, and that the latter was an important factor of self-regulated learning strategies.

Cleary (2006) conducted a study aimed at knowing the level of application of self-regulated learning strategies and its relationship to academic achievement on a sample of (142) students of ninth and tenth grade of some secondary schools using a tool of three main sectors: search for information and learning, behaviour management environment, and non-adaptive organizational behavior. The results of the study indicated the superiority of females over males in the application of self-regulated learning strategies. There was also a disparity in the use of strategies between high and low-achieving students in favour of high-achievers.

**7- Terminology definitions**

The main terms and concepts are defined as follows:

- **Self-regulated Learning Strategies**

Researchers define it as: a set of systematic actions within a structured framework, which reflect the processes used by pupils in order to achieve his/her educational goals, with the appropriate motivations for achieving the required achievements through adjusting and guiding the pupil's abilities to suit his/her academic requirements.

**It is procedurally defined as:**

A set of specific actions that pupils take when dealing with or confronting different educational attitudes, in order to reach the desired objectives. These actions are cognitive strategies (rehearsal, organizing, expanding and mastering, critical thinking), beyond cognitive strategies (planning, self-monitoring, self-evaluating), and resource management strategies (time management, search for social assistance, management of study environment, organization of effort, learning of companions). It is measured by the grades obtained by the pupil when responding to the self-regulated learning strategy measure that is adopted by the study researchers.

**Theoretical part**

**1- Self-Regulated Learning**

This concept came to prominence in (1989) by Zimmerman & Schunk through the book "Self-Regulated Learning and Academic Attainment: Theory - Research - Application". Since then, the concept of this type of learning has become an important area of contemporary research in the field of education. Work has been followed up, with the majority agreeing, despite diversity and differences, to use it to describe that learning, which depends primarily on the pupil's full responsibility in the learning process and the strategies he/she uses to improve the learning outcomes.

(Ahmed, 2007, p 67)

Bandura (2002) is credited with focusing on the importance of self-regulation in learners as a basis for achieving learning goals in acquiring new knowledge by introducing his theory that a learner is able to control his/ her learning behaviors through his or her own perceptions and beliefs about the consequences of such behaviors, and that his/ her self-regulation contributes to the desired changes.

One of the most important principles of this learning is that it is more effective when the pupil begins to be subjective and self-oriented. It is also better for the pupil to be responsible for his/ her learning and to be independent in it. In addition, one of the most important objectives of the school is to raise individuals capable of autonomy in learning especially at the advanced educational level.

**1-2. Self-Regulated Definition**

The definitions contained in the literature in the field of education include:

Pintrich (1999) defined it as: One of the strategies used by the learner to regulate his/her knowledge, which includes a set of knowledge strategies, meatcognitive, and management of available sources to control the learning process. It is the process in which the pupil sets goals for his/her learning and then he/she monitors, regulates and controls it.

Kattati and Qatami (2000) define self-regulated learning as: one of the manifestations of self-learning that represents a learner's ability to control cognitive and metacognitive strategies.

El Jarah (2010) defines it as: the ability of the pupil to set his/ her goals, plan his/ her learning process, keep records, monitor his or her learning, work on the rehearsal and memorizing of the learning material, and seek assistance where necessary from others (colleagues, professors, senior,...).

In the light of what has been reviewed for this type of learning, in the current study the researchers adopt the definition of Pintrich (1999).

**2- Components of Self-Regulated Learning**

It consists of three components; are:

**First: Knowledge component**

The concept of knowledge refers to those steps involved in a pupil's attempt to learn about the world around him and includes identifying steps related to cognition, understanding and mental trial, and usually including conscious feelings. The cognitive component is the pupil's understanding of his/ her knowledge system, the more a pupil knows about an educational situation the more success he/ she will achieve. This component emphasizes the pupil's knowledge that supports his/her ability to use cognitive strategies in his/her learning process to enable him/her to understand all the tasks, with goal setting, monitoring predictions and expectations of the desired results, enhancing mental knowledge activity, and reaching high levels of educational attainment. The cognitive component is assumed by the pupil's stable cognitive structure which helps him/her in setting and processing special processes.

