An Evaluation of Formal and Underlying Factors Influencing Student Participation within E-Learning Web Discussion Forums

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ABSTRACT
This paper examines factors that may influence student participation within e-learning web discussion forums. The existing literature suggests that there are several factors, but the author suggests that they have missed a crucial underlying element; the constructivist nature of the forums themselves. The paper through analysis of a small scale empirical project examines how factors such as psychology, lack of social cues and the timescales required may all influence participation, but that the constructivist nature itself may assist or hinder students at different times in their development. Also the paper gives suggestions on how participation may be advanced.

Keywords
Computer-mediated communication; cooperative/collaborative learning; interactive learning environments; teaching/learning strategies

INTRODUCTION
An area noted within the Dearing Report (1997) was the potential opportunities that Information and Communication Technologies (ICT) to encourage learning. One suggested mechanism within e-learning is that of Computer Mediated Communication (CMC) (Oh, 2003). The utilisation of a CMC mechanism within HE is not new, but does represent a significant area to allow further learning and student support (MacDonald, 2003). Email is often used as a problem diagnosing system between students or with their tutors, and additional mediums such as web discussion boards (WDB) exist (Selwyn & Gorard, 2003). Externally to HE, WDBs are a common form of discussion forum used on the internet to exchange ideas between members. Within HE, these mechanisms are utilised as a form of Computer Supported Collaborative Learning Environment (CSCL) (Dalgrano, 2001) for various courses at post- and undergraduate level, and within full, part-time and distance learning alike. While WDBs are successful within the external environment, WDBs use within HE has had limited success (MacDonald, 2003). A common grievance within the literature (Hughes et al, 2002), and from colleagues utilising such systems, is that student participation can be very limited, even when WDB interactions are tied to summative assessment.

Existing research on the area suggests various factors that influence student participation, including technological imperatives, social and psychological factors. One article that draws the area together quite well is Hughes et al (2002), but this only reviews the existing literature and does not utilise their own empirical research. It is asserted within this conference paper that the significant proportion of the existing literature fails to recognise the key underlying epistemological assumptions of learning within CMC and WDBs which may significantly influence student participation. The aim within this research paper is to evaluate formal factors influencing student participation within WDBs, and secondly the underlying philosophical and epistemological influences.

PHILOSOPHICAL APPROACHES TO STUDENT LEARNING
The pedagogical perspective has been dominant within the traditional methods of teaching and learning within HE (Jonnassen, 1991). A pedagogical approach assumes learners have a dependent personality, relying on instructors' knowledge. Knowledge is disseminated unilaterally from tutor to student. Learners, in turn, 'are expected to accept the information as disseminated, "learning" the material and delivering it back to the instructor in the same manner it was presented to them' (Gibbons & Wentworth, 2001, p. 2). Within pedagogy, education is subject centred and students' past experience is often ignored rather than used as a resource. Conversely, andragogy is based on self-directed learning and facilitates adult learning (Gibbons & Wentworth,

2001). Within an andragogical perspective, teaching and learning is problem or task orientated, based on requirements rather than a core prescribed curriculum. Andragogy is based on an experiential model that is 'learner-centred rather than instructor-centred, dialogue-based rather than lecture based' (Gibbons & Wentworth, 2001, p. 2), and utilises students' past experience as a valuable resource from which peers can learn. This represents a shift towards a more constructivist approach within CSCL and WDBs (Dalgrano, 2001). CMC and WDBs relate to Koschmann's (1996) fourth paradigm in the history of educational technology, Computer Supported Collaborative Learning (CSCL), which Koschmann argues is built upon social constructivist and socio-cultural perspectives of learning.

The underlying ontological and epistemological viewpoints of these different models of learning are objectivist and constructivist respectively (Moallem, 2001). The objectivist approach has an ontology closer to that of realism, i.e. reality exists independent of individuals, and an epistemology closer to positivism in that there can be a single measurable "truth" within knowledge. The constructivist approach follows ontology much closer to relativism and an epistemology of interpretivism, i.e. each individual interprets reality differently based on their own experiences. Hence, each individual develops their own understanding and interpretation of knowledge (Jonnassen, 1991). Within education, objectivism focuses on measurable performance objectives and programmed instruction, and follows a series of monitored stages that are intended to guide the instruction and evaluation of participants. It is characterised within the learning objective approach prevalent within HE (Gibbons & Wentworth, 2001). Corresponding to pedagogy, objectivism emphasizes passing knowledge from the tutor to the student, which may promote passive learning. Constructivism, however, focuses on learners with a goal of students developing meaning from experience through information-rich and socially meaningful learning environments (*ibid*).

