Professional learning using a peer learning circle

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STEM capability is accepted as one of the key competences necessary for creative thinking and problem solving. Many countries consider the issue of competence in STEM as important and incorporate strategies for its development during schooling, at the highest policy level (e.g., the USA). Students, however, sometimes perceive individual STEM disciplines (e.g., mathematics, science) as irrelevant abstract subjects dominated by rules and formulae. Perceptions such as these may deter them from studying STEM subjects and negatively influence their facility in them. Consequently, teachers of STEM need to employ explicit teaching strategies to urge students to engage more in learning tasks.

Research in STEM education suggests that the development of STEM competency requires effective learning environments. One of the elements evident in effective learning environments is the use of varied representations (e.g., visual, symbolic) and opportunities for students to make connections between them (sometimes referred to as "representational competence"). Although such practices have been advocated in the teaching of mathematics and science for some time, recently there has been a renewed focus on the use of representations in the teaching and learning of STEM (e.g., Glancy & Moore, 2013).

Working with representations plays a critical role in helping students develop flexible thinking and problem solving, and provides multiple entry points and access to the study of individual STEM subjects. The ability to create effective learning environments, inclusive of explicit strategies to develop students' representational competence, is one element of teacher knowledge. Expertise in this area is key to achieving desirable STEM learning outcomes.

Developing teacher knowledge is a focus of professional learning initiatives. Here we report the progress of an interdisciplinary learning circle (*Using Multiple Representations in Mathematics and Science Teaching Practices*) that met regularly over the course of a school semester to explore the use of representations in teaching and learning of STEM (with a focus on mathematics and science). The group developed their own understandings of representational competence, culminating in the development of learning tasks aimed at improving representational competence of mathematics and science undergraduates.

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