

Creating Lifelong Learners: Investigating Metacognition as Support for Learning and Learning Transfer

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KEY IMPLICATIONS

1. It is crucial to pay our attention to students' metacognitive experiences (ME), especially the negative ME, as negative ME could lead to disengagement of learning of the subject over time. Hence, a positive, conducive, and encouraging learning environment are necessary conditions that facilitate students' learning.
2. A certain level of fluency in content, procedures, and skills are necessary for the activation of higher order thinking processes.
3. Teachers and CCA trainers need to be more explicit and reiterate over a longer period of time when teaching students metacognitive thinking.

BACKGROUND

Concerns about the challenges of "future" learning and economy can be addressed by cultivating metacognitive strategies among students, particularly those directed for transfer of learning. Metacognition may allow students to make deliberate and explicit connections to their learning across contexts or domains, and between past, current, and future learning. While literature on metacognition has been extensive, few studies have examined its role in facilitating transfer across contexts (Benander & Lightner, 2005; Pintrich, 2002; Scharff et al., 2017),

and how such awareness and ability support students in adapting learning to new contexts, including those of the future economy.

FOCUS OF STUDY

This study aims to suggest ways to strengthen students' ability to transfer learning across different contexts or domains. Key objectives include: (1) finding out whether and how students engage with metacognition in learning and learning transfer across different contexts or domains; and (2) uncovering the different factors (e.g., student motivation, learning beliefs, and self-efficacy) that influence how metacognition would facilitate the transference of concepts or ideas across different contexts (e.g., classroom and CCA), and between prior and new learning.

KEY FINDINGS

1. From the latent profile analysis, there were four student metacognition profiles. Students with lower metacognitive profiles were associated with lower levels of achievement goal and transferable learning orientations and vice versa.
2. From the hierarchical linear regressions, students' mathematical performance was positively associated with their metacognitive levels.

3. From interviews and observations, teachers and instructors articulated metacognitive knowledge (MK) and used metacognitive regulation (MR) in the classroom and CCA contexts. There could be more opportunities for students to engage in such tasks with teachers' and instructors' explicit rationalisation of the potentials of metacognitive thinking with the students.

SIGNIFICANCE OF FINDINGS

1. Students could be clustered meaningfully according to their metacognitive levels.
2. Students mathematical performance was positively associated with their metacognitive levels. Metacognitive levels and profiles serve as another good predictor to gauge student's academic ability and test performance.
3. Metacognitive experiences – knowledge of self in the lack of fluency/difficulty – negatively and significantly associated with students' mathematical performance.
4. Negative experiences of learning of Math could lead to a negative impact on students' learning of Math and subsequently a lower self-concept. Hence how teachers' respond to students who are performing poorly requires more attention as it has a bigger impact on the student beyond academic performance.

PARTICIPANTS

This study involved 5 local secondary schools with a total of 757 Sec 2 students who consented and participated in the online survey. Thereafter, 12 students (5 Normal Academic [NA], 6 Express, and 1

Sec 4 Badminton) and 4 teachers (2 Math and 2 CCA teachers) also took part in semi-structured interviews. Three separate classes (2 Express and 1 NA) were also involved in lesson observations.

RESEARCH DESIGN

A mixed method approach was employed where both quantitative and qualitative inquiries were conducted simultaneously. This study adapted Akyol and Garrison's (2011) community of inquiry construct, and insights from the cognitive and developmental view of metacognition. Confirmatory factor analysis, item response theory, latent profile analysis, and multiple hierarchical regression were carried out on the online survey data. Qualitative analysis included deductive and inductive coding, categorizing, and theming of the observation and interview data.

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