Dalgrano (2001) gives an interpretation of the constructivist background of CSCL and suggests the constructivist approach is based upon three principles. Firstly, each person constructs their own view of knowledge. Secondly, learning occurs where learners find a mismatch between their knowledge and experience. Finally, learning develops through social interaction between learners and their peers (Vygotsky, 1978, cited in Dalgrano). The key to the CSCL, and the utilisation of WDBs within HE relates to the final two principles. Vygotsky's (1962) conception that all higher mental processes take place between people before they are internalised is congruent with constructivist views of learning. The social aspects of learning and intellectual development are highlighted, and learning is understood as 'a process of social negotiation or collaborative sense making, mentoring and joint knowledge construction' (Zhu, 1998, p. 234). CSCL focuses on providing tools for interactive processes where learners engage with peers, their tutor, mentor and/or experts in the field (Macdonald, 2003). Electronic conferences/discussions where text is the communication medium can be *synchronous*, i.e. students discuss issues in real time, e.g. using 'chat' functions, or *asynchronous*, where students may read and write their responses when it is most convenient for them, usually seen within WDBs. This latter reflects the value placed by constructivist instructional developers place upon collaboration, learner autonomy, reflectivity and active engagement. The asynchronous nature of WDBs corresponds to the reflective higher skills that Vygotsky's (1962) work suggests is apparent within constructivist approaches. In other words, the reflective time and asynchronous interaction may benefit learners to critically evaluate their peers' statements, internalise knowledge and develop deeper learning.

Ironically, it is these asynchronous WDBs that seem to have the greatest problems in developing student participation. Hence, because of the potential WDBs may bring to developing deeper learning, it is important to examine why student participation can be such an elusive goal.

FACTORS INFLUENCING PARTICIPATION

Within the literature, there is a wide ranging suggestion of what factors may effect a given student's participation within a WDB. These fall into two main streams; technological and social/psychological. Earlier studies have tended to reflect a more technological stance. Ge, et al (2000) suggest citing poor interface design as a possible cause, or that technological skill levels may also be a factor, as students with poor skills will feel hindered. Those with better technology skills and greater familiarity with ICT will develop and participate to a greater degree. Among group members, these differing skill levels may hamper collaboration efforts since those students with the greatest skills may quickly move the discussion into topics of their interest, dominating the WDB compared to lower skilled students. Thus, feelings of anxiety, confusion, and disorganization may appear, and drastically reducing interaction within the WDB. Poor connection speeds and technological glitches or failures may also be a factor, although this is less likely as the technology matures.

Generally, most of the literature has shifted away from purely technological reasons, towards the social and psychological. The work of Hughes, et al (2002) presents a useful review of this social and psychological

literature, drawing on the work of several authors in the subject area. While Hughes, et al have not undertaken empirical research themselves, they do give a significant categorisation of current literature. Hughes et al (2002) argue the literature suggests that for on-line collaboration participants must: see the value of expending the (considerable) effort required to undertake discussion; be comfortable with and trust the medium; be comfortable with and trust their instructor (or facilitator/e-moderator) and their fellow collaborators; and feel that they are immersed in a rich, engaging, and rewarding social experience. Their first point reflects the work of authors such as Jones and Martinez (2001), who argue that students who choose to take WDB based courses are often regarded as more self-directed and learning orientated that the general student population. They also argue that there must be a direct relevance to students' own learning objectives presented within the online discussion forum. Typically students who do not see the relevance tend to fail to develop a style of learning congruent with the medium.

The development of trust is seen as an important factor. Firstly, there should be trust in the technology, relating to earlier arguments. Importantly, there must also be trust between the students and their peers and also between the instructor and the student. Wegerif (1998, p. 34) argues that failures in such courses develop where students are not able to 'cross the threshold from feeling like outsiders to feeling like insiders.' To enable full student participation, the instructor must develop an environment that is 'democratic, respectful, open to challenges, prepared to give grounds for statements and seeking critically grounded consensus' (p. 48). Without it participants may become anxious, self-protective, cynical and unenthusiastic to collaborate. Indeed, instructor interventions reflect an important factor on the work of Rogers (2000). Rogers argues that students require frequent feedback on their postings, due to a lack of confidence regarding their own ideas and arguments, yet at the same time allow them to discuss the issues important to them. This reflects a need to have learner-centred environments rather than instructor-centred. Instructors should only act as facilitators, only offering guidance where major difficulties occur.