**Second: Metacognitive components**

The term metacognitive emerged in the early (1976) by flavel and it was derived from his research on memory processes, and his research on this topic extended to many research in the following years. Through these researches, he has developed several definitions of metacognitive, concluding that it means "The pupil's knowledge of the cognitive processes and what results from them, his/her strengths and weaknesses and awareness of all factors related to them" It refers to the pupil's self-interest and his/her adoption of knowledge processes and strategies.

Knowledge includes three types: starting with the editorial knowledge and how much the learner knows about a particular content. Then the procedural knowledge which is the learner's knowledge of how something works and finally the conditional knowledge that refers to the learner's knowledge of the conditions and laws that accompany a specific procedure, and which are related to questions: when something or an action is used? And for what purpose is it used?

**Third: Learning Resources Management Component**

Learning Resources Management Strategies that refer to activities that manage and control the subject learned by the pupil, and to internal and external

sources that are at the pupil's disposal to help him/her achieve his goals. They are strategies for regulating pupil behaviour, and some organizational models do not contain these strategies as a manifestation of self-regulation, as they do not involve clear attempts at self-control and regulation, and they are simply a control of behaviour.

Resource management strategies include managing the environment and study time, organizing effort, teaching companions, and seeking external assistance. (El Ghamdi, 2020, p.550)

The two researchers emphasize the need for all components in the educational situation, so that pupils can practice and implement strategies to the fullest, as these components are not preferential to each other, but complementary to each other.

**3- Characteristics of Self-Regulated Learners**

The behaviour of self-regulated learners is characterized by a high degree of seriousness and perseverance. Learners who will self-learn can manage the learning process efficiently and effectively to produce a learning environment that stimulates learning. Self-regulated learners have characteristics such as:

1- Knowledge of education strategies and methods of its use such as organization and rehearsal.
2- Knowledge of how to plan and control mental processes to achieve the objectives and increase the attainment.
3- Sense of self-effectiveness, development of educational objectives and adjustment of flaw according to requirements.
4- The ability to apply strategies that maintain focus in education.
5- Self-ability to learn, self-confidence and confront problems.
6- Ability to succeed in emerging tasks that require challenge and meaningful learning.
7- Control and organize of study tasks using the appropriate tools.
8- Results evaluation and knowing the difference between the actual and the required performance.
9- The use of feedback in self-evaluation. (El Ghamdi, 2020, p.549)

The two researchers believe that self-regulated learners should be aware of different self-regulated learning strategies and to be self-confident and able to cope with the encountered problems during educational attitudes, as well as to evaluate their learning outcomes.

**4- Self-regulated Learning Strategies**

**4-1. Cognitive Strategies**

**a- Rehearsal Strategy:** It refers to the pupil's practice or self-revision of remembering the educated material by using the apparent or invisible practice, i.e. the pupil's ability to memorize the subject by hearing and recounting it in a public or silent manner.

**b- Organization Strategy:** It is the pupil's explicit and implicit rearrangement of the learning materials in order to improve his/her learning, in which the pupil approaches ways in which he/ she arranges the information so that he/ she can understand it and present it more effectively.

**c- Elaboration Strategy:** It means redrafting and summarizing the subject to learn, as well as taking notes and asking questions about it.

**d- Critical Thinking Strategy:** Critical thinking refers to the degree to which pupils decide to apply the prior knowledge in the new encountered attitudes during learning in order to solve problems.

**4-2. Meat cognitive Strategies**

a- **Planning Strategy:** The planning and goal-setting strategy includes an analysis of the task of the pupil's work, and the preparation of manifestations that are linked to the prior knowledge which regulates, converts and understands the subject easily.

