# The Impact of Self-Regulation-Based Strategies in Improving Learning Scientific Concepts Among Students with Learning Disabilities in the Intermediate Stage

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**ABSTRACT:**

This study explored the self-regulated learning strategies common among students with learning disabilities in public schools compared to their regular counterparts. In the current study, the descriptive approach was followed to suit the objectives of the study. The study sample consisted of (320) students from the seventh grade, including (160) students with learning disabilities from public schools in Abha, Saudi Arabia. Another 160 students were also from the regular fourth grade in public schools. The study sample was chosen by a simple random method and at a percentage of 50% of its population. The study used a self-regulated learning scale that Purdie had created for use in a foreign environment. The regular person knows how to learn, is self-motivated, and knows his capabilities and limitations, and based on this knowledge, he controls and organizes his learning processes, and modifies them to suit the objectives of the specific task. The results indicate that there are statistically significant differences in the strategy (goal setting and planning) and the strategy (record keeping and monitoring), depending on the variable type of student.

## INTRODUCTION

The basic education stage is of great importance in the educational world as it marks the turning stone of the next educational stage, as it hosts the number of educational experiences that it prepares to include in the subsequent developmental stages. It is also the stage after the emergence of the main features of social development (Mustafa, 2020, Hadhrami et al., 2022). The current stage is the number of people living in poverty, who are now suffering from the social anxiety disorder that they suffer from (Khasawneh, 2021a). It is necessary to provide means of care and attention to their students to facilitate the grouping of them with their peers to improve the level of their academic achievement in the classroom (Al-Fakhri, 2018; Jarrah et al., 2024). The term "learning disability" now denotes a group of disabilities that alone do not have the right to protect themselves (Khasawneh, 2021b). Among the meanings of disability is that it is difficult to dress in a normal way, as a result of social situations, and it is difficult for her to tell her truths healthily (Khasawneh, 2021c). In addition to a set of behavioral characteristics, including a short attention span, loss of attention, loss of interest, weakness of love, social history, inability to communicate, poor mental behavior, frustration, and loss of awareness (Mishri, 2017; Alsrehan et al., 2024).

Among the most successful ways to teach students the many facets of effective learning—motor, cognitive, and emotional skills—is via self-regulated learning, which has several benefits (Khasawneh, 2021d). The cognitive explosion and the information and communication revolution are both apt times for it (Al-Ghamdi, 2022). Furthermore, it caters to the students' inclinations towards self-sufficiency and autonomy, creating opportunities for them to engage in meaningful conversations with one another and with their teachers, and ultimately preparing them for a career in science (Khasawneh, 2021e). Students have better abilities in self-management, and teachers have more time to focus on other aspects of the classroom (Muhammad et al., 2022). This shift in focus to the learner without sacrificing academic rigor is in line with current thinking in the area of education research. Self-regulated learning is one of the most prominent topics addressed by theorists, scholars, and specialists in educational psychology at present (Khasawneh, 2021f). The importance of self-regulated learning lies in the type of students it seeks to form. The self-regulated learner can monitor his performance and determine and apply appropriate strategies and is driven towards learning for

the sake of learning (Khasawneh, 2023a; Alomari et al., 2023a).

One of the crucial pillars that determine the degree of accomplishment, motivation, mental health, and capacity to attain personal and academic success is students' capacity for self-management (Khasawneh, 2023b; Alomari et al., 2023b). In addition to influencing the kinds of activities and tasks that students engage in, they may also influence how long it takes for students to overcome challenges, and vice versa (Al-Hayek, 2022). Our ability to self-regulate is shaped by our experiences in life and the people we look up to. A lack of self-management abilities is the root reason for some pupils' early academic failures (Khasawneh, 2023c). As a result, there has to be a unifying model for studies addressing students' intrinsic motivation, emotional intelligence, cognitive abilities, and metacognitive processes; this model should focus on students' ability to self-regulate their learning, encourage them to continue learning throughout their lives and push them to achieve academic excellence (Al-Kandari, 2022; Khasawneh, 2024a).