Hughes, et al (2002) also suggest social interaction problems are another important factor. Since the medium is text based with few graphics, students' abilities to pick up social cues that exist in non-virtual communication is reduced. Fisher, et al (2000) suggest students commented on a lack of face-to-face cues that exist even in telephone conversations as the forums are devoid of facial expressions, speech or tone of voice, inhibiting collaboration where students misinterpret the conversation they are viewing. While the use of emoticons may help facilitate some cues, they argue that these mechanisms can still be confusing.

The majority of the above factors represent social or psychological factors. While these are no doubt important, the underlying principle of the constructivist approach is rather taken for granted. The concern within this paper is that this may be an important omission, which is significantly with student participation within these WDBs. The development of empirical research to investigate this potential omission from the literature is therefore important.

METHODOLOGY

The research was designed to examine students reflections of utilising WDBs in order to answer these questions. Reflecting the constructivist nature of the topic area, a more interpretivist stance is taken, as factors may vary between students because of their differing viewpoints, learning styles and methods of constructing knowledge. The three sets of respondents within the Nottingham Trent University/Nottingham Business School were included; the MSc in Strategic Human Resource Management (SHRM) 2002-3 cohort who had directed tasks within a WDB, the 2002-3 PGCHE cohort, where it was supplemental, and finally the Teaching and Learning Online (TALO) 2003-4 cohort run within NBS. TALO is a course run for academic staff who wish to develop skills and understanding in utilising online environments within their own modules. Unfortunately access to an undergraduate module that utilised WDBs was not available at the time of the empirical work, although future research would hopefully include such a student cohort, and is a possible limitation. Both the SHRM and PGCHE are postgraduate courses with similar sized cohorts of around 30 students. The TALO cohort provided an interesting sample of academic tutors approximately 15 students; many experiencing WDBs for the first time. The data was collected by two mechanisms. Within the PGCHE and SHRM cohorts, semi-structured interviews of randomly selected students were conducted to collect evidence; six in total. Within TALO, data was obtained through a task for the students to reflect on their own experiences with the discussion forum, including factors that had hindered or encouraged them to post to the WBD. They also were asked to reflect on the constructivist nature of the WDB and suggest whether the different approach to learning may have influenced their participation. The findings between the combined samples tended to reflect similar concerns and produced some interesting results.

Certain limitations of this approach appear. Although all respondents used WDBs, the form these took differed, producing slightly different experiences for different modules. The random selection in the SHRM and PGCHE cohorts may have produced mismatched results, e.g. if these were all poor contributors or all excellent contributors, although this does not seem the case. Within TALO, the group could become self selecting, in that students who were having difficulties posting may not fully participate. However, students did seem to enjoy reflecting on the experience, and did post discussable replies. Also, as the TALO were interested in developing learning online, their reflections could be somewhat biased. The reflections they produced suggested that this was not the case.

DISCUSSION OF FINDINGS

The main factors will be addressed first, and the reflections on the constructivist nature of WDB as a factor will be considered. There were four main areas that the students regarded as the most relevant factors.

Technology is not that important

The respondents of all modules tended to agree that participation within WDBs the technology is not that important. The only elements of dissent were when respondents referred to slow connections which may have hindering typing or following a discussion. One TALO respondent suggested that an interface that she found with the WDB had '*need to put in passwords again and again and again'*, but was quickly advised by peers that there was a facility to store the password in the short term. Generally the technology for the WDBs were regarded as '*simple enough*' (TALO respondent) and '*there is plenty of help to hand*'.

