Qualitative Methods in Evaluating the Quality of Online Learning

Dr Veronica Hendriks
United Nations University/Institute of Advanced Studies
53-67 Jingumae 5-chome, Tokyo 150-8304, Japan
hendriks@ias.unu.edu

Dr Dorit Maor
School of Education
Murdoch University, Perth W. Australia 6150
dmaor@murdoch.edu.au

Abstract: This paper proposes qualitative methods for evaluating the quality and process of online learning. We argue that in order to adequately evaluate and understand how students share multiple perspectives, negotiate meaning and construct new understanding, researchers need to go beyond using routine quantitative methods for their data collection and analysis. Advanced qualitative methods will also enable researchers to understand how students themselves understand the complexities of their online learning experiences. This understanding will in turn enrich our own future online initiatives.

Purpose of the Study

In this study, we propose appropriate methodologies and tools for evaluating the quality of online learning. Specifically, in proposing these methodologies, our aim is to understand the quality and meaningfulness of the learning experience from the learners’ perspectives. It is now acknowledged that online learning has become an important alternative form of teaching and learning in higher education, affording learners with flexible modes of learning (Haughey, 2001), providing teachers and learners with sophisticated forms of learning technologies (Bonk & Dennen, in press), changing the traditional role of teachers and learners (Thorpe, 2001), and necessitating different ways of evaluation (Gunawardena, 2001; Thorpe, 2001). Given the pervasiveness of online education and its impact on teaching and learning, it has become imperative to assess the quality of teaching and learning online. As reflective practitioners of online education, we believe that evaluation not only serves to enhance our understanding of the way learners learn, but also to help us improve future initiatives. Therefore, not unlike Gunawardena (2001), we are interested in the process of learning and factors affecting learning. Given our research focus and interest, we argue that qualitative methods of inquiry serve as valuable tools that would enable us and other researchers to understand how learners learn, what factors affect their learning process and how meaningful they found their learning experiences to be. In view of this qualitative approach, we propose appropriate methodologies that can capture the complexities of online learning.

Motivation for the study

During our research work as both a learner and educator of online learning, we participated in rich discourse with our online participants, the majority of whom were science and mathematics teachers. The second author has been engaged in designing and facilitating on-line learning courses using social constructivism as a referent for her teaching. In her courses, she emphasised the importance of student-centred learning and interaction between all students and herself as a key component of the educational experience. Informal feedback that we received from students indicated that this aspect of learning, including the use of computer technology as a means for learning, was new to many of them. Further conversations led us to reflect on our learning and teaching experience, specifically with respect to how students make sense of their learning, what resources they used in order to collaborate and further their arguments, what factors affect their learning, and what is the adequate role of a facilitator in challenging student discourse. An extensive review of literature revealed a glaring lack of evaluation tools in which we can adequately assess the processes of learning and the meaning perspectives of students. This
study is a result of our endeavour to answer the following questions with respect to the processes of online learning: (a) What is the quality of interactions and the subsequent online learning experience among learners in higher education using computer-mediated learning technologies?, (b) what are the contextual factors that encouraged interaction within the community?, and (c) what are students’ perceptions of their online learning experience framed by social constructivist pedagogy?

Significance

In our review of recent literature on online learning, we found that the majority of studies centred around outcomes of learning rather than process of learning (Cummings, Bonk, & Jacobs, 2002; Gudzial & Turns, 2000; Gunawardena, 2001; Jonassen, 2000; Murphy & Cifuentes, 2001; Saba, 2000; Salomon, 2000), and on technology rather than the role of the instructor and learners in utilising them (Blake & Rapanotti, 2001; Bonk & Dennen, in press; Clark, 1994; Romiszowski & Mason, 1996). Consequently, quantitative analysis predominate over interpretive inquiries (Gunawardena, Lowe & Anderson, 1997; Gunawardena, 2001; Hara, Bonk, & Angeli, 2000; Rourke, Anderson, Garrison, & Archer, 2001; Windschitl, 1998). While quantitative methods are appropriate for investigating the medium for learning (Hara et al., 2000) or student characteristics (Gunawardena, 2001), qualitative methods provide more illuminating insights into the process of learning, including the quality of interaction and the relationship between interaction and knowledge construction (Gunawardena et al., 1997).