**b- Self-Monitoring Strategy:** this is to focus every pupil's effort and attention, distinguishing the effective from the ineffective performance, and to avoid, remove, and make adjustments to all the inappropriate strategies and ways of performing tasks, thereby contributing to the understanding and mastery of the studied knowledge.

**c- Self-Evaluation Strategy:** it refers to the pupil's self-assessment of the feasibility and quality of the performed work.

**4-3. Resource Management Strategies**

**a- Time Management:** Time management includes setting the agenda for the pupil's work, planning it and managing the school time in proportion to the tasks and its quality.

**b- Search Strategy For Social Assistance:** Pupils' initiatives and decisions related to seeking help from companions, teachers, adults and others, while facing difficulties and obstacles during learning whenever necessary.

**c- Management Strategy of the Study Environment:** Refers to the efforts made by pupils to organize the learning environment and make it appropriate, leading to a more accessible learning environment of a physical and such non-physical (psychological) nature.

**d- Effort Regulation Strategy**: It refers to pupils' ability to control their efforts, paying attention to distractions and distractive tasks, and persevere in completing or finishing difficult tasks.

**e- Peer Learning Strategy:** It about the dialogue between pupils and classmates in order to clarify and understand a subject, and their communication in order to reach out to insights that pupils may not reach alone and benefit from all of it.

(Hamuda, 2020, p.16,18)

**5/- Dimensions of Regulated Learning Strategies**

Zimmerman & Risemberg (1997) have developed a model of self-regulated learning dimensions of six basic psychological dimensions, summarized in the following table:

**Table (1): Conceptual dimensions of self-regulation of learning**

| **Scientific Questions** | **Pshychological Dimensions** | **Conditions** | **Self-Regulated Features** | **Self-Regulated Beliefs and Processes** |
|---|---|---|---|---|
| Why? | The motive | Participation choice | Internal motive | Pupil's goals, self-effectiveness, |

| | | | | |
|---|---|---|---|---|
| | | | | values,... etc. |
| How? | The method | Method adjustment | Planned or routine | Strategies using, comfort … etc |
| When? | Time | Time adjustment limits | Time limits and effective | Planning and time management … |
| What? | The performance | Adjustment of the performance | Conscious of its performance and outputs | Self-control, self-judgment, action adjustment and willingness |
| Where? | Environmental dimension | Control of the physical environment | sourced, environmentally sensitive | Environmental Selection and Construction |
| With whom? | Social dimension | Control of the social environment | sourced, socially sensitive | The form selection and ask for help … |

(Medid, 2020, p.20)

The different dimensions of self-regulated learning strategies help to optimize and best utilize these strategies. As learners have more of these dimensions, the better they implement strategies. Pupils must have a degree of awareness to choose the right strategy for the educational task, as well as the ability to manage time, organize the right environment, and seek help from others, both teachers and peers.

**Field aspect:**

**Methodological procedures:**

1- **Research methodology:** The used methodologies differ according to the field of specializations where it represents the mainstay of each research.

(Bouhouch, 1996, p.92)

The two researches adopted the analytical descriptive approach due to the nature of the topic.

2- **Research sample:**

**2-1. Human sample**

Represented in second year pupils of science and technology (Experimental science, Engineering process, Management and economy) in the two secondary schools of Zaouia Labidia Touggourt (338 pupil) of the school year 2021/2022, distributed by gender and stream as shown in the following table:

**Table (2): human sample by gender and stream**

| Stream / Schools | Experimental Science | | | Engineering Process | | | Management & Economy | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total |
| Houari Boumedien | 31 | 48 | 79 | 35 | 15 | 50 | 13 | 21 | 34 | 79 | 84 | 163 |
| Lazhari Tounsi | 50 | 75 | 125 | 40 | 10 | 50 | / | / | / | 90 | 85 | 175 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | 81 | 123 | 204 | 75 | 25 | 100 | 13 | 21 | 34 | 169 | 169 | 338 |

**2-2. The study sample**

The sample was chosen simply and randomly, and the number is 163 pupils (male & female) a percentage of 45.86 %.

