

**An analysis of the large-scale use of online discussion in an undergraduate medical course**

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# **Analysis of the large-scale use of online discussion boards in an undergraduate medical course**

## **Abstract**

*This paper offers an analysis of the use of online discussion boards within a single VLE used for a whole programme of study—the undergraduate medicine MBChB programme at the University of Edinburgh—rather than discrete modules or courses. The discussion boards have proved to be the most popular aspect of the VLE and have been a major contributor to its success in other areas as well. The analysis covers the development and use of the discussion boards, patterns of use, and content analysis of discussion board transcripts, and concludes with a discussion of the impact of introducing online discussion to a whole degree programme.*

## **Background**

The undergraduate medicine MBChB programme in Edinburgh has about 1300 students, spread across five years of study that take them from the University's main campus in the centre of Edinburgh to clinics and hospitals across southeast Scotland. After their second year, a student cohort will never come together in one place again.

Edinburgh's undergraduate medical course was redesigned and relaunched in 1998, in part as a response to general recommendations for medical education from the UK's General Medical Council (General Medical Council 1993). Like many other medical schools at the time (Cook 2001), Edinburgh took the decision to develop an in-house VLE system, mainly to accommodate the highly integrated and multi-dimensional dynamics of the new programme. This was called the 'Edinburgh Electronic Medical Curriculum' or 'EEMeC' (Ellaway et al. 2003, 4). In response to requests from the student body, asynchronous 'discussion boards' (using a Microsoft FrontPage component) and a synchronous 'chat room' (using Macromedia Director) were added as VLE features in 2000.

These discussion boards have been redeveloped over time, in an iterative cycle following a 'task-artifact cycle' (Carroll et al. 1991). Neither the discussion nor the chat functions were linked to teaching and learning; they were simply made available to users. The chat facility was rarely used, mostly for a lack of critical mass to ensure there would be someone else 'in there' when users had the occasional look, and was removed in 2003. Meanwhile, poor usability of the FrontPage component limited the use of the discussion boards. Despite this, significant interest was shown by students in asynchronous discussion (as reflected in focus groups and course review meetings). A substantial discussion board facility was built, went live in 2001 and has since proved to be one of the most widely used parts of the system, with 91% of students posting at least one message during the academic session 2003/2004 (see Figure 1). The analysis of discussion board use in this paper starts with the introduction of this new system.

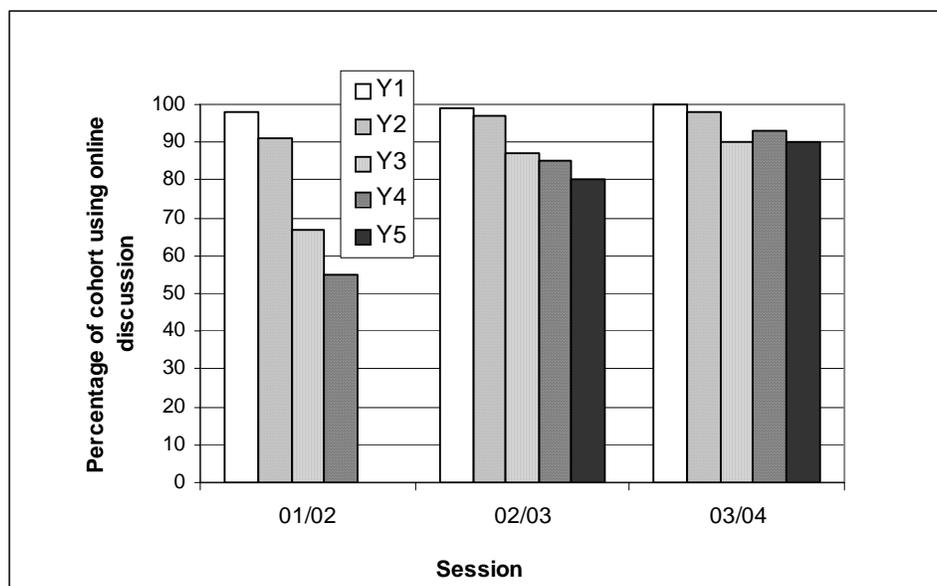


Figure 1: percentage of students in each year posting at least one message, split by cohort for 3 academic sessions. While Year 1 use was always high, usage in consecutive academic sessions increased for all other year cohorts.

