Metacognition and self-regulation

Background

The summary below presents the research evidence on metacognition and self-regulation in the Arab World.

The Teaching & Learning Toolkit focuses on impact on outcomes for learners; it presents an estimate of the average impact of metacognition and self-regulation on learning progress, based on the synthesis of a large number of quantitative studies from around the world.

This page offers a summary and analysis of individual studies on metacognition and self-regulation in the Arab world. In contrast to the Toolkit it includes studies which do not estimate impact, but instead investigate the implementation of interventions and how they are perceived by school leaders, teachers and students using a range of research methods. This information is valuable for school leaders and teachers interested in finding out more about particular examples of metacognition and self-regulation that have been delivered in the Arab world.

Summary of the research in the Arab World

Metacognition and self-regulation are recognized as approaches that have high impact on overall students' learning. Metacognition is often defined as 'learning to learn'. Self-regulation means managing one's own motivation towards learning. These approaches aim to help pupils think about their own learning more explicitly. For instance, when engaging students in analysing and evaluating their learning, they gain skills like: organizing information, planning and recognizing the learning task, monitoring and checking their comprehension process, asking questions to themselves and others, and communicating the main ideas with others, and assessing their own performance on a task. Thus, their awareness about their own thinking and motivation in are creased and their critical and creative thinking skills are improved (Al- Alwan, 2012).

Teachers' role is essential to teach students specific strategies to set goals for learning, planning, monitoring and evaluating their own academic development. Researchers argued that preparing teachers through training them and providing them with the right professional development are necessary for the successful implementation of these approaches in the classroom (Al Aerdan, 2017; Baroudi & Rodjan Helder, 2019; Laabidi, 2019). Most teachers failed in implementing these strategies because they come from a traditional way of teaching which is teacher-centered and have not had the needed training to integrate these strategies into their instruction (Al Aerdan, 2017). Furthermore, in one study teachers in Lebanon and UAE often complained about time constraints, demanding curriculum, lack of teaching assistants, and big classroom size as obstacles for implementing these strategies in their science classroom (Baroudi & Rodjan Helder, 2019). Thus, teachers failed to design the most suitable strategy for a learning task that will develop students' metacognitive and self-regulation skills.

Additionally, when examining teachers' practice of critical thinking in Moroccan high schools, 423 participants revealed that lack of incentives, insufficient teacher training, and lack of resources had considerable influence on their integration of critical thinking. Students showed lack of motivation to become critical thinkers and learners capable of self-regulating their learning due to their being over occupied with getting good grades (Laabidi, 2019). Furthermore, textbooks lack activities targeting students' meta-cognition and teachers are only concerned

with covering all the content of the curriculum (Laabidi, 2019). Teachers in Saudi Arabia highlighted the availability of resources as an upmost factor for fostering secondary students critical thinking (Almulla, 2018). Through a mixed method research strategy Almulla (2018) discovered that improvement of students' critical thinking is mainly dependent on two variables, open-ended questions (asking why, how, what if, etc.) and practical tasks. When expanding the p-value benchmark to 0.15, the author considered "comparing and contrasting" students' opinions about old and new information, as another variable to be associated with critical thinking.

Employing metacognitive strategies in Mathematics classes impacted the innovative skills for students (Abdel Razig, 2014; Rizk et al., 2017). Findings of an experimental study conducted in primary school in Saudi Arabia showed statistical significance on the post test in favor of the experimental group who was taught mathematics based on a metacognitive strategy (Rizk et al., 2017). This strategy included several steps. First, teachers clarified the learning process and prepared students to connect the concepts of the lesson with their experiences. Second, teachers provided a model for the mental processes to solve the mathematical problems and offer various and new solutions. Third, teachers participated with students whenever they felt there is a difficulty in the modeling and observing process. Fourth, students modeled the skill as the teacher did but for another problem. Fifth, at the end of the activity, teachers asked questions to assess student's performance and determine their strengths and weaknesses. Results of Abdel Razig (2014) and Rizk et al. (2017) indicated the effectiveness of using metacognitive strategies which helped to increase students' awareness and realization in solving pronunciational problems and increased their academic achievement.

Studies like Abo-Alkhail and Abu Mathana (2020) showed that metacognition and self-regulation are more effective when taught in collaborative groups. When students learn in groups, students support each other, take more responsibility about their learning, and make their thinking explicit through discussion. Thinking Actively in a Social Context (TASC) is a method that teachers use to encourage collaborative work among students. Ahmed (2018) divided primary students in an Arabic language class into an experimental (n=35) and control group (n=35).

