DISPELLING E-MYTHS AND PRE-EMPTING DISAPPOINTMENT: EXPLORING INCONGRUITIES BETWEEN INSTRUCTORS' INTENTIONS AND REALITY IN ASYNCHRONOUS ONLINE DISCUSSIONS

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ABSTRACT

Provided that effective practices in online instructional design are met and e-myths regarding online learning are contested, asynchronous online discussions (AODs) may promote productive interaction, reflecting knowledge sharing, knowledge construction, and knowledge creation or hybrids of these

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discourses. Within a naturalistic higher education setting, the authors revisited lingual data analysed in a previous study, employing Booth and Hultén's (2003) taxonomy of pivotal contributions to online discussions to describe students' 'talk' during text-based AODs. The taxonomy constituted a more comprehensive model of productive online discussion than that used in the earlier study. Contrary to the authors' initial assumptions as novice e-instructors that students would not only share knowledge, but also co-construct knowledge, there was little evidence of the latter. In terms of Booth and Hultén's (2003) analytic framework, functional moves were predominantly factual, while reflective contributions were uncommon. In other words, knowledge-sharing discourse rather than knowledge-construction discourse was the norm. In addition, participatory contributions were rare. The findings indicated that there was a mismatch between the authors' expectations about students' levels of cognitive engagement during their discussions and the instructional design. Thus, the authors interrogate their assumptions and identify design considerations that should underpin online pedagogy as it pertains to meaningful online discussion.

Keywords: online instructional design, asynchronous online discussions, e-myths, knowledge sharing, knowledge construction, knowledge creation

INTRODUCTION

In a previous study set in a third-year applied linguistics class, one of the authors of this article analysed students' posts generated during asynchronous online discussions (AODs) and synchronous group discussions in Blackboard. The model used to examine students' conceptual moves was based on that of Veerman and Veldhuis-Diermanse (2006). This time, and returning to the same AOD, we employed Booth and Hultén's (2003) taxonomy of significant contributions to online discussions to conduct a computer-mediated discourse analysis of students' messages. While Veerman and Veldhuis-Diermanse's (2006) model had been useful for analysing productive discussion, it did not make the characteristics of this kind of discussion explicit (Abedin, Daneshgar and D'Ambra 2014, 19). Here, productive online discussion is defined as the construction, comprehension, critique and synthesis of knowledge (Gao, Wang and Sun 2009, 69). This is similar to Van Aalst's (2009) distinction between knowledge sharing, knowledge construction, and knowledge creation, as well as to Booth and Hultén's (2003) taxonomy outlined later on.

Using a more comprehensive model of productive online discussion then, our aims were to describe students' online interactive behaviours in greater detail and to establish why these behaviours did not progress beyond the sharing of knowledge. Being novice designers and instructors of the AOD forum, we wished to interrogate our expectations about what this environment could achieve because we had initially looked at the instructional design of AODs through the schema of our face-to-face

classroom experience (Rosenthal 2011, 21). Based on our findings, we propose several tenets that educators should adopt to promote productive discussions.

While educators may wish to employ AODs in their own pedagogical settings, and as we learned to our own and our students' detriment, this learning environment is not without its drawbacks. As the literature review shows, neither using the appropriate technological tool nor constructing a specific topic of discussion around this tool necessarily maximises meaningful interaction (Comer and Lenaghan 2012, 264). The former notion 'reflects a powerful myth of online learning, namely: that increased connectivity deterministically leads to increased interaction' (Oztok et al. 2013, 92). The latter belief is based on the false assumption that if students generate probing questions, their responses will automatically reflect higher levels of cognitive engagement (Darabi et al. 2011, 216). Another myth relates to the notion that younger students are digital natives and therefore digitally literate, which is akin to 'assuming that students, because they can read, will also understand how to use the resources of a research library' (Goett and Foote 2000, 92). Questioning such e-myths will go a long way to avoiding inconsistencies between designers' pedagogical aims and the kinds of contributions students generate in reality.

Before considering what our expectations were of our students' engagement in online discussions and why we believed they would generate productive dialogue, it is worthwhile to take one step back and to consider what is meant by knowledge sharing, knowledge construction, and knowledge creation, since these modes of discourse are sometimes confused and used interchangeably in studies of AODs. Knowledge sharing is simply the transmission of information between participants and involves very little if any development, interpretation or evaluation of that information (Van Aalst 2009, 260). At the other end of the continuum, knowledge creation entails generating new intellectual artefacts, such as theories, models and ideas. By contrast, and corresponding to the theory of constructivism, knowledge construction includes the processes whereby participants collaborate with one another to solve problems and build on existing knowledge of phenomena, mental constructs, and situations in order to understand them (Van Aalst 2009, 261). AODs may reflect one or more of the three modes, and being able to distinguish between them will prove useful to instructional designers who want to steer clear of mismatches between the mode(s) which they purport their AOD activities generate and what actually transpires.

Assumptions about students' levels of cognitive engagement in asynchronous online discussions

Our own pedagogical context comprised third-year students of applied language studies (ALS) in English who were assumed to have progressed from level 6 to level 7 of the South African National Qualifications Framework (NQF): in the first semester, these students had completed an ALS module in English on NQF level 6,

having acquired detailed knowledge of discourse analysis and an ability to apply this approach in a particular context. What was expected of students in the second semester is discussed in more detail below, but with regard to the online component of the module, students were required to participate in AODs about academic writing using a website on essay writing called *Unilearning* as their point of departure. The reasons for employing AODs about writing were to encourage students to share and compare their ideas about writing and to help them prepare for one of the module's written assignments. Preparation for the online activity required students to learn more about the writing process; the key concepts of a written assignment; the research process; the appropriate style of academic writing; and the macro features of a written assignment. Students were then asked to discuss the following: Many students are ambivalent – even negative – about the writing process: what is your attitude towards academic writing and towards improvements in your own writing skills and habits? Having worked through the [Unilearning] links, is there anything new you have learned about essay writing at tertiary level when it comes to preparation?

