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Review

Beyond Grades: Harnessing Self-Regulated Learning to Empower Underperforming Students

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Abstract

Self-regulated learning (SRL) represents a critical educational framework through which learners proactively govern their learning processes using self-motivation, metacognitive reflection, and strategic task management. This article examines SRL's transformative role in enhancing academic performance, particularly for underperforming students who often face significant academic and environmental challenges. SRL offers a structured approach for these students by promoting resilience and reinforcing goal-oriented learning behaviors. Key SRL components include establishing structured learning environments, optimizing resource use, and building self-efficacy. Through SRL instruction, educators can support underperformers in cultivating sustainable, autonomous learning practices. Specific strategies, such as peer tutoring and interactive tools like "Betty's Brain," reinforce understanding as students teach and apply learned concepts. Integrating SRL among underperforming students cultivates lifelong learning skills and establishes a foundation for enduring academic and professional success. Future research should explore innovative SRL approaches tailored to the needs of underperforming students, with particular emphasis on applications within medical education, where SRL could significantly enhance both immediate and long-term outcomes.

Keywords: Underperformers, Self-Motivation, Medical Students, Self-Efficacy.

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Introduction:

Self-regulated learning (SRL) is an active, dynamic process where learners take control of their educational journey, using self-motivation, metacognitive reflection, and targeted behavioral strategies to engage deeply with their tasks.It involves proactive and reflective participation by learners, shaping their learning experiences through processes guided by well-established theoretical frameworks [1].Self-regulated learners are typically more resilient, overcoming learning barriers by analyzing and adjusting to obstacles. These barriers often include suboptimal learning environments, unclear instructional guidance, and challenging materials, such as complex textbooks and lecture notes. Self-regulated learners demonstrate greater accountability and achieve more successful learning outcomes [2,3].

While SRL shares similarities with self-directed learning, it emphasizes constructive, perceptive learning processes [4]. Zimmerman's 1989 model of SRL draws upon Bandura's 1986 socio-cognitive learning theory, suggesting that internal processes, a supportive learning environment, and strategic development for self-regulation influence SRL [5]. According to a study by Zimmerman et al. 2000, SRL encompasses self-generated beliefs and strategies that guide learners toward achieving specific educational goals [6]. The essential element to initiating SRL is the student's establishment of clear, personal goals.

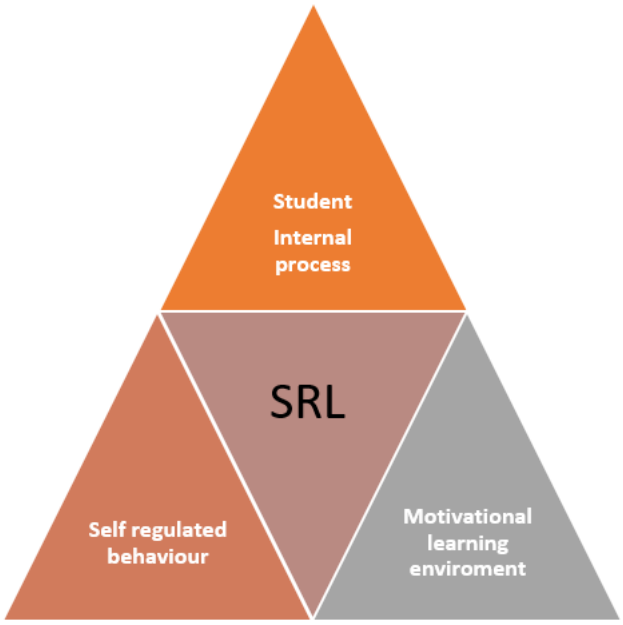

Figure 1: Self-Regulated Learning Model

Why Self-Regulated Learning Matters

Mastering Self-Regulation: Self-regulation is a process by which students learn to approach academic activities through practice and self-reflection. All students, regardless of skill, knowledge, age, or educational background, can develop self-regulated learning over time. This process emphasizes the gradual acquisition of skills rather than innate intelligence.

College Readiness: *The Case for SRL:* Unlike younger students, college students generally possess self-control and aptitude to manage time. However, they may face challenges balancing academic commitments with social activities. Managing time and staying motivated is crucial to achieving higher learning outcomes [7].

Building self-control: SRL allows students to actively manage three essential components, behavior, motivation, and cognition, to improve academic performance. Research by Schunk and Zimmerman highlights how students can develop self-regulation by taking control of their learning processes [4.8].

Teachability: SRL strategies can be acquired in any classroom setting, with various courses dedicated to fostering self-regulation skills [9]. Effective teaching requires a committed educator and motivated students to create the foundation for self-regulated learning.