**3- The study tools:**

The self-regulated learning strategy is used. It was translated into Arabic and legalized by Izzat Abdelhamid 1991. A doctorate thesis in education sciences for student Maryam Hamuda (2019/2020) examined the psychometric characteristics of the scale which turns out to have a good degree of validity and reliability. (Hamuda, 2020, p.152, 164)

**3-1. Psychometric properties of the scale in the current study**

The two researchers used the scale on a survey sample of 30 pupils from the study community, the results were as follows:

**3-1.1. Scale Validity**

The two researchers used the validity of the peripheral comparison and the results are shown in the table below:

**Table (3): Reliability of the peripheral comparison**

| **Statistical indicators / Variables** | **Sample** | **Arithmetic mean** | **Standard deviation** | **V Value** | **Statistical significance** | **Degree of freedom** | **Significance level** |
|---|---|---|---|---|---|---|---|
| **Lower 27%** | **09** | **137.44** | **11.74** | **9.61** | **0.000** | **16** | **0.01** |
| **Higher 27%** | **09** | **187** | **10.04** | | | | |

Table (3) shows: number of the lower category members is (09) with an arithmetic mean of (137.44) and a standard deviation of (11.74), while the number of the higher category members is (09) with an arithmetic mean of (187) and a (10.04) standard deviation. The calculated "v" value is (9.16) At the degree of freedom (16) the value of the statistical significance is (0.00) which is a statistically significant value at 0.01, that concludes that the instrument has the ability to distinguish between the lower and higher sets, and therefore the instrument has a high capacity of validity.

**3-1.2. Scale Reliability:** it was checked in two ways are:

**a- Split-Half Method**

**Table (4): Reliability Coefficient of Split-Half Method**

| **Staistical Indicators / Variables** | **Sample** | **Correlation coefficient** | |
|---|---|---|---|
| | | **Before the amendment** | **After the amendment** |
| **Self-regulated learning** | 30 | 0.78 | 0.993 |

Table (4) shows that the correlation coefficient in the Split-Half Method before the amendment was (0.87), and the value of the correlation coefficient

was (0.93) after applying Spearman-Brown Formula. This is high value which indicates that the instrument is of a good reliability.

**b- Cronbachs Alpha:**

**Table (5): Reliability Coefficient using Cronbachs Alpha and its dimentions**

| Dimensions | No | Alpha |
|---|---|---|
| **Cognitive strategies** | 18 | 0.88 |
| **Metacognitive strategies** | 10 | 0.81 |
| **Resource management strategies** | 18 | 0.67 |
| **Total** | 46 | 0.895 |

Table (5) illustrates that Cronbachs Alpha Reliability Coefficient are all high, confirming the scale's reliability and validity in this research.

**3-2. Scale description**

It is the scale of the self-regulated learning strategies which was adopted in the study of Hamuda 2020, formed of 46 phrases distributed on three dimensions that includes sub-strategies, the answer to the scale phrases is given gradually, grades 1 to 5, where grade 1 refers to the strongly responsive pupil's rejection of the phrase, While Grade 5 refers to strong approval of the phrase in case the phrase is positive, whereas the grades are reversed in the case of negative phrases. The score of 230 is the highest degree a respondent can receive on the scale, and the score of 46 is the lowest.

**4- Statistical Methods**

The two researchers used the Statistical Package for the Social Sciences software (SPSS), using the arithmetic mean, standard deviation, Cronbachs Alpha, Frequencies and percentages, Frequency Polygon Histogram, Chi-Square test, Independent-Samples T test, variance Analysis ANOVA.

**Results presentation, analysis and discussion:**

In the following, the findings of the research are presented, explained and discussed in the light of the theoretical framework and the previous studies.