### The development of the EEMeC discussion boards

At first, a separate board was provided for each year group. Students could post only to their own year's board, but could view the discussion threads of any year. Students could post messages anonymously, or use an alias or their real name. All transactions within EEMeC are tracked: although an 'anonymous' post would appear that way to other students, in reality staff viewing the post could see the matriculation number of the student posting the message.

In addition to the University's general matriculation regulations, medical students have to sign up to a code of practice. It is made clear to students that any online transaction within EEMeC is tracked and behaviour in the online environment is open to the same levels of scrutiny and accountability for behaviour as those for face-to-face situations. No additions or changes to the existing regulations were required to cover online behaviour.

Access to EEMeC is restricted to MBChB students and staff but as the boards are unmoderated, with optional participation, rather than structured and tutor-moderated, the discussion is more often 'chat'. This proved to be a distraction for some:

*"...the problem with the eemec thing is that you can convince yourself that you are 'working', where as all I ever end up doing is faffing around with the discussion boards."*—student, via discussion board

The ability to use an alias provided plenty of scope for abuse of the boards. Statistics for the first 3 months of the Year 1 discussion board show that only 2% of posts included the full name of the user - 30% were anonymous and 68% used an alias. A small number of students used what were considered to be offensive aliases, posted messages in the names of other students, or impersonated staff. This prompted complaints to EEMeC from staff and students, leading to a number of changes. The alias feature was removed and year boards were split into academic and non-academic themes. A notice was sent to all students informing them of these changes and reminding them that all posts were being tracked. However, a spate of

offensive messages occurred towards the end of session 2001/2002, with a corresponding number of complaints:

*"I find some of the site depressing. We seem to have set up an electronic version of a loo wall."—Teacher, by email*

A self-policing function was introduced, so the authority for identifying problematic posts was devolved to the course community as a whole. This automated reporting mechanism alerts key staff to offensive postings, who then decide what action should be taken against the perpetrator. This was implemented in June 2002 and 8 genuine complaints had been received by the end of that academic session, 3 weeks later, along with a number of false alarms caused by curiosity about the reporting button which necessitated making this a 2-click process. Examples of reported misbehaviour included using bad language, aggressive or bullying behaviour, inappropriate use of humour, negative personal comments and misinformation. This approach, although described by one member of staff as 'online grassing', both empowers and lays the burden of responsibility on the student corpus. Student attitudes were ambivalent:

*"Oh, c'mon, if this 'reporting' thing means that people won't be able to voice their real opinions and feelings on EEMeC anymore, then what's the point of having a discussion board?"—Student, via discussion board*

*"I don't believe that many of the comments on eemec are to be taken seriously. A lot of the remarks ... are purely in jest and should not be a reflection of a student's integrity."—Student, via discussion board*

Session 2002/2003 brought further development in response to complaints – after debating the issue in open forum with student representatives involved, anonymous posts were no longer allowed on the non-academic boards. Subsequently the number of posts to the academic boards jumped dramatically from 30% the previous session to 63% of all posts.

There were several complaints from staff about the blurring of distinction between non-academic and academic discussion boards. The option of anonymity meant that students were posting non-academic messages on the academic boards and the staff that used the academic boards were having to trawl through irrelevant messages.

