

DOES GENDER INFLUENCE DISCUSSION FORUM PARTICIPATION IN ONLINE EDUCATION?

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Abstract

In this study we have investigated aspects of women students' participation in asynchronous discussion forums in an online education context where the women were heavily outnumbered by men. We found that the perceptions of the women concerning how often they participated and the grade they expected, as compared to the men, did not necessarily agree with a statistical analysis of what actually happened. We studied qualitative feedback by the women participants on their experiences in the forums in order to try to understand the reasons for this gap between perceptions and reality. As a result of this project, we foreshadow further studies that might help us form strategies to encourage confident participation by women in online education forums.

Keywords

Computer-mediated communication, gender issues, teaching/learning strategies, online education, distance education, asynchronous discussion forums.

Background

One of the advantages that online education has over other forms of distance education is the ability of instructors and students to interact via online asynchronous discussion forums. Asynchronous discussion forums are used in a variety of online academic programs, and in widely different ways. However relatively little evaluation has actually been done on the effectiveness for learning and teaching of online education in general, and discussion forums in particular.

In this and related studies (Mazzolini, 2002; Mazzolini & Maddison, 2002) we have been investigating interactions in asynchronous discussion forums that are used for tutorial-type teaching purposes, and which form part of the assessment mix in Swinburne Astronomy Online (SAO). In semester 1, 2002, there were approximately 230 students resident in over 30 countries enrolled in SAO, a fully online, postgraduate suite of Masters/Graduate Diploma/Graduate Certificate astronomy courses offered by Swinburne University of Technology, Australia. The authors are the current coordinator (SM) and the designer and original coordinator (MM) of SAO.

SAO involves a hybrid online delivery strategy, combining high bandwidth course content on CD-ROMs with access to online, asynchronous communication and web resources. The assessment mix is typically made up of computer-managed testing, essays, project work plus contributions to the asynchronous discussion forums (Mazzolini, 2000; Mazzolini, 2002).

Discussion forums where students are divided up into groups containing up to approximately 30 students per instructor, each group with its own set of discussion forums, are a key feature of all SAO units. A new forum is opened up every two weeks during the teaching semester, where students are required to

post at least one question or 'extension comment' about current course material, plus answer at least one question posed by someone else. In the forum discussions, students clarify their own understanding of key concepts, and further develop their science communication skills by answering each other's questions, often in considerable depth. At the end of the teaching semester, SAO students are asked to nominate which three of their discussion forum postings are to be assessed. The discussion forum component of the final grade (up to 30%) is made up of marks awarded for the nominated forum contributions, plus a smaller 'participation mark' component intended to reward regular participation.

The SAO program offers an excellent opportunity to study student (and instructor) participation in discussion forums. With a growing number of forums being conducted 'in parallel' in any semester, although the astronomy course material varies, all SAO forums are conducted with the same overall guidelines and assessment criteria. In Semester 1 2002, the nine SAO units on offer involved 12 instructors, as three of those units had sufficient enrolments to be split into two discussion forum streams. (Major project units are also offered, but as their format is substantially different to that of 'regular' units, they are not included in this study.)

Students in SAO rate their educational experience highly in surveys (Mazzolini, 2002; Mazzolini & Maddison, 2002). However, what works well for the majority of students may not work for all subgroups. As is the case for many online forums (Ferris, 1996; Savicki, 2002), SAO has a male-dominated student population, averaging approximately 80% males. As part of a continuing study of how learning and teaching occurs in discussion forums, in this project we studied whether participants' gender significantly affects aspects of their discussion forum participation in SAO.

Study Outline

In Semester 1 2002 we emailed a short questionnaire to current women participants in SAO to explore their perceptions of how frequently they participate in SAO discussion forums, and how often they respond to others' postings, as compared to male participants. We asked them how well they expected to perform in their discussion forum assessment, again as compared to male participants. Many of the women participants who took part in the questionnaire also gave insightful comments about their questionnaire responses.

