*Australian Journal of Adult Learning*
*Volume 57, Number 2, July 2017*

# Gender differences in online participation: examining a History and a Mathematics Open Foundation online course

Annette Morante
Valerie Djenidi
Helene Clark
Susan West

Newcastle University

*With enrolment and completion rates in the University of Newcastle's online Open Foundation enabling program being considerably higher for women than for men, this case study investigates the engagement of male and female students in two different subject areas. History and Mathematics students' online behaviour is examined to identify whether they differ and if there is a correlation between time spent online and student results. Is low-level, or no online interaction a problem or does it differ for the two genders, and the two subjects? It is generally accepted that women engage more but does this lead to higher results for them? Students do not always appreciate how different the world of online learning is, and, in addition, some experience difficulties in understanding how to use Blackboard effectively. By examining students' online engagement we seek to identify the behaviours that lead to retention of students and ultimately to their successful completion of the program.*

***Keywords***: gender, Blackboard, Higher Education, online learning, online participation

## Introduction

As learning and technology intersect in tertiary institutions worldwide, implications about the ways women and men engage in online learning environments have become an important issue to examine. The growth of online courses requires researchers of higher education to consider how their students engage and find ways that ensure the learning environment can be successful for all. As lecturers, we were concerned that our students were not participating in the online courses as much as we had anticipated. We also noticed there were differences between how men and women were engaging with their course and each other. Further, research about enabling online education is limited, with little research on the ways men and women engage in online enabling courses. This case study will examine the differences in how men and women engage in two online Open Foundation courses; Mathematics and Australian History in their first semester of their courses. We seek to understand the engagement patterns of male and female students who are new to online university study, and to examine how engagement of both genders drops off as the semester progresses.

The first aim in studying the literature was to examine how men and women learn in the online environment and to discover if gender differences observed in the two cohorts of enabling students at the University of Newcastle were similar to the differences other researchers had found. McKnight-Tutein and Thackaberry (2011) asserted there was a strong body of evidence that suggested women learned differently from men, which made women inherently more successful in the online learning environment. They believed that women were uniquely positioned to be effective learners because they used affective learning methods that allowed them to learn in relational ways by drawing on connections.

Further, a study conducted in 2002-2004 with 191 learners at Open University UK indicated that, "women's access to technology and enrolment on the online version of the course was comparable to men's" (Price, 2006: 353). This study also found that women were significantly

more academically successful in the online version of the course than men, and a greater percentage of women than men completed the course. Similarly, a survey of 406 university students between the ages of 18 and 39 years old, found that female students were more receptive to online learning than male students (Selwyn, 2007).

These findings reflect the conclusions of Anderson and Haddad (2005) who also investigated the idea that female students were more reflective in their learning, appeared less hesitant to engage in the online environment, felt they had more control over their learning and found the mode a positive experience compared to face to face courses in similar academic areas. They believed online learning complemented women's 'ways of knowing' since, "many women are 'connected' knowers who make sense of reality by relating new knowledge to experience in the context of relationships" (Anderson and Haddad, 2005: 4). This idea that female students in online courses had greater opportunity for reflection, hence deeper perceived learning online was reflected in the research of both Anderson and Haddad (2005) and McKnight-Tutein and Thackaberry (2011) suggesting that this mode of learning was conducive to a high level of success for women.

Motivation and self-regulation also played a role in successful online learning. According to Yoo and Huang (2013: 156), "female students have a stronger intrinsic motivation to take online courses than their male counterparts." Studies by McSporran and Young (2001) found that women and older students preferred online courses, had a strong motivation to participate in online learning and were good at communicating online. They also noted that women did better on assignments and exams, were more successful at finding uninterrupted study time and at self-regulating. Women were also more likely to progress through a set task in a linear fashion, while men would jump ahead and run into problems.

Price (2006: 354) suggested that women were "confident independent learners who may outperform their male counterparts." Price's research suggested that women were more confident online than in face-to-face environments, were more willing to learn from other students, seek support, were more self-directed than men and had a strong desire to be academically engaged. Price's research also found women placed greater value on the pastoral aspect of tutoring and that their interaction styles were different to men's. Thus, the literature suggested the

differences between how men and women learn online was largely due to differences in how men and women perceived their learning, with women tending to be more receptive to, and reflective of their online learning. Levels of motivation, self-regulation and interaction also differed between men and women who studied online.

The second aim of our case study was to discover how engagement patterns differed between men and women. An examination of the literature about engagement patterns of men and women in the higher education sector was required so we could compare these behaviours of engagement with our enabling cohorts.

Li (2006, cited in Caspi, Chajut & Saporta, 2008) suggested women and men engaged differently in online courses; women were personal, task-oriented and liked to engage with others, whereas men were more likely to use information-driven approaches to engagement. Li's conclusions reflected Hirschman and Thompson's findings (1997) that differences between men's and women's interpretations or perceptions were significant, as women included their personal feelings in their interpretations, whereas men appeared more detached.

A study by Caspi, Chajut and Saporta (2008) investigated gender participation differences in online classroom discussions. They found that females posted more messages than males. Prinsen, Volman and Terwel (2007) also found that females posted more messages in their discussions.

Yaghmour (2012) completed a literature search about engagement patterns of online learners and found women were more likely than men to collaborate (Li, 2005a; Hermann Astleitner, 200; Li, 2005b; Prinsen, 2007), women contributed to online discussion more than men, and used communication as their motivation to be online (Hartsell, 2005). Yet Yaghmour also found that women were less confident as users as they tended to rate their technology skills lower than males (Liff, 2004, cited in Yaghmour, 2012). Li (2005) found that while both men and women were equally happy to disagree, when challenged women were more likely than men to drop out of the conversation. They were also more likely to apologise than men (Li, 2005) and were personal oriented (Li, 2005). Females preferred anonymous interaction to reduce gender-based judgment (Li, 2005), and had more searching and asking question behaviours (Astleitner, 2005).