Among the methods suggested and used by most qualitative researchers of online learning are, interviews, observation, collecting personal documents, and a combination of these methods (Mann & Stewart, 2000). Surprisingly, as Hara et al. (2000) and Rourke et al. (2001) pointed out, even though conference transcripts are the most instantly and permanently available sources of data, relatively few researchers had turned to these sources, and correspondingly, use content analysis as a research method rather than anecdotal evidence. These authors attribute this state of affairs to time and labour intensiveness. In view of this, our study is therefore, significant in two related areas: it investigates the quality of student learning, including the meaningfulness of the experience from their own perspective. Subsequent to this, it uses a mix of qualitative methods for triangulation (Erickson, 1986; Mathison, 1988), including systematic content analysis of conference transcripts.

Theoretical Framework

The theoretical framework for this study is social constructivism, both in the course design as well as research design and analysis. Social constructivist theory posits that knowledge is constructed through social negotiation and collaboration amongst a community of learners (Duffy & Cunningham, 1996; Phillips, 1997; Tobin & Tippins, 1993). Within this framework, education is considered a social learning experience (Barab & Duffy, 2000; Garrison, 1993) where interaction is one of the most important constructs of the learning experience (Ernest, 1995; Jonassen, Davidson, Collins, Campbell, & Haag, 1995; Kumari, 2001; Picciano, 2002). Interaction, using language as a tool of mediation among a community of learners, becomes a social mode of thinking where students learn by engaging in dialogue (Van Boxtel, 2000). According to Dewey (1938), interaction and the situation during which students experience the world cannot be separated because the context of interaction is provided by the situation. This idea of communication suggests the inter-subjectivity between the individual, other people, and the surrounding environment. This dialectical relationship is perfectly captured by Ernest (1995) in his metaphor of mind “persons-in-conversation” (p. 480).

In the study presented in this paper, inter-subjectivity is demonstrated through two interrelated elements: the establishment and presence of a community of learners, and the nature of discourse within the community. In a community of learners, meaning and knowledge are socially constructed within a particular context, at a certain time, with a specific community of students (Barab & Duffy, 2000). Therefore, discourse within the community is shaped by the context.

Research Design and Procedures

The online course discussed in this paper, was a postgraduate course for science and mathematics teachers who were enrolled in a higher education degree program. They came from New Zealand, Vanuatu, Canada and
various states of Australia, and had different levels of, knowledge in computers, teaching experiences, educational technology experiences, beliefs about the role of technology in education, and expectations of the unit. In taking this unit, they were familiarised with new educational technologies, current theories of learning with computers, evaluation of educational software, and various aspects of integrating new technologies into their own classrooms. On the whole, they were eager learners who were open to new ideas and keen to learn from one another’s experiences although there were a few who were interested in just knowing more about the topics or who took the course simply to pass their postgraduate program.

The course content, utilising both static and dynamic components, were structured over 14 weeks of focused activities. These activities included a set of readings, relevant questions for discussions, and pertinent issues, all of which were designed to assist students in their discussions with one another. In order to reflect the importance of interaction and collaboration, the Activity Room was created as the most important element of the online component. It is a virtual room where text-based asynchronous communication between the instructor and amongst students transpired. The importance of interaction was also reflected in student activities in the Activity Room, which contributed to 40% of their final assessment. These activities became the focus of this study (Maor, 1998, 1999).

This study utilised a qualitative case study design (Merriam, 1988, 1998; Stake, 1995, 2000; Yin, 1984) to investigate student interactions in the unit. In order to address the research questions in this study and the current lack of appropriate qualitative methods, a selection of various research methods were employed to generate and analyse the information. It is widely agreed that multiple methods in qualitative research are useful in achieving greater understanding (Denzin & Lincoln, 1994; Tobin & Fraser, 1998). It was with this in mind that data collection for the present study involved the collection of different sources and kinds of information as recommended by Erickson (1998), including conference transcripts, end-of-semester evaluation questionnaires, reflective stories from selected students, and open-ended questions. Data triangulation was also conducted to address the taint of researchers’ subjectivity associated with qualitative studies and interpreters of qualitative content analysis (Mayring, 2000). The collection and analysis of the data were integrally linked, each informing the other during a recursive process.