The core elements of SRL are (i) Listening and following instructions, (ii) Creating a learning environment, (iii) Utilizing the resources efficiently, (iv) Learning through memory by arranging, decoding, and recalling the information, (v) Optimistic self-belief (vi) Factors regulating learning and (vii) Experiencing pride and fulfillment with the taken efforts [10].

Phases of Self-Regulated Learning

Paul Pintrich (2000) [11] proposed a comprehensive framework for SRL, integrating elements from other theories, including Zimmerman's and Schunk's models (2001) [11,12]. This framework outlines four self-regulation phases.

Phase I- Cognition: Gaining knowledge may occur without awareness, but in self-regulated learners, gaining knowledge is more planned through self-contemplation. Metacognitive knowledge can be self-regulated through intentional, conscious control. Planning and activation require a motivational process and fixing goals, self-efficacy, and interest. The motivational process relies on challenging perceptions, self-efficacy, fixing achievable goals, and the student's fascination with learning. It depends on students' likes of the subject area, perception of the learning relevance, and mental judgment in perceiving the difficulty level of educational resources and managing time by preparing schedules for varied activities.

Phase II-Monitoring: It refers to awareness of self-action and its outcomes. Monitoring can be in motivational, behavioral, and Contextual monitoring. Motivational monitoring is self-awareness about one's efficacy, interests, and values. Behavioral monitoring is the ability to regulate time and effort in accordance with the outcome. Contextual monitoring is monitoring the changes in task management.

Phase III-Control: The control during this phase is obtained by cognition, motivation, behavior, and context. Cognitive control involves the control of metacognitive and mental activities that the students use to adapt [11]. Motivational control is the ability of the student to control his curiosity and anxiety during their performance. Behavioral control approaches the educator only when required and does not seek immediate help. They try to learn and understand the concept from reliable resources. Contextual control is using stratagems to reduce distraction and selecting working peers to support them.

Phase IV-Reaction and Reflection: Students evaluate their performance and use these insights to enhance their learning approach [11,12]. The behavioral reaction is about whether the time was aptly planned and adequate to complete the learning task. In contextual reaction, one assesses the conceptual factors.

SRL in Medical Education: Rising to the Challenge

During the last few decades, SRL has gained popularity in medical education. The successful implementation of SRL in the curriculum requires good educator-student collaboration, adequate teacher preparation, and student's interests and learning preferences. Foley et al. suggested that promoting SRL is challenging and requires a hostile implementation environment [13]. Self-regulated learning is more targeted to top performers. Still, underperforming students can become self-regulated learners with educator support and a motivational environment. Guiding underperforming students into SDL and SRL will pave the path to achieving high academic performance. Underperforming students in medical institutions are led by environmental and psychological factors; continuous support from mentors and teachers will lead to higher learning outcomes. Promoting SRL in medical colleges for underperforming students will produce a new dimension for learning, even in large groups.

Information technology helps to create a deeper connection between the educator, students, and educational content, enhancing academic performance and learning outcomes like critical thinking, reflective writing, and individual student development [14-19]. The boom in digital technology has brought SRL to the forefront, and its context has changed with the current technology in various learning avenues.

Integrating SRL in Higher Education: Key Strategies

Pintrich and Zusho (2002) [20] stated that students are more capable of utilizing cognitive and metacognitive strategies for learning [20]. Cognitive development plays a crucial role in developing SRL. With cognitive development, students can set targets, follow and analyze their progress, and make changes in the framework. Further cognitive development also increases the memory retrieval process and speeds up the learning process.

Creating Cognitive Awareness: Students can use structured feedback tools to enhance their cognitive development understanding. Two widely recognized tools for this purpose are the Motivated Strategies for Learning Questionnaire (MSLQ) and the Learning and Study Strategies Inventory (LASSI) items, which assess both motivational beliefs and SRL behaviors, allowing students to evaluate themselves in each category and rate their performance across different variables [21,22]. Pintrich describes the MSLQ scales as highly reliable and closely associated with academic success, making it a practical and effective tool for self-assessment and reflection [23].

Strengthening Motivational Beliefs: SRL relies heavily on solid motivational beliefs, clear goals, and practical resource use. Unlike simple memorization, SRL is a more profound process that requires time and a strong sense of self-efficacy. Rather than focusing solely on grades, teachers should encourage students to set and master personal learning goals. Self-efficacy, or a student's confidence in their ability to complete tasks, is essential and should be nurtured by faculty through balanced motivation, neither overly optimistic nor too critical. It is vital to distinguish self-efficacy from self-esteem: while self-esteem aims to make students feel generally positive, self-efficacy is task-specific and directly influences academic success. Faculty can effectively support SRL development among students by fostering motivation and self-efficacy.