In line with NQF level 7, the competencies that students were supposed to demonstrate during the discussions related to: (1) accessing, processing and managing information about academic writing; (2) generating and communicating information about writing; and (3) managing their own learning. In terms of the level descriptors for NQF level 7, the first competency listed entailed students demonstrating that they were able to recall and share information about academic writing based on the *Unilearning* website as well as to evaluate and manage this information. The second competency involved students communicating their ideas and perceptions about academic writing with one another in such a way that they would be able to generate substantive claims while using appropriate academic discourse. In terms of the third competency, students were expected to be able to identify gaps in their writing skills and habits.

Bearing these competencies in mind, the outcomes we wanted students to demonstrate during the discussions therefore related to knowledge sharing and knowledge construction; we wanted them to be able to: recall the various elements of academic essay writing; communicate/compare their ideas and opinions; make connections to the given learning materials; respond to one another's posts; and assess their writing skills. We did not specifically ask students to summarise and synthesise knowledge with a view to generating new ideas, and so we did not expect their discourse to reflect knowledge creation.

At the time the module was designed, the use of an online forum as a channel of communication to further productive discussion was entirely new to us, and so the assessment criteria employed were not based on any conceptual framework of online discourse, but emerged from the given competencies and related learning outcomes. The criteria presented in Table 1 were intended to communicate our expectations

to students. We assumed that, together with the discussion prompt and learning outcomes, criteria (2) to (4) would be explicit enough to illuminate what students should *do* in order to generate productive discussions. We expected that students' posts would reflect not only knowledge sharing, but also knowledge construction. However, these assumptions were misguided for a number of reasons as will become clear later on.

Table 1: Assessment rubric for assessing students' AODs

Criterion	Poor	Average	Good	Mark out of 5
(1) Frequency and promptness	Your contributions are infrequently posted or you do not post any contributions.	Your contributions are fairly prompt and they are also fairly regularly posted.	Your contributions are always prompt and are posted on a regular basis.	
(2) Relevance of posts	The claims, ideas or opinions you make are off-topic; they are not related to the topic and to questions related to the topic.	The claims, ideas or opinions you make are, to some extent, related to the topic and to questions related to the topic.	Your claims, ideas or opinions are consistently related to the topic and to questions related to the topic.	
(3) Corroborated claims, ideas or opinions	You do not elaborate on your claims, ideas or opinions and they are not supported through reference to the learning materials.	Your claims, ideas or opinions are, to some extent, elaborated on; they are also, to some degree, supported through reference to the learning materials.	Your claims, ideas or opinions are elaborated on in detail; they are also supported through reference to the learning materials.	
(4) Substantive contributions	You do not acknowledge/ respond to fellow students' posts.	To some extent, you acknowledge/ respond to fellow students' posts.	You acknowledge/ respond to fellow students' posts in detail.	
(5) Quality of writing	You do not use formal language and your contributions reflect many language and spelling errors.	To some extent, you use formal language and your contributions do not reflect many language and spelling errors.	You use formal language and your contributions reflect few, if any, language and spelling errors.	

Asynchronous online discussions and the construction of knowledge

Research on knowledge construction in online educational settings is proliferating at an impressive rate, and over the past five years, numerous researchers have offered thought-provoking insights into how asynchronous computer-mediated communication (CMC) may be exploited to promote productive online interaction. Of significance to instructional designers is that these researchers' findings either hint at or explicitly highlight the potential pitfalls of AODs that do not follow certain instructional design principles.

A number of studies have attempted to determine how instructor or student facilitation affects students' interactions during AODs, and one such study is that of An, Shin and Lim (2009). Employing analysis of variance, content analysis, and social network analysis to make sense of online postings, An et al. (2009) evaluated three instructor intervention approaches and their impact on teacher trainees' online interactions. One surprising finding was that increased instructor intervention may impede students' higher-level knowledge construction. In cases where intervention was kept to a minimum, students expressed reflective and insightful opinions more freely. It appears that over-intervention may inadvertently induce students to reduce their interactions in order to respond to the instructor's comments (An et al. 2009, 758). A more recent study by Nandi et al. (2012) examined the quality of AODs between students and facilitators using a case study method. The results signalled that the quality of students' conferences may depend a great deal on the type of moderation – encouragement, feedback, and direct instructions – which facilitators provide. Utilising the interaction analysis model proposed by Gunawardena, Lowe and Anderson (1997), Hew and Cheung (2011) considered how student facilitators' behaviours may influence students' knowledge construction during online discussions. Four specific sets of behaviours modelled by the student facilitators appeared to promote meaningful dialogue, namely: being aware of their own thinking; demonstrating and expecting accuracy from students; displaying open-mindedness about different viewpoints; and taking or justifying a specific position about a topic (Hew and Cheung 2011, 283).

Some studies of asynchronous interaction have shed light on how project-based learning may advance knowledge construction, notably those conducted by Lang (2010) and Koh, Herring and Hew (2010). Lang (2010) used Gunawardena et al.'s (1997) framework to determine, amongst other things, what kinds of participation notes students engaged in AODs may generate in a project-based learning environment. Students' notes reflected mainly low mental notes in the sense that they compared and shared information rather than questioned one another's ideas to enhance deeper thinking. Lang (2010) speculated that the prevalence of low-level knowledge construction could stem from difficulties with the task, lack of teacher facilitation, and the absence of feedback. Koh et al.'s (2010) discourse-based

study of project-based versus non-project-based learning environments mediated by asynchronous CMC concluded that AODs produced during the former learning environment may reflect more advanced levels of knowledge construction than those generated outside this environment. Koh et al. (2010, 290) ascribed higher-order thinking to creating tasks that guide students from exploring ideas to solving problems, using appropriate functional moves (such as feedback and facilitating discourse), and assigning students 'wicked problems' (Rowe 1987, 391), that is, ill-defined problems lacking straightforward solutions.