- **Presentation, analysis and discussion of the results of the first hypothesis**

The first hypothesis is that: the majority of second year science and technology pupils have a high level of self-regulated learning strategies.

The hypothesis includes the following sub-hypothesis:

a- Most of second year science and technology pupils have a high level of cognitive strategies.

b- Most of second year science and technology pupils have a high level of metacognitive strategies.

c- Most of second year science and technology pupils have a high level of resource management strategies.

To check the hypothesis, we have conducted a Goodness of Fit for Chi-Square test. We came out of the following results after confirming the assumptions and conditions of the Chi-Square test as shown in the following table.

**Table (6): Significance of the different levels of self-regulated learning strategies among secand year science and technology pupils**

| Levels of having self-regulated learning strategies | | T | % | Chi-Square Values | DF | Probability Values | Statistical Significance |
|---|---|---|---|---|---|---|---|
| Cognitive strategies | Low | 67 | 43 | 16.74 | 2 | 0.000 | significant |
| | Average | 28 | 18 | | | | |
| | High | 60 | 39 | | | | |
| | Total | 155 | 100 | | | | |
| Metacognitive strategies | Low | 87 | 56 | 41.82 | | 0.000 | |
| | Average | 22 | 14 | | | | |
| | High | 46 | 30 | | | | |
| | Total | 155 | 100 | | | | |
| Resource management strategies | Low | 78 | 50 | 27.19 | | 0.000 | |
| | Average | 25 | 16 | | | | |
| | High | 52 | 34 | | | | |
| | Total | 155 | 100 | | | | |
| Self-regulated learning strategies | Low | 64 | 41 | 11.47 | | 0.003 | |
| | Average | 32 | 21 | | | | |
| | High | 59 | 38 | | | | |
| | total | 155 | 100 | | | | |

$\chi^2_{t\,(df\ 2,\alpha 0.05)} = 5.99$

a- Table 06 shows that: the difference between levels of cognitive strategies among second year science and technology pupils is statistically significant since the calculated Chi-Square, estimated as 16.74 is greater than the tabular Chi-Squrae that is estimated as 5.99 with an approximation of (0.000) lower than the significance level $(\alpha \leq 0.05)$. i.e., there is real difference between cognitive strategies of second year science and technology pupils.

Explanation: Frequency and percentage of second year science and technology pupils at the low level of cognitive strategies that is estimated as 67 by 43%, is the greater. On the other hand, that of the high level of cognitive strategies is estimated as 60 that is 39%. Whereas, frequency and percentage of second year science and technology pupils at the average level of cognitive strategies is estimated as 28 that is 18%. These results lead to the rejection of the first partial hypothesis of: Most of the second-year science and technology pupils possess a high level of cognitive strategies.

Contrary to the study of Al-Jarah (2010) which found that the level of having cognitive strategies is particularly high on the rehearsal and memorizing component, which may be attributed to the pupils' lack of training and practice of cognitive strategies, particularly mastery and critical thinking.

b- Back to table 06: the difference between the possession levels of metacognitive strategies of second year science and technology pupils is statistically significant since the calculated Chi-Square value

that is estimated at 41.82 is greater than the tabular one estimated at 5.99, with a P-value of 0.000 lower than the significance level ( $\alpha \leq 0.05$). i.e., there is a real difference between the possession levels of metacognitive of second year science and technology pupils.

Explanation: frequency and percentage of the lower possession level of metacognitive strategies among second year science and technology pupils estimated at 87 and 56% is the highest. On the other hand, that of the high level of metacognitive strategies is estimated as 46 that is 30%. Whereas, frequency and percentage of the average possession level of metacognitive strategies among second year science and technology pupils is estimated at 22 and 14%. This result leads to the rejection of the second parti al hypothesis of: Most of second year science and technology pupils possess a high level of metacognitive strategies. This is may be due to the fact that pupils at this educational stage do not have the ability to self-evaluation and self-monitoring, because they have not received training from their teachers, and there are not many quotas within the curriculum.

c- Back to table 06: the difference between the possession levels of resource management strategies of second year science and technology pupils is statistically significant since the calculated Chi-Square value that is estimated at 27.19 is greater than the tabular one estimated at 5.99, with a P-value of 0.000 lower than the significance level ($\alpha \leq 0.05$). i.e., there is a real difference between the possession levels of resource management of second year science and technology pupils.

