MONITORING GENDER PARTICIPATION AND PROMOTING CRITICAL DEBATE IN AN ONLINE CONFERENCE

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Abstract

This paper presents some preliminary findings from a study with the two aims of examining: (i) gender differences in online participation and (ii) methods for obtaining better online debate. A number of research methods were used. The study involved a WebCT conference for a total population of 123 second year undergraduate students following a module on Communicating via Multimedia. Students were split into groups of 3-6 students. There were about 1500 contributions to the debates over 10 days. One result was that 70% of students stated that the approach taken was successful at getting them involved in critical debate (the 1999 score for the same question was 56%). Another result was that women read about 11% more items than men and men posted about 6% more items than women. Furthermore, women were under-represented in the top 20% of overall module grades and over-represented in the module fails. The paper explores these issues.

Keywords

critical thinking, gender and technology, multimedia education

Introduction

This paper presents some preliminary findings from a study of online debate for multimedia students. The study had various aims. The module tutor's aim, the first author, was to conduct research into the process of facilitating online debate, i.e. skills in articulating and debating ideas and development of skills in communication. The research team's aims, i.e. all of the authors, were to provide an external view on the online debates and to investigate issues related to gender and online learning.

We start from the position that both gender and computing are socially constructed. A considerable amount of research has pointed to gender differences in computer use, with some earlier work suggesting that the problem lies with women. Chen (1986) for example, suggested that "the main obstacle to a higher level of female interest lies in the willingness to engage in such experiences more frequently" (Chen, 1986; p. 275). In contrast, a number of feminist researchers have

demonstrated how the history and construction of computers is gendered, and has been dominated by Western men (Janson, 1989; Sofia, 1993), with a masculinist influence evident in more recent developments in artificial intelligence and virtual reality (Adams, 1998; Balsamo, 1997). Gender differences have also been identified in online communication, with men tending to post more than women, and dominating online discussions (Hall, 1996; Herring, 1994; Herring, 1996; Stewart, Shields, Monolescu & Taylor, 1999). Spender (1995) noted that there is a risk that men will dominate this new technology just as they did the printing press (Spender, 1995), and indeed the number of women studying traditional computing courses in the UK has dropped significantly in recent years (Clegg & Trayhurn, 1999). There are, of course, considerable differences in computer use *within* genders as well as between them, but the evidence does suggest an on-going problem with the ways in which computers, computing culture and computer education continue to be defined as areas of masculine dominance and expertise. As Clegg and Trayhurn argue, we need "to ask what is wrong with computing rather than what is wrong with women" (1999; p. 75). It is in this spirit that we approached research on this module.

The paper is structured as follows. In the next section we describe the research methods used in our study and in Section 3 we describe the study set up. In Section 4 we present the results, which are then discussed in Section 5. Section 6 briefly concludes the paper.

Research Methods

A number of research methods were used, which are outlined below. The project made use of a mixture of quantitative and qualitative methods. This mixture of methods provides summary numerical data supported by richer insights based on discussion (England & Finney, 1999; Atkins, 1993). The methodological approach taken could be seen to stem from the teacher as action researcher model (see Stenhouse, 1975) building on reflective pedagogic practice to a more explicit research strategy. The tutor took responsibility for evaluating his own module, with the assistance of the other authors, to provide different perspectives and a more robust analysis. Methods used included asking students about their initial expectations of the module, analysis of online conferencing, and a post-module questionnaire. Attempts to set up post-module focus groups to explore the gender issues that emerged were not, unfortunately, successful. The modular system, along with students' work and family commitments, have proved significant obstacles to engaging students with research activities outside class time.

The post module questionnaire was administered to students in the last week of their study. The questions usually used a scale from 1 to 4, where 1 indicates 'very poor' and 4 indicates 'very good'. Space was left after each question for additional comments by the student. Different sections asked participants for data related to the module web based study resources, the online critical debate and gender/age. Each student was asked to fill in the questionnaire and was informed that: (i) the results would be used to improve the module online resources for next year's students and to help with some research, (ii) their identity in the reporting of the research will not be revealed, and (iii) that by filling in the questionnaire they were agreeing to take part in the research.

