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Social Constructivist E-Learning: A Case Study

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Abstract– This paper considers the use of Knowledge Forum to complete a curriculum-based project with students enrolled in asynchronous, web-based Advanced Placement courses in Canada and the United States. Knowledge Forum is an online database that promotes written interaction in a social constructivist environment. The paper looks at how students utilized the system to enhance learning, more so than traditional environments, at both lower-order and higher-order levels.

Introduction

This study considers the Advanced Placement European History learning objective “students should develop an ability to analyze historical evidence.” This objective is required of students in order to better prepare them to answer the Document-Based Question (DBQ) effectively. The DBQ, one of three components to the AP History exams, requires that students answer a question based upon a topic that is usually too specific to be covered as a part of the content of the course. Along with the question, students are provided a short paragraph that places the question in its proper time and place context and a series of 10 to 15 documents that they must use to answer the question.

In many classrooms, the instructor teaches the skills required for students to analyze historical evidence and to write an effective response to the DBQ by repetition. These teachers, reflecting practices of an empiricist epistemology, supply students with the mechanics of what to look for when analyzing a piece of historical evidence, provide the students with examples of historical evidence that have been analyzed and then proceed to instruct the students on how the individual arrived at that analysis. To improve students’ ability to respond to the DBQ, a teacher with an empiricist epistemology then provides the students with previous DBQs and former student responses. They outline the positive and negative aspects of each response and proceed to have students complete multiple DBQs of their own. Each of the DBQs that students complete are marked by the teacher and returned with feedback. If these students have been shown how to “analyze” a DBQ and have seen examples of it being done, the only missing element for these students to write an effective response to the DBQ is repeated practice. This project proposes a break with such tradition.

The Study

AP European History students from one Canadian province and one U.S. state and AP U.S. History students from the same Canadian province and another U.S. state, all of which were enrolled in asynchronous, web-based courses through the a private Canadian consortium or a state-sponsored virtual high school, came together as a community of learners within Knowledge Forum® with the learning goal of completing a well-written document-based question. Prior to this project, students from both classes had been provided with sample document-based responses and previous student response with commentary on how the response was an example of a well-written response, a moderate response and a poorly written response, along with a standard rubric that is used to evaluate the document-based

question. They had also completed four to six document-based questions of their own, which had been graded using the rubric with feedback provided for future attempts.

Students were given a week to introduce themselves and get to know each other. This discussion was created in one “Note” view. In a second “Note” view, students were presented with nine different documents and asked to provide an analysis of at least two of the documents and, as a community, ensure that all nine documents had at least two analyses. They had one week to complete this portion of the activity. In a third “Note” view, students were given the DBQ which included a short historical context and the nine documents that they had analyzed in the second “Note” view. They were asked to complete their response to the document-based question by the end of the week. At the end of the week, the instructor posted the rubric and students were asked to evaluate at least two of their fellow students’ responses using the rubric. At the end of this fourth week, the two instructors posted their evaluations of the students’ responses and invited students to comment on the differences between the students’ and the instructors’ assessment, along with their impressions of the entire process. The purpose of the project was to create a social constructivist environment for the students to explore the process of writing an effective DBQ.

Social Constructivism

Social constructivism views that “the most important features of humans as a species are that they have developed language...; that they fashion their own tools...; and that they can transmit the discoveries and inventions of one generation to the next” (Case, 1996, p. 80). Knowledge is defined as the meaning that is negotiated through social interaction within a community of learners. This meaning is obtained by the participation of individuals as they become initiated into their community of practice. This theory of knowledge and learning is largely based upon the work of Russian psychologist, Lev Vygotsky. Vygotsky (1978) states

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (p57)

The major theme of Vygotsky's work is that social interaction plays a primary role in the development of cognition. This interaction allows for meanings that are negotiated within the culture of the community. Within the community, individuals are able to develop these higher mental functions through their use of tools and symbols, especially language.