Explanation: frequency and percentage of the lower possession level of resource management strategies among second year science and technology pupils estimated at 78 and 50% is the highest. On the other hand, that of the high level of resource management strategies is estimated at 52 that is 34%. Whereas, frequency and percentage of the average possession level of resource management strategies among second year science and technology pupils is estimated at 25 and 16%. This result leads to the rejection of the third partial hypothesis of: Most of second year science and technology pupils possess a high level of resource management strategies, contrary to the results of the study of (Wissal Hani Salem El Omri, 2013) where the degree of components after managing the environment and searching for information was high, and then came non-adaptive organizational behaviour at the mid-level, which is probably attributed to the fact that pupils do not know how to invest the environment and school time factors, as well as not taking advantage of learning from their classmates in a positive way, but rather copying their information and solutions without understanding it. As for seeking assistance, it is a part of tutoring sessions that have not been exploited appropriately. For the organization of the effort, they

are in urgent need of training on this important strategy; they are exposed to many distractions from modern means of communication and websites as they exploit them irrationally.

And finally back to table 06: we find that the difference between the levels of self-regulated learning strategies possession among second year of science and technology pupils is statistically a significant difference, as the value of the calculated Chi-Square estimated at 11.47 is higher than the tabular Chi-Square estimated at 5.99 with a lower P Value 0.0003 to the significance level ( $\alpha \leq 0.05$). i.e., there is a real difference between the possession levels of self-regulated learning strategies among second year of science and technology pupils.

Explanation: frequency and percentage of the lower possession level of self-regulated learning strategies among second year science and technology pupils estimated at 64 and 41% is the highest. On the other hand, that of the high level of self-regulated learning strategies is estimated at 59 that is 38%. Whereas, frequency and percentage of the average possession level of strategies among second year science and technology pupils is estimated at 32 and 21%. This leads to the rejection of the main hypothesis of: the majority of second year science and technology pupils have a high level.

The current study goes along with the studies of (ElHuseinan, 2010) and (Jardat 2014) as pupils had a low level of possessing self-regulated learning strategies, contrary to the studies of both (Ibrahim 2012) and (Tanriseven-Dilmac 2013) which show that the possession level is average.

The following figure: Summarizes the presentation of levels of second year science and technology pupils possession of self-regulated learning strategies.