Psychological barriers

The key "psychological" barrier that respondents suggested was the first to post a message, or reply. This corresponds to Wegerif's (1998) arguments as while-ever students feel they are "outsiders", they will not have the confidence to initiate or develop discussions. Many respondents suggested that initially they were nervous about posting and regarded discussion initiators as very '*brave'* (PGCHE respondent) or '*a go-getter*' (SHRM respondent). Many preferred to see how conversations were progressing before involving themselves. Indeed, this was despite the fact contributors were used to using other forms computer mediated communication, such as email:

> '*It has been more difficult than I thought it would be. I frequently communicate by e-mail, both formally and informally, and thought this would help. However, giving my own answers to specific questions in a public forum has seemed very daunting*.' (Regular TALO Participator)

This suggests the student in question did not really recognise in advance the importance placed upon their thoughts within forums, and the fact that postings were on public view was more than a little disconcerting. Linked to this is the need to avoid writing something incorrect or ambiguous, which could make arguments seem silly or undeveloped. This also relates to certain group psychological factors that drove the students to participate, partly because of the expectation of course leaders that they would participate, and also the feeling that '*I would let the group down if I did not contribute*' (SHRM Student). Peer pressure is important and links to Wegerif's (1998) arguments that students ensure they remain an "insider" rather than an "outsider" and is further heightened by those students who met peers face to face; contributors were not faceless text. These students also took a greater control over the forum, rather than those who had the best technological skills, contradicting Ge, et al (2000). A suggestion here is that the tight knit group that formed itself into an "insider" group suggests small groups may help, as participants may '*feel more secure as part of a group that has established its own culture*' (TALO respondent), and are then less conscious about criticism. This reflects Jones and Martinez (2001) arguments regarding a direct relevance for the students of the online discussion forum related to their own learning objectives.

Social cues

Beyond psychological factors, the lack of social cues is another cited factor, supporting Hughes et al's (2002) arguments regarding developing a proper rapport between students (TALO member):

> '*Establishing a form of rapport or relationship online is far trickier than f2f. Not only do participants miss out on any form of cues […], but also our fine-tuning of measured replies cannot kick in easily,*

> *because we cannot measure the reaction to our response easily and adjust the next comment in that light*.'

Although respondents had pictograms, emoticons and abbreviations were used to overcome the lack of cues, most respondents noted that this generated the additional problem of not being perceived objectively, and could be a hindering factor to participation. Fisher, et al (2000) argue that abbreviations may carry different meanings in different subject-specific and cultural contexts and emoticons can be perceived as patronising if taken in the wrong context. Humour was regarded to be a potentially dangerous activity online, as many respondents believed that they had misinterpreted the intended response and potentially damaged group dynamics. This was important when dealing with one international participant who kept being upset by misinterpreting responses. Even British nationals had problems working out abbreviations. One student took two days to identify that "f2f" was an abbreviation for face to face, yet could not believe how obvious it was once she had recognised it. There were positive aspects of the lacking social cues in CMC despite these negative aspects. Many respondents thought that using WDBs may have liberating and democratising qualities which allow students to take control of the learning situation away from tutor-led learning. This they felt would actively encourage them to participate in the future.

Time

One multi-facetted factor for participation was time, appearing on several levels. Unanimously cited by all respondents, this area was not addressed in the literature to any real degree. Physical writing time was often, since most respondents believed it took them '*at least five times as long as speech*' (Low activity TALO member) to put write their point on the WDB. Abbreviations may have helped speed physical typing time, but the expended time attempting to understand or explain abbreviations meant that sometimes '*it was not worth the effort*' (regular TALO participator). This was a real problem for some to contribute, particularly when busy at work.

The lack of synchronicity between messages and replies was often cites as a common factor as students were frequently desperate to get some sort of response. The time lag exacerbated the problem since all respondents suggested that they were frequently nervous about what sort of response they would get from their peers. Indeed:

> '*I find that looking in and seeing how many times a posting has been read without any response at all much more daunting than thought of someone disagreeing with me, or […] it not being read at all. In face to face communication you would at least get a facial expression of some sort*.' (Top TALO Participator)

This suggests another factor. The time needed to reflect upon a post and give a "good" response, because of the psychological factor of their response being on view (noted earlier), was often quite a long time. The reflection time was seen as both a hindrance, and a pro-participation factor. This was because students knew they would have to wait a while for a response, which was de-motivating, but they generally got a very good response to read.

