A method to track discussion forum activity: The Moderators’ Assessment Matrix

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Abstract

There is a difference between the conventional social cues utilised by teachers in face-to-face classes and the textual cues of the online environment. It can be difficult for teachers to monitor students’ interactions in a text-based discussion forum, particularly if an online discussion is successful and has significant amounts of text to digest. Using a focused, evaluative literature review, a method was developed for moderators to track three kinds of interaction needed in educational, online discussions for business students. The Moderators’ Assessment Matrix gives moderators a framework through which to sort information about learning activity. Summaries of information tracked with this matrix could support professional practice by offering a means for self-reflection, a guide for novice moderators, and a focal point for staff development. Furthermore, there is scope to incorporate this method into the instructional design phase.

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1. Introduction

There is little doubt that the use of information technology (IT) in teaching and learning is an increasingly important aspect of the tertiary institution, although the exact extent of it is

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probably subject to some hyperbole (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001, p. 66). As more and more courses ‘go online,’ students rely on asynchronous discussion forums, or computer conferencing, to interact with each other as part of their learning in an electronic environment. The significance of interaction amongst students, and with teachers, is widely acknowledged (Rovai, 2000), and shown to be the ‘essential enabling mechanism that facilitates the building and sustaining of a sense of community’ (Rovai, 2001, p. 115) online. However, if the discussion forum is successful, the resultant text can be substantial. Furthermore, teachers are often responsible for more than one discussion forum. This raises the question, how does a teacher monitor and gauge educational activity on discussion forums? There was a need for a tracking method to help teachers visualise, or summarise, the ‘state of play’ in discussion forums.

A consistent method for sorting and recording discussion forum activities in terms of the interactions that progress pedagogical objectives would substantially assist moderators. What was required was a method to track activity so that teachers could record educational interactions in such a way that they could gauge the stage their class had reached. Any activity tracking method would need to address a diverse range of learning objectives. With this information, teaching staff would then be better able to respond to student interaction needs specifically and quickly. Moreover, the information from an activity tracking method could form a common starting point for discussion with experienced or novice colleagues. Using an evaluative literature review, this project devised such a tracking method. The paper sets out this investigation and describes the tracking method devised to assess student interactions.

2. Information needs of moderators

This project had a strong practical orientation. It was a proactive evaluation that searched available resources for an answer to a need (Owen, 1999, p. 171; Patton, 1987, p. 20). Moderators, in an educational setting, are teachers who communicate with their students asynchronously and textually using computer-mediated communication (CMC) in electronic environments called computer conferences, or bulletin boards, or discussion forums. The usual social cues are absent from the textual environment of the discussion forum, and because of this, it has been called a “lean medium” (Anderson, Rourke, Garrison, & Archer, 2001, p. 3; Garrison, Anderson, & Archer, 2000, p. 90), particularly in comparison to the face-to-face classroom. Goffman (1959/1990) wrote at length on the uses people made of minute social cues and their significance to the conduct of everyday life, often referred to colloquially as ‘body language.’ He presented his ideas through the metaphor of the theatre and stage, and suggested that people conducted themselves differently depending on how they assessed the level of trust and intimacy of relationships. Where most students are currently familiar with the conventional classroom (Anderson et al., 2001, p. 5), commentators often noted the need for moderators to show students how to conduct themselves in the electronic educational environment (Goodyear et al., 2001; Jonassen, 1999, p. 231; cf. McConnell, 2000; Salmon, 2000), and short induction courses prior to the commencement of
teaching are useful for this (Brace-Govan, Wagstaff, & Luxton, 2001). The point is, that people ordinarily get many of their interaction cues from faces through eye contact and facial expressions, as well as body positions, gestures, and voice tone. Social cues build up ‘instructor immediacy’ (Rovai, 2000, p. 290) in the classroom and contribute to the relationship between teacher and students, which is important to the learning process. The online teacher, the moderator, has to establish an appropriate learning atmosphere and encourage students to develop rapport and trust with only limited cues. Rovai (2000, p. 290 argued, “online instructors must deliberately structure interactions to overcome the potential lack of social presence” and noted the importance of timing in this.

In addition to overcoming the deficits in social cues, moderators also have to maintain a sense of how their classes are progressing without the benefit of visible interactive behaviour that could indicate concentration, or engagement, with the task at hand. Moreover, the interactions are dispersed over time and expressed in text. If a discussion forum is successful, then a great deal of text can be generated relatively quickly. For example, an online class of 20 students communicating in the forum twice a week with half a page each time would generate 200 pages in 10 weeks. A moderator responsible for two or three online discussion forums would have read 400–600 pages of interaction by the 10th week. Clearly, busy teaching staff needed a method to track, record, and organise information about what was happening in discussion forums in a quick, easy, and succinct manner.

There were a number of outcomes that were required of such an information gathering and tracking method. Firstly, moderators would want to ascertain whether students were interacting with each other in ways that would further the established learning objectives. Furthermore, if progress was not being made in these interactions, moderators needed to be able to identify this and make relevant suggestions to students. In the same way, as teachers informally assess classroom work by watching the behaviour and reactions of their students, moderators needed a tracking method that maintained a record of interactions to give them an indication of what progress the students were making towards educational objectives. Currently, the methods available do not offer this kind of information to moderators. For example, summary statistics of participation are not helpful in this regard (Bernath & Rubin, 2001, p. 221) because they focus on the coming and going activity, not the actual type of activity. While content analysis is valuable (Mason, 2000, p. 68), it is also time consuming and offers a level of detail not required by moderators for their day-to-day working relationship with students. The object of this project was to find a method for moderators to gather information about the educational interactions that took place in computer-mediated environments. It was crucial that this method did not add significantly to the moderators’ workload.

