

The Psychology of Learning in Teaching Mathematics

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The mathematics teacher has a plethora of ingredients to emphasize in teaching and learning situations. First of all, having breadth and depth of knowledge to use in the instructional arena is salient. Bringing in available technology to improve student learning is a must. These ingredients need blending with the psychology of learning in helping students succeed. It is vital, then, to secure the interest of learners in ongoing experiences. Without the interest factor, student involvement will be minimal. To achieve objectives, learning activities must be varied, challenging and appropriate to the ability levels of learners. It behooves the teacher to choose experiences that develop and maintain student interest. Additional criteria for teaching mathematics also need attention.¹

Quality in Teaching Mathematics

Motivating students in attaining mathematics objectives means that their energy level increases. Motivated students are attentive and are eager to participate actively in the curriculum. Their attention span increases and they stay on task, rather than daydreaming or thinking about the weekend. The mathematics teacher must observe students to notice their achievement, as well as where diagnosis and remediation are necessary. Meticulous observation of learners in the classroom setting provides feedback for teaching and allows teachers to get to know student behaviour better while seeking innovative ways to motivate them. Creative approaches to the mathematics curriculum must be found in order to increase student motivation (Ediger and Rao 2011).

In each learning in mathematics, meaning must be emphasized. The facts, concepts and generalizations that are acquired serve as building blocks for subsequent lessons. If the learnings are hazy, students will likely experience difficulties with the new objectives. A professional teacher possesses a reservoir of mathematical knowledge and skills in guiding students to overcome problem areas. The content must make

sense and be understood clearly. The teacher should pace the teaching of subject matter to facilitate achievement of the objectives. The goal is for students to master vital subject matter and abilities (such as critical and creative thinking, reasoning skills, and problem solving).

Purpose must be stressed and accepted by students in ongoing lessons. Thus, students acquire reasons for participating actively. With purpose, learners perceive a need for using the subject matter in school and in society. Mathematics is functional and precise, and it contains patterns for mastery. Too frequently, students see mathematics class as another day of drill and rote learning. Rather, mathematics must be perceived as exciting and challenging and as a process of discovery. Too often, learners in the classroom are perceived as lethargic and uninterested. It should be just the opposite, with active participation and use of manipulative materials that harmonize with the developmental levels of those in the classroom. It is possible to adapt the curriculum to where students are currently and then sequence learnings to make for continuous progress (Wiske 2004).

Resilience must be integrated into mathematics curricula. With resilience, students bounce back from difficulty and failure. A major problem in teaching is that learners give up too quickly in problem-solving activities, as well as when a new process is being emphasized. Securing student attention is salient, and carefully ordering steps in teaching new learnings is necessary. However, in school and in life, frustrating situations do occur. Students need help to deal with difficulties in a manner that stresses resilience. For example, the teacher can scaffold content and skills. A competent math teacher might then raise sequential questions whereby learners discover the answer or the knowledge needed to realize increasingly difficult objectives. Instead of taking an inductive approach, the teacher, deductively, might sequence from where the child is having difficulty to the desired level of accomplishment. This, too, can make for feelings of accomplishment and minimize frustration, increasing the chances of success in future endeavours.

Teachers must be accountable for their own behaviour. An off-the-cuff statement in a moment of weakness may cost a teacher a recommendation or even result in dismissal. Calling students names or losing one's temper is regrettable, and harassment and rudeness must be eliminated from the school setting. The consequences of such actions are high indeed. It behooves teachers to be in complete control. Teachers need emotional intelligence in order to control their behaviour and actions. Probably, we all have been in classes along the way from elementary school through the college years in which an instructor lost his or her temper for one reason or another. Teaching can be stressful, but teachers must be accountable for their behaviour, such as in the following situations:

- Students disrupting teaching in ongoing lessons
- Learners failing to "get it" during explanations of specific mathematical processes
- Students not being focused on the subject matter or skills presented
- A classroom atmosphere that does not promote learning

It is not easy to deal with one's emotions in difficult situations, but the responsibility for maintaining a positive learning environment rests with the teacher. Otherwise, learner achievement in mathematics will tend to go downhill. Teachers must learn about the customs, mores and folkways of a given community in order to understand the beliefs and motivational patterns of students. The total child is involved in learning, not just the academic and cognitive facets. Each student has diverse needs that must be fulfilled. Some of these needs the school can fulfill, such as providing breakfast and lunch. Some schools even serve dinner at the end of the school day. All teachers must attempt to involve learners in meeting their need to belong. Feeling isolated greatly hinders student progress in mathematics, as well as in other curriculum areas. Collaborative and committee endeavours in which learners work harmoniously together are a starting point.

In Conclusion

Mathematics teachers need to possess self-efficacy in knowledge to impart to students. Knowledge consists of relevant facts, concepts and generalizations, which are necessary for high-quality instruction. These are needed for a developmental approach in sequencing learnings for students. Subject-matter knowledge, alone, is not adequate. The mathematics teacher must also be able to use the best methodology possible to reach children's abilities in teaching and learning situations. High expectations but achievable objectives should be in the offing. Scaffolding should be used when helping learners realize optimal achievement. Appraisal of learner progress must be continuous, with the use of feedback to improve the curriculum. Inservice education is necessary in order to stay abreast of current developments in instruction, such as the ensuing common core objectives.

Note

1. See National Council of Teachers of Mathematics (1989).

References

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