Students were provided with the same learning task; however, the experimental group was required to generate solutions and discuss them collectively, and then apply these ideas and evaluate them in order to decide about the best applicable solution. After that, they were asked to evaluate their work individually and collectively. TASC significantly improved students' linguistic achievement in Arabic but also developed their critical thinking and decision-making skills. It provided students with the experiences and skills to apply what they learned in other situations inside and outside the classroom. Findings of this study showed that students problem solving, independent skills increased and their social interactions with their peers and the teacher expanded (Ahmed, 2018). Despite the acknowledged benefits of collaborative groups work, teachers until this date are unaware of these benefits to students' learning and they view this approach as highly challenging to integrate in their regular classroom activities (Almulla, 2018).

Other strategies like using open-ended questions inspired learners to think critically and develop their higher-order thinking skills (analysis, synthesis, and evaluation) (Laabidi, 2019; Al-Muqusi, 2016). Randomly dividing female students at grade 10 in Jordan to the control and experimental group provided evidence that students who learned Islamic Studies using the open-ended question strategy performed better on the posttest than their peers who learned using the closed-question method (Al-Muqusi, 2016). Students who were given time to think to provide an answer to the open-ended question were able to remember the information, apply it, and make an analysis and evaluation of what they learnt. This strategy strengthened the interactions between teachers and students, improved students' motivation towards their learning, and encouraged them to participate positively and effectively in class.

Integrating technology in the curriculum is a strategy that could enhance primary and secondary students' lower and higher order thinking and critical thinking skills. In a study conducted in Algeria, teachers who showed videos to EFL secondary students facilitated their analysis, evaluation, and supported them in creating and producing knowledge (Bougherara, 2019). It also enhanced their independency and helped them become more autonomous. As a result, students' critical thinking and self-regulation increased. In another study, using e-task based approach for a science homework in kindergarten students in Kuwait boosted their critical

thinking, problem solving, and effective communication skills (Al Kandari & Al Qattan, 2020). E-task based approach provided learners with hands-on and mental activities that are challenging. Thus, student's motivation to learn improved. It is noteworthy to mention here that teachers were prepared and trained to use the technology and the e-task based approach for the period of four weeks before implementing it in their classroom. At the end of this activity, pupils were able to ask questions, seek help, work individually, with peer and groups (Al Kandari & Al Qattan, 2020).

Implementing metacognitive and self-regulation approaches is really difficult in practice. That is why the majority of research in the Arab world examined these approaches among older students. For example, critical and creative thinking of secondary students in Jordan developed whenever they learned through an educational program on the Web Quest during the computer science subject. The researchers measured students creative thinking skills based on: students' **originality** in finding and expressing new ideas, **fluency** in producing many correct ideas to solve a problem, and **flexibility** in thinking differently and looking at the problem from different angles (Abo-Alkhail & Abu Mathana, 2020). Using the Web Quest encouraged students to work collaboratively and increased their flexible participation, independent learning which increased their self-regulation skills.

In an experimental study conducted on 164 grade 10 students in Jordan, the experimental group taught through the use of critical thinking activities showed greater impact on their metacognitive skills compared to the control group. Findings of this study revealed that students were aware of the information received but they were also able to take on multiple roles at the same time. They were asking questions and answering others, they controlled and evaluated their knowledge. Their metacognitive skills grew and students were more able to argue based on reason and logic. This type of activities created an active environment in the classroom that encouraged discussion, enquiry, and dialogue, and reflection (Alnasraween, 2019).

Summary paragraph:

A number of studies in the Arab world have noted the significance of meta-cognitive skills on students' academic outcomes. In a study done in 2017 in Saudi Arabia, students in the experimental group performed better on the posttest when taught using the metacognitive strategies comparing with the control group.

Arab world-based research on the topic suggests that students can benefit from exercising self-regulated learning skills. In order for students to learn how to effectively and autonomously apply these skills, studies in the Arab world suggest that teachers use more open-ended questions and implement activities that encourage students collaborative learning.

Further research is recommended to investigate other meta-cognitive and self-regulation strategies impact on students' achievement particularly among primary grades. Researchers are invited to look at teachers' understanding about these strategies and how and in what ways they can best integrate them in the curriculum. Having this evidence-based data would be helpful for the design of professional development programs for teachers.

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Search Terms

Meta-cognition; executive function; self-regulation; study skills; thinking skills; cognitive processes; critical thinking.

Databases searched

Academic search complete
ERIC
Education Source
Google scholar
ProQuest Central
ProQuest Dissertations
PsycINFO
Web of science