3. Method

The search for a way to tackle the problem was a variation on the academic literature review (Chelimsky, 1977; Owen, 1999). Cooper (1989) asserted “integrative research reviews summarize past research by drawing overall conclusions from many separate studies
that are believed to address related or identical hypotheses” (p. 12). He described another type of academic literature review where theories were presented and compared for their explanatory power as a “theoretical review” (p. 12) and suggested that a “comprehensive review” (p. 12) would incorporate elements of both. However, the aim of the literature review presented here was somewhat different. Smallwood and Hurworth (1998) described the significant difference of the evaluation review as contained in the intention, or aim pursued. The steps of the evaluation review process were similar to those for a literature review as described by Cooper (1989, p. 14): formulation of the problem (or guiding question); data collection; assessment of the data; analysis and interpretation; and presentation of results. However, in the evaluative review, the end result was not a meta-analysis of results from other studies in the way of the integrative review, nor was it a comparison of theories. Rather, the evaluation review distilled issues around a key question: How can moderators track students’ educational interactions? By interrogating the literature for information around this question, it was anticipated that essential elements of educational interaction would become evident and could be utilised to generate a method for gathering the information on which moderators could rely.

3.1. Problem formulation

The approach taken to answer the key question was to progressively narrow the literature by using significant criteria intersected with the rationale for the project. This problem formulation process is illustrated in Fig. 1.

The first parameters of the search were limited chronologically due to recency of the general area, CMC. Having said that, there was an enormous amount of material about online, or web-based, teaching and learning, but much of this was not relevant to the purpose. All searches were limited to refereed scholarly journals and monographs. Initially, a broad search determined the overall framework of the literature. This part of the process also established the relevance of resources from “primary channels” (Cooper, 1989, p. 42) such as personal libraries and reference-tracking through “already-obtained relevant research” (p. 43). The potential for bias that these primary channels can introduce was ameliorated by the broader search of large public databases, such as Educational Resources Information Center (ERIC), PsychINFO, and Social Sciences Citation Index (SSCI). A brief overview of this framework is reported in a section below.

The next step in the problem formulation process was to define criteria that limited the search to manageable proportions while maintaining relevance to the project aim. The pertinent educational context and educational principles refined the search. It was important to define the educational context because of the diversity of IT use in education and the lack of consistency in vocabulary. Mason (1998a) addressed this issue directly and proposed three distinct models of online learning. The most basic model she labelled the “Content + Support” model which was also the “earliest and most extensive” (Mason, 1998a, p. 4). Here the content was usually printed and separate to any discussion forum. The discussion often occurred through e-mail or in a computer conference, but the online component was usually only a small part of the students’ time. Chronologically, the next model was the “Wrap
Around Model’ where the materials for the subject were tailor made for online delivery (Mason, 1998a, p. 4). The balance of online time increased to about half of the students’ effort but so did the effort of the teacher as less of the subject was predetermined and discussion became a larger part. The final model was the ‘Integrated Model’ (Mason, 1998a, p. 5) where the subject content was fluid and revolved around collaborative group activities. This model “dissolves the distinction between content and support” (Mason, 1998a, p. 5).

The particular context of interest to the author was the online delivery of business education to postgraduates. The model that most closely represented the format of moderation at the author’s institution was the Wrap Around Model. In addition to the website for communication and pedagogical interaction, subject materials included a printed subject...
guide, printed support materials, and a CD ROM of these printed materials with some additional Internet-linked resources. Students were expected to participate on the asynchronous discussion forum and, although one-on-one contact with their subject moderator was available, they were expected to use the discussion forum as the principal source of interactive support for their learning. The review focused on discussions about this Wrap Around Model, and, where possible, the review focused on postgraduate and business education.

At the first level of definition, the educational principles identified as relevant recognised that online learning, and the interaction that was expected to occur, relied quite heavily on the ideas behind constructivist learning theory. The theory suggested that through constructing reality, individuals learned best when they were actively engaged with the material and built new ideas onto previous experiences (Goodyear et al., 2001; Jonassen, 1994, 1999; McConnell, 2000; Preskill & Torres, 1996). The very close fit between online delivery and this education theory meant that much of the material was written from this perspective. Therefore, students were expected to collaborate with each other and be actively engaged in their own learning with facilitative support from the moderator. Although students were not left to flounder, there was an expectation that the teacher would not deliver and direct in a lecturing style. Rather, there was recognition that students, especially adults learning at a distance, needed to have some control over their learning experiences (Garland, 1994; Garrison, 1985, 1992; Laurillard, 1993).

Having defined the online context as ‘Wrap Around’ and the educational principles as constructivist, the author further defined the review through business education’s reliance on three particular kinds of learning interactions, which are included in Fig. 1. First, progression through learning materials on an individual basis, which was assessed through individually completed assignments. There was an expectation that students would develop their own views by engaging in discussion with each other using industry-based and literature examples, but they would work through materials independently. The second focus was on teamwork, where working closely and collaboratively with each other was essential. Here, group assignments were the basis for assessment and students were expected to contribute to a collective project. Finally, there was an expectation that students, particularly in more advanced classes, would debate the issues contained in the learning materials and generate new knowledge through the processes of sharing, disagreeing, and reflecting. The exact mix of these three types of educational interaction varied depending on the subject matter, the seniority of the students, and the learning objectives that were set out clearly in the written guides.