Self-regulation is a practical step that embraces the needs of the people to carry out the practical implementation of what has been set upon them for the sake of their behavior in the face of the desired reconciliation in a way that strengthens their target in life (Khasawneh, 2023d; Saleem Khasawneh, 2024). Self-regulation must be the main and ultimate goal of education that must be achieved. With the help of our people, there is a basic approach to directing us to the next goal, with the vital motivation to achieve the goal, in a way that is easy to achieve, where we can find the right place (Khasawneh, 2024b). Self-regulation is the ultimate way to self-management and control (Al-Hindawi, 2020; Salman et al., 2024).

**Problem statement**

Self-regulated learning is a process through which learners can direct, direct, and monitor their learning process. Self-regulated learners can manage their own learning experiences, and they share characteristics that indicate that they are self-regulated in the learning process and one of those characteristics is their achievement of high levels regarding the learning process. Self-organized learners employ many strategies that contribute to completing academic tasks, setting goals, finding the motivation to achieve those goals, and monitoring the learning process with feedback about the learning process and their continuous flexibility to modify learning behaviors according to what the learning conditions require (Khasawneh

& Khasawneh, 2023). The majority of educators still rely on time-honored practices that put the spotlight squarely on the educator. Furthermore, students face a plethora of challenges while pursuing scientific education, including poor academic performance and an absence of self-control. After visiting the classrooms of a few elementary school science instructors, this became quite evident. Neither self-management nor self-regulated learning was used in the classroom. Scientific study (Khasawneh, 2021a). Experimenting with techniques, methods, and teaching strategies that would attain the learner's positivism, the elevation of skills, self-control, and organization is crucial, as the Ministry of Education continues to improve educational development processes (Khasawneh, 2024c).

Self-regulated learning is of great value, as it plays a fundamental role in the lives of individuals because it leads to an increase in the individual's achievement in all the tasks he performs in general, and academic tasks in particular, and the use of self-regulated learning strategies will lead to students' integration into the content. Learned material; It thus leads to the acquisition of knowledge, decision-making, and social skills, and it also plays an important role in developing the ability to make judgments and independence, which leads to the development of self-assertion (Khasawneh, 2024d).

### Questions of the study
The following sub-questions emerge from this question:
1. What self-regulated learning strategies are common among students with learning disabilities in public schools compared to their regular counterparts?
2. Do self-regulated learning strategies differ at the significance level ($\alpha$ = 0.00) according to the type of student (disability or regular)?

### LITERATURE REVIEW

### Self-regulated learning
The concept of self-regulated learning refers to "the effort made by the learner to deepen and direct preparation and processing to improve his learning" by controlling resources, setting goals, expectations of success, and deep cognitive integration (Al-Khawaldeh, 2019). Concepts such as self-awareness, self-direction, and self-evaluation are closely related to self-regulated learning and achievement behavior. Thus, it expresses the integration of the individual's stable knowledge, skills, and beliefs acquired through the educational experiences he goes through, as the individual arrives at a certain period of his develop-

ment to possess a personal philosophy of learning, which represents the cognitive frameworks for the concepts that determine what learning is and what it is. They are the ways and means that help and why the individual learns (Al-Nagib et al., 2018).

Various research has shown that self-regulated learning has a collection of components (Al-Qahtani, 2023). The cognitive component refers to the student's comprehension of their knowledge framework. The more the learner understands about a situation, the greater the success achieved (Khasawneh, 2024e). It focuses on providing knowledge that enhances the learner's ability to use cognitive strategies in their learning preparation (Al-Sharif et al., 2023). This allows him to comprehend the responsibilities and assignments at hand, establish objectives, develop anticipations and forecasts of outcomes, enhance cognitive mental activity, and attain a significant level of academic success. An individual's grasp of cognitive processes and the consequences of those processes, as well as their awareness of their cognitive strengths and shortcomings, as well as their acknowledgment of all components related to these processes, are all aspects that are included in the metacognitive component (Anjarah, 2018). The involvement and use of cognitive processes and tactics carried out by the person is the primary emphasis of this approach (Khasawneh, 2024d). When it comes to the motivational component, refers to the innate drive and vigor that gives people the ability to choose and pursue certain goals. The term "internal processes" refers to the cognitive systems that direct the behaviors of a person towards the accomplishment of a certain goal within their environment (Bin Qasimah, 2021).