Our main data source was the conference transcripts, which provided us with direct evidence of students’ ongoing contributions, conversation, learning processes, and experiences between students and the facilitator throughout the semester. Using the WebCT conferencing system, 225 messages were posted during the entire 14 week semester. Another data source was the open-ended end-of-semester evaluation, administered on the 13th week of the semester. The purpose of this evaluation was to give students the opportunity to express their feelings about their experience as well as to give critical feedback to the facilitator on the strengths and weaknesses of the unit. In this way, the cognitive and affective aspects of students’ learning can be brought to the notice of the facilitator, and future design and facilitation of online courses can be improved. The evaluation contained 16 questions which were divided into three sections: yourself as a learner, yourself as a Discussion Leader, and other aspects which were significant to their learning, including suggestions for improvement.

Due to the recursive process of data collection and analysis, we felt that further questions were required in order to verify, refine as well as contradict key observations found during the initial analysis of the conference transcripts. Some phenomena pertained to all students while others were related to certain individuals. Thus, we formulated two categories of open-ended questions, a general category relating to all students, and another with specific questions relevant to the respective students.

To begin our data analysis procedures, we first downloaded the conference transcripts from the WebCT conferencing system onto Word and imported them into the NUD*IST data analysis software. We then began categorising our transcripts by selecting a unit of analysis. Although there are currently no standards employed in unitizing the data within the context of computer conferencing (Rourke et al., 2001), we nevertheless incorporated Lincoln and Guba’s (1985) advice to select a unit of analysis that is heuristic and able to stand by itself as well as Merriam’s (1998) proposal that “communication of meaning” (p. 160) be the main focus, and used an idea (or thematic) as our unit of analysis (Bullen, 1998; Kanuka & Anderson, 1998; Newman et al., 1995).

Essentially, we used three data analysis procedures on the data corpus. Our first and main approach was category construction, which according to Merriam (1998), is the construction of themes “that capture some recurring pattern that cuts across the preponderance of the data” (p. 177). Merriam (1998) states that all qualitative data analysis is content analysis for it is the content of the conference transcripts (which was the case in this study) that is analysed. We began our analysis by reading the transcripts in its entirety, immersing in the details in order to obtain an overall sense of the interaction amongst students (Erickson, 1986; Stake, 1995; Tesch, 1990). We followed this by multiple readings of the data with a search for regular episodes of events, situational factors, circumstances,
strategies, interactions, and phases relating to the social construction of knowledge. The recurring regularities became the themes into which subsequent items were sorted.

Our second procedure was Erickson’s (1986) interpretive method which we used in order to describe and interpret the phenomenon within each theme. In this phase of data analysis, we followed closely the inductive and deductive stages as they were proposed by Erickson (1986) who states that “induction and deduction are in constant dialogue” (p. 121). The inductive stage of data analysis was open-ended, during which time we organised the conference transcripts, memos, end-of-semester evaluations, and open-ended questions, and generated assertions. According to Stake (1995), an assertion may be a statement about relationships observed in the data, hypotheses, or a propositional statement which the researcher believes are true, and can be stated at various levels of inference and generality. In the deductive stage, we scrutinised the data corpus in detail for evidence that will confirm or disconfirm the assertions. After we checked and warranted the assertions against the data, we then examined ways in which the assertions could be related across the themes, thereby interpreting the relationship between the themes.