The problem focus was narrowed further still through two specific questions that addressed the particular aim of the project. What advice was there for moderators regarding CMC with students? What methods were available to moderators to assess student activity online? The results of the focussed data collection are developed in two sections: one that addresses advice to moderators; and one that examines the processes of discussion forum analysis.

3.2. Assessment of the resources

The third step in the review method, assessment of the data, was oriented by a key criterion for the project, that the tracking method would be usable by a busy teacher on a daily basis.
The purpose of keeping track of the kinds of interaction taking place was to help moderators stay in touch with whether their students’ interactions were appropriate for the learning objectives. By monitoring student interaction, moderators would be better able to plan their responses online, and to reflect on their teaching strategies. The intention was to give moderators a ‘feel’ for the way their class was going. In other words, give moderators a method to compensate for the reduced social cues and extended timelines for interaction. Therefore, it was most important that the review focused on assessing the strengths and weaknesses of previous analysis methods from the standpoint of the moderator who had a full teaching load.

Overall then, the criteria for the proactive evaluative review addressed moderation where there were learning materials in addition to the computer conference. It was also expected that most literature would be written from constructivist principles of education. After a brief chronological framework, the focus narrows to explore advice for moderators on computer-mediated interactions. Then, busy moderators review discussion forum analysis techniques for their usability. Finally, the essential elements of the literature review that intersect with the project criteria are distilled into a matrix. It is suggested that through using this matrix of essential elements, moderators can track and assess student activity on discussion forums.

3.3. Overview of online learning

The literature of online learning can be sorted chronologically into three phases. This created an organising framework, or context, from which to work, and outlined the progression that the literature had made overall. The first phase of initial enthusiasm was written in the late 1980s and early 1990s. During this phase, the advantages of flexible asynchronous and synchronous communication using computers were discussed in detail. Although there was a general description about the subjects taken, the students, and the positive evaluation reports, there was not much information on moderation. Authors often commented favourably on the opportunities afforded by being anonymous (Myers, 1987), or being able to invent new identities (Turkle, 1995) or being part of virtual communities (Harasim, 1994; Hiltz & Turoff, 1993). There was not much of real substance written about moderation during this phase, although there were a few widely used (and cited) texts (Harasim, 1990; Hiltz, 1990; Hiltz & Turoff, 1993; Mason & Kaye, 1989). This phase of the literature was directed at helping potential moderators to become familiar with, or even reassured about, the technology, and encouraged mastery of that aspect.

The second phase focussed on exchanging information about professional experience. This phase overlapped with the first in that it started around the end of the 1980s and continues today (cf. Steeples & Jones, 2002). One of the most common types of article described the process of getting a subject up and running online, the progress of staff and students through the semester, with some evaluative commentary towards the end (Graham, Scarborough, & Goodwin, 1999; McComb, 1993; Moller, 1998; Rahm & Reed, 1997; Rice-Lively, 1994; Webster & Hackley, 1997), and there were some fairly influential monographs in this vein too (Bates, 1997; Collis & Davies, 1995; Harasim, Hiltz, Teles, & Turoff, 1995; Mason, 1993, 1994). Typically, the aim was to give some guidance on the overall process from selecting

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technology to organising delivery, for example, Bates’ (1997) framework called ACTIONS. During this second phase there was more consideration of the actual practices of moderation with an ‘instruction manual’ approach that offered hints and tips for practitioners. Mason (1993, 1994) noted two important points of difference from classroom teaching. Firstly, Mason (1993, p.18) explored the impact of teaching in text through “preserved conversations” and noted that:

writing involves a different set of psychological functions and cognitive demands from oral speech. In face-to-face situations, the context is given. In text, the writer must establish both meaning and context (p. 18).

Secondly, Mason (1994) identified the following advantages that have a teaching focus: interactivity; collaboration; independent, and self-directed approach for the learner (pp. 57–58). The disadvantages, however, focused on organisational aspects: silence, or lack of activity; chaos from too much activity; a small number of people dominating the discussion; overheated responses or ‘flaming’; and that discussion forums were time-consuming (pp. 59–60) (a point that is not often made in the literature). Here, Mason (1994) brought an important issue for educational conferencing to our attention; that “the medium is very dependent on the teacher setting an appropriate climate and structure for interaction” (p. 60). In other words, the interactions of the moderator were crucial, and it would therefore be important to track activity and respond appropriately. Overall though, this second-phase literature remained relatively uncritical, and fairly descriptive, of the process of teaching and learning through computer-mediated processes.

The third phase, which only emerged towards the end of the 1990s, was the beginning of a more critical stance that weighed up the benefits of IT in education. For example, Shaw and Polovina (1999) noted the importance of the social aspect for students. Brace-Govan and Clulow (2000) found that differences in communication expectations affected students’ perceptions of discussion forums, and that shy students still had difficulty taking part, which is a point of difference with first phase effusiveness. Ross and Schulz’ (1999) research suggested that certain styles of learning [what they called “abstract random” (p. 21)] may not be well suited to computer-mediated learning, a point not raised in earlier literature. When students compared online with classroom experiences they complained about the lack of immediacy in communication online and the need to be more formal in their expression in text (Brace-Govan & Clulow, 2001), which, again contradicts earlier blanket enthusiasm. Freeman and Capper (1999) specifically set out to “dispel the hype and heresies” (p. 1), while Kirkpatrick and McLaughlan (2000) concluded that “there are some limitations on the quality and nature of interactions that can be supported” (p. 30) in computer conferencing. They also noted the need for scaffolding, or building onto the experience of students, and that critical self-reflection was particularly important in this learning environment. Once more, this implied that moderators needed to track activity fairly accurately in order to support this kind of student interaction appropriately.