It is used to characterize the level of self-regulation shown by autonomous pupils in maintaining their practice or study habits without external supervision from parents or professors (Fang et al., 2023).

### Cognitive and meta-cognitive strategies
These strategies are the methods and cognitive methods students use to learn, remember, and understand the new academic material and link it to the previously learned material. Cognitive strategies are considered among the important strategies associated with academic performance in the classroom (Ghbari et al., 2014). These strategies can be applied to simple memory tasks, such as recalling information, and words, or to more complex tasks that require understanding the information. Cognitive strategies are divided into superficial cognitive strategies and deep cognitive strategies. Superficial cognitive strategies refer to recall, which includes repetition and in-

timate memory of information, which helps in encoding new information in short-term memory, then reading the learned material over and over again and repeating it (Hassan, 2020). Deep cognitive strategies are related to mastery, organization, and critical thinking, which include testing the validity of the information that the learner receives and trying to integrate new information with the learner's previous knowledge and experience, which facilitates retaining the information in long-term memory, such as making a planned summary of important concepts (Irfan, 2022).

Metacognition means the individual's awareness of cognitive processes his control over his cognitive work and the organizing mechanisms that he uses to solve problems. Metacognition skills include knowledge of all kinds, as well as planning, organizing, and evaluation processes (Kayaalp et al., 2022). There are different classifications of metacognition skills. Meta-cognition about knowledge includes three types of knowledge. The first is declarative knowledge, which relates to the learner's knowledge of a specific content, and consists largely of facts and concepts. The second is procedural knowledge, which relates to the learner's knowledge of how to do something. The third is conditional knowledge, which relates to the learner's knowledge (Muhammad et al., 2022). The conditions and evidence that accompany a specific procedure, and relate to when something is used. Metacognitive strategies in self-regulated learning include planning strategies, monitoring strategies, and control strategies.

**Self-management skill**

The self-regulated learner shows a greater awareness of his responsibility to make learning meaningful and monitors his performance. He views educational problems and skills as challenges that he wishes to confront and enjoys learning through them. Self-regulated learning contributes to making the student have motivation, perseverance, and independence. He has self-discipline and confidence in himself and he can use different strategies to achieve the learning goals he has set for himself (Mishri, 2017). At the beginning of the nineties of the previous century, the idea of self-management was first put into practice. Along with its birth, there was also a growth in the vocabulary that was used to describe everything. Initially, it was referred to as self-control of conduct to communicate self-management (Mustafa, 2020). However, as time progressed in the late eighties, it progressively evolved into what is today known as behavioral self-management (Rizk et al., 2020; Alsowait et al., 2023a).

Thereafter, in the middle of the nineties, the phrase "self-identification" was used. The phrase continues to be one of the most often used terms in the area of educational and psychological sciences, even though it has undergone a change and developed additional meanings (Sever & Akyol, 2022; Alsowait, et al., 2023b).

According to Türkben (2019), self-management is comprised of several distinct processes and abilities that a person develops in response to a variety of circumstances to improve their behavior, recognize their requirements, and accomplish their objectives. The capacity of people to make sensible use of their time by determining their requirements, establishing objectives to accomplish those needs, and prioritizing the activities that are necessary via planning, analysis, commitment, follow-up, and the creation of agendas, in addition to estimating the amount of time that each job requires, is referred to as time management (Ziadat & Sakarneh, 2022; Jarrah et al., 2024). When we talk about emotion management, we are referring to an individual's capacity to cope with a variety of feelings, to pull themselves out of negative moods, to calm themselves down, and to exhibit suitable emotions in a variety of settings. The ability to build strong relationships with others and put effort into maintaining them through effective communication, conflict resolution, influence, persuasiveness, offering constructive criticism and guidance, having a clear vision for the future, and working together as a team to achieve common goals is what we mean when we talk about "social relationship management."