To see how the perceptions of the women participants matched up to reality, we also calculated the average posting rates for women and men for Semester 1 2002 forums and also over the last four semesters of SAO. We calculated average discussion forum marks for female as compared to male SAO participants over the same periods, and we estimated how often women responded to others postings in Semester 1, 2002, as compared to men in the same period.

Finally, we analysed responses by SAO male and female participants in Semester 1, 2002, to a question in the official Swinburne Student Evaluation Survey seeking to determine if the students found the forums useful. In the following sections we summarize and interpret our results.

Data Samples

Our questionnaire was emailed to the 42 current women participants in SAO, and 28 responses were received, representing a 67% response rate. In most cases, students also included extra qualitative comments, and these are also discussed in Section 4. Ethics Committee permission has been received for this study.

Figure 1 below shows the distribution of the number of semesters' study already undertaken in SAO by respondents to the questionnaire. 50% of the respondents had studied for 3 semesters or less in SAO. The distribution is skewed towards the left, probably reflecting the fact that the total number of enrolments in SAO has been growing steadily with time.

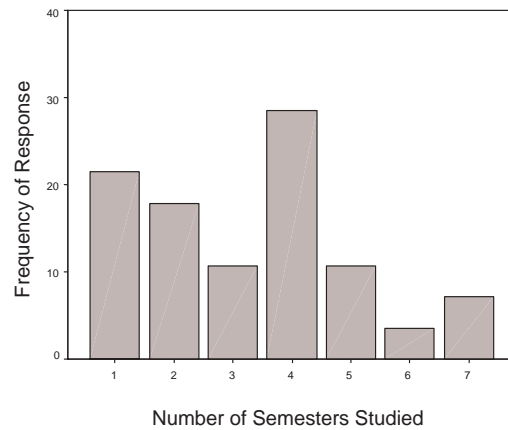


Figure 1 The number of semesters' study undertaken by female respondents to the questionnaire.

As our analysis from this questionnaire was based on only 28 respondents and involved a limited range of responses (5 alternative responses to each of the 3 questions discussed here), it would have been misleading to apply normal distribution statistics blindly. It could also be misleading to treat responses on a discrete (Likert) scale as continuous. Instead, we will describe the distribution of responses received for each question in terms of its median – that is, the value below which 50% of responses lie – and according to whether the distribution is skewed to high or low values.

Archives of SAO discussion forum contributions from Semester 2, 2000, Semester 1 and 2, 2001 and Semester 1, 2002 were also analysed – see statistics in Table 1. Each of the forums contains between 80 to 200 postings each for every 2-week period. The average posting rates for females and males were calculated for each 2-week discussion forum, in each 14-week semester.

| | Number of students | Number of unit enrolments | Number of units (subjects) | Number of discussion forums |
|------------------------|--------------------|---------------------------|----------------------------|-----------------------------|
| Semester 2 2000 | 135 | 200 | 6 | 8 |
| Semester 1 2001 | 180 | 270 | 7 | 10 |
| Semester 2 2001 | 200 | 280 | 7 | 11 |
| Semester 1 2002 | 230 | 350 | 8 | 11 |

Table 1 Approximate statistics for numbers of students, unit (subject) enrolments, units and discussion forums in each semester studied.

We then looked at the marks received by females and males for their forum contributions, where forums act as asynchronous 'online tutorials'. As already discussed, students receive marks for their participation, plus marks for selected forum contributions. Average marks have been calculated for discussion forum contributions for SAO students over all four semesters.

In our presentation of results calculated for forum posting rates and assessment marks below we will quote standard deviations and 95% confidence levels, but these statistics must be interpreted with some caution in cases where we quote them over four semesters. Although including data from four semesters does increase the accuracy of our analysis, our samples of students from each of these semesters are not truly independent, because they predominantly contain the same overall student population. A number of students enter and leave SAO each semester, but the overwhelming majority continue on in their studies, and may well keep up similar patterns of forum participation and receive similar marks from semester to semester. On the other hand, variation is introduced as a student progresses into each new SAO unit and typically finds themselves with a predominantly different mix of students and a different instructor, and this could possibly be expected to affect their participation and consequently the marks they receive.

