Andrews University

School of Education

A CRITIQUE OF KUBASKO'S STUDY ON REMOTE COMMUNICATION WITH SCIENTISTS

In Partial Fulfillment

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LEAD 636 Issues in Research

by

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Kubasko, D., Jones, M. G., Tretter, T., & Andre, T. (2007). Is it live or is it Memorex? Students' synchronous and asynchronous communication with scientists. *International Journal of Science Education, 30*(4), 495-514. doi:10.1080/09500690701217220

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Introduction

My research is focused on the use of videoconferencing to enrich instruction in K12 classrooms. One way to use videoconferencing in the classroom is to access guest speakers, specialists and scientists to enhance the study of the topic at hand (McCombs, Ufnar, & Shepherd, 2007; Pachnowski, 2002). I selected the article critiqued in this paper because it provides an alternate view, comparing synchronous and asynchronous communication with scientists. Second, I selected this article because it is one of the few in this area that gives evidence of rigorous research. The article by Kubasko et al. was a unique fit for this assignment because of its divergent view from other literature.

This critique consists of a summary and overview of the research question, literature, methods, and findings in the article. It continues with a critique of the strengths and weaknesses of the article, and concludes with judgments on the article's contribution to the literature and usefulness for my own research.

Article Summary

This section examines the content of the article, beginning with the research question, purpose and background literature. The methods and findings of the article will be summarized, followed by a summary of the overall integration of the article.

Research Question and Purpose

This study investigated “whether high school students’ interactions with scientists using a real-time Internet connection were similar or different when compared with students who interacted with scientists via email” (Kubasko et al., 2007, p. 6). A social-constructivist framework was used in both methods of connecting students to the scientists. The goal was to determine if the “replays of scientists’ experiments could be as effective as real-time, live experimentation” (Kubasko et al., 2007, p. 7).

Background Literature

Kubasko et al. (2007) laid a rich foundation of background literature for this study. The authors began with an overview of research on using inquiry and hands-on experimentation in science education to assist students in constructing meaning. In the next section, the authors address the challenges of students learning science online, both synchronously and asynchronously, and the lack of research that “examines the social dimensions of learning” via technology (Kubasko et al., 2007, p. 4).

Methods

Kubasko et al. (2007) used an experimental method with students randomly assigned to classes that used the synchronous, live experimentation method and those that used the asynchronous method to interact with scientists while watching the replay of the experiments done by the scientists. The data collected included transcripts of the students’ interactions with scientists in both methods, pre and post knowledge assessments of the topic, and student newspaper articles written to share their experiences. The transcripts and newspaper articles were analyzed qualitatively and the knowledge assessments were analyzed using quantitative methods.

Findings

The findings for each separate analysis were shared. In the transcripts of the interactions with the scientists, Kubasko et al. (2007) found that while the students in the two groups asked a similar amount of questions, the synchronous students asked significantly more questions about the scientist (62% for synchronous students; 10% for the asynchronous students). In the newspaper articles, students in the asynchronous group wrote longer stories about what they "learned or knew" (Kubasko et al., 2007, p. 15).

Discussion

In the discussion section, the authors reflected on the results of the study. Kubasko et al. (2007) suggested that this study is important because the live connection is more expensive to set up and maintain. The authors concluded that the students communicating with the scientist via email asked more questions about the scientific investigation. "The scientist that appeared on the computer screen was at times more interesting … for some students than the manipulation of viruses" (Kubasko et al., 2007, p. 16). The newspaper articles supported the outcome that the asynchronous group were more focused on the science content. All students changed their concept of viruses from two dimensional to three dimensional. The authors suggest that future research should explore "how students can benefit most from communicating with scientists" (Kubasko et al., 2007, p. 17).

Research Critique

In the following critique, the strengths and weakness of this article will be addressed, followed by suggestions for improvement.

Strengths and Weaknesses

Overall this article had a very clear purpose and focused the reader on the procedures and background throughout the article. The underlying theory of social constructivist learning was indicated and the literature review section was clearly organized by topics. The literature review cites mostly research within five to six years of the current study, using past literature to provide a background for the current research.

The research design of this study was strong and a good example of an experimental study as described by Pyrczak (2003). Random sampling was used to assign students to classes, and four classes were randomly selected from the four high schools and the participation rate was acceptably high. The sample was appropriately diverse, and although the sample size of 85 is small, the inclusion of two high schools and two different classes seems appropriate given the scope of the study.

The instrumentation seemed appropriate, however sample questions were not included. The instrument was piloted and reviewed in a previous study, as well as reviewed in the current study; however, information relating to the validity and reliability of the instrument was not included in the article as suggested as essential by Suter (1997). The mixed methods collection of observations, writing, and assessments gives weight to the research by using triangulation to confirm results as suggested by O'Leary (2005).

In the analysis of the subjective data (the field notes, emails, and videotapes), the researchers reported using two observers code the transcripts. However, it was not clear if the observers' coding was independent; and rate of agreement was not reported.

The experimental procedures for this study are one of its strengths. The treatments are described in detail and administered by the researchers. The experiments were conducted in a natural setting, the students' classrooms, exhibiting external validity.

The article introduction begins with a broad overview of how the Internet is used in science instruction. The problem and significance are explained clearly in the discussion section, however providing this sooner would have been helpful for the reader.

Additional details about the Pre-Knowledge Questionnaire and the Post-Knowledge Questionnaire would have been helpful. Sample questions would help the reader understand the survey, and details about the validity and reliability of the instrument would have assured the reader about the data collection methods. Including the internal consistency and the interobserver reliability would strengthen this study.

This article was consistent throughout. The literature reviewed was consistent with the research purposes and questions and the results and findings were consistent with the implications and discussion. The article held together well and provided a good example of quality research in this field.

Conclusion

This study makes an important contribution to the research on videoconferencing and using technology to communicate with scientists. While the findings of Kubasko et al. are not as positive towards videoconferencing as some may prefer, the study places the use of videoconferencing in a wider perspective by showing its use compared to asynchronous communication. It suggests caution towards viewing videoconferencing as the best method in all situations, because the students were more reflective in the asynchronous environment.

This study is useful to my literature review because it provides a contradictory voice to the other studies supporting videoconferencing to interact with scientists (Ba & Keisch, 2004; McCombs et al., 2007; Shaklee, 1998). It makes my literature review stronger because it introduces another perspective and requires me to integrate these

ideas. In addition, it provides another source of references to be examined carefully for references appropriate to my research study.

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