Scheduling

A final factor which is related to timing is that of the problem of no official scheduling, as almost all respondents suggested finding the time within their busy schedules to respond was quite difficult. Those courses that directly required participation within the schedule achieved better contribution levels. The PGCHE course which utilised a WDB as a supplementary support function had little participation. One PGCHE member suggested that '*between work, marking, home life, writing assignments and that small issue of doing my half finished PhD, I don't have time for writing things on the forum that really won't do me any good*.' This again tends to support Jones and Martinez's (2001) arguments and contradicts Huang (2002), p28:

> "Adult Learners can arrange their learning around their everyday lives without being constrained by time and place. Moreover, online learning allows learners to take courses not available on campus resulting in cost effective learning environments, and utilizes some appropriate delivery and instruction methods."

Arguably removing the constraints has made it more difficult for some students participate, particularly when they can postpone posting. If students had to commit to attendance at a specific time and place, the work for this course would at those times assume a priority, but this may affect the constructivist nature of the forum.

CONSTRUCTIVISM AS A PARTICIPATION FACTOR

Within this research we have seen a number of factors that have acted as barriers or boosts to student contributions within WDBs. However, the argument over whether the actual constructivist nature of the forum itself is a factor that will influence students' participation still exists. Indeed, there have been a number of factors that are linked to constructivism. The fact that to achieve a good discussion requires the reflection time that asynchronous interaction affords, requiring students to articulate their own knowledge and think critically about others bears considerable resemblance to the characteristics Dalgrano (2001) suggested. The discursive element of WDBs relates heavily to Vygotsky's (1962) conception that all higher mental processes take place socially before they are internalised. Additionally, the nature of WDBs reflects 'a process of social negotiation or collaborative sense making, mentoring and joint knowledge construction' (Zhu, 1998; p. 234).

Evidence within the findings suggests that the constructivist nature of the WDBs does act as a factor in student participation. The fact that students suddenly became aware that they had to post their own thoughts in a visible manner suggests in the initial stages suggests that their objectivist learning background has not necessarily equipped them for a constructivist approach to learning. This appears for students and academic staff who are students on the WDBs. In the initial period of the forum, the constructivist nature acts as a form of disincentive to participate. Secondly, the need for reflection within the constructivist approach requires an asynchronous approach to the discussion which again can be a de-motivating factor. Once the initial period is over, better students quickly recognise the constructivist nature is a worthwhile factor, encouraging participation. This is through the movement away from instructor led learning to more student centred learning, generating a more democratic (Wegerif, 1998) method of learning. The discursive approach of constructivism also allows learners to develop critical thinking skills. While at first students found posting their ideas daunting, towards the end of the courses students appear to have enjoyed comparing ideas and responding to others' messages. The constructivist nature of WDBs acts as both a hindrance to the very weak student, but may assist the stronger candidate, supported by evidence on the three WDBs, where weaker students posted less relevant or lower numbers of messages. What is noteworthy is the fact that even students on the TALO WDBs who are lecturing staff missed this mismatch between objectivist and constructivist approaches. The sudden realisation of their ideas can be seen and critiqued by anyone within the WDB suggests that the underlying different epistemological nature of these forums is missed. Students using this medium, including academic colleagues, do not appear to have grasped this concept. Module leaders or organisers who utilise WDBs may well think that the constructivist underpinnings of this medium are obvious or may miss the different focus themselves. In other words, students and staff who wish to utilise such WDBs need to be informed and socialised into this form of interaction much more carefully. The transparency of their viewpoints may make even stronger students nervous; the interactions and feedback given by staff need to be more supportive in the earlier stages and reduced quite rapidly as they gain confidence.

CONCLUSION

This paper has examined the factors influencing student participation within E-learning WDBs. Although based upon a small sample, this research has suggested that there are several key factors influencing student participation in WDBs. The psychological factors, lack of social cues and problems of time and timing may all act as either a challenge or opportunity for participation. The fact that the constructivist nature of the forums themselves also is a de-motivating factor in the short term, but an incentive in the long term suggests that the forums do need some small changes in the initial period of use, but in the long term may benefit from the discursive nature of the WDB.

To facilitate better participation it is advised that students should meet face to face in an induction session to get to know each other "in the flesh" to facilitate an active exchange of thoughts online. Standardisation or glossary of abbreviations and emoticons may facilitate better participation if it reduces writing time. Finally, students do need some form of response, especially in the early period of use to reassure them that their contributions are valid. Students and staff should be openly informed and socialised of the constructivist nature of WDBs to reduce the shock of their own ideas and reflections appearing as transparent to all members of the forums.

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