

An evaluation of selected pedagogical attributes of online discussion boards

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Technology has for long been used as a pedagogical aid in learning. While technology has numerous ways of providing pedagogical assistance, the current paper attempts to focus on online discussion boards as a pedagogical tool in an elearning environment. The paper highlights some of the pedagogical attributes of online asynchronous discussion boards that do not exist in a traditional classroom learning environment. Based on ideas emphasised in literature, the paper lists learner centricity, asynchronous interaction, communication effectiveness and assessment facilitation as the major pedagogical attributes of online discussion boards. Even as technological innovations continue to evolve alternative pedagogical tools, discussion boards continue to play a significant role in the learning facilitation process. The paper also discusses the strategy of applying data mining techniques to aid assessment of discussion board transcripts. Text mining as an extension of data mining algorithm could be used effectively to assess discussion board transcripts with the goal of eliminating subjectivity in the assessment of discussion board contributions.

Keywords: discussion board, learner centricity, asynchronous learning, elearning, assessment, data mining

Introduction

Exploiting information technology to enrich learning experience has come a long way even as new ways of doing so continue to emerge. Students enjoy the use of technology in their classes (Clarke, Flaherty, & Mottner, 2001). Similar findings have been reported by other studies. Clarke, et al. studied the relationship between the use of educational technology tools in the classroom and overall learning. Nine of the fourteen educational technology tools assessed in the study were found to be positively associated with student learning. A study by Sivin-Kachala (1998), found that students in technology-rich environments showed increased achievement at all educational levels (preschool through higher education). The use of technology in education seems to have been largely kicked off on the instructor's side through the use of audio, video and computer aided presentations in the classroom along with the use of optical reader in assessing multiple choice response tests. Soon, the use of technology proliferated to the student side as well through computer word processed, internet researched and computer spreadsheet analysed assignments followed by computer aided presentations in the classroom. With the growing affordability of portable computing devices students could carry their laptops to the classroom to aid case study discussions or to participate in simulations and business games. Students' level of comfort with technology has also been found to affect student learning. Piccoli, Ahmad, & Ives (2001), found that students with more experience in using technology and with a positive attitude toward it perform better in a virtual learning environment. Alon (2003) found that internet based experiential exercises produced improved international business skills among students. Thus, these studies seem to suggest that technology can definitely improve the effectiveness of learning even though the degree of effectiveness may be dependent on several factors.

This paper focuses on the use of computer based discussion boards in learning. Online threaded discussion boards provide an excellent platform for learning through moderated peer to peer interactions. Discussion boards are similar to public bulletin boards. Messages posted on the discussion board by an individual can be viewed and responded to by others. Multiple posts in the form of replies to previous posts resembling a tree structure is referred to as a "thread" of discussion. Discussion boards can accommodate a number of threads, each thread addressing a separate aspect or topic. The series of messages may evolve into a very complex and multilayered conversation among several participants, in some respects similar to face-to-face conversations. Most of the good universities across the world use a learning management system to host discussion boards in their graduate and even under-graduate programmes. These online boards often serve as an extension of the classroom to facilitate discussion on

relevant topics for effective learning. However, some consider discussion board's effectiveness as superior to the learning experience that is possible in a traditional classroom setting. For instance, Yang et al. (2008) find that online boards significantly improve the learners' critical thinking skills. Similarly, Chen and Chiu (2008) point out that unlike face-to-face discussions, online discussion messages that disagreed with an earlier message were more likely to elicit responses, thereby promoting critical thinking.

Using relevant prior literature and the experiences of the author in facilitating online graduate courses, the paper evaluates selected pedagogical attributes of online discussion boards and identifies recent trends that seek to sustain the significant pedagogical role of discussion boards in the elearning environment.