In summary, there are three chronological stages: enthusiasm, sharing professional experience, and developing critique. The apparent wealth of material had only recently
moved beyond the descriptive. However, the significance of interactions was pointed out and, with this in mind, it is time to turn to specific advice on moderation.

3.4. Advice on moderation

Like the general overview, early work on moderation was comparatively descriptive in nature, for example, Mason (1991a, 1998b) advice that the moderator has three roles: organisational, social, and intellectual. Based on the same three roles, Paulsen (1995) generated two pages of detailed lists on how to behave, or react, in each role and below is an example from each list:

Organisational: Set up student interaction. Encourage participants to address each other as well as the moderator (Paulsen, 1995, p. 4).

Social: Frequent meta-comments. Invite participants to tell how they feel about the course within the conference (Paulsen, 1995, p. 5).

Intellectual: Write weaving comments. Summarise the state of the conference every week or two as a means of focusing discussion (Paulsen, 1995, p. 5).

Paulsen’s list, which parallels Mason’s (1991a), was then widely used. Salmon (2000) also compiled similar useful points, as do others, and some websites (Berge, 1995; Collins & Berge, 1997). Burge (1994) drew out many of the same issues, such as: summarise regularly; open up a discussion of the advantages and disadvantages of text-based learning; and make students responsible for logging on and taking part.

Recent research has been more specific. Beaudin (1999) showed that a carefully designed question was the most important element for keeping students online and on topic and providing students with guidelines on how to prepare responses was a close second. However, Tagg and Dickinson (1995, p. 33) found that differences in moderator behaviour were not “a necessary precursor to student activity in all circumstances”. Using mixed methods, the researchers compared the conferencing activities of four moderators and concluded that:

there is no single simple recipe for an ‘ideal’ tutor [moderator] style of messaging: quantity alone is no answer; nor is promptness . . . A pattern of frequent, prompt tutor responses that address individuals and offer guidance in a succinct and predictable manner seems, therefore to be most effective in encouraging student activity (Tagg & Dickinson, 1995, p. 54).

The suggestion here was that, just as social face-to-face environments vary, so too do educational environments, including computer conferences. The other underlying principle that emerged was, once again, that it was important for moderators to direct and manage the textual interaction. This assumption was evident in several recent references that discussed
computer-mediated learning from a variety of perspectives: networked learning (Steeples & Jones, 2002); cooperative learning (McConnell, 2000); and innovative distance learning (Lockwood & Gooley, 2001). The broad range of advice included descriptions of the most recent developments in teaching and learning technologies from around the world (Lockwood & Gooley, 2001) and increasing depth of information about the pedagogical process and how that was affected by the IT environment (Steeples & Jones, 2002). McConnell (2000, pp. 136–141) gave detailed information on how to implement online learning and some excellent advice on the role of the moderator. Although not finalised, Goodyear et al., (2001) have begun to develop a series of moderator competencies.

In this latest phase, there was an increase of specificity and complexity of advice to moderators. A widely cited source of advice was Salmon’s (2000) book e-Moderating: The key to teaching and learning online. She outlined how to train moderators, the qualities and roles that the moderator takes, and a description of what moderating is with several examples. The list of moderator qualities included: being confident, constructive, developmental, facilitating, knowledge sharing, and creative. Salmon set out each of these qualities to intersect with task area headings: understanding of the online process; technical skills; online communication skills; content expertise; and personal characteristics (p. 40). What could be taken from this was that the moderator’s key role was creating the kind of ‘textual atmosphere’ that would encourage students to engage in a relatively close personal way in a text-based environment. A concept that was reminiscent of Mason’s (1994) assertion that online teaching relied on the moderator to set the climate and structure the interaction.

Overall, the advice on moderation followed a similar chronology to the general overview as it moved from initial expressions of enthusiasm towards sharing professional experience, and later developed a more critical and complex stance. Moreover, the expectation that moderators fostered collaborative learning environments by directing student interactions was clarified. There was either an implied, or sometimes overt, acknowledgment that a constructivist approach to teaching and learning was best for the online environment. Furthermore, given the potential diversity of group dynamics, it was shown that there was no single successful formula for moderation. This was, of course, a point of similarity with face-to-face teaching. However, while there was an abundance of process-based, activity-orientated advice for moderators, there was little that suggested how best to obtain a sense of being as an effective online teacher. Indeed, it was even acknowledged that effectiveness was much easier to achieve in face-to-face situations (McConnell, 2000, p. 175). Although a repertoire of appropriate approaches was well developed, and the significance of good quality, timely moderator communication was well established, the question that remained unanswered was how to track student interactions on discussion forums. The next step was to review how discussion forums had been investigated and assess these methods for usability by busy moderators.