Still other studies have compared online and face-to-face discussions. In a mixed methods study, Qui and McDougall (2013) compared the strengths and weaknesses of online small group discourse with that of face-to-face discussions. They discovered that online discussions may be more thoughtful and in-depth than face-to-face ones, and attributed this to small group size (Qui, Hewitt and Brett 2014); avoidance of over-involvement by instructors; the absence of time limits; and the accommodation of shy or marginalised students who may feel uncomfortable conversing in a brick-and-mortar classroom. A study by Comer and Lenaghan (2012, 279) advocates that replacing face-to-face interaction with AODs 'does *not* have to lessen the lesson'. Drawing on Bloom's (1956) taxonomy, the study suggests that meaningful discussions are possible if students' posts reflect so-called Original Examples and Value-Added Comments: the former are comments, questions or requests for advice that reflect the fact that a student has applied course concepts to issues of relevance to him/her, while the latter are analyses of these Original Examples and other Value-Added Comments that advance the discussion (Comer and Lenaghan 2012, 266–267).

Content analysis coding schemes for online discussions

Undoubtedly, studies such as these focus on the different dynamics of online interaction, such as cognitive learning, argumentation, and social knowledge construction. Henri's (1992) model of content analysis was one of the first to assess the cognitive and metacognitive processes of online participants, and a number of researchers (Ke et al. 2011; Chang, Lin and Tsai 2012; Nandi et al. 2012) have exploited this model to make sense of their students' online discussions. Although Henri's (1992) model is one of the most frequently cited and employed by CMC analysts, it was not applied in the current study: the model was designed in the context of teacher-centred instruction and it does not take the co-construction of knowledge within a group into account. The latter flaw in Henri's (1992) model is addressed by the interaction analysis model devised by Gunawardena et al. (1997), who proposed five progressive phases of knowledge construction ranging from sharing and comparing of information to agreement and application of newly generated knowledge. Since it was first proposed, the model has been used by several analysts

including Lang (2010), Hou and Wu (2011), and Yang et al. (2013). However useful the model may be for analysing students' knowledge construction in AODs, it was not considered suitable for this study, since it was developed to assess knowledge building processes in the context of an online debate and does not take cognisance of social interaction moves generated during online discussions (Koh et al. 2010, 287). Another often-cited model is Garrison, Anderson and Archer's (2001) community of inquiry framework which examines not only cognitive presence, but also social and teaching presence. Although it has been utilised by several researchers (Burgess et al. 2010; Koh et al. 2010; Nandi et al. 2012), a criticism levelled at the framework is that it fails to clarify what participants should *do* to generate meaningful discussions: the framework 'encourages one to think about what a successful [online] conference would entail, but it does not adequately account for how to get there or make it happen' (Xin 2012, 5).

It goes without saying that no single model can capture the multifaceted, complex nature of online interaction. Yet, rather than attempting to devise new models to examine AODs, Paulus and Phipps (2008, 462) recommend that researchers use existing models because they build on prior studies. They also suggest that a mixed-methods approach be followed to achieve a better understanding of AODs (Gasiewski et al. 2012, 234). For this reason, and using computer-mediated discourse analysis, which is a sub-type of content analysis (Herring 2010, 238), we employ a coding scheme utilised by Paulus and Phipps (2008) who draw on Booth and Hultén's (2003) taxonomy of contributions to productive online discussions. Their phenomenographic approach 'stands out as an exemplary approach to identifying critical learning moments in online transcripts' (Yang and Goodyear 2006, 922); it provides a multi-layered, albeit category-driven, account of students' discourse, unpacking the functional moves associated with specific language functions such as agreeing, disagreeing, extending claims, and the like. With the exception of participatory contributions, the approach reflects the knowledge-sharing, knowledge-construction, and knowledge-creation discourses identified by Van Aalst (2009).

ANALYTIC FRAMEWORK

Using discourse analysis to examine online discussions generated by engineering students, Booth and Hultén (2003, 79–81) identified four types of contributions regarded as pivotal to meaningful online interaction. Participatory contributions are social in nature, making either direct or indirect reference to discussion group members. Participatory verb types are associated with naming a fellow participant; referring to a participant or contribution made; acknowledging a prior contribution; making a general request; or encouraging responses through positive statements. Factual contributions, which essentially reflect knowledge-sharing discourse, make direct reference to the given topic and reflect speech acts such as stating an

idea; elaborating on a statement; asking a question about content; and answering a content-related question. Learning contributions, on the other hand, are responses to a minimum of two conversational threads that reflect either parallel or opposing points of view, and constitute knowledge-creation discourse. Typical verb types that accompany learning contributions are discerning or refining; however, isolating these verb types must be done by looking at the contributions that precede and follow them (Booth and Hultén 2003, 79–81). Reflective contributions, which encourage knowledge-construction discourse, go beyond referring to given topics to pondering them in a new light, and reflective verbs entail challenging one another, agreeing or disagreeing with a prior contribution, and comparing viewpoints. Table 2 reflects the analytic framework adapted from Paulus and Phipps (2008, 482–483) and Booth and Hultén (2003, 79–81).