Lastly, we analysed responses by male and female participants in Semester 1, 2002, to an item in the Swinburne Student Evaluation Survey that asked them to respond to the statement “I found the newsgroups useful”. (In SAO, discussion forums are called newsgroups.) Of the 230 students enrolled, responses were received from 22 women and 97 men – just over a 50% response rate.

Results

In this study we analysed responses by SAO participants in Semester 1, 2002, to the questions:

- A. How often do you think that you post to SAO discussion forums, as compared to men in your discussion forum(s) this semester, on average? (1=much less, 2=less, 3=same, 4=more, 5=much more)
- B. How often do you think that you respond to others' questions and comments on discussion forums, as compared to men in your discussion forums(s) this semester, on average? (1=much less, 2=less, 3=same, 4=more, 5=much more)
- C. Do you expect to do (1=much worse, 2=worse, 3=about the same, 4=better, 5=much better) in your discussion forum assessment as compared to the men in your discussion forums(s) this semester, on average?
- D. From your observations, women in discussion forums tend to be (1=much less articulate, 2=less articulate, 3=about the same, 4=more articulate, 5=much more articulate) than men on average?

Quantitative Questionnaire Responses

As can be seen from Figure 2 below, the responses to Question (A) on perceived posting rate are skewed heavily towards the ‘same or less’ end of the distribution. 50% of respondents chose 2 or less on the survey – indicating that half the female respondents believed that they post less or much less than do male participants in their discussion forums.

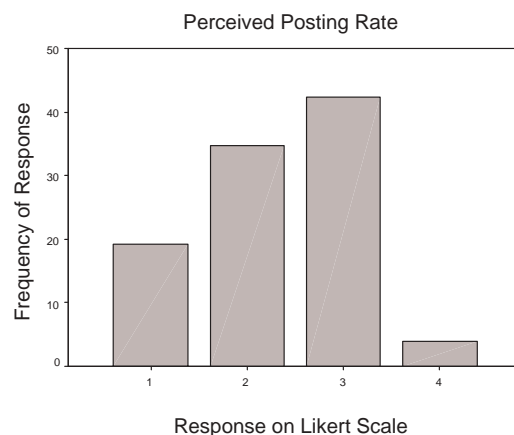


Figure 2 SAO women participants' responses to Question (A) “How often do you think that you post to SAO discussion forums, as compared to men in your discussion forum(s) this semester, on average? (1=much less, 2=less, 3=same, 4=more, 5=much more)”, where the mean value = 2.31 and the median response = 2.

Again, Figure (3) below shows that the responses to Question (B) on how often women respond to others' questions and comments (compared to the men in their discussion forums) are heavily skewed to the ‘same or less’ end of the distribution. 50% of respondents indicated that they believed that they responded less or much less often to others' postings than did men on average. No respondents chose a positive (‘more’ or ‘much more’) response to this question.

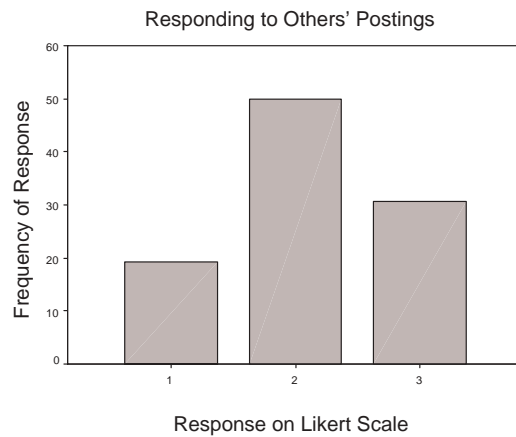


Figure 3 SAO women participants' responses to Question (B) "How often do you think that you respond to others' questions and comments on discussion forums, as compared to men in your discussion forums(s) this semester, on average? (1=much less, 2=less, 3=same, 4=more, 5=much more)", where the mean value = 2.12 and the median response = 2.

