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**LEARNING STRATEGIES
IN MATHEMATICS EDUCATION**

A THESIS PRESENTED IN PARTIAL
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Abstract

Interest in learning strategies is particularly relevant to current curriculum reforms in mathematics education. The body of literature concerning the constructivist perspective of learning characterises the learner as being cognitively, metacognitively and affectively active in the learning process. The learner must appropriately control his or her learning processes by selecting and organising relevant information and building connections from existing knowledge.

In order to assist students in becoming more active, and self-regulated, it is timely that we learnt more about learning strategies, and their relation to knowledge construction and effective performance. This ethnographic study examines sixth form students' use and awareness of learning strategies. Data was obtained from observations, questionnaires, and stimulated recall interviews. Case studies of four students provided descriptive learning profiles of strategic behaviours in context.

Learning strategies are classified according to cognitive, metacognitive, affective, and resource management goals. Examples of students' specific use of learning strategies indicates that a wide range of strategies are employed. However, the use of learning strategies *per se* is not inherently indicative of purposive, intentional learning behaviour. There is a strong indication that the appropriateness and effectiveness of strategies relate to the learning goal and the task demands.

Learning behaviours that contribute to successful learning include rehearsal, elaboration, organisation, planning, monitoring and, self-evaluation. In addition, more successful students modify their learning tasks, know when it is appropriate to seek help, and are able to adapt their physical and social learning environment to optimise their learning opportunities.

Contributing factors of low achievement include: lack of relevant prior knowledge; lack of orientation towards mastery learning and an associated confusion about task goals; and inappropriate use of learning strategies related to monitoring understanding. Less successful students provide infrequent reports of metacognitive behaviours to control learning and employ ineffective use of help seeking and resources.

The study provides ample evidence of passive learning behaviours. Students sample selectively from the flow of instructional stimuli according to their needs and interests, but seldom take action to adapt the lesson to their individual requirements. Specific instructional factors which appear to contribute toward passive learning behaviours are highlighted in this study.

The present study provides evidence to support the proposed *Interactive Model of Learning Mathematics*. The influence of presage and product factors on strategic learning behaviours is clearly demonstrated in reports of the students' classroom and home learning environments.

Success of new curriculum developments in mathematics is critically linked to creating a suitable learning environment. To promote higher-order thinking in the mathematics class we may require a less instrumental approach - one that transfers some of the burden for teaching and learning from the teacher to the student, creating greater student autonomy and independence in the learning process.

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