Table 2: Coding scheme for productive asynchronous online interaction

Participatory contributions	
Functional move	**Description**
Name	Acknowledges another participant's presence by naming him or her
Greet	Greets a participant
Invite/Mitigate/Joke	Makes a general request for information/Suggests that the idea is not necessarily correct or relevant/Makes a humorous comment
Acknowledge/Encourage	Acknowledges/Encourages a participant by means of a positive statement
Transition/Temporal	Signals the start of a new topic/Guides the discussion to a previous topic
Close	Indicates presence by concluding the conversation
Factual contributions	
Functional move	**Description**
Ask Specific	Asks a question directed at a specific participant
Ask Other	Asks a question in general that is not aimed at a specific participant
Answer Specific	Answers a specific participant's question
Answer Self	Participant answers his or her own question
Claim	Reflects a claim that is not explicitly related to another participant's post
Re-state	Re-states an idea without making direct reference to a prior post
Support/Extend	Corroborates a claim based on experience or by referring to examples and learning materials

Learning contributions	
Functional move	**Description**
Learn	Participant identifies a new idea or reflects on the idea from a new angle
Reflective contributions	
Functional move	**Description**
Challenge/Respond to challenge *Agree 1* *Agree 2* *Disagree 1* *Disagree 2*	Challenges a contribution by asking questions of that contribution Agrees with the given topic Agrees with another participant's post Disagrees with the given topic Disagrees with another participant's post

The unit of analysis

In the literature on asynchronous CMC, the unit of analysis may be a sentence, paragraph, message or thematic unit. Following Paulus and Phipps (2008, 465–466), we unitised students' messages and labelled each unit in terms of functional moves. We argue in favour of the functional move 'to emphasize that the unit is one move in an ongoing conversation that serves a particular function in the discourse' (Paulus and Phipps 2008, 465). Thus, multiple functions are reflected in the message 'I agree with you, Lerato, writing is a skill which needs some nurturing'. First, this message contains a name as well as an acknowledge because the student addresses a peer by name and acknowledges her presence with a positive statement. Second, an agree 2 is reflected in 'I agree with you', since the student concurs with a statement made by 'Lerato' in a prior post (that 'writing is an ongoing process that needs to be [practised] and polished over and over again').

Several CMC researchers have opted for the message as their unit of analysis and labelled these messages in terms of functional moves or speech acts (Paulus and Phipps 2008, 2009; De Wever et al. 2009; Koh et al. 2010; Carr, Schrock and Dauteram 2012). Weltzer-Ward (2011, 70) has identified over 50 content analysis coding schemes for AOD, observing that for many researchers, the message 'is most appropriate for reliable and valid analysis …'.

Research questions

We adopted qualitative and quantitative methods of research with a view to describing students' online interactive behaviours during AODs and exploring disparities between what we believed these behaviours reflected and what the pedagogical aim

of our instructional design was, namely, to foster meaningful interaction. We posed these research questions:

1. What kinds of functional moves were generated during the AODs?
2. How should AOD-based activities be structured if they do not foster productive interaction?

METHODOLOGICAL ORIENTATION

Background and data collection

We focused our research on 53 ALS students studying Education (n = 22), Media Studies (n = 15), Language Practice (n = 4), Integrated Marketing Communication (n = 2), and Human Movement Science (n = 1). The remainder of the students were doing either a general BA degree (n = 3) or Occasional Studies (n = 6). A total of 34 students were female and 19 were male. Most students (33) spoke Afrikaans at home, while eight came from a Sesotho-speaking background. Five were Setswana speakers, three spoke isiZulu, three isiXhosa, and one English. Apart from one student who was in her early 50s, the students were in their 20s or early 30s.

The ALS module comprised computer-assisted language learning and discourse analysis. The former component was presented by one of the authors of this research study, while the latter component was taught by a colleague. The odd combination was necessitated by the fact that the institution was phasing out 8-credit modules in favour of 16-credit modules: specific combinations had to be retained for a year to accommodate students who had failed 8-credit modules in the previous year. The discourse-analytic component called for students to record and transcribe a key scene from a soap opera of their choice and to analyse the dialogue within Wheatley's (1999) discourse-analytic model as well as from the perspective of From (2006), who employed Bakhtin's (1986) concept of speech genre to analyse the conversational patterns of soap operas. Based on Hoey's (1983) Situation-Problem-Solution-Evaluation model, Wheatley's (1999) framework enabled students to identify key features in soap opera scenes such as mini closures and evaluations, while From's (2006) model allowed them to determine how soap opera dialogue reflects the kinds of small talk generated in everyday conversation. The assignment was therefore designed from a constructivist, learner-centred view of learning, the aim being to encourage students to critically engage with the content of the module (Weimer 2013, 24).

The presenter of the computer-assisted language learning component structured four activities around Blackboard's discussion and chat forums over a 4-week period, but it is the online postings that originated from the first activity that are the focus of the study. The presenter wanted to create a space in which students could share their

perceptions of academic writing and heighten their awareness of the writing process in preparation for the soap opera assignment. Even though the students were at third-year level, the majority of them still found the task of writing an essay daunting. As one student observed:

> Sometimes I feel that the fruit of my [labour] is a juicy peach and other times I feel that it is a [shrivelled] up potato. Meaning? I have mixed feelings about academic writing. I feel that I write from the heart, but I cannot do it in [an] academic way.

It should be noted that shortly before the discussions, the students attended an orientation session in a computer laboratory during which they were provided with an overview of Blackboard's discussion board. Current research findings on so-called digital natives suggest that young students may not necessarily be digitally literate and they may also not be as functionally proficient in the use of technology as educators assume them to be (Margaryan, Littlejohn and Vojt 2011; Masterman and Shuyska 2012).