Finally, in order to analyse the process of student interaction, we employed Glaser and Strauss’ (1967) constant comparative method of grounded theory. The basic strategy of this method is to constantly compare. We began with a particular operation of interaction from the conference transcripts and compared it with another operation of interaction in the data, based on the unit of analysis. From these comparisons, we formed tentative operations and compared them to each other, carried out revisions and modifications on the transcripts until every unit of analysis were placed in the themes representing the larger environment, and/or in the categories representing the operations of interaction. When we felt that new themes and/or categories had been exhausted and further analysis did not provide new information, we completed the categorisation. This method was also used by Gunawardena et al. (1997) and Kanuka and Anderson (1998) in their category construction of on-line participants’ interactions. They state that this method is useful when little is known about a phenomenon, as was the case in this study where our focus was to investigate knowledge construction and social interaction in an on-line environment from the meaning perspectives of the students. In qualitative analysis, both the themes and the operations of interactions were developed inductively. The relationship between the analytic technique, generation of themes, operations of interaction, and data sources is illustrated in Table 1:

<table>
<thead>
<tr>
<th>Analytic Technique</th>
<th>Purpose</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Analysis (Merriam, 1998)</td>
<td>Generation of the main themes (representing the larger environment). Theme 1-7</td>
<td>Conference Transcripts</td>
</tr>
<tr>
<td>Analytic Induction (Erickson, 1986)</td>
<td>Generation of assertions within each theme</td>
<td>Conference Transcripts, end-of-semester evaluations, reflective stories, open-ended questions, interview with the facilitator</td>
</tr>
<tr>
<td>Constant Comparative Method (Glaser &amp; Strauss, 1967)</td>
<td>Generation of the operations of interaction within the theme “Communicative Strategies.”</td>
<td>Conference Transcripts</td>
</tr>
</tbody>
</table>

Table 1: Analytic techniques and the generation of themes and categories

Findings and Implications

Based on Table 1, applying content analysis on the transcripts produced seven themes with respect to students’ online learning. They are: Theme 1 - The Learning Environment (established by the facilitator), Theme 2 - A Community of Learners, Theme 3 - Students’ Background and Prior Knowledge, Theme 4 - Reflective Thinking, Theme 5 - Peer Learning, Theme 6 - Communicative Strategies (representing student interactions), and Theme 7 - The Role of the Facilitator. From these seven themes, we concluded that themes 1-3 constituted The Learning Community while themes 4-6 constituted Discourse Within the Community. Embedded within these themes is the role of the facilitator, which is Theme 7. These themes provided us with a broad picture about the processes of
Learning that was occurring online. By applying Erickson’s (1986) analytic induction within each theme, we were able to describe more accurately the phenomenon that was occurring. Our assertions regarding these phenomena were supported by students’ end-of-semester evaluations and open-ended questions. The relationship between the themes and assertions is shown in Figure 1. Finally, by applying Glaser and Strauss’ (1967) constant comparative method of grounded theory on Theme 6, we produced 16 operations of interaction, which were further categorised into the five phases of interaction (Hendriks & Maor, in press) similar to the Gunawardena et al. (1997) model. These operations of interaction enabled us to understand the kinds of communicative strategies students used, thus understanding the process through which knowledge construction occurred. This process includes: (a) types of cognitive activity students performed, such as questioning, clarifying, negotiating, elaborating, agreeing, disagreeing, critiquing, suggesting, and summarising, (b) types of arguments they advanced throughout the discussions, (c) resources they used in order to justify their perspectives and negotiate meaning, and (d) evidence that they had constructed new knowledge through a change in understanding.

**Figure 1:** Relationship between the themes and assertions
In conclusion, we found that using advanced qualitative methods of inquiry enabled us to satisfactorily evaluate student process of learning online. Data triangulation provided us with rich sources of data, which not only enabled us to validate our findings, but also helped us to understand why and how the contextual factors influenced their interaction. Given the purpose and significance of the study, which aimed to evaluate how students negotiate meaning and make sense of their learning in a community of learners, these qualitative methods are significant in providing researchers with useful ways for collecting, analysing and reporting data. For practitioners interested in improving their facilitation of online courses, knowing how students learn and make sense of their online environment will considerably enhance their teaching techniques and experience. Finally, in adopting a more advanced and systematic way for qualitative analysis, we were able to refine the analysis and therefore, capture the complexities of the online learning environment.

References


Erickson, F. (1986). Qualitative methods in research on teaching. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 119-161). New York: Macmillan.