3.5. Discussion forum analysis

In spite of the proliferating publications on computers and educational interactions, and the widespread commentary on teaching online, there was remarkable little literature on actually
analysing the content of discussion forums (Garrison, Anderson, & Archer, 2000, p. 93). Once more, initial efforts tended to be descriptive, for example, counting messages amongst the participants (Levin, Kim, & Riel, 1990). Apart from being quite complex, it was not clear exactly what this analysis offered beyond the fact that some people and some issues were more active than others. Mason (1991b, 1992, 1994) explored several methods for assessing the educational value of discussion forums, and said that:

> counting the number of messages makes no distinction between a one-line message and a well-prepared thoughtful response of several screens; second it over-emphasises the quantity of inputs at the expense of their quality (Mason, 1991b, p. 164).

Bernath and Rubin (2001) made a similar point while Graham et al. (1999) remarked:

> the distinction between the evaluation of the effectiveness of the learning and the functionality of the medium is crucial, as access statistics and the number of messages do not indicate student learning (p. 43).

The first approach that distinguished between participation and interaction was taken by Henri (1992). However, her classification system was complex. Messages were coded separately for participative, social, interactive, cognitive, and metacognitive activity, and the model also separated skills from knowledge in the metacognitive category. Henri’s model was rejected as too difficult to operationalize by several researchers (Gunawardena, Lowe, & Anderson, 1998; Rourke, Anderson, Garrison, & Archer, 2001; Tagg & Dickinson, 1995). Although an evaluation team at Queens University Belfast did not reject Henri outright, they did find it necessary to modify the model (Newman et al., 1997; Webb, Newman, & Cochrane, 1995). Instead, they made use of the cognitive dimension of Henri’s (1992) classification in conjunction with Garrison’s (1992) five-stage critical thinking model (Newman et al., 1997; Webb et al., 1995). So far then, discussion forum analysis had little to offer busy moderators. Either the information gathered was too superficial or the method was too complex.

Recently though, interest in discussion forum content analysis had increased (Anderson et al., 2001; Garrison et al., 2000, 2001; Rourke et al., 1999, 2001). Deriving from Garrison’s critical thinking model, one research team identified several facets of discussion forums: social presence (Rourke et al., 1999); teacher presence (Anderson et al., 2001); cognitive presence (Garrison et al., 2001). The overall point was that the cognitive, or critical thinking, skills required by higher-order thinking (Garrison et al., 2001) could only be supported with an appropriate teaching presence (Anderson et al., 2001) and a conducive social presence (Rourke et al., 1999). Teaching presence was defined through a discussion of three elements: design and organization of the environment; facilitating discursive exchange; and direct instruction (Anderson et al., 2001). The definition of teaching presence had some parallels to Mason (1991a) and Paulsen’s (1995) descriptions of organisational, social, and intellectual roles of the moderator, and again, reinforced the importance of well-tailored moderator responses to interactions. The concept of social presence relied on categorising emotional
expression, open communication, and group cohesion (Rourke et al., 1999, p. 56). This too echoed earlier recognition that the quality and type of social interaction influenced the constructivist educational environment of the online discussion forum.

Others had also identified student social presence as a useful predictor of learner satisfaction (Gunawardena & Duphorne, 2000; Gunawardena & Zittle, 1997; Shaw & Polovina, 1999). However, there were also critics of the social presence concept who pointed out that taking part socially was not the only way to engage with learning in a group (Mayes, Dineen, McKendree, & Lee, 2002). Those who did not want to interact, could ‘lurk,’ which was when students logged on only to read. They were described as “vicarious learners” (Mayes et al., 2002, p. 224). Others were critical of the separation of interaction as a single element, and argued that all contributions to a computer conference were, at some level, directed at interacting with others (Gunawardena et al., 1998, p. 2). If a posting was made to the discussion, then the intention was to have a presence on the forum, however, that may be viewed. A further point can be made here: different kinds of social presence might be required depending on the learning objectives set for the discussion forum. An example of this would be the difference between a cohort of students who were expected to work through materials in order to grasp the fundamental concepts of a discipline and demonstrate this in an individual assignment, as compared to another cohort expected to work collaboratively on a group assignment. Students in these two situations would be expected to have a social presence, but the type of social interaction, and the timing of those interactions, could be quite different. This important point recognises variations in expected and appropriate interactions for both students and moderators.

Overall then, the increase in critical complexity in discussion forum analysis had extended earlier more descriptive commentary. It had also, indirectly, confirmed the significance of moderator interactions. At the same time, critics had identified student interactions as variable. However, while this work was valuable and informative, it was very complex and, by their own admission, their methods were time-consuming (Rourke et al., 1999, p. 68). A crucial criterion in assessing the method of analysis was that it could easily be incorporated into the daily teaching practices of busy moderators. As this was not the case here, clearly, these methods had to be rejected. Furthermore, although it was clear that timely, appropriate interventions by moderators were crucial, exactly what to do and when to do that had not been addressed.

It was expected that the method selected to track, record, and organise discussion forum activity, in order that moderators overcame the paucity of social cues and maintained a sense of what stage their classes had reached, would be informative yet straightforward to use. In a classroom, it was noted earlier that this might include the teacher’s assessment of the students’ attitude to the work at hand through the kinds of comments that the students made and the types of links that students generated across materials. It would also be evident in the students’ demeanour. This working sense of ‘the state of play’ in a classroom was often relied on to adjust teaching. In the lean environment of text-based discussion forums, these cues are often only evident after some time has elapsed, which may leave the moderator with insufficient time to tackle difficulties. Other times, essential interactions can be absent because visual, social cues are missing. Moderators needed a method to track student activity on discussion forums that captured the elements they relied on and sought to influence.
3.6. Essential elements of business education

Part of the problem formulation process (illustrated in Fig. 1) asserted that there were three kinds of learning interactions expected when teaching postgraduate business students that needed to be identified by moderators:

1. progression through learning materials with individual assignments as assessment tasks;
2. group work with group assignments for assessment; and
3. debate on issues around a problem to develop solutions collectively but not necessarily for work on a group assignment.