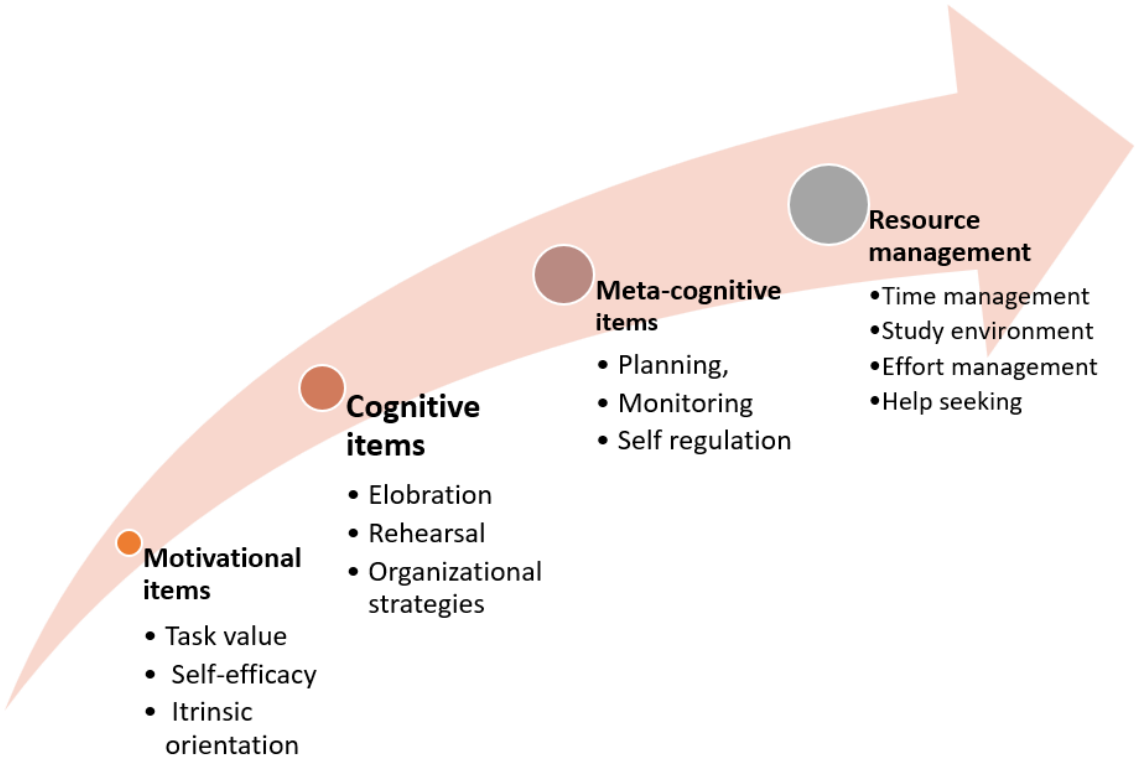

Figure 2: Steps in Self–Regulated Learning

Role Modeling SRL: One of the most challenging tasks for faculty is mastering various learning models and thinking strategies that effectively guide students. As subject experts, faculty may sometimes overlook the beginner perspective and unintentionally engage students as if they were already familiar with the field's nuances. While critical thinking might come naturally to faculty, students often struggle to develop these skills. Educators can foster reasoning and critical thinking habits that support students in becoming self-regulated learners by intentionally modeling their thought processes and adapting strategies to meet students at their level.

Practicing SRL strategies: Developing self-regulated learning skills is a gradual process that may take months or even years to master fully. While massive open online courses (MOOCs) can help students begin this journey, consistent effort and practice are essential to build effective SRL habits. Faculty play a critical role by guiding students through classroom activities, providing constructive, timely feedback, and helping them understand and learn from their mistakes. This supportive instruction equips students with the skills needed to become self-regulated learners, setting them on a solid academic path.

Creating Classroom Opportunities: Offering students the chance to choose and exert control over their learning fosters self-regulated learning. Implementing strategies that allow students to make decisions while maintaining the integrity of course content is essential. However, key decision-making responsibilities, such as curriculum development, exam design, and assignment topics, ultimately lie with faculty members. Balancing student autonomy with faculty oversight is crucial in creating an effective learning environment.