A spreadsheet was complied with the following data for each student: grades, gender and online participation data (items read/items posted). It was possible to gain a high degree of accuracy, in terms of the amount of access to the discussion group, because WebCT provides data on the number of 'hits' and 'posts' for each student. Because all other course web pages were kept outside the WebCT environment these figures (given below) hence related to the use of the conferencing facility. That is to say, precise data on the number of discussion area readings and postings was automatically collected by WebCT for each student.

The Study

The study involved 123 second year undergraduate students. These students were following a module on 'Communicating via Multimedia'. Participants in the module were involved in assessed

online discussion groups that aimed to foster a 'community in inquiry' (Lipman, 1991) and provide an opportunity for vicarious learning (McKendree, Stenning, Mayes, Lee & Cox, 1998). A community of inquiry is teacher-guided; it places an emphasis on social interaction and co-operative learning, and it involves reasoning and judgement about knowledge. The starting assumption for vicarious learning is that much real learning occurs through observation of other learners engaged in active dialogues.

On the module under study students had to complete two assessment tasks, each carrying equal weighting; there was no exam. The focus of this paper is assignment one, which involved groups of students co-operating to devise and apply criteria for website evaluation. We were particularly keen to design the interactions with students on the module in such a way that would promote critical debate about the assessment task. The learning that the assessment one was trying to foster was critical thinking and argument. Assignment two had as a learning outcome a critical evaluation task, so this first assignment was also preparing students for this.

A live debate relating to the assignment would not, in the first author's view, have taken place if students were not motivated in some way. Consequently, the marking scheme for the assignment included 60% for group work and 40% for individual work. The individual marks were to be allocated as follows:

Individual contributions (to online debate)
20% ability to answer questions
20% taking a lead in the discussion, showing awareness of the issues.

Students were asked to make at least three postings to the online debate. The central focus in this study was thus the development of discussion and debating skills, and the assessment reflected this target.

The study involved a WebCT conference where students were split into groups of 3-6. A screen-shot of the group discussion areas for the module is shown in Figure 1.

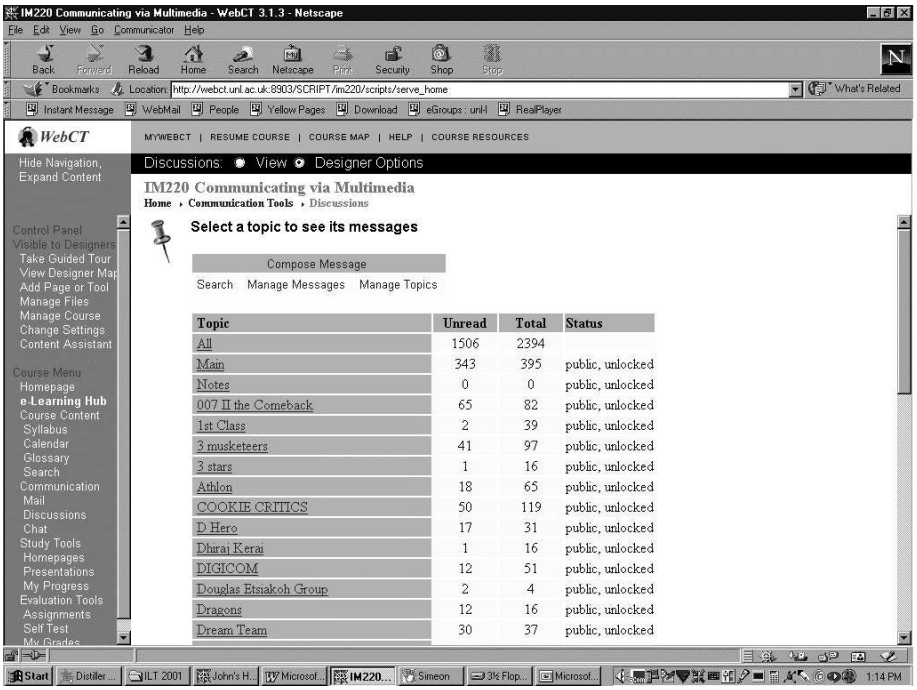

Figure 1: WebCT group conference area for online debate

There were about 1500 contributions to the debates over 10 days. The module tutor and 3 tutorial assistants were involved in the debate. Of the tutors teaching on the module three were men and

one was a women. In total there were 29 women and 94 men participating in the module. Thus 24% of the cohort were women (just under a quarter). Some example dialogues from the previous year's cohort were put on the module website in order to provide a vicarious learning resource.