Method

Applying purposive sampling (Flick 2014, 175) in order to explore the instructional design flaws around a specific AOD, we electronically logged 55 contributions generated by the students in response to the activity, with the coders identifying an average of 427 functional moves in the data set. Analysing a larger sample was not possible in light of the fact that the study was conducted in a naturalistic higher education setting in which only 53 students contributed to the discussion and given that five registered students did not participate at all. Our preliminary findings will have 'to be tested again in the next encounter and again in the encounter after that' (Guba 1978, 70). We would like to add, in the words of O'Reilly and Parker (2012, 195), that 'the adequacy of the sample … is not determined solely on the basis of the number of participants, but the appropriateness of the data'. We were interested in the incongruities between our instructional design and the kinds of contributions produced by students in *this* forum and not in subsequent discussion forums. (Following the first discussion forum, 47 of the students participated in a second discussion forum, focusing on the pre-writing and planning phases of the assignment on soap opera discourse. Since the discussion reflected mainly logistical or procedural moves, it was not included in our sample.[1] Functional moves generated in the two chat forums were also disregarded, since our focus was not on synchronous CMC.)

All the data collected was scrubbed in that information that could identify a particular student was removed. Thus, students are referred to by their initials, and any names used have been changed. Direct quotes cannot be traced to any one student because the logs are unsearchable, having been deleted from Blackboard.

We imported the archived contributions to NVivo 10 and created nodes for the contributions identified in Booth and Hultén's (2003, 79−81) taxonomy and expanded on by Paulus and Phipps (2008, 482–483). Next, each student's functional move was coded and counted according to the coding scheme, and categories were refined or added. Since one researcher lives on another continent, we communicated via Skype or email to compare our findings as well as to undercover and resolve any disagreements.

While NVivo facilitates both coding and analysis of qualitative data, it 'cannot turn sloppy work into sound interpretations, nor compensate for limited interpretive capacity by the researcher' (Bazeley and Jackson 2013, 3). Thus, we coded the messages independently and created memos in NVivo to record our observations for later comparison. These observations of students' online messages are rich as well as detailed, and therefore constitute 'thick description' (Geertz 1973, 26–27; Lincoln and Guba 1985, 125). Dense, meticulous descriptions compel researchers to immerse themselves in their data in order to enhance their understanding of that data and to generate insightful interpretations that transcend lists of codes (Polit and Beck 2010, 1456; Packer 2011, 219). They also enable other analysts to decide if they concur with a researcher's interpretations of particular phenomena. Importantly, thick description allows for 'disclosure of the study's challenges and unexpected twists and turns …' (Tracy 2010, 842). In this regard, and as the memo in Figure 1 suggests, the one researcher experienced some difficulties in coding certain functional moves, sharing her doubts in the form of a question to be addressed during subsequent meetings with her co-author.

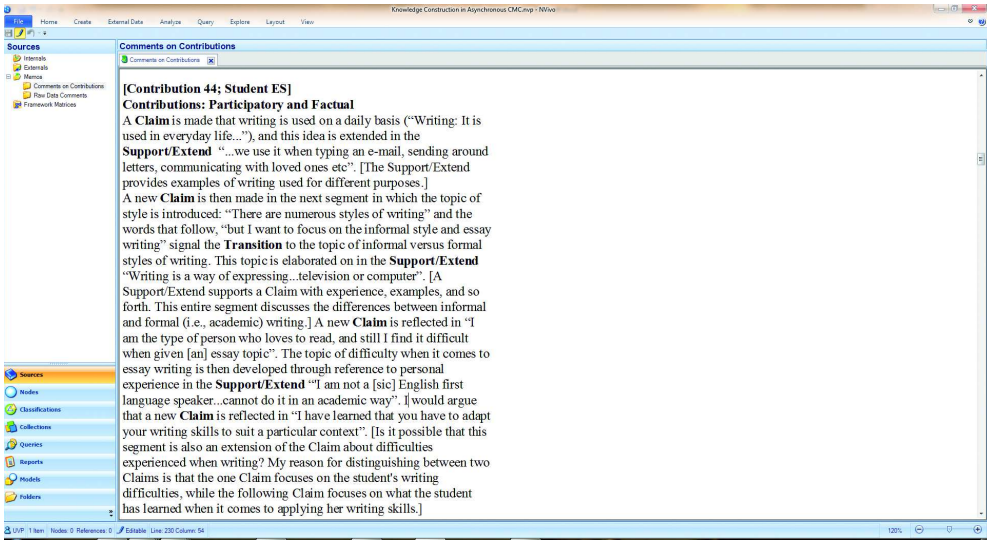

Figure 1: A thick description of a student's online message using the memo in NVivo 10

Our NVivo 10 coding results differed in two respects: frequency of moves coded and distribution of factual moves. Coder A, and second author, interpreted the model as a clause-level analytical tool which allowed multiple codings of clauses so that each clause could be coded either once or for as many categories and moves as relevant in the context. Coder A deemed the model to be limited in the sense that all 53 learner contributions could be viewed from a conversation-analytic perspective (Schegloff 2007) as relevant second pair-parts following a teacher-designed and teacher-initiated task. Following Ellis (2012), who points out that the design features of pedagogical tasks and task types have a fundamental impact on learners' meaning-making and interactive exchanges, the second author felt that this argument was relevant here too, reinforcing one of the key findings, namely, that we should interrogate task design for AODs.

As coders, we reflected on the differences in the coding distributions within factual contributions, agreeing that the coding process for distinguishing *re-states* from *claims* and *supports/extends* should remain on our agenda for further analysis. We nonetheless concurred that these differences did not invalidate the general trend in our codings. Following Torbert's (2004) approach in action inquiry, we concluded that coding should be a process in which multiple coders are used so that shared, co-constructed and intersubjective interpretations could be developed. In our case, Coder A performed an independent analysis to cross-validate Coder B's (the first author's) codings. The differences in the codings for the two raters represent an agenda for reflecting not only on the analytical model, but also on the student discourse and how teacher-designed learning spaces and tasks provide the framework for student participation and knowledge construction. Our reflections prompted us to consider other research methods in future research, especially Charmaz (2003), whose constructivist grounded theory might yield findings and a data-specific new model co-constructed by the coders.