**Previous studies**

Fang et al. (2023) suggested a method for self-regulated learning that is based on idea mapping. To test the efficacy of the method, a self-regulated learning system based on idea mapping was used in a quasi-experimental fashion. Compared to the standard self-regulated learning method, the suggested strategy considerably enhanced students' STEM abilities but had no discernible effect on their STEM knowledge, according to the experimental data. When contrasted with the standard method of teaching self-regulation, the suggested strategy significantly enhanced students' ability to control their behavior. In a nutshell, students' ability to acquire STEM abilities is improved by the idea mapping-based self-regulation learning strategy, which also increases their self-efficacy.

Türkben (2019) explored how fifth graders' comprehension, reading motivation, and self-regulation abilities change after practicing strategic reading based on self-regulation. The research took place at two middle

schools in Aksaray that serve students from middle-class families. Researchers employed a controlled experimental design with a pre-and post-test control group. The study design called for the random assignment of paired groups to either the experimental or control groups. A program that aims to enhance self-regulation-based reading abilities was implemented in the test group, while the control group continued to follow the present education program. The tools employed for data collection were the following: reading comprehension scale, reading motivation scale, reading strategies scale, and motivation and learning strategies scale. Reading comprehension, motivation, and self-regulation abilities were all positively impacted by the results of the study.

Syefrinando et al. (2020) conducted a mixed-methods study to identify the factors that motivate students to learn and how their ability to self-regulate affects that motivation. Using a complete sampling approach, 534 students from Madrasah Tsanawiyah in Jambi City, Indonesia, were selected for the study. After that, we used SPSS 21 to do some descriptive and inferential statistics (via simple regression and the independent sample T-Test, respectively) on the data. Because of the strong correlation and mutual effect between self-regulation and students' intrinsic drive to learn, the findings of this study have far-reaching implications for both areas. With a significance level of 0.019, it contributes 70.3%. Findings suggest that both students and instructors should have more opportunities for hands-on learning and that educators should be more creative in their approaches to the subject.

A group of students from the College of Education were tested by Khasawneh (2021a), who created a curriculum to help students become better self-managers. The goal was to see whether the program might promote mental toughness. In all, 22 students (22 male and 22 female) formed part of the sample. Two groups were formed from the students. The first group consisted of 12 students, 12 of whom were female and 10 of whom were male. Findings indicated that the program was effective in educating participants on self-care and in fostering positive mental health.

The use of self-regulated learning methodologies to the development of cognitive accomplishment and attitude toward chemistry was investigated by Hussein et al. (2022). Two groups of sixty-six female students each made up the sample for this quasi-experimental study. Two measures of attitude and an accomplishment test were used in the research. The findings showed that compared to the control group, the group of female students who used self-regulated learning methodologies did better academ-

ically and had a more positive outlook on the topic. As a result, we can see that there are effective methods of structured learning that may help students improve their chemistry attitudes and cognitive abilities on their own.

Research by Al-Sharif et al. (2021) investigated the potential benefits of student-chosen learning strategies for improving chemistry performance and critical thinking skills. They zeroed down on students in high school. Sixty females in their first year of high school were surveyed using a quasi-experimental approach. Results showed that there was a significant difference between the two groups of female students in terms of their reflective thinking skills after using certain learning approaches. The experimental group of girls did better on tests after employing various learning strategies compared to the control group of females. These differences were substantial and deliberate.

## METHODOLOGY

In the current study, the descriptive approach was followed to suit the objectives of the study.

### Sample

The study sample consisted of (320) students from the seventh grade, including (160) students with learning disabilities from public schools in Abha, Saudi Arabia. Another 160 students were also from the regular fourth grade in public schools. The study sample was chosen by a simple random method and at a percentage of 50% of its population. This percentage was chosen to preserve the scope for applying the study tool and extracting its psychometric properties.