It was noted that mixes of these kinds of interactions might also be set out in learning objectives. A method to track student activity would need to include the elements of all these kinds of interactions. While there was much advice for moderators, and discussion forum analysis further established the importance of this advice, there was no resource that had identified elements of different kinds of learning interactions. Therefore, the next step was to overcome this dilemma and devise a method that would track those elements succinctly and quickly.

A first step on how to tackle this central dilemma emerged in Salmon’s (2000) five-stage model. The model described the increasing depth of communication that was assumed, potentially even required, by constructivist principles of education, from first contact through later, more intense, educational interaction. Personal links between the students encouraged a depth of interaction and allowed them to be sufficiently comfortable with each other that they could engage in collaborative and critical exchanges (Preece, 1999; Salmon, 2000). Salmon described the progress of a computer conference, or discussion forum, as not only going through these stages, but her model also incorporated stages of contact through CMC (p. 26):

1. access and motivation,
2. online socialisation,
3. information exchange,
4. knowledge construction,
5. development.

The relevance of this list was that the progressively more intense interaction of students was described in tandem with shifts in moderator responses. Moreover, some elements on the list described the kinds of interaction moderators wanted from students if they were engaged in progressing through learning materials with individually assessed assignments. Other elements were not as relevant such as the first stage of ‘access and motivation.’ This is an orientation phase and important both for the technical and social induction of online students (Jonassen, 1999; McConnell, 2000). It is linked to ‘online socialisation,’ which is a specific type of orientation needed by online students to familiarise them with the particularities of the electronic environment, including ensuring that technical connections and resources are
functional. This kind of orientation is not singularly about teaching and learning and these processes are best dealt with in a specific, and separate, unit (Brace-Govan et al., 2001). Therefore, from this list, there were two stages that dealt with the issues of technical links and asynchronous textual socialisation and, three stages of elements of educational interaction, listed as progressive steps. This combination of electronic environment and education interaction in incremental steps made this model relevant to the development of a method to track discussion forum activity.

An aspect of the elements distilled from Salmon (2000) was the ease with which moderators could relate to them. It would therefore be useful if such easily identified elements could be found for groupwork as this would enhance the functionality of a method. One early, but undeveloped, suggestion for discussion forum analysis was to examine the behaviour of online participants (McCreary, 1990) by using Tuckman’s well-known model. Tuckman (1965) described the formation of small groups by combining the development of personal relationships with tasks into the following stages (p. 396):

1. Forming: identify the task and group goals;
2. Storming: group polarises around key issues;
3. Norming: cohesion through mutual support;
4. Performing: positive interdependence is achieved.

This has some parallels to Salmon’s (2000) model as both rely on an increasing depth of interaction in order to progress. Learning objectives that relied on individual assignments and progression through materials would categorise more easily using Salmon’s stages, while group-based work would categorise better using Tuckman’s group formation. In addition, both of these typologies use vocabulary and concepts that are familiar to teaching staff. Taken together they described two sets of interactions, which could be present in different amounts in business education depending on the set learning objectives: the engagement of the learner with the learning materials with a deepening involvement, and the formation of a group or team focus by the learners.

One further element of tertiary learning important to discussion forums remained: the development of a debate amongst the students to interactively assess and build knowledge from the learning materials. An analysis of discussion content from this perspective would have much to offer. Gunawardena et al. (1997, 1998) analysed a transcript of a debate amongst professionals and identified the type of cognitive activity used, the type of argument advanced in the debate, the resources brought in by participants, and the evidence of changes in understanding. Through this process they described five phases in that kind of interaction (Gunawardena, 1999; Gunawardena et al., 1997, p. 414, 1998):

1. Sharing/Comparing
2. Dissonance
3. Negotiation/Coconstruction
4. Testing Tentative Constructions
5. Statement/Application of Newly Constructed Knowledge
They found that messages often contained more than one phase and that progress usually occurred through phases one to five: “showing progress from lower to higher mental functions” (Gunawardena, 1999, p. 5). There are similarities between the above list and Ohlsson’s taxonomy of epistemic tasks as described by Goodyear (2002, p. 63), as well as similarities to Garrison’s critical thinking model (Garrison et al., 2000, p. 93). Here, the clear and separate focus on the development of debate by Gunawardena was useful to the purpose of creating a method that tracked interactions. The movement through different stages had parallels to Tuckman’s (1965) group process typology and also Salmon’s (2000) conference progression model. Again, these are intuitively recognisable progressive categories for teaching staff.

Collectively, these three separate pieces of literature offer useful indicators that covered the range of learning interactions needed by a business education discussion forum. The moderators at once easily understood the various headings, but also, the headings were sufficiently descriptive so that information gathered under these headings would closely reflect activity. Thus, giving a snapshot from which to assess the state of play, or how the class was progressing. There was potential here to usefully describe the progress of the conference, the formation of a group process, and the development of a text-based debate. Drawn together in a matrix and synthesised, these three lists, or models, combined to make a framework for a method through which student learning activities on discussion forums could be quickly, succinctly and easily tracked. Assessment of activity against learning objectives would give moderators an indication of the type of intervention that was required.