To support our findings, we computed an interrater reliability coefficient for the coding categories at the level of contributions, following Hatch and Lazaraton (1991, 533–534, 606).

FINDINGS

In reporting the findings, we commence with the coding data in tables 3 and 4. In Table 3, we report the raw coding data (expressed as totals and %), while in Table 4, we outline the codings expressed as a percent for the two sets of codings, as well as standard deviations and means for the functional moves. We then proceed to qualitative analyses of the actual coded data to argue our case.

Table 3: Frequency of categories in coding data sets for the two coders (Raw coding data, sub-totals and percentages)

Functional categories	Moves	Coder A	Coder B
Participatory	Name	3	3
	Greet	0	1
	Invite/Mitigate/Joke	0	0
	Acknowledge/Encourage	5	3
	Close	1	1
	Transition/Temporal	2	4
	Sub-total and percentage	**[11] (2.22%)**	**[12] (3.35%)**
Factual	Claim	87	177
	Re-state	8	16
	Support/Extend	349	139
	Ask Ask Specific Ask Other	 0 3	 0 4
	Answer Answer Specific Answer Self	 0 0	 0 1
	Sub-total and percentage	**[447] (90.12%)**	**[337] (94.14%)**
Learning	Learn	**0 [0] (0 %)**	**0 [0]**
Reflective	Challenge	0	0
	Respond to challenge	0	0
	Agree Agree 1 Agree 2	 15 18	 3 5
	Disagree Disagree 1 Disagree 2	 0 5	 0 1
	Sub-total and percentage	**[38] (7.66%)**	**[9] (2.51%)**
Total no. of codings		496 (100%)	358 (100%)

As stated earlier, we calculated an interrater reliability coefficient for the coding category data at the level of functional moves. The results are reported in Table 4.

Table 4: Codings expressed as a percentage for the two coders, as well as the means and standard deviations for the two coding sets

Contributions (%)	Coder A	Coder B	Standard deviation	Means
Participatory	2.22	3.35	0.80	2.785
Factual	90.12	94.14	2.84	92.13
Learning	0	0	0	0
Reflective	7.66	2.51	3.64	5.085

Following Hatch and Lazaraton (1991, 533–534, 606), we calculated a correlation for the coding percentages for Coder A and Coder B. We then used the Fisher Z transformation table to find the corrected value (2.647) which we substituted into the equation. The value calculated (1.451) was again converted to yield an interrater reliability coefficient of 0.89. Next, we proceed to the qualitative interpretation of the findings.

Based on our qualitative analyses, students essentially engaged in sharing existing knowledge rather than in co-construction of knowledge, primarily generating factual contributions which, in descending order of frequency, reflected claims, supports/extends, re-states, asks, and answers. Supports and extends were not substantiated by reference to either the *Unilearning* links or other learning materials. As far as the functional moves of asking and answering were concerned, students did not pose questions to anyone in particular and they also did not answer questions asked. With regard to reflective contributions, there were a few instances in which students agreed either with the general statement about students being ambivalent about the writing process or with specific claims made by their peers in previous posts. Where students did not concur with one another, disagreements did not evolve into challenging previous posts through, for instance, pertinent questions that could have resulted in a counter-argument. Moves that reflected participatory contributions were limited to four transitional/temporal moves, three names, one greeting, one closing, and five acknowledgements/encouragements. Neither joking nor invitations to provide additional information were reflected in the data, while mitigation of statements made did not materialise. Examples of the kinds of moves we coded are provided in Table 5.

Table 5: The kinds of contributions generated by students during the AOD

Participatory contributions	
Move	**Examples**
Name	'I agree with you, Lerato …'
Greet	'Hi Sipho'
Acknowledge/Encourage	'I think that you have a brilliant manner of delivery Clair ...'
Transition/Temporal	'As a final point (albeit extending beyond the specified two paragraphs) ...'
Close	'Hope it helps! – Thanks!'
Factual contributions	
Move	**Examples**
Claim	'Writing requires an extensive passion and knowledge of the world around us'
Re-state	'... but as I said, writing alone is just not enough' (Re-statement of a previous claim)
Support/Extend	'... because if the right foundation is not laid when students get to tertiary level or even high school level the requirements and standard of writing maybe too high for them to meet ...'
Ask Other	'... so why spend so much time and effort acquiring the skill?'
Answer Self	'It almost goes without saying' (in answer to 'Don't you agree that the things we all want to finish as soon as possible without making 'too much of a sacrifice', is usually the things we don't enjoy')
Reflective contributions	
Move	**Examples**
Agree 1	'I agree that many students are ambivalent or even negative about the writing process'
Agree 2	'I agree with you, Lerato, writing is a skill which needs some nurturing ...'
Disagree 2	'I am a bit critical of your piece and though I grasp some of the thoughts you may have on writing, I am battling to find the direction of your contribution'

DISCUSSION

At the outset, we indicated that we initially expected that setting up a discussion topic or prompt and identifying specific learning outcomes and related assessment criteria would encourage not only knowledge sharing, but also knowledge construction among our students. While these elements may be helpful in shaping student engagement, they do not necessarily guarantee a high level of critical engagement.

Our analyses signalled that students' discussions remained embedded in knowledge sharing (factual contributions), while there was little evidence of knowledge construction (reflective contributions). The analyses also signalled that participatory contributions were minimal and that participation revealed little collaborative effort.