### Instrument of the study

In the current study, Arabized and codified the self-regulated learning scale that Purdie had created for use in a foreign environment. The scale was limited to four dimensions of self-regulated learning: goal setting and planning, record keeping and monitoring, reciting and memorizing, and seeking social assistance. The scale in its final form consisted of 28 items, distributed by seven items for one dimension. The student answers the scale through a five-point Likert scale (Khasawneh, 2023e).

In the current study, the validity of the scale was confirmed by presenting it to ten arbitrators with specialization in the field of educational psychology at King Khalid University to extract the content validity of the scale. An agreement rate of 10% was adopted between the arbitrators to maintain the paragraphs, modify them, or delete

them. Their comments regarding the clarity of the wording of the paragraphs were beneficial.

By calculating the repetition reliability coefficient (Test-Retest), it was possible to confirm the stability of the scale in its foreign form. Reliability was also calculated by calculating the repetition stability coefficient in the current study, which was calculated in the same way as previous studies, with a time difference of two weeks on a stability sample (n=30). Table 1  shows the results.

It is noted from Table 1 that the reliability coefficients for the self-regulated learning scale are high, which indicates the possibility of using this scale for the current study.

**Data analysis**

To do statistical analysis of data collected in the present study, the SPSS program was used to statistically analyze the data and address the research inquiries. The mean scores, standard deviations, and independent Samples T-test were used to compare the means of two separate groups.

**RESULTS AND DISCUSSION**

To answer the first question, the frequencies, and percentages of the responses of the study sample members on the dimensions of the scale and on the total score of the scale as a whole were extracted. Table 2 shows the results.

It is noted from the previous table that the percentage of goal-setting and planning strategies for students with LDs was (20%), while it was (21%) for ordinary students. It is also noted that the percentage of listening and memorizing strategies for students with LDs was (22%), while it reached (20%) for ordinary students. It is also noted that the percentage of the strategy of asking for help from external monitoring and supervision for students with LDs was (21%) while it was (70%) for ordinary students. It is also noted that the percentage of the total score for self-regulated learning strategies for students with LDs is (20%) while it was 20% for ordinary students.

The regular person knows how to learn, is self-motivated, and knows his capabilities and limitations, and based on this knowledge, he controls and organizes his learning processes, and modifies them to suit the objectives of the specific task. This result is the goal that this study seeks to achieve, as it has Based on this result, it is possible to propose a new tool for detecting gifted people later, after conducting more studies that support and support this approach.

To find out if there were differences in how students self-regulated their learning based on the type of student,

Table 1. **Reliability coefficients for the Purdie scale of self-regulated learning by repetition**

| Dimension | Prudie's study | Current study |
|---|---|---|
| goal setting and planning | 0.73 | 0.77 |
| record-keeping and monitoring | 0.68 | 0.71 |
| reciting and memorizing | 0.75 | 0.72 |
| seeking social assistance | 0.80 | 0.73 |

Table 2. **Frequencies and percentages of responses of the study sample's respondents on a scale of the degree of use of self-regulated learning strategies**

| No. | Dimension | Group | Frequency | Percentage |
|---|---|---|---|---|
| | goal setting and planning | Students with LDs | 160 | 53% |
| | | Regular students | 160 | 38% |
| | record-keeping and monitoring | Students with LDs | 160 | 51% |
| | | Regular students | 160 | 17% |
| | reciting and memorizing | Students with LDs | 160 | 63% |
| | | Regular students | 160 | 35% |
| | seeking social assistance | Students with LDs | 160 | 61% |
| | | Regular students | 160 | 25% |
| | | | 320 | 100% |