Figure 2 shows an example intervention by the tutor into one of the group's debate.

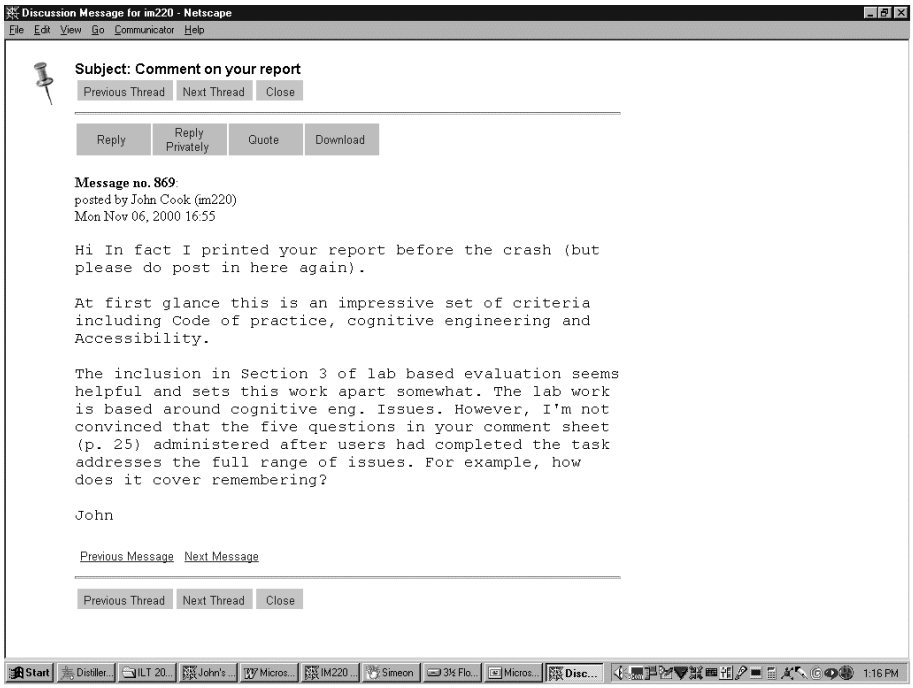

Figure 2: Example tutor intervention from online debate

Figure 3 shows the one student's response to the intervention shown in Figure 2. As can be seen the debate included some interesting open-ended discussion. The student's name has been blanked out in Figure 3 in order to preserve the participant's anonymity.