4. The Moderators’ Assessment Matrix

4.1. Tracking method

The first step towards a method to track discussion forum activity was to combine the three progressive lists, or models, into the Moderators’ Assessment Matrix. The resultant table showed three columns each of which listed elements of the learning interactions expected to occur for one type of learning objectives (see Table 1). These were labelled: Conference Progress; Group Formation; and Debate Development. Discussion forums are also called computer conferences and Conference Progress was chosen as a label to make a clear distinction between these more individually oriented elements and the anticipated complexity required by the elements in the Debate Development column. Salmon’s concern with orientation to the electronic environment showed as an additional stage that was not considered by either Tuckman or Gunawardena. Although it was argued that orientation should be part of a separate unit where students ensured their technical connection to the discussion forum, the two stages that Salmon used to described this process were included in the Moderators’ Assessment Matrix so that moderators could identify the point at which all students had joined the forum and could take part in learning activities. After the collective start point was established, phases one through four would build up a picture of student learning by tracking student discussion forum activities.
The method is a simple recording framework that conforms to the key criterion that it be easy to use. First, put the Moderators’ Assessment Matrix onto a spreadsheet (or paper grid) and leave adjacent columns to record evidence, as shown in Table 1. As moderators identify the various learning elements noted in the Moderators’ Assessment Matrix, then they record a mark against this on the spreadsheet. As marks accumulate in columns next to the elements in each phase, moderators will have a visual record of what has, and what has not, happened in the discussion forum. Moderators would need to know what was expected from the learning objectives in order to assess the progress of the student group. Learning objectives could encompass all or some elements from any combination of the columns. Although variations in pedagogical design could have an impact on the frequency of recording, this could be done weekly, or for each discussion question. The coding could be a letter, or a number, or a simple tick for each phase identified in a discussion forum. Other symbols could show other kinds of information of interest to the moderator, such as ‘?’ for a query and ‘!’ for a technical hitch that required attention. As moderators tracked activity, the Moderators’ Assessment Matrix would be a visual summary of what had happened in terms of learning activities. Collections of ticks would quickly show moderators what kinds of learning activity had been undertaken, and, by comparing this to the set learning objectives, moderators would have a clear indication of what was required next. The visual summary would enable moderators to identify the kind of appropriate interaction that was required. Over the duration of a discussion forum the spreadsheet would accumulate to form a description of the students’

<table>
<thead>
<tr>
<th>Progressive phases</th>
<th>Conference progress</th>
<th>Record activity</th>
<th>Group Formation</th>
<th>Record activity</th>
<th>Debate Development</th>
<th>Record activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical connection to conference</td>
<td>access and motivation online socialisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase one</td>
<td>information exchange</td>
<td>forming: identify the task and group goals</td>
<td></td>
<td>sharing/comparing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase two</td>
<td></td>
<td>storming: group polarises around key issues</td>
<td></td>
<td>dissonance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase three</td>
<td>knowledge construction</td>
<td>norming: cohesion through mutual support</td>
<td></td>
<td>negotiation/ coconstruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase four</td>
<td>development</td>
<td>performing: positive interdependence is achieved.</td>
<td></td>
<td>testing tentative constructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase five</td>
<td></td>
<td></td>
<td></td>
<td>statement/application of newly constructed knowledge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

interactions. Further discussion of the potential uses of this collected information occurs in a following section, firstly, the various phases will be described in more detail working across the three types of learning interaction and relying on the descriptive material from Salmon (2000), Tuckman (1965) and Gunawardena et al. (1997).

4.2. Phase one

Assessment of student educational interactions starts at phase one on the Moderators’ Assessment Matrix. This is the beginning of students working on the topic, or task, set out by the moderator of the discussion forum. At this point, the three source models, or lists, are aligned into a common phase one. Moderators would search discussion forum text for evidence that students had exchanged information for Conference Progression, or identified tasks and goals for Group Formation, or shared and compared information as the start of Debate Development. To initiate debates around issues, students could make statements of observation or agreement, ask for information, or use supportive examples as part of this phase. The seniority of the students and the learning objectives would help moderators to make a judgement here about whether information exchanges were to be recorded in the Conference Progress or Debate Development Column.

4.3. Phase two

Once the students move on to phase two of the Debate Development process as shown in the Moderators’ Assessment Matrix, the cohort has begun to disagree and students might ask for clarification or restate their position. Where Group Formation is concerned, students could have differing points of view, perhaps take different stances on issues under discussion, and there could be resistance to being part of the group. Progression through learning materials does not include this dissonant phase, which would be indicative of more individually based learning. It is suggested that the nature of the task, or material, had an impact here. The students’ need to form a coherent working structure with others would be limited where the learning objectives of discussion forums led to individual assessment tasks. Also, it is often the case that an educational topic can sustain several different points of view concurrently. Therefore, it is likely that any dissonance could be absorbed or side stepped. However, if a discussion forum was directed at a group assignment, then disagreements between students become more significant as a single direction would be required. In this instance, views could split and recombine as Tuckman (1965) suggested. The concept of debate itself relies on some level of disagreement. Further research is needed to investigate this, but it is proposed that the spaces visible in the Moderators’ Assessment Matrix are explained by these variations.