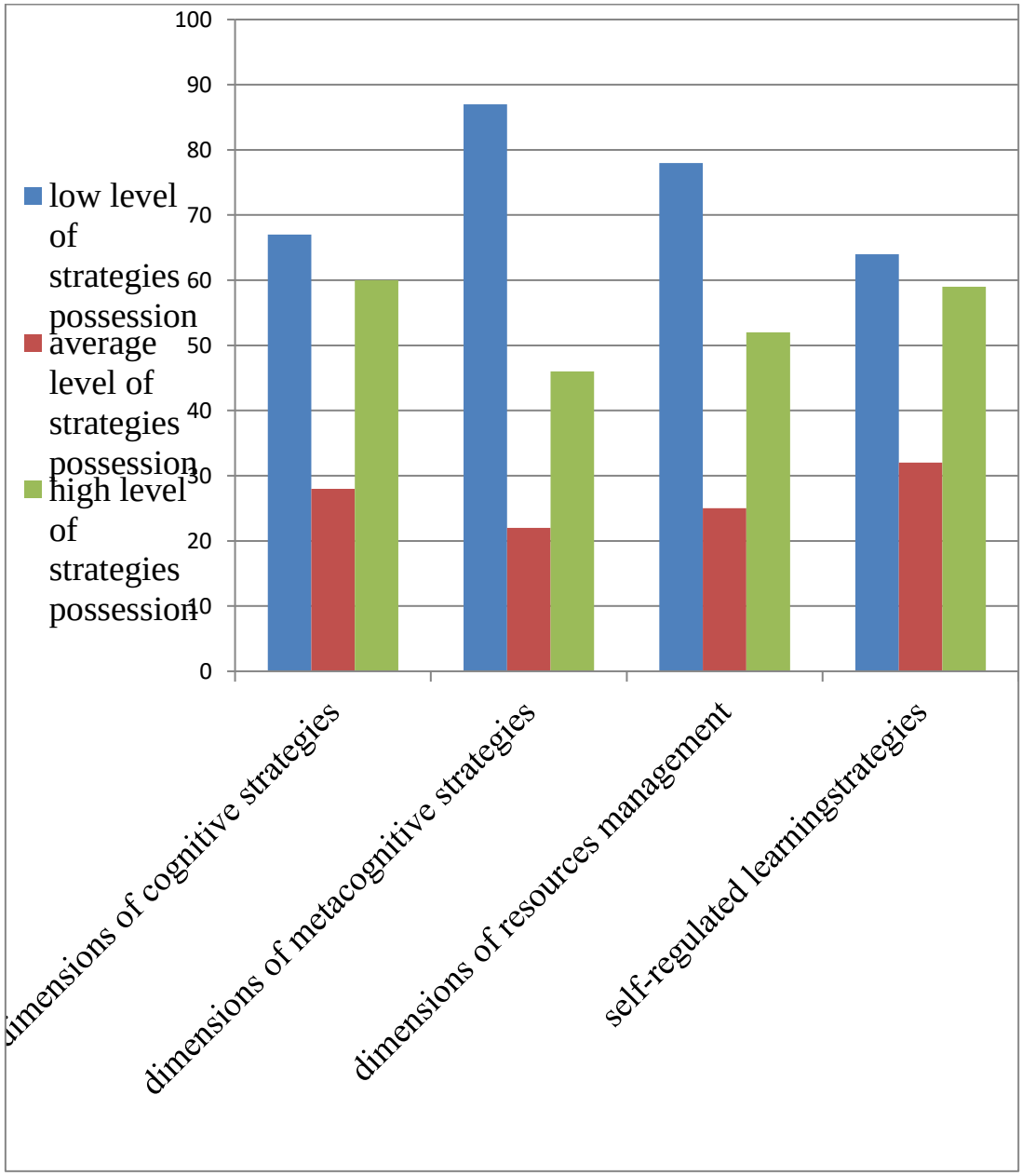


**Figure (1): levels of the possession of self-regulated learning strategies of second year science and technology pupils**

- **Presentation, analysis and discussion of the results of the second hypothesis**

The second hypothesis is about: there are statistically significant differences in self-regulated learning strategies of second year science and technology pupils attributable to gender.

To check it, we have used arithmetic mean, Standard Deviation and Independent-Samples T test. Results are as shown in the table below:

**Table (7): arithmetic means, standard deviations and T values of differences between genders**

| Gender | Sample | Arithmetic mean | Standard deviation | T value | Degree of freedom | Sig value | Significance level |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Boy** | 75 | 154.65 | 23.95 | 4.35 | 153 | 0.000 | 0.01 |
| **Girl** | 80 | 169.46 | 18.10 | | | | |

