Sabbatical Mini-Report #9
Situated Learning

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Real world. Relevant. Connections.

Our standards often call for us to incorporate these elements into our courses. This report looks at these efforts strictly from the learning perspective, realizing that there are other reasons to include such features.

What is Situated Learning?

Situated learning refers to the learning of material within a context (a situation). For example, a group of students might find (or collect for themselves) data on rates of infection over a period of time in a region or across regions and then asked how we might predict the future development or spread of infection … leading to discussions of trends, regression, estimates, and other skills. Situated learning has a close sibling called "Anchored Learning"; in anchored learning, the situation involved stays the focus for an extended period – not just a class period.

Situated learning involves more complex information, and this connects to what research has shown.

What does the research "say"?

In general, new skills and information are processed best if presented with a minimum of other information. (Bruning, pg 200) This means that, if the situation is 'too complex', learning can be difficult. In keeping with this prediction, Anderson et al (1998, pg 9) have found that 'authentic' (real world) contexts have not been shown to produce better learning.

Another finding is that 'contextual learning' (as in situational learning) is more bound or limited when taught in a single context. In other words, material learned based on just one context is not learned as well as material learned in multiple contexts … or learned in an abstract (general) way. See Anderson et al (2000).

Several of the school mathematics "reform" models of the 1990's had a strong emphasis on situated learning. This includes Core-Plus, Math Connections (MC), Interactive Mathematics Program (IMP), and Systemic Initiative Montana Math & Science (SIMMS) Integrated Mathematics. Another program predated the NCTM standards of 1989, and does not emphasize situated learning as much … the University of Chicago School Mathematics Project (UCSMP). Some of these programs have been extensively researched, and will be discussed in

more detail in the report on standards. For the purposes of situated learning, the results from these programs is "mixed" – the evaluations usually report that the students were not harmed significantly (skills were approximately equal to control groups), with some hints of improved problem solving performance for MC and somewhat for Core-Plus. On the other hand, much of these efforts to use situated learning was undertaken specifically to improve access and equity; on this criteria, none of the programs seemed to make a significant difference. (See Senk and Thompson, whose entire book is devoted to evaluation of these curricula.)

Even before these programs, there was systemic evidence that an emphasis on situated learning does not improve learning. The Project Follow Through research involved models which based learning on authentic situations, sometimes based entirely on the student's interest. In the evaluation of those models, these models trailed the models which focused on direct instruction and skills … even on measures of attitude; see Norton, Becker, and Carnine (all online).

Should We Use Situated Learning?

The answer depends on whether "learning" is the only reason to include situations. Below are some other reasons.

Developing problem solving skills depends on dealing with new situations, and some situated learning is likely to be involved. In a review of schools that serve the poor, Kitchen found that effective schools used both problem solving with situated learning and "drill and kill" approaches (Kitchen, pg 161).

Situated learning can also provide indirect benefits … connecting with the history of mathematics, providing concrete visualization for abstract ideas, and may create "pleasant imagery' to allow mathematical ideas to stay in the mind. See Gerofsky, pg 141-142.

When properly chosen, situated learning can motivate students – which is a non-trivial factor. However, students may not have the background to understand a particular situation; care must be taken to provide enough support so that all students can access the context. (Some mathematics educators use context as a way to address other issues – community development, poverty, crime, and more; see Gutstein.)

Anderson et al (2000) provide a good summary of "when to use situated learning":

> *"Whether abstract or specific instruction is to be preferred, and to what extent, depends on the balance among (a) the cost of the more general abstract training, (b) the cost of the specific training, (c) the cost of the supplemental training for application of abstract training, and (d) the range*

of jobs over which the learner is likely to have occasion to apply what was learned."

A major problem we face is that we generally do not know the specific situations our students will encounter in the future … and we don't know the range of jobs either. This is a limitation that has no long-term and general solution – we will always lack most of this information.

Therefore, we might be best served by using enough situated learning to support student motivation without making situated learning a focus of our courses.

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