Effective prompts for students: Tasks that enhance reasoning and reflection should be actively encouraged. Journals serve as valuable prompts, enabling students to analyze research problems and develop solutions. Zimmerman (1989) suggested incorporating techniques such as progress worksheets and graphs to track student behavior [5]. Encouraging self-reflection on personal challenges can enhance

metacognitive skills [24]. Assigning more challenging tasks motivates students to adopt self-regulation rather than relying on routine assignments [25]. Additionally, instructional games can spark curiosity and drive engagement [26]. Providing opportunities for students to compare and reflect on various learning materials allows for individualized learning, ultimately improving their metacognitive knowledge.

Peer Support and Collaborative Learning: Student support is essential for fostering SRL among underperforming students. (i)Peer interaction: Engaging with peers allows students to learn new techniques and gain moral support. A social environment promotes learning without barriers. (ii) Mentor interaction: Mentorship encourages and builds self-confidence in underperforming students. Personal interactions provide valuable feedback and guidance, aiding in the mastery of self-regulation [5].(iii) Reassurance: Underperforming students can benefit from the reassurance that learning is a challenge even for top performers, which connects to their capacity beliefs [24].(iv) Educator–student collaborations: Direct instruction from educators on developing a conducive learning environment, managing time, and implementing self-regulation strategies will enable underperformers to approach educational tasks more confidently.

Leveraging Technology for Enhanced SRL: Advanced technology can be a powerful motivational trigger for self-regulated learning. A study by Becker et al. (2000) demonstrated that teachers believed students' engagement in classes increased when technology was integrated into the curriculum [27]. Similarly, research by Harris et al. (2002) revealed that teachers utilized ICT to foster positive outcomes in students, including improvements in self-esteem, enthusiasm, social skills, teamwork, and overall accomplishments [28].

Technology support, including online reading, exposes students to a wide range of resources that align with their interests, allowing for personalized, self-paced learning. Online learning enhances the effectiveness of student learning methodology. SRL is further facilitated by Open Educational Resources (OER), which provides free resources for exploration and learning. These resources empower students to delve into subjects of interest without needing a teacher.

Social media has often been viewed negatively for its potential to distract students and hinder academic focus; the rise of Personal Learning Networks (PLNs) has transformed it into a tool for passionate, self-directed learning. Platforms like blogs, Twitter, Facebook, and WhatsApp foster connections that enhance SRL. Visual elements such as lectures, educative animations, and short medical case videos on YouTube, Med Cram, and MedEd online make learning more enjoyable.

These technologies empower students to design their own learning experiences. However, the successful integration of technology in SRL within medical education depends on students' ability to evaluate and synthesize information critically. This process minimizes the demands of SRL. Effective communication and collaboration help students fill gaps in understanding. Communication and cooperation help the students to bridge the space in which clarity is lacking. The use of technology on SRL has shown enhanced learning among students across European nations [29].

Supporting Underperformers: A New Path to Success

Underperforming students require targeted support from peers, teachers, parents, and instructional coordinators to achieve successful educational outcomes. Neglecting these students' challenges can lead to critical issues that may hinder their academic progress. Despite institutions offering a wide range of programs designed explicitly for underperformers, symptoms such as depression, low self-esteem, and negative emotions are often prevalent among this group.

Institutions employ various methods to identify students needing additional curricular support, including educational data mining techniques, analysis of previous school grades, formative assessment scores, and evaluation of classroom engagement. In response, institutions typically should implement support programs emphasizing teacher motivation, individualized attention, specialized educational programs to build self-confidence, curricular reforms, remedial classes, and peer tutoring.

While guiding underperformers can significantly benefit them during their undergraduate education, these students may continue to struggle with similar issues in their postgraduate education or professional careers. SRL is an essential internal process that integrates motivation and cognition. By utilizing mentoring techniques and teaching underperformers how to become self-regulated learners, educators can help them develop diverse strategies for overcoming obstacles and achieving long-term success.

Underperforming students have the potential to develop self-regulated learning (SRL) skills, enabling them to recognize learning challenges, set realistic and attainable goals, and enhance their self-efficacy and motivation. While SRL is often associated with high-achieving students who demonstrate proactive engagement and autonomy in their learning, fostering these skills in underperforming students remains a critical yet complex endeavor. Effectively guiding these learners to identify and leverage their internal resources, regulate their learning strategies, and take ownership of their academic progress requires targeted instructional approaches and sustained support.