Productive online discussion should not reflect only certain kinds of contributions: 'all types of contributions are needed and have value' (Paulus and Phipps 2008, 476). We now realise that participatory contributions are a key aspect of AODs, since they not only establish social cohesion, but also shape cognitive presence or collaborative enquiry (Garrison, Cleveland-Innes and Fung 2010; Shea and Bidjerano 2010). Participatory contributions also partly compensate for a significant weakness of text-based CMC – the absence of cues such as voice intonation, facial expressions, and body language present in face-to-face interaction. A text-based AOD environment that reflects a paucity of participatory contributions, such as ours did, constitutes a space in which students are forced to post their contributions in a temporal and spatial vacuum. As indicated at the beginning of the article, having only recently begun making use of CMC tools, we had assumed that based on the requirements reflected in the assessment rubric, students would jointly construct meanings in AODs just as they did in traditional classroom settings. We had not appreciated the weight that should be accorded to social interaction which is in keeping with Vygotsky's (1978) notion of socially significant interactions between individuals as necessary for internalising learning.

Prior to the discussion of a topic, we suggest that participants be encouraged to engage in social talk to break the ice, as it were, and establish social rapport which should also inform subsequent discussions. There is little research on rapport building (Ädel 2011, 2934), but the few studies that have been carried out suggest that it fosters positive relationships; establishes solidarity; and helps students accomplish their instructional tasks (Nguyen 2007, 298). Although Sung and Mayer (2012, 1745) caution that their recommendations need to be tested rigorously, they offer additional instructional design strategies that may promote social presence in AODs. To overcome lack of connectedness, Sung and Mayer (2012, 1746) suggest 'awakening the learner's identity', encouraging students to identify themselves and explicitly address one another. Another recommendation entails fostering respect for one another's posts, a strategy which reminds students that their questions and ideas are of sufficient value to be recognised and appreciated by others (Sung and Mayer 2012, 1745). Coupled to this strategy is the importance of creating a space in which participants not only keep an open mind about divergent points of view – one of the habits of mind we have seen Hew and Cheung (2001) refer to – but also

respond to one another's posts in constructive ways (Sung and Mayer 2012, 1745). Yet another design consideration relates to group size. In our setting, the students were not divided into groups, but research suggests that small group size results in higher levels of social presence which may, in turn, lead to improved levels of knowledge construction (Qui, Hewitt and Brett 2014). Although the students were provided with the assessment criteria illustrated in Table 1, they were not explicit enough to help students generate participatory contributions.

Just as participatory contributions are an essential part of productive online discussion, so too are factual contributions/knowledge-sharing discourse. Van Aalst (2009, 262, 279) notes that although knowledge sharing does not promote higher-level learning as knowledge construction and knowledge creation do, it nevertheless has it uses: it establishes close relationships; increases willingness to share information; and facilitates knowledge acquisition (Ma and Yuen 2011, 212–213). While our data showed many instances of factual contributions, carefully considered peer questions and answers were missing. Students did not specifically refer to their classmates' claims or ideas and their own claims were not necessarily substantiated by reference to the learning materials. Similarly, with regard to reflective contributions, while there were instances of students acknowledging other contributions, such acknowledgement was superficial, since students did not unpack or actively contest fellow students' contributions. Agreements were not substantiated, while disagreements about viewpoints did not progress to challenging them. In addition, these two moves reflected mainly personal opinions uncorroborated by reference to prior posts or the *Unilearning* website. Students need to be taught how to support their claims without relying solely on personal opinions or experience, and in this regard, Pawan et al. (2003, 134) advise instructors to take part in the discussion in such a way that they not only extend, clarify or challenge messages, but also make use of outside references, thus providing a model for students to follow. In fact, teaching presence is critical to the construction and development of cognitive engagement (Darabi et al. 2011, 216).

An additional design consideration has to do with role definitions, and in this regard, it may be worthwhile to explicitly teach students discussion strategies, modelling contributions that students can emulate (Garrison and Cleveland-Innes 2005, 145; Gao et al. 2009, 74) as illustrated in Table 6. The sample extracts provided are from first-year Literature students' discussions of *Macbeth* generated during AODs structured on the basis of the lessons learned from the current study.

Table 6: A model for explicit instruction of discussion strategies (adapted from Gao et al.'s (2009, 70–72) productive online discussion model and Paulus and Phipps' (2008, 482–483) adaptation of Booth and Hultén's (2003, 79–81) taxonomy of contributions)

Participatory contributions: establish social presence and acknowledge others	
Actions/Verb types	**Sample extracts**
Name yourself and **address** others by name	'My name is Angela' 'Thank you Barbara'
Greet fellow participants to announce your presence	'Hi everyone!'
Invite a participant to join the conversation, **mitigate** (soften) an action or **joke** to claim common ground/express collegiality/mitigate an action	'If anyone wants to add, agree or disagree – let us hear it' 'Sorry Michelle, for taking so long to respond' 'Better late than never' [A humorous comment is made by a latecomer to his discussion board group.]
Acknowledge or **encourage** a participant through a positive response	'I [a]pplaud Sipho MOTSAI for the opinion…'
Use **transitions** or **temporals** to indicate the start of a new topic or to guide the conversation back to a previous topic	'In addition, if we look at the last part of scene 4…'
Use a **close** to end the conversation	'got to love and leave for class. Later: -)'
Factual contributions: share and compare views through substantive contributions	
Actions/Verb types	**Sample extracts**
Make **claims**	'While Macbeth struggles with his conscience at the beginning (1.7.13) and shows that he is human, I think that one has to possess a certain level of ruthlessness to carry out multiple murders ...'
Re-state an idea without referring to a previous post	'Things get worse for him as he continues to strive for his desires ...' [The participant re-iterates a claim made that Macbeth's circumstances deteriorate after he has committed murder.]
Support or **extend** your claim by referring to personal experience, class notes, texts, amongst other things	'And throughout her soliloquies in Act 1, scenes 5 and 7, she shows that her main concern is with the throne ...'
Ask (a participant) a question	'Hey Kevin, just out of [curiosity] do you really think that Macbeth is a coward ...?'
Answer a question and substantiate the answer	'In reply to your Lady Macbeth question, I do think she has good in her, after all everyone does, I do believe though that every person has the same amount of good as evil, vice versa, within them and their character [develops] with the side they choose to nurture ...'