*"Why are people so worried about maintaining their anonymity? If you write a comment on a discussion board but don't want people to know it was you then perhaps you shouldn't be writing at all - maybe such 'anonymous' comments are better left un-said."—Student, via academic discussion board*

With 53 complaints via the self-policing button and several longer complaints via email, a warning message about inappropriate behaviour in discussion boards was sent to the whole student corpus in 2002. Occasionally a staff member would request that a message or even an entire thread be removed. This did not go unnoticed:

*"Is it me or was the post that was put up yesterday morning about the no-show lecturers deleted? Are the faculty censoring the discussion boards?"—Student, via discussion board*

Usually, however, the concern was that staff should not be seen as heavy-handed:

*"... there are positive as well as negative comments there... I don't want the students to think that we are over-strict, humourless and over-controlling - this would send out the wrong messages about the course and also about EEMeC's student- friendliness ..." —teacher, by email*

A guide for students using the academic discussion boards was developed by one of the more enthusiastic staff users to increase student awareness of good practice and online etiquette, as well as the types of message that should be considered appropriate for this board. The number of complaints warranting warnings for session 2003/2004 fell, with only 17 students cautioned and 2 complete threads removed. The percentage of academic posts also fell slightly compared to the previous session, from 63% to 59%, with a corresponding increase in non-academic posts to 41%.

Staff activity, in terms of numbers of posts, has remained the same over the three sessions. The EEMeC team is responsible for 25% of staff posts, with a core group of about 60 other academic and administrative staff who participate in online discussion.

### Gender Differences

During the 2002/2003 academic session there were 682 female students and 416 male students on the MBChB. Males log into EEMeC more than females, with an average of 335 logins per male student over the course of the session, but only 275 logins per female. Thus, while males comprise 37.9% of the EEMeC student body they account for 42.6% of all logins. Males were also more active on the discussion boards, with an average of 23.3 posts per male and 18.3 posts per female over the whole year. Figure 2 shows how those posts are distributed month by month over the academic year.

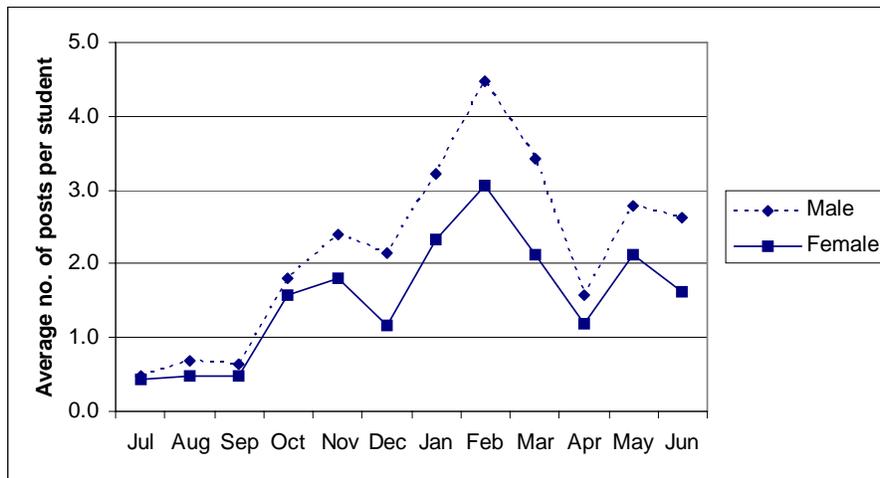


Figure 2: EEMeC discussion board posts by gender (academic session 2002/2003)

An analysis of discussion board posts by males and females in each year over 24 hours are shown in figures 3 and 4 respectively. The online behaviour for year 1 males is atypical in that the bulk of activity takes place later in the day, peaking at 9pm. Year 1 females are also active later in the day than in later years but discussion board posts peak earlier than for year 1 males – being most active at around 5pm with another active period around 8pm.