Literature reviews indicate no standardized strategy for identifying students needing additional support globally; these strategies vary from one institution to another. For instance, when students are categorized as underperformers based on formative assessments, confounding factors such as exam content, question formats, and preparation time may differ across institutions and exams. As a result, a student deemed an underperformer at one institution may not be classified as such if they undertake formative assessments elsewhere or under different instructors. This variability highlights the subjective nature of current educational methods for identifying underperformers.

Practicing various strategies for self-control, self-instruction, and self-reinforcement can significantly enhance self-regulated learning among students. While personalized education, flexible curricula, and curricular reforms are undeniably challenging to implement within large teaching populations, more feasible alternatives exist. Offering self-regulated learning (SRL) courses and applying targeted strategies can effectively support underperformers in becoming self-regulated learners.

Metacognition and Its Role in SRL

Metacognition, often defined as "thinking about one's thinking," serves as a foundational element within the SRL framework [30,31]. It operates at the intersection of cognitive processes and self-regulatory mechanisms, enabling learners to identify gaps in their knowledge, assess the effectiveness of their learning strategies, and adjust align with their academic goals.

Within the monitoring phase of SRL, metacognitive self-awareness plays a pivotal role as learners evaluate their task performance, self-efficacy, and expected outcomes [32]. This awareness, which operates in real-time, facilitates critical reflection, allowing learners to appraise their progress immediately. In the control phase, metacognitive skills empower students to effectively regulate their cognitive, motivational, and behavioral strategies.[11] Learners may adapt their approach to studying,

manage distractions, or seek resources to bridge identified knowledge gaps, thus ensuring alignment with desired outcomes.

In the reaction and reflection phase, metacognitive skills enable learners to evaluate their learning experiences critically [33]. Through this reflective process, students derive insights into the efficacy of their strategies and refine their approaches for future tasks. By integrating metacognition within the SRL framework, learners cultivate a comprehensive understanding of their learning processes, enhancing their self-regulating ability [31]. This dynamic interplay between metacognition and SRL underscores its significance in fostering autonomous and effective learning and inspires a lifelong commitment to learning.

Uncovering Best Practices for SRL in Medical Training

Medical institutions host a diverse student body from across the country, each with varying IQ levels and foundational knowledge. To achieve positive academic outcomes for underperformers, institutions implement various strategies. However, a standardized process for identifying underperformers on a global scale is essential. Such universal identification protocols would eliminate subjective biases among faculty members and institutional criteria used to recognize underperformers. Currently, institutions tend to categorize underperformers based on comparisons with their peers, meaning students who score the lowest are labeled underperformers. Establishing uniform identification criteria worldwide would minimize peer comparisons and enhance self-confidence among underperformers, fostering a more supportive environment for them to overcome challenges.

Faculty cooperation and concern for underperformers are essential prerequisites for fostering academic success. A dedicated faculty training program aimed at improving outcomes for underperformers should be developed and implemented. These training programs must be tailored to address all faculty members' diverse environmental and psychological needs. By equipping educators and mentors with uniform guidance, we can ensure consistent support for underperformers. Additionally, providing students with e-resources, including various online tools and lectures, will facilitate their learning and contribute to a more successful educational experience.

Implementing self-regulated learning among underperformers is a challenging task. It can be difficult to motivate students who may be resistant to regulation. Underperformers often participate in various educational programs and remedial measures to enhance their academic outcomes. Practical application is essential to convert these strategies into methods for developing self-regulated learning. One common approach is peer tutoring, where underperformers can teach their peers instead of receiving guidance solely from teachers, mentors, or parents. This empowers underperformers to deepen their domain knowledge and organize content for presentation, fostering SRL [34]. By enabling them to take on teaching roles, we can tap into their intrinsic motivation, helping them to build self-confidence and ownership of their learning. However, a key question arises: whom can they teach to help self-regulate their learning? A study by Gautam Biswas et al. demonstrated the effectiveness of computer-based applications, such as a “Teachable Agent System” called Betty’s Brain. This system acts as a listening and analyzing agent, allowing students to teach the agent and increasing their accountability for cognition and reasoning. The agent's ability to answer questions about what has been taught provides effective coaching, while its analysis reports help students self-assess and monitor their progress [35]. It allows the students to deliver effective coaching. It also gives an analysis report of what was expected by the student

and leads the student to self-assessment and monitoring. The use of various AI tools like chatGPT, can assist students in assessing their knowledge through both voice and written interactions. In the future, educational research on developing novel techniques for identifying and implementing self-regulated learning among Underperformers can be proposed.

Conclusion

Providing support to an underperformer to become a self-regulated learner will not only help the student during the course, but it will also lay a strong foundation for the student to perform consistently throughout the academic and professional journey.

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