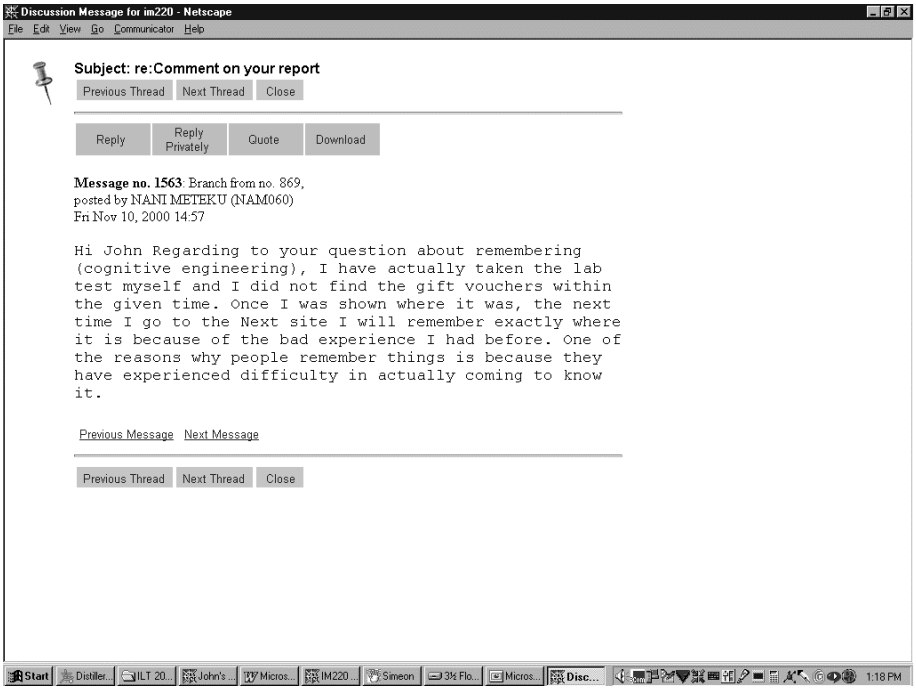

Figure 3: Example student response

The tutor predicted that he would be able to build on the previous year's experience (Boyle & Cook, 2001) in order to improve the online debate. Below are extracts from an email that was sent by the first author to the other course tutors in an attempt to 'prepare' them for the debate.

> Dear IM220 teaching team,
> The big debate starts Monday 6th November and ends Friday
> 10th at 5 pm. I have set up all the groups with a discussion area. Don't come into the labs for week 7&8. That means I'm freeing up 4 hours of your time to do the debate in your own time. Please, please don't get ill next week, I really want to pull this one off ;-)
>
> Here are some guidelines for you:
> 1. Read reports asap on Monday and post messages asap.
> 2. John and Stella focus on these groups:
> *[list of 11 groups given]*
>
> Fred and Martin to focus on these groups:
> *[list of 12 groups given]*
>
> But feel free to join in the other groups if you have time :-)
>
> 3. Fred and John to do targeting tactics: i.e. tracking students in a group with low postings.
> 4. Please try and mix your postings between short sharp replies and more reflective posting.
> 5. Remember, students can reply to our questions and take a lead in the debate.
> 6. In this critical debate be on the lookout for evidence. This is like a court of law, if an assertion is made we need evidence. HOWEVER, there is room for creativity and passion and enthusiasm.
> 7. Each pair to mark the group report out of 30 marks and individual input to debate out of 20 marks. I have attached the Assignment 1 Group Work marking sheet. For the individual component give marks as follows: 10 marks ability to answer questions and 10 marks for taking a lead in the discussion, showing awareness of the issues.
>
> Ask me if you get stuck or have tips to share
> Good luck
> John

The students were given briefings similar to point 6 above in lectures. Furthermore, the research team predicted that, based on the current evidence already cited, there would be gender differences in online participation, with men likely to post more than women.

Results

The first activity undertaken by the module tutor was to ascertain students' own expectations about the module, and what they want to get out of it. This took the form of an online exercise in week 2. Students communicated online about their expectations/desired outcomes from the module. A preliminary analysis of the data has shown that students typically expressed their views on what they expected to get out of the module in terms of the subject area and not in terms of generic skills.

The next step was to ascertain the effectiveness of teaching, learning and assessment activities in relation to the critical debate skills during the module. This was evaluated in two ways: the questionnaire asked specific questions on these points and the rest of the study team (the second and third authors) were asked for an opinion on the critical debate skills displayed by students during the module online debate. The questionnaire provided an indicator which showed that the

module has improved on last years performance: 70% of students stated that the approach taken was successful in getting them involved in critical debate (the 1999 score (Boyle & Cook, 2001) on same question was 56%). The members of the study team, who were not involved in the delivery of the module, commented on the critical debate. Their observations are contained in the next paragraph.

As will be seen, gender differences in numbers of postings were evident, with women making fewer postings, proportionately, than men. Most of the students, both women and men, made reasoned and thoughtful contributions to the debate. The most successful debates were those where all group members stated their appreciation of, and/or support for, others' comments before going on to add their own contributions. There were, however, some adversarial or hostile postings, and these were all by men. The postings by women tended to ignore these hostilities, and/or were conciliatory, as were some men. There does, therefore, seem to be some evidence here for the gender differences in styles of postings that have been noted elsewhere (Hall, 1996; Herring, 1994; Herring, 1996; Stewart et. al, 1999).