The table (7) illustrates that there are 75 boys with an arithmetic mean of 154.65, and standard deviation of 23.95. whereas girls are 80 with an arithmetic mean of 169.46 and a standard deviation of 18.10. the calculated T value was 4.35 and the statistical significance 0.000 which is a statistically significant value in the significant level of 0.01. This result leads to the acceptance of the hypothesis, as it shows the difference between boys and girls in self-regulated learning strategies in favour of girls. The result goes along with the study of (Fatima Helmy Hassan, 1995) on which the results indicate that girls are more used for strategies than boys on the scale as a whole, and on the dimensions of organization, transformation, rehearsal and seeking help from others. Lotfi Abdelbasset's study agrees with it as it indicates the superiority of girls over boys in the overall degree of self-regulated learning on its dimensions: regular revision, selection of solutions, automatic motivation, lessons preparation and search for information. It also agrees with Dabbas's (2005) and Cleary's (2006) studies which indicate that girls use self-regulated learning strategies more than boys. The results differs in Izzat Abdelhamid's study (1999), which showed that boys had high scores than girls in all strategies, and that there were no differences between the two in dimensions of frequency, mastery, organization, and seeking for help. The studies of Rashwan (2005) and Wissal Hani Salem Al-Omari (2013) found that there were no statistical differences attributable to gender, and the study (ElJarrah, 2010) where the results were differences attributable to gender and in favour of boys for the goal setting and planning component.

The results can be attributable to the fact that girls are more persistent and organized than boys, and they seek to achieve their goals, especially educational ones in order to find a job. Girls also seek to excel and join universities, unlike boys who can be easily distracted. Moreover, most of employees in the education sector are females, making it easy for girls to communicate with them and seeking help.

- **Presentation, analysis and discussion of the results of the third hypothesis**

The hypothesis is that: there are statistically significant differences in self-regulated learning strategies among second year science and technology pupils attributable to streams.

To check this hypothesis, we have used the total sum of squares and variance method, as shown in the following table:

**Table (8): the total sum of squares and variance in and between groups**

| **Statistical indicators / Variables** | **Total sum of squares** | **Degree of freedom** | **Variance** | **V Value** | **Significance** |
|---|---|---|---|---|---|
| **In groups** | 239.32 | 2 | 119.66 | 0.23 | 0.78 Insignificant |
| **Between groups** | 76599.02 | 152 | 503.94 | | |
| **Total** | 76838.34 | 154 | | | |

Table (8) shows that in groups, the total was 239.32, and the variance was 119.66, whereas degree of freedom reached 2. While between groups, the total sum squares was 76599.02, variance was 503.94 and degree of freedom was 152,

whereas V value was 0.23 and the significance was 0.78 which is a statistically insignificant value. This lead to the rejection of the hypothesis, i.e. there are no differences attributable to stream between pupils. According to Dabbas's study 2005, students of scientific streams are the most used for remembrance and organization of literary streams. This is confirmed by Rashwan's study (2005) whose results include statistical differences between students of scientific and literary streams in favor of scientific disciplines.

The lack of differences between pupils of second year science and technology is probably attributable to the fact that all the pupils of such streams are close in the possession of self-regulated strategies. And the variance between them is so small form stream to another. This is due to the pupils' qualities and the teachers' competence in training and accompanying them.

**Recommendations**

The following are proposed based on the finding of the study, literature and previous studies.

- Work to develop and train students' self-regulated learning from the early stages of education to maximize the use of its strategies in the elementary stages of education before passing to university.
- Working on the creation of an educational environment within educational institutions that gives pupils an opportunity for self-regulated learning to demonstrate their cognitive and mental abilities and to highlight individual differences between them.
- Raising the teachers' awareness on the importance of self-regulated learning strategies and guide them to train their pupils in using these strategies for learning and studying.
- Diagnosing the pupils' extent of using self-regulated strategies for learning and preparation of the necessary training programmes to develop the skills of using these strategies.
- Incorporating strategies into curriculum activities to ensure pupils' use and its gradual transformation into desirable behavioural habits.
- School counselors and vocational guidance should be interested in developing the concept of self-regulated learning among secondary school pupils, in order to support the trend towards adopting and using its strategies.

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