

Balancing tools and teachers: Can features of online software influence the effectiveness of the teaching that it supports?

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Abstract

This paper describes research in progress, to identify and explore the factors that lead to effective online learning and teaching. The primary aim of the research is to investigate whether the features of online software can influence the effectiveness of the teaching that it supports.

We describe in more detail our aims and methodology, including the development and trialing of an analytic grid for identifying effective online and blended teaching. We describe some of the problems we have encountered in relation to data gathering and analysis, how we are overcoming these and our progress so far.

Keywords

analysis of online interactions, effective online learning and teaching, online educational software

Research aims

Institutions both nationally and internationally continue to invest huge resources into the use of educational technology using various software programs developed for learning and teaching online. While numerous studies have been carried out examining how teachers and students interact online when using such technology, no research to date has explored specifically if and how features of the software itself may influence the effectiveness of the teaching that it supports. How can teachers find the balance between how to teach and what tools to use to help them?

The main aim of this research is to explore the factors that lead to effective online teaching, by investigating whether the features of online software can influence the effectiveness of the teaching that it supports. In this context 'teaching' is taken to mean interaction, between and among students and teachers; that is, mediated by the teachers. This form of online interaction is the specific focus of our research.

The research questions we are addressing include:

- What pedagogical strategies do teachers use online effectively to engage their students?
- How does the software used in the online environment impact on these factors?

Methodology

For this study both qualitative and quantitative data gathering and analysis are being used. Data is being gathered from two main sources, the electronic transcripts from selected online courses and interviews with the academic staff involved in teaching these courses.

A range of online and blended learning courses from the University of New South Wales and the University of Edinburgh is being examined. The courses use two different software systems; one system provides explicit structural supports for pedagogic interaction (WebTeach used at UNSW), while the other features a relative lack of such supports (WebCT at UNSW and Edinburgh).

Semi-structured in-depth interviews — the teacher of each online course is interviewed by one of the researchers after the group/class/course has run. A number of trigger questions are asked to explore the academics' own perception of how the online component worked and what their role was within it. In particular we are seeking to uncover how each teacher managed the students, or groups of students, online and what structures and strategies they chose to do this. Specific prompts are included to determine if and how the teachers encouraged their students to interact and maintain motivation in the online environment. Each of the interviews is being recorded and transcribed for the purposes of later analysis by the researchers.

Analysis of electronic transcripts — a range of online courses from both undergraduate and post graduate classes across various disciplines, in which the number of contributions made overall was relatively high, have been selected for the study. It is our intention to include an equal number of courses using the two different software systems. There is a wide range in the level of interaction in online groups. It is important that groups with high levels of interaction are included, so that there is an adequate number of contributions to analyse.

The transcripts of the selected groups are printed and de-identified, then analysed using criteria developed from among those offered in the literature. This data is then entered into an analytical grid designed for this research, in which every posting is coded using the criteria and recorded in a database.

Development of analytic grid for analysis of online group transcripts

To determine the criteria for coding we reviewed the literature and drew on our own experiences. This paper does not include a review of the numerous studies undertaken to analyse online transcripts (see for example, Henri, 1992; Mowrer, 1996; Gunawardena, 1997; McDonald, 1998; and Angeli, 1998) or of those that built on these (for example, Newman, 1995; Kanuka, 1998; Garrison, 2001; and Pawan, 2003) or those that reviewed these (for example McKenzie, 2000; Rourke, 2001; Fahy, 2001; and Corich, 2004). Unlike any of the previous studies analysing electronic transcripts, our aim is to capture the purpose of each posting in the online group, whether it be from the teacher or a student, in order to identify any patterns of interaction and engagement within the group as evidence of good teaching.

The grid divides the purpose of each posting into *individual* posts, capturing contributions that are new, and *interactive posts*, capturing contributions that build on others' ideas (Salmon, 2002). A maximum of three purposes are identified for each posting. A percentage of the posting is assigned to each purpose — if there is only one purpose this would receive a 100%, if it was half the posting it would receive 50% and so on. The minimum percentage given is 20%.

Break down of dimensions and categories

Dimension: Individual

This dimension indicates a posting that contributes new information or ideas to the discussion.

Definitions:

- *Initiate new topic*: The emphasis here is on initiating or starting a discussion or activity.
- *Articulate, explain, justify position*: This is when an argument is articulated, an explanation is given, or a justification of a position is presented. The emphasis here is on expressing an individual's opinion.
- *Give examples or illustrations*: This is contributing a concrete example to illustrate an idea and/or further justify a position.
- *Reflect or reevaluate personal opinion*: This is characterised by a change in opinion after reflection.

Dimension: Interactive

This dimension indicates a posting that builds on or adds to existing information and ideas in the discussion.

Definitions:

- *Expand ideas of others: critique, discuss, negotiate*: A posting is clearly building on someone else's idea or contribution, by adding to it, offering another perspective or providing a critique.
- *Summarise previous contribution*: A summary is provided of what others have contributed. It can be a summary from the teacher, a student or a group of students.
- *Proposing actions based on ideas developed*: An action is proposed based on ideas developed in the postings such as writing a letter to the editor of a newspaper, forming another online group and so on.
- *Share resources (URL, reference,s etc.)*: Specific information that leads to resources is offered so that it can be shared, for example references to books, journal articles, or websites.