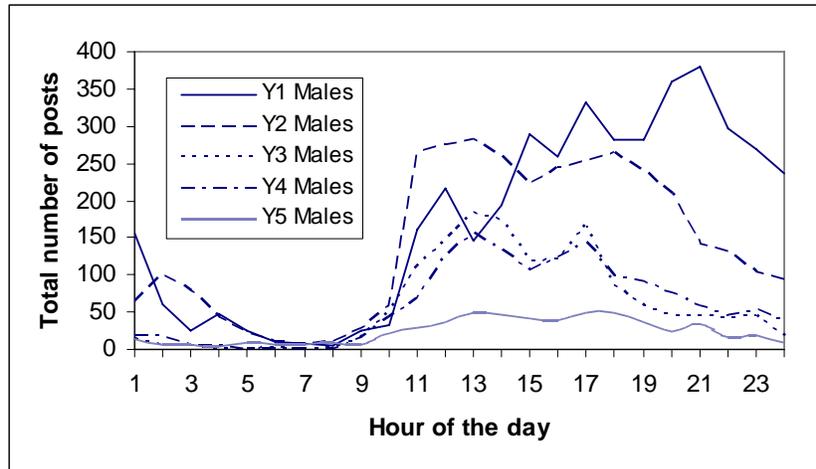


Figure 3: EEMeC discussion board posts for male students across all five years of the Edinburgh MBChB (academic session 2002/2003)

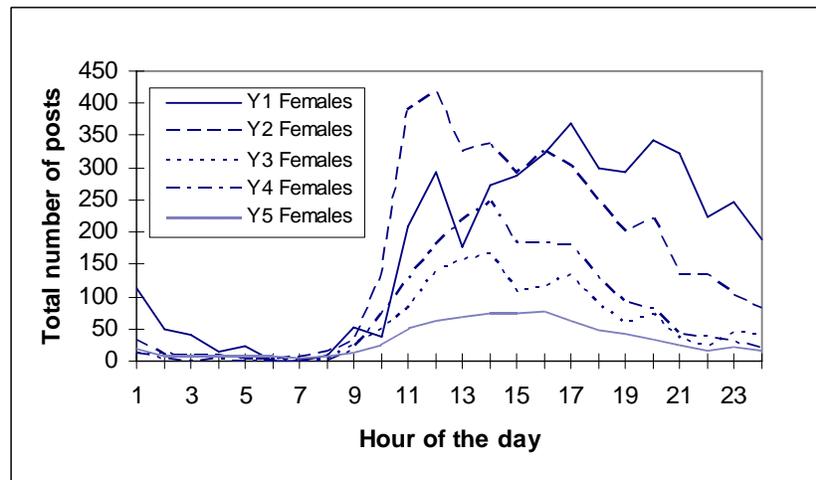


Figure 4: EEMeC discussion board posts for female students across all five years of the Edinburgh MBChB (academic session 2002/2003)

The academic boards show a steady drop in participation over the 5 years while posts to non-academic boards remain similar across all years. Non-academic participation rates for females hover between 60% and 70% until year 5 when they jump to 80%. The male participation rate for the non-academic boards is slightly higher than for females at all stages except year 5. While the academic participation rates are similar for males and females in terms of the percentage of each year group posting to the academic boards, the patterns of usage are quite different, particularly in years 1 and 2 (Figure 5).