Table 3. **The mean scores and standard deviations of the responses of the study sample according to the student type variable**

| Dimension | Group | No. | Mean score | Standard deviation |
|---|---|---|---|---|
| goal setting and planning | Students with LDs | 160 | 3.06 | .474 |
| | Regular students | 160 | 4.19 | |
| | Students with LDs | 160 | 3.28 | 1.110 |
| | Regular students | 160 | 5.07 | |
| record-keeping and monitoring | Students with LDs | 160 | 2.72 | 1.381 |
| | Regular students | 160 | 4.02 | |
| | Students with LDs | 160 | 2.74 | 1.292 |
| | Regular students | 160 | 3.78 | |
| reciting and memorizing | Students with LDs | 160 | 1.73 | 1.063 |
| | Regular students | 160 | 2.88 | |
| | Students with LDs | 160 | 1.28 | 1.040 |
| | Regular students | 160 | 2.23 | |
| seeking social assistance | Students with LDs | 160 | 2.50 | .979 |
| | Regular students | 160 | 3.69 | |
| | Students with LDs | 160 | 2.43 | 1.169 |
| | Regular students | 160 | 3.69 | |

the responses of the study sample to one of the self-regulated learning strategies and the scale as a whole were compared between students with learning disabilities and those who were not disabled. Table 3 shows the arithmetic means and standard deviations for the use of self-regulated learning strategies according to the categories of the student type variable.

Table 3 indicates that there are apparent differences in the means according to the student type variable. The results of the previous table indicate that there are statistically significant differences in the strategy (goal setting and planning) and the strategy (record keeping and monitoring), depending on the variable type of student. Looking at the table of averages, it is noted that the regular students outperformed their peers from students with LDs. Regarding the strategy for keeping records and monitoring, this may include self-monitoring, which is when the student uses specific methods or strategies and then tests them. The gifted person here may use imagination and self-observation, which refers to the self-recording of personal events or personal experiences to find out the cause of these events. This is what distinguishes gifted students from ordinary students.

As for the lack of differences between gifted students and ordinary students in the strategy (recitation and memorization) and the strategy (seeking social assistance), cul-ture may have a role in this. The strategy of seeking help may be seen as starting from a source of weakness for the student. Seeking social assistance may be a defect, and indicates a lack of independence and an inability to solve problems and deal with different situations. The strategy of reciting and memorizing may also be viewed as the strategy of a student with low mental abilities who relies on silent memorization. Under the educational systems in Arab countries, there may be no difference between a gifted student and an ordinary student in employing the strategy of reciting and memorizing, as both are subjected to the same type of teaching and evaluation; teaching is based on the principle of memorization and rote learning. Students in general rarely resort to research and investigation to obtain information.

**Significance of the study**
Consistent with current trends in education, this research looks at the effects of self-regulated learning on students' performance in school and their capacity to manage their own time and energy more effectively. To improve students' academic performance and foster the development of self-management abilities, the research suggests that science classes should focus on employing self-regulated learning strategies. More investigations and research into self-regulated learning, accomplishment, and self-man-

agement abilities across educational contexts will be possible as a consequence of the findings.

## Study limitations

The study included fourth-grade students at public schools in Abha, Saudi Arabia. This study was applied during the second semester of the 2022/2023 academic year. The results were limited to the use of the study instrument and the results obtained based on the participants' responses.

## RECOMMENDATIONS

The research suggests that instructors should be instructed on the significance of using self-regulated learning techniques and the need to educate students in implementing these strategies throughout their learning and studying activities. It is crucial to assess the degree to which individuals with attention-deficit/hyperactivity disorder use self-regulated learning techniques and have access to appropriate courses and training programs to enhance their ability to apply these strategies in their academic pursuits. Incorporating self-regulated learning techniques into the school curriculum is crucial to guarantee that students actively use them and progressively internalize them as positive behavioral patterns. The study suggests conducting training programs for science teachers as well as teachers of other subjects to instruct them on incorporating self-regulated learning into their curricula. These programs would equip teachers with the necessary skills to effectively implement self-regulated learning, enhance their ability to manage it and clarify the roles of both the teacher and the student in promoting academic achievement and self-management.

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