Dass, P.M. (2001). Journaling and concept mapping through electronic media in science teaching methods classes: A commentary on Germann, Young-soo, and Patton. *Contemporary Issues in Technology and Teacher Education,* [Online serial], *1*(3) 334-336.

Journaling and Concept Mapping through Electronic Media in Science Teaching Methods Classes: A Commentary on Germann, Young-soo, and Patton

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Within the last decade monumental advances have occurred in information and communication technology. The result is a tremendous increase in the ease and speed with which we can communicate, gather and process information, and make our findings available to whoever is interested. This revolution in technology[1] has impacted the way teaching and learning are viewed and practiced at the present time. Teachers[2] are continually faced with decisions regarding what particular technological applications they should or could use and to what extent, in order to enhance their teaching and improve student learning.

The skeptic tends to ask, 'Wouldn't my old (nontechnology based) approaches accomplish the same results?' 'Where is the evidence to suggest that using a particular technological application would lead to improved student learning?' The incorporation of technology in academic instruction has not reached a maturity level that can boast of a mountain of evidence in support of its role in improving student learning. However, there is evidence that an increasing number of teachers are using technological innovations in their instruction and are evaluating their effectiveness in a systematic manner.

This trend of increasing use of technology in science instruction is obvious in the recent conference programs of professional organizations such as the AETS, NSTA, and NARST. Evaluation and communication of the results of the use of technology in instruction is a critical need of our time if we are to put technology to effective use in our teaching. To that end, Germann, Young-soo, and Patton are to be commended for their efforts in both using electronic journaling and concept mapping in their science teaching methods course and communicating their findings of the usefulness of these technologies in their course.

As Germann et al. have clearly demonstrated through a literature review, both journaling and concept mapping have specific value in a teaching methods course. The use of electronic media to do journaling and concept mapping, however, is not, as yet, a commonplace practice. Again, their efforts at this venture and its evaluation are worth commendation. However, as the authors admit, their study can raise several questions that may serve as fodder for further investigation. In this commentary I focus on two such questions that are important in my opinion.

Question One

The explicit goal of this study was to examine the effect of electronic journaling and concept mapping on students' capability to 'reflect.' The authors want to measure the degree of 'reflection' in two ways: (a) change in student statements and propositions over time, and (b) change in habits of questioning leading to increased skepticism and discrimination. The authors contend that the results of this study indicate no significant gain in the first type of measurement but definite gains in the second. The question raised here is how can the two types of measurement be treated separately when considering the effectiveness of the electronic media? Shouldn't change in questioning behavior lead students to conclusions that force them to modify their initial statements or propositions.

To me, that is where the heart of reflection lies. The result of reflection ought to be demonstrated in changes in one's thoughts, words, or deeds. In other words, while the second type of measurement demonstrates some value of the electronic medium, positive gains in the first type of measurement are critical to argue the value of the electronic medium more thoroughly. The authors attribute no gains in the first type of measurement to the shortness of the time period (one semester). Perhaps the students should be engaged in the same media during their student teaching semester and asked to further revise and submit their 'culminating paper' at the end of the student teaching semester. Comparison of the culminating paper at the end of the methods course and the one at the end of student teaching might provide information regarding whether or not there are positive gains in the first type of measurement. If further engagement with the electronic media is not feasible during the student teaching semester, they could just be asked to revise the 'culminating paper' during the student teaching semester on the basis of the gains they made in the second type of measurement during the methods course.

Question Two

The authors claim that 'the electronic medium appeared to be a catalyst' in the development of behaviors conducive to what Schon has called 'reflective conversation.' Intuitively, this sounds true, and some of the student comments cited as examples tend to support the claim. However, one could ask, 'How do we know that the same behaviors may not have developed if students did their journaling in the so called 'traditional' manner and shared their journals in class?' Before we can attribute the development of these behaviors to the electronic medium (even though we use guarded language such as 'appeared to be' rather than 'were'), we need to conduct experimental studies. For instance, methods instructors could conduct two sections of the course, use the electronic medium in one and the traditional approach in the other; then compare the two groups for development of the same behaviors. If the section with the electronic medium shows greater gains in the development of desired behaviors, we will have a more convincing argument in favor of the use of the electronic medium. (If the course had only one section, different treatment and comparison could be done with the fall and spring groups.)

Notes

1. I use the word 'technology' throughout this commentary to mean all forms of computer based information and communication technology presently available.

2. The word 'teachers' is meant to include both school teachers and university instructors who teach preservice teachers.

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