In contrast, although the responses on assessment expectations (see Figure 4) are skewed somewhat towards the 'same or worse' end of the distribution, the median response is "3 = about the same", and twice as many respondents chose that response as compared to the other alternatives. We conclude that women SAO students expected to do as well as men in the discussion forum assessment, at least according to this limited survey.

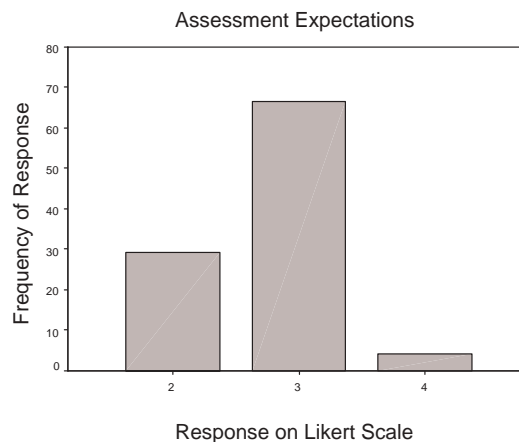


Figure 4 SAO women's responses to Question (C) "Do you expect to do (1=much worse, 2=worse, 3=about the same, 4=better, 5=much better) in your discussion forum assessment as compared to the men in your discussion forums(s) this semester, on average?", where the mean value = 2.75 and the median response = 3.

Question (D) asked the women if they thought that they were more articulate than the male participants. Although the median response is again "3 = about the same", the distribution (Figure 5) is skewed towards the "more articulate" end of the distribution. 40% of the admittedly small group of female respondents regard women as being more articulate in the forums than are men. In contrast, only 14% regard women as being less or much less articulate than male participants.

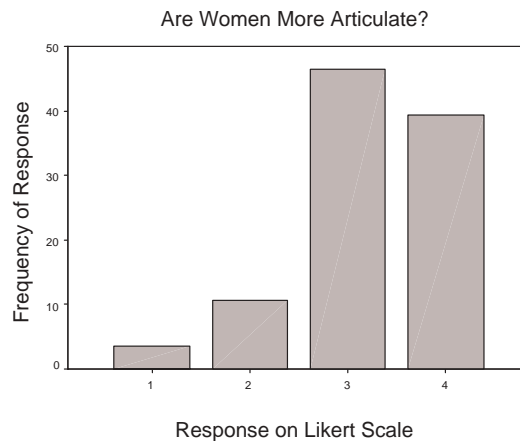


Figure 5 SAO women participants' responses to Question (D) "From your observations, women in discussion forums tend to be (1=much less articulate, 2=less articulate, 3=about the same, 4=more articulate, 5=much more articulate) than men on average?", where the mean value = 3.21 and the median response = 3.

Qualitative Questionnaire Responses

As well as asking women SAO students to answer multiple-choice questions, the questionnaire also invited them to add extra comments, and 24 out of the 28 respondents did so. This was of course the more enlightening part of the survey from our point of view, and while many interesting issues were raised, two in particular stood out. Firstly, several women felt that the men on average seemed to have more background experience in the physical and mathematical sciences than they did and that this was reflected in their answers - even to the point of excluding the women for the discussions. To quote one respondent:

"I have found a couple of replies to my postings from a particular male in one of my subjects a little pompous and condescending this semester, this is perhaps more of a comment on my postings themselves, rather than my gender."

Secondly, it was pointed out that the type of questions and answers posted by men and women were different. Some men's questions were prefaced with 'I disagree with', while women were more likely to preface questions with 'I don't understand'. Was this really related to background experience or gender? Herring (1994), Herring (2000) and Blum (1999) would argue that gender was the culprit. In terms of answering questions, men seemed to be bogged down with technical detail, while women gave more "big picture" type responses. The women were more likely to be 'open-ended' in their responses, while the men seemed to be were looking for 'definitive answers'. To quote one of the respondents,

"My general opinion is that womens answers tend to be more to the point and understandable. Some of the men get bogged down and it is more hard to follow their point."