4.4. Phase three

In phase three, the construction of knowledge becomes the students’ focal point. Moderators would look for evidence that progression through learning materials is facilitating
knowledge construction for individuals. In other words, students demonstrate through their discussions in text that they understand and can manipulate the information in their learning materials. In group work, this process would additionally involve some evidence of student cohesion and mutual support. The development of debate requires evidence of negotiation around pertinent issues in order to bring about a collective construction of understanding. This kind of discussion is likely to be more complex and intricate than the discussion identified for simply progressing through learning materials. The expectation is that if moderators are searching for evidence of debate development, students are at a more advanced stage than students working through the kind of progress described by the Conference Progress list.

4.5. Phase four

It is anticipated that phase four would be achieved towards the end of the study period. In Debate Development, moderators would find students contradict the literature, offer personal experience as examples, and test their ideas against those of others. At this stage in Conference Progression, students have developed a more holistic view of the subject materials and have built onto individual prior experiences. Although the mutuality established for phase four of Group Formation has no further to develop, the work produced by the group shows evidence of positive interdependence. For Group Formation, from phase four the group is functioning well, so there is no phase five to achieve. Similarly, if the learning objectives are set around progression through materials, the integration of information achieved in phase four would demonstrate a functionally interactive discussion forum. The highest-order thinking of reflecting, articulating, and evaluating one’s own position is present in the final phase only in Debate Development, phase five. This is in keeping with the assertion that some students are more advanced and learning interactions need to take this into account. Here, students summarise, apply, and illustrate the changes that their knowledge construction has made to their perception.

On the whole, the Moderators’ Assessment Matrix combines well to form a framework for tracking learning interactions on discussion forums. It offers moderators a choice of assessing any combination of the three types of interaction, either separately or together. For instance, the Debate Development column indicates educational interaction around pertinent concepts, while the stage of Group Formation that the participants have reached may be important if collaborative group assignments are set. The overall Conference Progress helps a moderator to gauge the extent and type of involvement students have reached with regard to more individually pursued learning materials. Moderators can focus on any combination of elements and phases depending on the learning objectives and the expected interaction needs.

4.6. Practical implementation

The accumulated information held in the Moderators’ Assessment Matrix could be used for different purposes. For example, moderators could reflect on their professional practice, or a summary of activity on previous discussion forums could give guidance to inexperienced
moderators. Also, information gathered through this method and held in the Moderators’ Assessment Matrix could be used to focus discussions amongst moderators who were interested in exchanging views and sharing their knowledge. Staff development for moderators requires many strands and must avoid underestimating the difficulties that are involved for teachers (McNaught, 2002, p. 113; McNaught, Phillips, Rossiter, & Winn, 2000). Teachers need to be supported in a variety of ways including offering tools that can help them change their professional practice individually (Orrill, 2001). The Moderators’ Assessment Matrix offers staff an individual reflective tool, irrespective of their experience in moderating, as well as a tool for collaboration. The Moderators’ Assessment Matrix could also offer the means to generate a collective memory of exemplary practice by giving ‘stories’ of experiences a common framework (Jonassen & Hernancez-Serrano, 2002) and instigating an action research cycle (Kemmis, 1985; Salmon, 2002).

A further potential use for the Moderators’ Assessment Matrix would be in the design stage where it could be useful to identify which interaction elements are expected as part of the instructional design prior to going online. For example, if the semester’s work included a group assignment, then an expected time scale for forming a group prior to submitting a collective assignment could be identified. If the group formation did not occur according to plan, the moderator could pay close attention to the learning interactions and intervene to encourage group integration. Alternatively, if debate was perceived to be a central factor in the learning process, then progress through these elements could be highlighted as desirable and become the focus of encouragement from the moderator. The next stage will be to test the Moderators’ Assessment Matrix and rigorously evaluate its performance.

5. Conclusion

Overall, despite the broad range of literature available to such an evaluative review, once the criteria were established, the range of material that was relevant reduced quite significantly. The educational context and principles further narrowed the field and it was noted that constructivist learning principles intersected with this educational environment. The review demonstrated the importance of timely and appropriate moderator interaction in educational discussion forums. However, although advice to moderators became more detailed and, in spite of the eventual complexity of discussion forum analysis, the review found no specific advice on how to track student learning activities succinctly and effectively.

Salmon (2000) provided a five-stage model of educational computer conferencing that was a useful way to gauge students’ progress through learning materials. In addition, business education needed a way to assess group formation and Tuckman (1965) was selected. The wide recognition of both Tuckman and Salmon enabled the premises to be grasped more readily. The key criterion of usability by a busy teacher during their daily professional practice dismissed bulletin board content analysis as too complex. However, without going into the detail pursued by Gunawardena et al. (1997), the headings they used to describe the debate process had an intuitive usefulness. The elements of the review were combined as the Moderators’ Assessment Matrix and it was suggested that by recording discussion forum
activity through this framework, moderators would have a method to visually summarise discussion forums.

The method builds up a snapshot as the moderator tracks student activity week by week. Although the phases of the three kinds of interaction tracked do not match exactly, it was suggested that differences between more advanced student groups and variations in expected interactions needed to be accommodated. The usefulness of further research was highlighted here. The Moderators’ Assessment Matrix gives moderators a framework through which to track student activity. In other words, the Moderators’ Assessment Matrix offers versatility and can deal with mixtures of learning objectives concurrently. In this relatively lean teaching medium, where there can be a deficit of social and visual cues, this method gives teachers a useful visual yardstick. It was suggested that moderators could share information in ways that would support staff to consolidate their own experiences and potentially incorporate the good practices of others.

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References