- *Affirming, phatic*: Confirmation or acknowledgment is given in relation to building another students' self-esteem and motivation for learning, for example a short statement of agreement or when praise is given or some social comment.
- *Metacomment/Group management/ off the point*: The teacher provides information about assessment requirements, directs students on how to post or use the technology and so on. It is also when a student offers a comment on the course or environment or adds something unrelated to the course in any way.

Problems encountered and solutions sought

Student consent — One of the main, but possibly most predictable, problems we have encountered so far is in obtaining consent from students and to a lesser degree, teachers, to use the transcripts from their classes in our research. Attempts at recruiting ALL students in online classes (required if student consent is to be sought and the object of study is a transcript which may contain contributions to the class from any student in the class) by an opt-in process, failed to achieve a 100% return rate for any class. If this study, or any study of the interaction of students in online classes is to be viable, the risk to students has to be reduced to the point where active recruitment of the whole classes is not required.

Solution — We posted a notice to each class once we had obtained teacher consent, that explained the research, including the anonymous nature of it and the fact that student participation would in no way affect assessment for the course or any relationship with the university, and asked students to let us know if they did not wish to be a part of the study. This has proved far more successful with only a few students choosing not to take part.

Transcript analysis and coding — The other problem we grappled with was how to analyse the transcripts, and more specifically, how to determine the categories for coding. We were mindful of criticisms directed at previous attempts to analyse online interaction (Fahy, 2001; Gunawardena, 1997; Campos, 2004). Reliability in particular is often called into question with Fahy 2001 declaring 'reliability is often either low or not simply mentioned at all in published reports of transcript analysis research, and to improve reliability researchers often resort to convenient but inefficient and expensive strategies such as collaborative coding'. Other criticisms refer to the complexity of the instrument used (both too many categories or codes, and lack of mutual exclusiveness among them), and use of an inappropriate unit of analysis.

Solution — We use collaborative coding as we consider it to be a critical part of the study. This was particularly so in the early stages of developing and trialing the analytic grid. As collaborative researchers we are able to meet to discuss how we have coded the transcripts and discuss any differences. These early discussions and coding led to the grid being simplified to ensure a higher degree of reliability. There is no doubt the time factor is limiting with this form of coding however.

Progress so far

We are in the process of coding the transcripts of 16 courses, 8 for each online environment. In addition, 5 interviews with teachers have been conducted and more are planned. When analysing the transcripts, each course and topic is documented, each contribution is coded blind by two coders, and the results are recorded in a database. In addition, pedagogic indicators such as the implicit or explicit teaching strategy in use, the task set, whether the course or topic was assessed, and whether participation was assessed or required are recorded.

Rates for all the contribution coding categories are reported, along with more general parameters including: the course and topic durations; the number of posts per student in each topic and course; the course and topic intensities (posts per day); the number of times a teacher contributes to a topic; the number of times a contributor names another person; the number of errors made, and so on. Similar statistics are generated, as appropriate, at the level of the two online environments.

While we hope to report some preliminary findings at the conference, early impressions suggest that courses that employ frequent (eg. weekly) activities with clear tasks, as opposed to open-ended topic discussions, yield higher numbers of student contributions. Another pattern noted is a tendency for initial topic contributions to cluster in the Individual dimension, with later contributions increasingly involving the Interactive dimension. Both of these results seem intuitively correct, perhaps even trivial, to those experienced in face-to-face teaching, but in a world where online pedagogy is often touted as an entirely new project, this fact alone reassures us that the process we are engaged in is capturing significant characteristics of online teaching.

References

- Angeli, C., Bonk, C. J., & Hara, N. (1998). Content analysis of online discussion in an applied educational psychology course. *Instructional Science*, 28(2), 115–152.
- Campos, M. (2004). A constructivist method for the analysis of networked cognitive communication and the assesment of collaborative knowledge building. *Journal of Asynchronous Learning Networks*, 8(2).
- Corich, S., Kinshuk, H., & Lynn, M. (2004). Assessing discussion forum participation: in search of quality. *International Journal of Instructional Technology and Distance Education*, 1(12).
- Fahy, P. J. (2001). Addressing some common problems in transcript analysis. *International Review of Research in Open and Distance Learning*, 1(2).
- Garrison, R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*.
- Gunawardena, C. N., Lowe, C., & Anderson, T. (1997). Analysis of a global on-line debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17(4), 397–431.
- Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing* (pp. 117–136). Heidelberg: Springer-Verlag.
- Kanuka, H. et al. (1998). Online social interchange, discord and knowledge construction. *Journal of Distance Education*, 13(1), 57–74.
- McDonald, J., & Gibson, C. C. (1998). Interpersonal dynamics and group development in computer conferencing. *The American Journal of Distance Education*, 12(1), 7–25.
- McKenzie, W., & David, M. (2000). “I hope this goes somewhere”: Evaluation of an online discussion group. *Australian Journal of Educational Technology*, 16(3), 239–257.
- Mowrer, D. E. (1996). A content analysis of student/instructor communication via computer conferencing. *Higher Education*, 32, 217–241.
- Newman, D. R., Webb, B., & Cochrane, C. (1995). A content analysis method to measure critical thinking in face-to-face and computer supported group learning. *Interpersonal Computing and Technology*, 3(2), 56–77.
- Pawan, F., Paulus, T., Yalcin, S., & Chang, C. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology*, 7(3), 119–140.
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education*, 12.
- Salmon, G. (2002). *E-tivities: The key to active online learning*. London: Kogan Page.

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