Actual Posting & Response Rates

We have seen that 50% of the female respondents to our questionnaire in Semester 1 2002 believed that they post less or much less often than do male participants to their SAO discussion forums, but was this actually the case? We analysed the SAO discussion forum archives to determine the actual posting rates of men versus women in that semester. We also combined those posting rates with averages determined from a previous study (Mazzolini, 2002) to determine relative posting rates over 4 semesters – see Table 2.

| | No. Forums Analysed | Mean No. Postings (standard deviations) per Forum | 95% Confidence Interval for Mean | |
|--------------------------------|---------------------|---|----------------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| Semester 1 2002 - Women | 77 | 3.5 (1.0) | 3.1 | 4.0 |
| Semester 1 2002 - Men | 77 | 3.8 (1.8) | 3.4 | 4.2 |
| All 4 Semesters - Women | 244 | 3.9 (2.2) | 3.6 | 4.2 |
| All 4 Semesters - Men | 244 | 4.0 (1.5) | 3.8 | 4.2 |

Table 2 Average Posting Rates for Women and Men to SAO discussion forums – for Semester 1 2002 (the semester in which the questionnaire was distributed), and also over all 4 semesters (Semester 2 2000, Semesters 1 & 2 2001, Semester 1 2002).

The results from Semester 1 2002, and also from all four semesters analysed (Semester 2 2000, Semesters 1 & 2 2001, Semester 1 2002), show that there was (at least to the accuracy of our survey) no significant difference between the average posting rates of women as compared to men.

We also saw that 50% the women respondents believed that they responded less or much less often to others' questions and comments than did men in their discussion forums. To estimate how often men and women actually responded to other student postings in Semester 1 2002, we analysed the SAO discussion forum archives to determine how many times men and women initiated new discussion threads, and how often they responded to existing threads. Table 3 below shows the percentage of responses compared to overall numbers of postings, for men and women.

| | No. Forums Analysed | Percentage of Responses (standard deviations) per Forum | 95% Confidence Interval for Mean | |
|--------------------------------|---------------------|---|----------------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| Semester 1 2002 - Women | 77 | 67.1 (15.6) | 63.6 | 70.6 |
| Semester 1 2002 - Men | 77 | 70.1 (9.0) | 68.0 | 72.1 |

Table 3 Average Percentage Response Rates for Women and Men to others postings in SAO discussion forums, for Semester 1 2002 (the semester in which the questionnaire was distributed).

As can be seen from Table 3, the mean number of responses for men was slightly higher than that for women, but the difference was not statistically significant. Therefore, contrary to the perceptions of many of the women in the survey, women responded just as often on average to others postings as did men, at least in Semester 1 2002.

Forum Assessment Results

We saw earlier that the women who responded to the questionnaire expected to receive equally high marks for their discussion forum assessment as the men in their forums. As can be seen in Table 4, they were right. The mean mark for women was slightly higher than that for men, however as Table 4 shows, the difference was not statistically significant, neither for Semester 1 2002 or for all four semesters studied (to the accuracy of our survey).

| | No. Forum Marks analysed | Mean % Discussion Forum Mark (standard deviations) | 95% Confidence Interval for Mean | |
|--------------------------------|--------------------------|--|----------------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| Semester 1 2002 - Women | 38 | 77.5 (12.5) | 73.3 | 81.6 |
| Semester 1 2002 - Men | 211 | 73.1 (15.6) | 71.0 | 75.3 |
| All 4 Semesters - Women | 125 | 77.4 (18.0) | 74.2 | 80.6 |
| All 4 Semesters - Men | 604 | 73.8 (19.8) | 72.2 | 75.4 |

Table 4 Average Percentage Discussion Forum Marks for Women and Men in SAO – for Semester 1 2002 (the semester in which the questionnaire was distributed), and also over all 4 semesters (Semester 2 2000, Semesters 1 & 2 2001, Semester 1 2002).

Student Evaluation Survey Responses

Figure 6 below shows female and male SAO participant responses to the official Swinburne Student Evaluation Survey statement “I found the newsgroups useful”, rated as 1=strongly disagree, 2=agree, 3=neither, 4=agree, 5=strongly agree. In both cases the median value is 4.0, but the mean value for women is 4.14, whereas for men, the mean value is 3.77, because the distribution of women’s responses was skewed slightly more towards the right (see below). Clearly these women respondents found the forums just as, if not more, useful than did the men.