Learner centrality

Discussion boards are based on the core concept of providing a learner centric learning environment. The effectiveness of any pedagogical tool is largely based on the involvement of the learner in learning activities. Discussion boards provide a learner centric environment through peer to peer learning facilitation. The peer to peer interactions offer a 360 degree learning opportunity, whereby in addition to the direction provided by the facilitator, an individual is exposed to the ideas and perspectives of each of his peers. Dennen (2008) presents evidence that even learners who were less active in writing posts, experienced learning while reading others' posts. Unlike the traditional instructor centric learning environment, peer to peer learning is well known for its effectiveness as suggested by Jonassen et al. (1995). Jonassen et al. further explained that learning environments which encourage active participation, interaction and dialogue, provide learners with opportunities to engage in a process of knowledge construction as they try to create meaning from new experiences that are shared. They further reasoned that dialogue served as an instrument for articulation because in the process of explaining, clarifying, elaborating, and defending ideas, a cognitive processes involving integration, elaboration and structuration took place. The significance of learner centrality and its facilitation by elearning is also well highlighted by Williams and Goldberg (2005) who find elearning to be inclusive and democratic since everyone has an equally 'loud voice.'

Learner centrality might get affected particularly when the class size is large, leading to large number of posts and difficulty in navigating across numerous threads. This experience may prove self-defeating, stressful and may severely affect the effectiveness of discussion boards. One method often employed to counter this phenomenon is to divide a large class into groups, where each group would have its own discussion board. Traditional classroom based courses may not have this flexibility as dividing a class into sections may be constrained by availability of physical infrastructure. Thus, discussion boards possess the scalability to allow better control over maintaining learner centrality compared to a physical classroom facility.

Asynchronous Interaction

Discussion boards are primarily asynchronous mediums of interaction. The asynchronous feature allows for self-paced, student centric participation across time zones. The asynchronous medium provides the scope for well researched participation since there may not be a constraint to respond immediately. This improves the quality of discussion when compared with the spontaneous discussion taking place in a traditional classroom setting. In an interesting study by Newman et al. (1995), they found that students in the computer-based interactions exhibited significantly deeper overall critical thinking ratios than did students in the face-to-face interaction. They also found that in online discussions, students contributed more of outside material and experiences, and integrated the ideas better.

Often traditional classroom discussions may get too noisy and get dominated by students having public speaking and debating skills. Students who may not possess these skills often feel helpless in putting forward their views within classroom time constraints. Online discussion boards on the other hand remove most of these constraints, leading to active participation. Typically, face-to-face interactions tend to be linear, focusing on a single discussion thread. On the other hand, interaction through asynchronous discussion boards can be non-linear. This is because discussion boards can have multiple threads with several discussions and interactions progressing simultaneously, both peer to peer as well as between peer to instructor. Students can initiate a new discussion as easily as the instructor. For this reason, Ruberg et al. (1996) observe that in order to interact successfully, students must adjust to the non-linear, asynchronous nature of web-based learning. Sproull and Kiesler (1991) caution against discussions that may continue based on misinformation because in asynchronous mode an instructor may not be able to immediately correct or clarify a comment. Thus, students need to have the experience and knowledge

base to discern potential misinformation in the interim until the instructor is able to intervene. In a business management programme for instance, this capability may be more easily forthcoming from students who are working executives possessing adequate experience. Moreover, busy working executives may find elearning valuable since most of their constraints of juggling between work and study can be overcome through the flexibility offered by asynchronous discussion board interaction.

Communication effectiveness

Koschmann et al. (1996) argue that when communication among peers takes the shape of written medium, without the immediate feedback of the 'listener' as in oral communication, it requires a fuller elaboration in order to successfully convey the intended meaning. According to Chun (1994), students may take a more active role in a computer mediated communication than they do in face-to-face classroom communication. Thus, communication on the discussion boards being largely in the written form and computer mediated, has a potential to generate active and detailed interaction. Most of the modern elearning management systems have actually advanced well beyond pure text based interaction capabilities by providing the option of multimedia based communication capability. Use of multimedia in learning has exhibited growing popularity. Mayer (2001) extensively discusses the effectiveness of multimedia medium in learning. Most discussion boards today also allow multimedia content to be uploaded or embedded on to them. With the popularity of services like "YouTube," embedding multimedia content is no longer a struggle these days. With the help of multimedia capability, discussion boards can easily overcome the monotony of a text-only medium. Thus, multimedia capability tends to enrich the discussion board and provides the students an opportunity to use their creativity to embed multimedia content in their posts.