One of the primary features of this social negotiation is the zone of proximal development (ZPD). The ZPD “is the zone between the level of problem solving an individual can do in isolation and the level of problem solving the individual can do in social situations involving other, somewhat more knowledgeable individuals” (Gardner, Kornhaber & Wake, 1996, p. 200). Essentially, the ZPD is the community in which individuals are faced with a problem is just beyond their own cognitive reach, but through interaction with more experienced members of the community individuals will receive social guidance to assist them in solving the problem. According to Brown (1994), “within these multiple overlapping zones, students navigate by different routes and at different rates. But the push is

toward upper, rather than lower, levels of competence. These levels are not immutable, but rather constantly changing as participants become increasingly independent at successively more advanced levels” (p. 7). A necessity of the ZPD is the community of learners.

The Community of Learners

According to Hewitt and Scardamalia (1998), the definition of knowledge as it is grounded in Vygotskian theory, is the meaning that is negotiated within a social group as it communicates, makes use of symbols and tools, and organizes its belief systems. For a student to obtain this knowledge, they would have to become a part of this social group or community. This is the basic notion of the community of learners, or a group of individuals that “are committed to investing their resources in the collective upgrading of knowledge” (Bruning, Schraw, Norby & Ronning, 2004, p. 229). The collective upgrading of knowledge can also be referred to as knowledge building. The difference between knowledge building and simply learning is that “learning is activity directed towards improving personal knowledge [whereas] knowledge building is trying to improve knowledge itself by considering ideas in regard to their strengths, weaknesses, applications, limitations and potential for further development” (Lamon, Reeve & Scardamalia, 2001).

Knowledge building can be defined as “the production and continual improvement of ideas of value to a community through means that increase the likelihood that what the community accomplishes will be greater than the sum of individual contributions” (Scardamalia & Bereiter, 2003). This means that the knowledge that the individual would have been able to come to terms with using their own resources is limited, compared to what the community of learners are able to create with their collective resources.

CSILE/Knowledge Forum

Within the K-12 education system, this type of community of learners or knowledge building environment is difficult to create. Within an entirely asynchronous, web-based distance education program is it even more difficult. However, the Internet-based software Knowledge Forum, a second-generation Computer Supported Integrated Learning Environment (CSILE) product, was designed to foster knowledge building within the classroom. Knowledge Forum endeavours to create “a true knowledge building environment [that] facilitates learning... centered around ideas and deeper levels of understanding rather than the completion of often unrelated activities” (Knowledge Forum, 2004).

According to researchers from the Ontario Institute for Studies in Education at the University of Toronto (the original developers of CSILE), Knowledge Forum

is an online environment where learners... can talk to one another, ask questions, contribute ideas, read what other people have written, challenge ideas, build upon them, and in that way build the knowledge of the community... Knowledge Forum provides graphical Views of notes enabling people to see and adjust the structure of their discourse... Knowledge Forum also affords student-student dialogue that is not directly mediated by the teacher. This averts the problem of teacher-centered dialogue... Peers provide much of the procedural facilitation or supports for deeper understanding for each other in their database. (Lamon & Scardamalia, 2002)

This Internet database is utilized to promote the community of learners based on the notion

A successful knowledge building community largely depends on students' activities, especially on self-direction among students. Students need to make own ideas explicit and to critically argue. Confrontation with a variety of ideas and arguments enhances deep reflection and coherent explanations, due to an increase visibility of different ideas. (Lamon & Scardamalia, 2001)

A key feature of this knowledge building process is “the information [the students] have gathered, learners' perspectives on that information, and their reactions to others' viewpoints, [which allows it to] stimulate individual cognitive growth through the participation and growing sophistication of a community of learners” (Bruning *et al.*, 2004, 231).

Methodology and Data Collection

The transcripts of students' contribution to the database were independently analyzed by two researchers. This discourse analysis used the coding system developed by Knight (1990), which consisted of seven categories: recall, compare, contrast, cause-effect, idea to example, example to idea, and evaluation. This method was selected due to its previous use for coding electronic discussion groups at Acadia University (see Hemming & MacKinnon, 1998; MacKinnon & Aylward, 1999; MacKinnon & Aylward, 2000; and MacKinnon, 2000).

The two analyses were compared for similarities and differences in the coding by both researchers were discussed. There was agreement on 56.5% of the original coding. After discussing the rationale that each researcher had for their particular coding, there was agreement on an additional 34.6% of the code. This meant that there was agreement in 91.1% of the analysis conducted by both researchers.