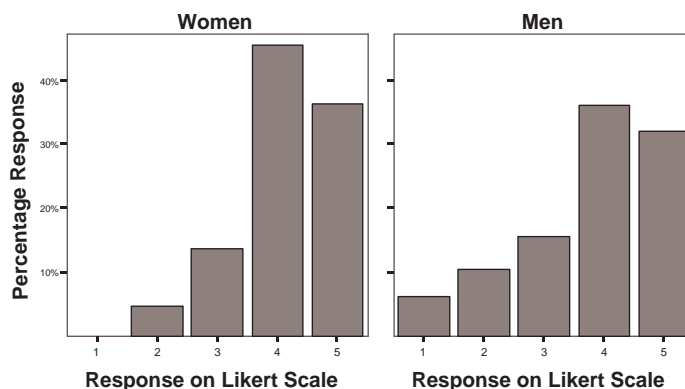


Figure 6 SAO female and male participants’ responses in Semester 1, 2002 to the student evaluation survey statement “I found the newsgroups useful”, rated on a Likert Scale where 1=strongly disagree, 2=agree, 3=neither, 4=agree, 5=strongly agree. Responses were received from 22 women and 97 men, a 50% response rate.

Interpretation

Given that the intention of this study was to explore whether gender influenced participation in discussion forums in online education, what, if anything, have we found?

The women who responded to our survey were confident that they would receive similar marks for forum participation to their male co-participants. Their confidence was well placed: that semester (and over the last four semesters in total) there was no significant difference in the marks scored by men and women for the forum component of their assessment. Women surveyed in the student evaluation survey in the same

semester rated the usefulness of the discussion forums just as highly as did men. In one way, this is the end of the story, at least for SAO – women achieve equally high marks for forum participation as do men, and they appear to find the forums just as useful.

On the other hand, the women tended to believe that they contributed to forums less often than men, and posted less responses than did the men on average, even though the statistics show that this was not so, either for that semester or for the four semesters analysed here. This may well have been a simple reaction to being heavily outnumbered in the forums. It may also have partly been a response to the styles of postings made by men as compared to those made by women. Our results on posting rates disagree with observations of male dominance in general Internet forums quoted in the literature - see, for example, Herring (1994) and Ferris (1996) - but agree with the results of McAllister and Ting (2001) for discussion forums in online college courses.

The women respondents often described postings by male participants as being more technical in language and nature, and more likely to be quick replies to ongoing discussions, rather than the considered and crafted responses that the women felt that they were more likely to post. Although the women respondents saw themselves as posting less often than the men, they also believed that they were as, if not more, articulate than male participants. This was summed up in one of the more amusing responses we received on this topic from a women participant,

“... I have strengths in other areas that they [the male participants] may not - i.e. research and writing. (Take that, you pushy guys who answer every little thing with the right answers before I have a chance to think about them! You may know this stuff off the top of your heads, but give me time and I'll write about it better!)”

So on the plus side, SAO women respondents were confident that they would do reasonably well in forum assessment, and saw themselves as just as, if not more, articulate than their male participants. On the minus side, they felt that they don't participate as much, and that the men had the advantage when it came to 'techno-speak'. These perceptions did not seem to have any observable consequences in terms of retention rates. After analysing feedback from SAO students who failed to complete semester 1 2002, we see no evidence of experience with the discussion forums being a contributory factor to their failure to complete, either for men or women. Also, the proportion of women students who failed to complete was the same as the proportion of women in the whole program - however as the numbers involved were very small, this analysis would need to be repeated over several semesters before any definite conclusions can be made.

Outlook

Finally, why should we care? After all, as SAO has so few women participants, we shouldn't be surprised if they feel outnumbered and perceive the online discussions as being dominated by men.