In quantitatively exhaustive topics involving frequent expression of complex equations and formulae, participants might get discouraged by the difficulty in using the computer keyboard or the equation editor to compose expressions which might get quite complex at times. However, the classroom discussions are also equally affected by this drawback in the absence of access to the class whiteboard/blackboard by all the participants. Moreover, with the easy availability of numerous software aids to process quantitative information, one may not be too dependent on written mathematical expressions today. Additionally, Hwanga et al. (2006) exhibit the effectiveness of online multimedia whiteboard system in learning mathematical problem solving.

Assessment facilitation

Most formal elearning programmes require assessment of discussion board contributions to gauge the academic performance of students. Interestingly, Shea et al. (2001) find that the greater the percentage of the course grade allocated to discussions, the more satisfied the students were, the more they thought they learned from the course, and the more interaction they thought they had with the instructor and with their peers. Moreover, after engaging in discussions, students deserve appropriate feedback at regular intervals on their performance and progress. From the perspective of an instructor, the assessment of discussion board contributions may appear much easier compared to a physical classroom discussion. This is on account of easy accessibility of historical discussion board transcripts, as a result of which the contributions on the discussion board remain well documented and readily accessible. On the other hand, unless assisted by a specialist, assessment of physical classroom discussions may not remain objective since the instructor's attention would be dedicated to moderating and guiding live discussions simultaneously. However, as mentioned earlier, while discussions in a physical classroom may be linear, the discussion boards may involve nonlinear interactions over several threads and among numerous participants concurrently. This complexity creates a challenge in terms of tracking and assessing contributions of an individual over several threads on a discussion board. In such a scenario assessment may not remain objective. Jarvela and Hakkinen (2003) therefore, quite rightly noted that there is an urgency to develop ways to organise and analyse data in web environments to show the dynamics of online learning and interaction processes.

From an instructor's perspective, some of the very basic parameters to be considered while assessing the discussion board contributions could be timely posting of contributions, timely response to postings by others, and uniqueness of posts, etc. Unfortunately, most of these attributes may not be readily obtained from the learning management system in an automated form. The instructor often has to manually extract these attributes from the transcripts and their time stamps, thereby rendering the processes difficult and time consuming. To overcome these problems and to remove elements of subjectivity in assessment, attempts have been made to utilise data/text mining techniques to aid instructors in this important task. Data mining is a process for examining databases to discover and display previously unknown

interrelationships, clusters, and data patterns with the goal of supporting improved decision-making (Benoit, 2002). Businesses have used data mining to analyse customer demographics and transaction history to better target direct marketing efforts (Tsantis & Castellani, 2001). More recently, data mining concepts have been extended into text mining to analyse numerous blogs and public online discussion forums to gather marketing intelligence relating to preference for brands, products and services as discussed by Matsuo et al. (2002). Similarly Thomas, J.D. and Sycara, K. (2000), discuss application of text mining across blogs and online forums to predict movement in stock prices based on investor preferences and expectations. Thus, while the emphasis of data mining is on presenting relevant data from databases, text mining seeks to extract relevant attributes from text based sources such as discussion boards. Application of the text mining strategy in an online learning environment finds detailed discussion in Dringus and Ellis (2005) who use common participation indicators to exhibit how the use of data and text mining techniques in the query process can improve the instructor's ability to evaluate the progress of a threaded discussion. Recent trends suggest that text mining would be attracting a lot of research interest in the near future. The current study therefore leaves further discussion on text mining to future research.

Summary and conclusion

The paper attempts to analyse some of the pedagogical attributes of discussion board. The widespread use of discussion boards is a testimony of its pedagogical strength. While the learner centric environment provided by discussion boards tends to enrich the learning experience through peer to peer interactions, asynchronous interactions ensure well researched contributions and the flexibility to participate across time zones. Similarly, discussion boards can facilitate effective communication through the use of multimedia resources which stretch beyond purely text based interactions. The paper finally discusses the strategy of applying text mining tools to facilitate objective and detailed assessment of discussion board contributions. Thus, discussion boards continue to retain their pedagogical prowess with the help of continuing technological innovations.

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