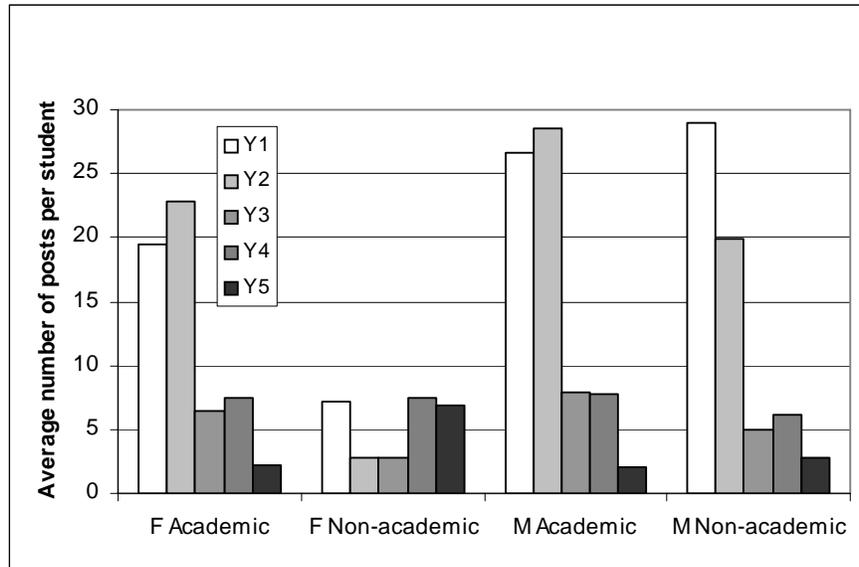


Figure 5: average number of posts per student for academic and non-academic boards for males and females across the 5 years of the MBChB

For females, non-academic posts dropped to their lowest number in Year 2. In Years 1 and 2, females post to the academic boards more often than the non-academic boards. There is a sharp decrease in the overall number of posts in Year 3, but still twice as many academic as non-academic posts in this year. By Year 4 however, the non-academic posts have slightly overtaken the academic posts, with this gap continuing to widen in Year 5. For males, non-academic posts still constitute a large percentage of all posts. Generally, the male and female patterns are much more similar in the clinical years, but with females making relatively more non-academic posts in Years 4 and 5.

The behaviour patterns in terms of the mean number of posts per user differ markedly in the preclinical (1 and 2) and clinical (3-5) years, with males posting twice as many messages as females in Years 1 and 2. This activity drops steeply in the clinical years. Males remain slightly more active than females until Year 5, when the two groups display roughly equal patterns of behaviour (see Figure 6).

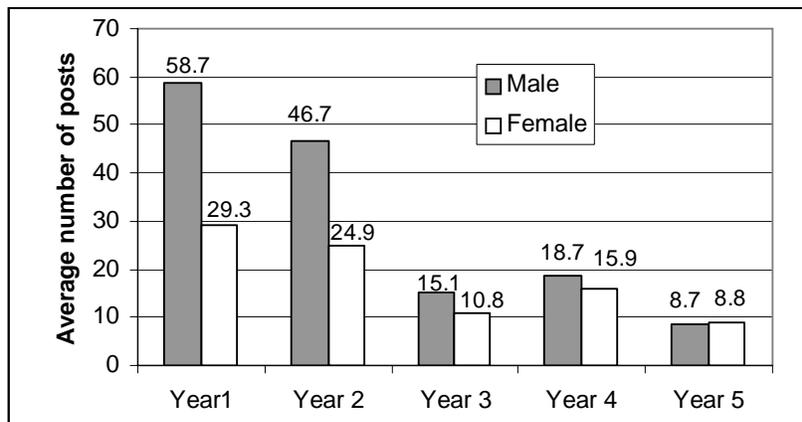


Figure 6: average number of posts per student for males and females

These data are, however, slightly misleading as only 6 males were responsible for the bulk (52%) of the male posts in Years 1 and 2, with the most active students posting over 200 messages each. The academic board in Year 1 shows a more balanced spread of posts but with 4 males still being responsible for 25% of male posts. Overall, males posted in equal numbers to the academic and non-academic boards. Females however posted 2.4 times as many academic messages overall as non-academic messages.

### **Structure of messages**

Most threads (73%) had 5 or fewer messages posted to them, but one thread exceeded 500 messages. The majority of messages were short – between 1 and 99 characters in length. Males were more likely to post short messages than females (52% versus 41%).