Learning contributions: synthesise knowledge and draw conclusions	
Actions/Verb types	**Sample extracts**
Generate a new idea or regard an idea from a new angle/Synthesise knowledge or draw conclusions by **discerning** or **refining** ideas	'I am aware that all of us agree that Macbeth had a choice and we all seem to agree that he was not necessarily evil but it so happened that the witches chose him. The question still remains that will Macbeth have become King if he hadn't killed anyone ...'
Reflective contributions: agree/disagree with or challenge others' views in a sensitive manner and through substantive contributions	
Actions/Verb types	**Sample extracts**
Challenge a post, asking probing questions or making a claim	'Again, however, you should realise that humans are made in such a way that there is both good and evil within them ...'
Agree with a post and substantiate your agreement	I am going to agree with you on one condition when you say 'Macbeth wanted to be King even before the witches approached him, it was always lingering at the back of his mind'. Macbeth in 1/3/127 believes what he has been told ...'
Disagree with a post and substantiate this disagreement	'Although external forces may contribute to your reaction and adaptation to certain circumstances, they do not necessarily change who a person is. Change within a person and their character is an internal decision and thus only the individual who is making the changes in themselves can take responsibility for it. An example of this can be Act 5 Scene 5 ...'

A model that explicitly teaches discussion strategies may help prevent a problem that may occur when instructors assume that students know what is meant by certain words or phrases embedded in their instructions and/or assessment rubrics. For example, one of our assessment criteria reminds students that their discourse needs to reflect 'substantive collaboration' and this is defined as acknowledging/ responding to fellow students' posts. However, this is clearly not sufficient to help students respond appropriately to one another – taking a critical-reflective stance for knowledge construction purposes. Do all students necessarily know that substantive contributions entail, amongst other actions, challenging one another or asking for explanations of claims made? Has the instructor helped them to understand that simply posting an 'I agree/disagree' is non-substantive (Monroe 2003, 33) and halts meaningful interaction?

CONCLUSIONS

Based on the findings and after reflecting on our assumptions about what CMC tools could accomplish, we questioned the design features of our AODs. As instructors accustomed to social, teaching and cognitive presence in face-to-face classes, we did not anticipate that we would have to spend a great deal of time laying the foundation for these essential elements in our AODs. Social presence supports interaction and cohesion, and so it cannot be ignored in online pedagogy (Shea and Bidjerano 2010, 1722). Teaching presence, in the sense of not only choosing learning content and setting up activities, but also managing and facilitating productive discussion, is also required (Garrison et al. 2010, 32). Without these components, cognitive presence cannot be established (Pelz 2010, 114). The instructor's design of the learning task has a significant impact on learners' performance of the task.

We now know that it is essential to begin any task design with a coherent framework, such as that proposed by Booth and Hultén (2003), one that explicitly conceptualises what meaningful online discussions should entail so that higher-order learning outcomes are indeed achieved (Gao et al. 2009, 66).

The crux of the matter is that educators interested in promoting higher-order thinking skills 'need to be deliberate about their use of a discussion board' (Comer and Lenaghan 2012, 4), specifying the roles and contributions of the participants. In order to have students move beyond mere knowledge telling, discussion activities should indeed be structured around explicit, well-structured prompts (Zydney, deNoyelles and Seo 2012, 78) and assessment criteria (Jackson 2010, 455). However, clear instructions and assessment rubrics are, by themselves, insufficient to elicit critical-reflective comments among students. Detailed instructions may shape engagement among students (Okech et al. 2014, 125), but do not guarantee cognitive engagement. Similarly, as Jackson (2010, 456) observes, assessment criteria may help to shape students' contributions to an online discussion, but 'the bedrock is sound task design'.

The analytic model employed in the study allows us to conclude that the largely absent statement-agree-disagree, ask-answer, and statement-extend/clarify sequences could be resolved by revising the task requirements and developing learner strategies for producing such discourse. In future, we will need to determine if, by changing the task requirements and specifying the roles and contributions of the participants, we would obtain discursive data to show that the task design can be used to predict, shape, and elicit discursive contributions that are consistent with pre-activity objectives.

Educational technology is a tool whose function in the educational enterprise should be clearly specified – it remains a tool in the hands of the educator whose task designs, theories of learning and teaching, and role perceptions, for instance, will dictate how it is employed.

We have already begun integrating some of the design considerations discussed into our current AODs with a view to critically reflecting on whether or not they show increased levels of productive discussion. This was what Coder A sensed in labelling the 53 learner contributions as specific answers or responses to the teacher-designed task. We plan to collect and examine much larger samples of asynchronous talk in order to establish generalisability. In addition, it is our intention to conduct interviews with students in order to gain additional insights into the use of AODs to foster productive discussion as well as to determine how students view CMC tools as they might 'see' them in ways that we as instructors do not (Seidman 2012, 13).

NOTE

1. The times at which collection of online discussions takes place may result in inaccuracies in terms of the number of posts analysed: in a previous study, the first and second discussion forum archives were downloaded shortly after the deadlines, and reflected 47 and 43 students, respectively. A Blackboard administrator later restored the archives on request of one of the researchers, and the first and second forums reflected 53 and 47 students, respectively. It appears that students generated contributions some weeks after the deadlines.

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