The ability to hold online discussion forums sets the learning experience in online education apart from that in traditional distance education, and programs like SAO rely heavily on forum discussions to enrich and deepen student learning. These forums are generally very popular with students, however they can create significant challenges for instructors. Without visual feedback, instructors can find it difficult to gauge whether most if not all members of their forums are finding the learning experience useful. Particular minority groups (such as women, in this case) may well feel left out, but feedback from studies like this could encourage instructors to develop strategies to make sure that forum discussions are more inclusive.

Not surprisingly, this study raises more questions than it answers. We intend to follow up with a larger scale study, surveying all male *and* female participants in SAO and analysing their discussion forum participation in greater detail, to attempt to find out whether

- male participants perceive that their posting rate is any different on average to that of women,
- other minority groups (e.g. students for whom English is a second language) also believe that they post less often than the majority, even if that is not actually the case,

- the nature (technical content, use of jargon, length) of women's postings to SAO discussion forums is different to that for men, on average, and
- whether retention rates for women in SAO are different to those for men.

A key issue not addressed here is whether the results of this study have any generalisability to the participation of women and men in other discussion forums. Do our results only apply to forums made up of predominantly male 'mature age' astronomy enthusiasts, studying in purely online mode, or can we learn from this study about factors that might affect the way in which women and men participate in other discussion forums in online and on-campus education too? We would like to see similar analyses with other mature age, lifelong online learners, especially in situations such as in the study by McAllister and Ting (2001) where there is a more even balance of male to female participants. As well, it would be interesting to see this style of analysis carried out on the interactions of young, undergraduate students in discussion forums, with the proviso that the fact that the students are also in face-to-face contact may affect the dynamics of the discussions.

In the case of SAO, as a result of this study we would suggest that a part of the initial advice to instructors should be to make sure that in their postings to forums they show that they value clarity of explanation as much or more than the use of technical terminology. Initial instructions to students on how to take part in discussion forums could make the point that participants post in different ways – e.g. some tend to make brief, frequent postings as part of continuing conversations, others make less frequent but longer, more crafted and researched responses – and that each of these forms of posting is valued and has its place in a good forum discussion.

References

- Blum, K.D. (1999). *Gender Differences in Asynchronous Learning in Higher Education: Learning Styles, Participation Barriers and Communication Patterns*. JALN 3(1), [Online]. Available: http://www.aln.org/alnweb/journal/Vol3_issue1/blum.htm [26th September 2002].
- Ferris, S.P. (1996). Women On-line: Cultural and Relational Aspects of Women's Communication in On-line Discussion Groups. *Interpersonal Computing and Technology*, 4(3-4), 29-40.
- Herring, S. (1994). *Gender Differences in Computer-Mediated Communication: Bringing Familiar Baggage to the New Frontier*. [Online]. Available: <http://www.cpsr.org/cpsr/gender/herring.txt> [26th September 2002].
- Herring, S. (2000). *Gender Differences in CMC: Findings and Implications*. [Online]. Available: <http://www.cpsr.org/publications/newsletters/issues/2000/Winter2000/herring.html> [26th September 2002].
- Mazzolini, M. (2000). Assessment Techniques in an Online Astronomy Course. *Publications of the Astronomical Society of Australia*, 17(2), 141-144.
- Mazzolini, M. (2002). The Use of Online Discussion Forums as a Learning and Teaching Tool in Astronomy. *Publications of the Astronomical Society of Australia*, 19(4), 448-454.
- Mazzolini, M., & Maddison, S. (2002). Sage, Guide or Ghost? The Effect of Instructor Intervention on Student Participation in Online Discussion Forums. Accepted for publication in *Computers & Education*.
- McAllister, C., & Ting, E. (2001). *Analysis of Discussion Items by Males and Females in Online College Courses*. [Online]. Available: http://www.esc.edu/ESOnline/Across_ESC/infonews.nsf/wholeshortlinks2/Recent+Presentations?opendocument [26th September 2002].
- Savicki, V. (2002). Gender Language Style and Group Composition in Internet Discussion Groups. *Journal of Computer-Mediated Communication*, 2 (3). [Online]. Available: <http://www.ascusc.org/jcmc/vol2/issue3/savicki.html> [26th September 2002].

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