Logins to EEMeC peak at 2pm with 9.5% of logins occurring at that time, whereas discussion board posts peak at 5pm, thus a higher proportion of users logged on during the evening and at night are posting to the discussion boards than in the daytime. Females are most active between 12 noon and 6pm, with three distinct peaks during this period. The level of male activity remains high over a longer period, from 12 noon to 8pm, with the highest peak at 5pm. Males consistently post more messages than females, except between the hours of 8am and 10am when activity is equal.

On the non-academic boards, male activity is greater than female activity at almost all times of the day and is often double the female activity, except between 6am and 10am when rates are similar. The curves show similar periodicity but males show a large increase in activity between 8-9pm whereas females show a small increase in activity at 11pm.

### **Analysis of academic discussion content**

The EEMeC database automatically captures data about every transaction users make within the system, including a record of all discussion board entries. Content analysis (a method for identifying themes or concepts in transcripts of communication content, and coding these into categories) was used as a method of examining the content of the boards. Manual coding of content by multiple coders can be extremely labour-intensive (Rourke et al. 2001). Using Leximancer, text mining software produced by the University of Queensland in Australia, it was relatively straightforward to analyse the total content of discussion board transcripts, consisting of over 60,000 messages grouped by thread.

The Leximancer software analyses text documents, automatically generates concepts from seed words, and maps these concepts in a visual display with which the user can interact to look at the information in greater depth. The relative frequencies with which concepts occur in the processed text are indicated by the brightness of the concepts on the map, with related concepts appearing closer together. In order to validate the tool, test analyses were run using two MBChB study guides with known content and the resulting conceptual maps described the documents accurately.

The analysis found that concepts fall into four broad categories:

1. **Scheduling and administration** - timetabling of events, locating venues and arranging meetings. Example concepts include 'today', 'tomorrow', 'Monday', 'Thursday', 'swap' and 'meet'.
2. **Learning and teaching activities** - course assignments or course delivery, including essays, exams, lecture notes and clinical options projects. Example concepts include 'lecture', 'tutorial', 'essay', 'project', 'poster', 'diary', 'elective' and 'portfolio'.

3. Course subject matter – medical/scientific terms and jargon relating to course content and medical topics. Example concepts include ‘cells’, ‘blood’, ‘secretion’, ‘anatomy’, ‘system’, ‘heart’ and ‘inflammation’.

4. Other - general information-seeking behaviour not covered by the categories above, or dissemination of information, such as announcements from class representatives. Example concepts include ‘find’, ‘question’, ‘wondering’, ‘idea’, ‘email’, ‘www’, ‘announcement’, ‘message’ and ‘help’.

As Leximancer only examines the syntactic properties of text there is a certain semantic level that it is not able to capture, such as style or implied tone of voice.

A brief analysis of male and female posts in years 1 and 2 confirmed what previous studies have shown about gender differences between in conversational styles:

*“The evidence for conversational style differences between women and men is substantial... Women are generally more cooperative, more socioemotional in orientation, and more facilitating of conversational interaction... On the other hand, men have been characterized as less cooperative contributors to the conversation of others, and they are eager to hold the floor and control the topic of conversation. ... compared to women’s conversations they are more likely to use bragging, verbal jousting and mutual insults.” (Hannah & Murachver 1999)*

The Leximancer analyses indicated that, particularly in year 1, males were more aggressive and often insulted each other, particularly in terms of sexuality. In general, females used less direct language - prefacing comments with ‘I think’, ‘I feel’ or ‘I was just wondering’, phrasing comments as questions rather than statements and downplaying the value or usefulness of information offered:

*“Not sure how useful that is ... hope it helps” – Year1 female student.*

*“... ammonia can be secreted in a free form if someone is suffering from acidosis to give a more alkaline environment (that could be completely wrong though- did anyone else get that?)” – Year1 female student.*

The argument has been made Maltz and Borker (1982) that because males and females are socialised differently they acquire their norms of conversational interaction in same-sex groups, thus developing two distinct linguistic subcultures. However:

*“we need to be aware that each type of CMC has its own usage conditions ...and these ... may, in turn, influence the character of language produced in that medium (e.g. formal versus informal, collaborative versus aggressive, verbose versus terse, edited versus scattershot, informative versus whimsical)” (Baron 2004)*

Further analysis of conversational style is beyond the scope of this paper but there is evidently plenty of opportunity for future studies to investigate gender differences in computer mediated communication, particularly as it falls into some middle ground between written and spoken communication and in many forms of CMC participants can be anonymous, and can conceal or lie about their gender. Research has shown (Dubrovsky et al. 1991) that in many respects CMC brings about an ‘equalisation phenomenon’: the lack of social context and non-verbal cues present in face-to-face interactions allows ‘lower status’ participants to contribute to discussion on more of an equal footing – those who are reticent, or less assertive may participate more online due to decreased anxiety levels and the opportunity to reflect on what others are saying. However, cues from gender differences in conversational style may exert other subtle pressures that have an effect on both the content of the discussion and on who participates (Blum 1998).

## Discussion

The use and opportunity of asynchronous discussion in online learning environments is well documented:

*“the online environment for computer-mediated communication mediates the communication but also shapes it... Participants do not need permission to contribute and individuals can receive ‘attention’ from those willing and able to offer it.”* (Salmon 2000)

The characteristics of computer conferencing include: asynchronicity of interaction, the reification and permanent record of ideas and interactions, and the potential for observation without participation (Mason and Weller 2000).

MBChB students experience a blended learning environment, interacting with each other and with staff both in face-to-face situations and within the EEMeC online environment. Some of the interest groups and friendships formed via face-to-face interactions are continued online, with many discussion threads concerned with special interests and extra-curricular activities of students such as sports, music and religion, as well as the smaller, academic-related group activities that occur in face-to-face situations but that are often managed via the discussion boards.

There are many questions raised by the opportunity to use asynchronous discussion. How much learning is actually done via the academic discussion boards? Should the use of discussion boards to facilitate learning or to discuss class assignments be encouraged? Should moderated boards with mandatory contributions become structured learning activities within the course? If so, how should the type and extent of students’ learning through these methods be evaluated? To what extent do students’ activities on the discussion boards strengthen their ties within the MBChB community as a whole?

The use of online discussion boards is considered a valuable way for students to establish collaborative working practices and to develop a cohesive supportive community. In addition to these broad social themes there are specific community benefits that can be gained (Wegerif 1998). EEMeC allows participation in the MBChB to continue even though the students may be geographically removed from the blended environment during such periods as electives, off-campus clinical attachments or vacations. One student noted:

*“...students on peripheral attachments can feel quite isolated and EEMeC was a good way to keep in touch although in some cases substandard computers and software make it difficult.”*

In one class where discussion boards were used for discourse about a particular essay topic, one student expressed concern that this was a form of cheating. The response from the lecturer was very positive:

*"Personally, I'm delighted to see this discussion. It's super to learn in this sort of way and I don't think you need worry about such an exchange of ideas being cheating, as long as the final writing you submit is your own. Well done, all of you!" –teacher, via academic discussion board*

Staff participation, other than for administrative purposes, is limited to a small, core group of highly-motivated users with an interest in learning technology. Interviews with staff members who do use the discussion boards have yielded some informative and positive comments:

*“...it’s been much easier to get in touch with the student body... if there is anything we need to discuss it can be done and sorted very quickly. That gives me as a course organizer considerable flexibility.” –teacher, from interview*

*“...the discussion boards have been a very good way of getting students stimulated to discuss things amongst themselves ... I think its educational benefits are immense.” –teacher, from interview*

Regarding norms of use for online discussions and conformance with regulations the following was observed in reference to the discussion boards:

*“There are certain norms that people have to conform to and I think they’re quite clearly laid down in the discussion boards and the blurb that goes with them. In the first year those discussion boards got going they were rapidly stamped on when people went outside – and quite rightly so.” teacher, from interview*