Tables 1 and 2 show response scores to the first two sections of the questionnaire. Out of the 123 students on the module 60 completed the post module questionnaire. Percentages have been rounded to the nearest whole number. Each response score is expressed as a percentage of the sample response. Thus male responses are expressed as a percentage of 38; women responses are expressed as a percentage of 14. Note that 8 respondents to the questionnaire did not specify their gender and have hence been excluded from Tables 1 and 2.

Question Category	**Men (%)**				**Women (%)**			
	very poor	*poor*	*good*	*very good*	*very poor*	*poor*	*good*	*very good*
Website Navigation	3	26	63	8	0	7	50	43
Website Presentation	5	24	68	3	0	21	50	29
Web-based Support Materials	0	32	57	11	0	29	42	29
Notice Board Rating	3	39	45	13	21	14	36	29
FAQ Rating	0	42	40	18	7	7	50	36
Usefulness of Module Website	0	19	62	19	0	14	57	29
Access to other websites	0	24	70	6	0	21	57	22

Table 1: Website rating

Table 1 summarises the response to the first part of the questionnaire. This part of the questionnaire asked seven questions that related to the various web-based resources made available to students. Table 2 summarises the response to the second part of the questionnaire. This part of the questionnaire asked four questions that related to the online critical debate that students engaged in for assignment 1.

Question Category	**Men (%)**				**Women (%)**			
	very poor	*poor*	*good*	*very good*	*very poor*	*poor*	*good*	*very good*
Contribution to Critical Debate	0	30	51	19	0	14	57	29
Critical debate Rating	3	8	57	32	0	7	50	43
Success of Critical Debate	6	11	64	19	0	7	57	37
Readability of Debate	0	32	44	24	7	21	57	13

Table 2: Online critical debate rating

Table 3 shows the average number of items read and posted by gender. As we point out above, it was possible to gain this accuracy because WebCT provides data on the number of 'hits' and 'posts' for each student. If we express these figures as a proportion of the population (i.e. 29 women and 94 men), then women read 10.9% more items than men and men post 6.25% more

items than women. These figures were derived as follows. Averages = total posted/read for gender type ÷ total population for gender type. Average items read by women = 10321 ÷ 29 = 356, average items read by men = 26837 ÷ 94 = 286. Average items posted by women = 432 ÷ 29 = 15, average items posted by men = 1600 ÷ 94 = 17. These calculations are represented in Table 3.The difference in reading hence = (356 ÷285) 642 = 10.9 %. The difference in posting = (17 ÷15) 32 = 6.25 %.

The following questions now arise: What would be a statistically significant difference? What is the quality of the submissions, rather than quantity? (do women put in fewer, but longer well considered contributions?) The answer to the first question is that there is a significant difference in that 10.9% women read more men. The answer to the second question will require further research and is beyond the scope of the report of preliminary results; however, below we make some initial observations.

	Items Read	Items Posted
Women	356	15
Men	286	17

Table 3: Average reading and posting by gender

Another result was that women were under-represented in the top grades and were over-represented in the fails. We would expect 6 women in the top 20% (i.e. the top 24 students), however we get 4. Also, 8 students failed. We would expect 2 women to fail but we get 4. However, if we only look at womens' grades for the first assignment (i.e. the group report and the online debate) then women do better: we get 7 women in the top 20% and 3 women fails. Caution must be expressed about these pass and fail rates for women given the variability of the 'distribution' that is applicable to a small cohort. However, given this reservation, a tentative result was that the online debate acted in favor of women students, i.e. it boosted womens' grades for the first coursework in comparison to womens' grades overall.

Discussion

It is important to note that the small numbers in this preliminary set of findings have implications and limitations for our interpretations. However, taken at face value the module produced 70% satisfaction rating with respect to approach taken to getting the students involved in critical debate. This represents a 14% improvement on the previous years rating. This success can be put down to better briefings given by the module tutor to the tutorial assistants about how to cope with the heavy load in terms of postings in the 10 day critical debate period. Another result was that, if we examine Table 1 and 2, we find that women are more ready to give positive assessments of the Website and online critical debate.