There was substantial interaction among the participants in the project. This interaction was to be expected due to the nature of the project and the instructions that were given to the students. The nature of that interaction is provided in the following table.

Table 1 – Coding of Knowledge Forum transcripts

	Recall	Compare	Contrast	Cause-Effect	Idea to Example	Example to Idea	Evaluation
Researcher 1	52	21	10	41	21	27	74
Researcher 2	47	20	10	43	27	25	74
Average	49.5	20.5	10	42	24	26	74
Percentage	20.1%	8.3%	4.1%	17.1%	9.8%	10.6%	30.1%

The table above illustrates that students' contributions to the database were not all lower order, but in many cases contained a significant amount of higher order thinking. “Lower order thinking” is rated principally by the use of recall, which is mere restatement of factual information. The chart grows progressively toward higher order analytic skills from left to right. Note that there was still of good deal of recall (lower order) in the students' writing.

Discussion

Knowledge Forum's socially interactive environment did not eradicate student use of one skill over another, but rather provided opportunities for students to employ all of these skills fairly equitably. Although “lower order” has an undeniably negative connotation, such skills are nonetheless important and should not be lightly dismissed as less worthy of

attention. Consider, for example, Bloom's taxonomy. Knowledge, although lower order, is just as important as Evaluation, a higher order skill. The problem with traditional instruction is its reliance on one form over the other. This study shows the fairly equitable distribution of skills manifest when engaging students in a socially interactive analysis.

In addition to the coverage of a variety of lower order and higher order contributions made to the database, both instructors indicated that the students' performance on the document-based questions in this activity was noticeably better than the previous six attempts made through traditional instruction. There are a variety of reasons which could be used to explain these findings. The social constructivist nature of the activity may have been better suited to both the learning objective itself and the students' own individual learning styles.

The interaction of the students in the community may have also played a role. Over a decade ago, Chickering and Gamson (1987) put forward the concept that interaction is a key mechanism in enhancing learning. This concept could be applied to this project if the students' contributions to the database were considered a form of interaction.

Finally, the act of writing may have also played a role in the noticeable difference experienced by the teachers. In the project, the ability to write their analysis of a piece of historical evidence required that students consider the actual evidence (and not just their own prior knowledge of the event). They began to translate what they saw or read with their own schematic knowledge. They had to generate ideas out of their consideration of the historical evidence and then use those ideas to plan out their own written analysis, using outlines, notes, drafts or other steps in the pre-writing process. In this learning environment, they sought assistance from others around them: both in terms of their thoughts and ideas about the piece of historical evidence and on their actual written analysis. The feedback from the other students assisted them in creating a community of writers in their own virtual classroom. Once the students were comfortable as members of this community, it allowed and even encouraged them to become more creative in both their interpretations of the historical evidence and in their written analysis of it.

This is consistent with Ambron (1987), who found in a survey conducted at the end of the course that "student response [was] extremely favourable; ... most mentioned the value of writing in helping them understand [the subject]" (p. 266). Also, Moore (1993) has shown the connection between writing and higher course scores. He specifically states "learning improves ... when writing assignments are complemented with instruction about how to use writing as a tool to learn [a subject]" (p. 217). Based upon these premises, as the students engaged in the act of writing throughout this project, they were able to gain deeper understandings of the material that was presented to them.

Conclusion

Initially the instructors were faced with a unique group of students. Not only were they separated by great geographical boundaries, but students were also participating in two different, seemingly unrelated courses. The instructors were able to bring these students together into one community with the single goal of learning to better analyze data based on documented evidence. Prior to the experiment, the students had all participated in at least 6

document-based question exercises and had been given the rubric for effective scoring. By traditional standards, this should have been ample training to perform well on this type of assessment. This was not the case. By creating a community of learners, students effectively engaged in discourse that took them beyond initial find-and-report analyses. They were able to run the gamut of necessary analytical skills, manifesting that socially interactive environments can balance instruction. Students demonstrated judicious use of both lower and higher order thinking, effectively finding a cognitive balance we suggest all teachers aim for.

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