This is not significantly different from community interactions in other media except that the rules are more clearly defined and individuals may be held accountable for their contributions long after they have been made. At the same time, opportunities that discussion can provide may also act against conformity:

*“There’s a slight informality about electronic communication that I quite like but which some members of staff might not like. I could see that it might lead to conflict with some members of staff who have a more formal view of what a student should and shouldn’t say and do.” teacher, from interview*

The VLE may also affect the relative levels of empowerment of different participant groups:

*“I think the students might be more empowered because of the possibility to discuss things more with their colleagues in public. For staff it’s difficult to say because they mostly don’t use it... It doesn’t really affect their authority.” –staff, from interview*

If there is political change though, it may not be entirely welcome by all those involved:

*“Students are part of the system and have as much right as anybody else to discuss issues that concern them. ... I think it’s got a beneficial democratic tendency and I could see that might not appeal to some staff members that don’t want students to have a voice.” –teacher, from interview*

A few members of staff have questioned whether staff should be able to see the non-academic boards at all, stating "this smacks of big brother". This is echoed in some students’ comments, showing that they are concerned, at least to some extent, about being monitored:

*“they [sic] record every defamatory comment made on the EEMeC discussion boards and adjust your mark depending on your obedience/insolence.” –student, via discussion board*

The ability of online environments to facilitate unseen observation and monitoring of students has been equated to Foucault’s ideas of panopticism (Land and Bayne 2004) and has the potential to both disempower the student and subvert by creating new selves. There is little evidence for either of these concerns with regards to EEMeC however. In a separate evaluation of EEMeC, tracking was considered to be of lesser importance than most other aspects of the system (Ellaway et al. 2004) and there is a general consensus that the use of discussion boards has empowered the student body rather than disempowered it.

## Conclusions

It should be noted that usage patterns of the discussion boards are not stable yet and may never be. Although page views by users accessing EEMeC on-campus have already leveled out, off-campus access continues to increase. More importantly the development of EEMeC is a process- rather than product-oriented activity and as such it is anticipated that EEMeC will continue to develop and change along with the programme of study that it serves. Nonetheless, for students, discussion boards have been one of the most heavily used and valued features of EEMeC and this has in turn made the system viable for many other activities and services. The importance to staff of EEMeC discussion is therefore greater than it may seem as it has helped to build the user base for more direct online teaching, learning and assessment activities.

Throughout the 5 years of the MBChB, males are slightly more active than females in terms of overall posts, logins, and posts to the non-academic boards, but by Year 5 females are slightly more active than males on the non-academic board. Year 1 males make up the most unusual sub-group in this study: staying up late, posting messages all through the night, and are highly active on their non-academic discussion board, frequently insulting each other. By year 2 they have settled down a bit and their profile begins to look more similar to the year 2 females. This is an indication of both the changing dynamics of the MBChB programme and changes in student behaviour across the five years of the programme. In particular, it indicates a trend of disparate school leavers maturing and becoming more members of a more homogenous cohort as they approach professional practice.

The content of the discussion can be broken down into four areas: scheduling and administration, learning and teaching activities, course subject matter, and general information-seeking behaviour not covered by the other categories. It is clear that although learning-related activity is a significant component of the use of discussion boards it is only one theme among many. The holistic nature of student participation in a degree programme is therefore thrown into sharp relief. Learning activity has to be seen in the context of a matrix of other activities including logistics, social interaction and orientation.

Students have been enthusiastic about using the discussion boards, but, other than a small group of motivated (and perhaps intrepid) individuals, there has been limited staff participation so far. As the idea of online discussion for teaching and learning becomes more pervasive and embedded in the culture of the MBChB, it might be anticipated that more staff will be curious and motivated enough to experiment with discussion forums. The demand, if it exists, for discussion boards to be adopted formally as part of structured teaching and learning activities, will most likely continue to originate from the student body.

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