The gender differences in overall grade scores for the module were, however, worrying. The trend nationally is for women to outperform men at university, with women home students in the UK now getting more first class honours degrees than men, and 59% of upper second class honours results go to women. In contrast, men get 61% of the third class/pass degrees (HESA, 1998/99). However, the overall results for this module appear to reverse this trend. Even more worrying is the over-representation of women in the fail category.

The reasons for these gender differences in students' results are not made clear by this study. More research into women students' perceptions and experiences of the module is called for. In particular, single sex focus groups exploring students' computing background, reasons for choosing the subject/module, their aims and ambitions, and their experiences and preferences during the module would enable us to make more sense of the quantitative data about online participation and differential grades than has been possible in this study.

Although in the post-module questionnaire we asked about access to a computer at home, more in-depth qualitative work would help to articulate the quality and frequency of this access. Other

research has suggested that access to home technology remains gendered in favour of men and boys (Gray, 1992; Millard, 1997), and it would be interesting to discover whether this is the case for computing students. This is just one of the issues that may be of interest in attempting to explain gender differences in the results. Of greater significance, however, is likely to be gendered aspects of curriculum content and delivery as well as the wider context (a school of computer science) in which the course is located. For example, only one of the four module tutors was a woman; and she was a junior member of the team (an M.Phil. student taking on part-time teaching). This may have reinforced the perception that computing is a male dominated subject area. Further research is needed to investigate these issues.

Conclusions

The module appears to have been successful overall in involving students in critical debate. The gender differences identified, however, remain a serious cause for concern. Work currently in progress, see Appendix, has examined two University of North London computing modules for the academic year 1999/2000, see Table 4 in the Appendix. The two modules examined were Communicating via Multimedia (again, see Table 5 in the Appendix) and Software Engineering for Computer Science (see Table 6 in the Appendix). We have found that for these two modules the UK national trend in 1999/2000 for women to get less first class honours than men is not replicated; for the two modules examined women did better than men in the first class category. However, for these two modules women were over represented in the unclassified results. We feel that these additional finding require further work to examine ways of enhancing the achievement of women.

As we point out in the introduction, this paper reports some preliminary results. Consequently, future work will revolve around the following three areas.

- We still need to answer the question posed in the paper: “What is wrong with computing rather than what is wrong with women?”
- Improving the experiment design. Monitoring gender is only one of the many factors that might affect this complex learning situation. We will consider generating some alternative hypotheses for testing.
  - Create gender-free identifications for the students (to rule out expectation-driven behaviour). For example we could consider other random groupings of students’ race, age, hair colour, whatever, to see if the effect happens across other dichotomies.
  - Analyse for a variety of other possible contributing factors, for example previous grades or academic experience, experience with computers, etc., to see if these explain the effect.
- Include more questions to elicit open-ended comments to enlightened the authors about other factors influencing both the submissions (quality/quantity) and the reading time (quality/quantity)

Funding is currently being sought to address some the above issues in a new study.

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Appendix

Table 4 is UK national data on degree classification with each gender expressed as a percentage of population for the relevant gender. Tables 5 and 6 are for University of North London computing modules for the same year as the HESA data, i.e. 1999/2000.

	Gender	
Class of degree	**Women**	**Men**
First class honours	8.71	10.57
Upper second honours	36.10	32.84
Lower second honours	36.10	36.36
Third/Pass	12.45	13.98
Unclassified	6.22	6.25

Table 4: 1999/2000 UK national statistics for computer science showing degree classification by gender (source HESA, 1998/99) (Women = 2410, men = 8800)

	Gender	
Class of degree	**Women**	**Men**
First class honours	10.34	15.96
Upper second honours	37.93	35.11
Lower second honours	34.48	34.04
Third/Pass	3.45	10.64
Unclassified	13.79	4.26

Table 5: 1999/2000 Communicating via multimedia module (results showing degree classification by gender, women = 29, men = 94)

	Gender	
Class of degree	**Women**	**Men**
First class honours	11.11	1.39
Upper second honours	22.22	9.72
Lower second honours	5.56	20.83
Third/Pass	16.67	31.94
Unclassified	44.44	36.11

Table 6: 1999/2000 Software engineering for computer science module (results showing degree classification by gender, women = 18, men = 72)