PEER-LED TEAM LEARNING
LEADER TRAINING

HOW CAN THE WORKSHOP LEADER PROVIDE SCAFFOLDING TO REINFORCE PRIOR KNOWLEDGE?

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City Tech – New York City College of Technology, part of the City University of New York (CUNY) system - is a commuter school and a large portion of the student body is made up of non-traditional students who work at multiple jobs and juggle family responsibilities on top of their various course loads. Students often have difficulty finding time to learn the new material, let alone review prior concepts that would support the new information they are about to learn.

The overall pattern in the math workshops often is to get the students to recognize ideas that have already been covered in previous courses, in the new material that they are learning. Students need to be able to make connections between their prior math knowledge and the new material. A student once noted that whenever she is learning something new, she ignores what she has learned previously in the belief that she can completely focus on understanding the new material. She later realized on her own that what she was doing was not a good idea. This belief is very damaging to the prior knowledge that she would need to grasp the newer material. Students need to be made aware of what they already know.

What I have come across in the workshops is finding out that many of the students do not really know some of the basics well enough to have relied on prior knowledge to solve the problems. This is a big issue. While some said that they have "done" (covered) the material in high school (which for some of them was not that long ago), other students have not seen the material in years because they have been out of school for so long and cannot remember it.

This leads to the need to build student confidence, another major trend in the math workshops. Some of the students understand the material, but seem to be unsure if the step they may have just done is correct. Even if the step is correct, they are still unsure. In a situation like this, it seems as though solving a problem has become more mechanical instead of solving from his/her own understanding of the methods by which the problem must be solved.

Here are a couple of instances where relying on prior knowledge helps in learning new information in a math course:

In algebra, students are taught the importance of grouping like terms together for the purpose of having answers written in simplest form.

$$2x - 5 + 7x$$
$$= 9x - 5$$

Now, when the variable x is replaced by a radical (of any kind), students are not sure what to do any more.

$$2\sqrt{7} - 5 + 7\sqrt{7}$$
$$= 9\sqrt{7} - 5$$

One of the tools that a Peer Leader has in his or her tool box is asking guiding questions. An example of a guiding question in such a situation could be, "How can you relate this topic to something you (may) have seen before?"

A similar situation occurs in the MAT 1275 course (Introduction to Mathematical Analysis). Sometimes if a student is given

$$2\sin^2 x + \sin x - 1 = 0$$

to solve, he/she may say, "I'm not sure where to begin." To make this equation look familiar to the student a substitution of x for $\sin x$ is done yielding the following:

$$2x^2 + x - 1 = 0$$

The student would feel more comfortable working with this instead of the previously given trigonometric equation.

What is the real trouble shown here in these two situations? The trouble is that sometimes students do not recognize patterns (categories) and thus do not add to their understanding (Heit, 1994). The understanding of new information is based upon one's prior knowledge concerning the subject. Heit's (1994) Weighting theory suggests that the learning of new material is based on the amount of prior knowledge that the student possesses. That is to say, the more prior knowledge a student possesses on a particular subject, the easier it is to learn new information concerning that subject. According to Schmidt (1983), the more prior knowledge a student has helps the student to process new information more easily. Heit (1994) also suggested the Distortion theory, which says that what is observed is distorted to make it more congruent with prior knowledge. Unexpected observations are filtered unless there is a category of knowledge to which they can be attached.

Schmidt (1983) also states that students do not understand the cumulative nature of learning mathematics. Because background knowledge and observations are put together to learn new concepts, background knowledge is updated, reflecting what is learned about the new concept. Observations are used to select background knowledge that will be helpful in learning about a new concept (Heit and Bott, 2000).

The role of the Workshop Leader is to model confident behavior and encouragement to help students tie in what they do remember with new learning (Heit and Bott, 2000). A workshop leader is "a more capable peer" (Vygotsky, 1978, p. 86). Helping to build the confidence of the students is critical. Some students solve problems correctly but are unsure of the steps taken in doing so. Solving a problem becomes more mechanical rather than solving from understanding. The Workshop Leader's role also includes helping students feel comfortable in tackling new material and reinforcing prior knowledge.

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References

Peer-Led Team Learning – Leader Training: How can the Workshop Leader provide scaffolding to reinforce prior knowledge? Lori Younge – 2012, www.pltlis.org

Heit, E. (1994). Models of the effects of prior knowledge on category learning. *Journal of Experimental Psychology: Learning, Memory and Cognition*. 20, 1264-1282.

Heit, E. & Bott, L. (2000). Knowledge selection in category learning. *The Psychology of Learning and Motivation*. 39, 163-199.

Schmidt, H. G. (1983). Problem-based learning: rationale and description. *Medical Education*. *17*, 11-16.

Vygotsky, L. (1978). *Mind in Society*. Harvard University Press.

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