In a 1996 study Savicki, Kelley and Lingenfelter found that in women-only groups, women acknowledged the other group members, responded to each other, and avoided flaming. Lewis (2007) referred to the work of Herring (1996, 2002) and Hawisher (1999) who found women tended to support each other in online contributions. Lewis (2007:86) stated, "women give more appreciating statements, send fewer flames, ask other participants for their opinion, and keep silent in aggressive arguments." These attributes are not found in the male-only groups.

Prinsen (2007) found that men disagree more and cites Montieth (2002) that this might be because men wanted to establish control and status. Men were more likely to use abusive language online (Prinsen, 2007), used authoritative statements (Li, 2005) and were fact oriented (Prinsen, 2007). The literature also found that women sent more messages than men (Li, 2005; Astleitner, 2005; Li, 2005; Prinsen, 2007), but men were more motivated to acquire new skills (Li, 2005). Male users had higher levels of enjoyment than women, men accessed the Internet for longer periods of time (Li, 2005) and had better access to the Internet (Prummer, 2004, cited in Yaghmour, 2012).

Thus, while some patterns of engagement differed between men and women, there were also engagement patterns that were similar for both men and women. According to Lim and Kim (2003, cited in Yoo and Huang, 2013) both male and female students engaged online to improve their ability, and were motivated to continue to study online if there were incentives for their efforts such as feedback and grades. These extrinsic motivations drove the desire to attain an educational outcome (Deci and Ryan, 2000, cited in Yoo and Huang, 2013). There was also evidence to suggest that intrinsic motivation played a role in online learning as students felt they could choose to engage, bringing them a sense of satisfaction (Martens, Gulikers and Bastianens, 2004, cited in Yoo and Huang, 2013).

In summary, patterns of engagement for women tended to be personal, task oriented and collaborative. Women posted more, used communicating with other students as a motivator for their learning and displayed more searching and asking question behaviours than men. Men, on the other hand, preferred information driven approaches to learning, were more detached online, and used the acquisition of new skills as their motivator to learn. Both men and women engaged online

to gain an educational outcome, were motivated to continue their study if their efforts were rewarded via feedback and grades and if study gave them an intrinsic sense of satisfaction. With this literature in mind, understanding why participation rates fall away for both men and women studying in enabling courses is important. To understand the complexity of why, or why not, students engage in their courses was the last focus of this case study.

In 2011 a comprehensive review of the Open Foundation Online program was conducted at the University of Newcastle. One finding of that review was that interaction and engagement was lacking for both genders, even at the very beginning of the course. Goode and Clark (2012:39) found that, "students were not engaging with each other, lecturers or support staff in a way that promoted the establishment of active or supportive learning communities". Bryson & Hand (2007, cited in Yoo and Huang, 2013) made the point that lack of engagement was not necessarily a result of lack of motivation, but rather, as adults having responsibilities to family and work, motivation became one of many factors that impacted student engagement. In other words, it was not motivation alone that determined if a student remained engaged in an online course. Along with the pressure of adult responsibilities, other factors contributed, including the level of interaction with instructors, institutional support (Leach and Zepke 2011, cited in Yoo and Huang, 2013) and prior online learning experiences and perceived barriers of the students themselves (Muilenburg and Berge, 2005, cited in Yoo and Huang, 2013).

In the online learning environment, research on gender and age differences as determinants of engagement were inconclusive and require further study (Yoo and Huang 2012). Ian Solomonides (2012) suggested that student engagement was embedded in the, "quality assurance and policy directions of many higher education institutions and regulatory bodies" which did not allow for more affective and socio-cultural reasons for engagement to be considered. He believed gauging engagement using quality assurance measures did not fully address the multi-faceted and complex nature of student engagement in the online setting. It appears, a wider view of what student engagement is and how it can be encouraged is required. Given the complexities of engagement, this study attempts to examine gender as one impact on engagement patterns.

There was some agreement, however, on strategies that might encourage student engagement. According to Tyler Griffin (2014) engaging and retaining students required instructors to keep content relevant, use questioning to keep students involved, and understand that students want more than the consumption of content, but to see connections between content and its relevance to their world and experiences. Griffin believed engagement happened when students had opportunities to share relevant problems with their teacher and come up with solutions together. He suggested the question uppermost in the mind of the teacher should be: why should a student in my class care about this? (Griffin, 2014). Pascarella and Terenzini (2005, cited in Richardson & Radloff, 2014:603) suggested, "students and staff should be regarded as allies in learning." Their investigation found that frequent interaction between student and teacher led to higher levels of engagement and lower attrition. Vincent Tinto (1998) also found that students who felt supported were most likely to persist with their studies and achieve academic success. Finally, Richardson and Radloff (2014:612) made as their final observation that, "notable differences [exist] between what students do and what teaching staff perceive students do in order to suggest ways of improving engagement and outcomes for both students and staff." Genuine engagement with students then was a key driver of long-term participation in online courses. There is a view that motivation alone predicts engagement patterns. Teacher perception of student behaviour was often at odds with why students exhibited certain engaging or non-engaging patterns of behaviour. This moves the gender debate about student engagement into a more nuanced space. University policies and regulations that did not take into account the affective and socio-cultural reasons for engagement risked reducing this complex and multifaceted issue into a student or teacher blaming activity when low levels of participation in courses were being questioned. Our case study seeks to highlight the individual and complex nature of male and female student engagement to find a diverse range of ways that can encourage increased engagement and participation.

## Comments on the History Blackboard's Site and Students' Engagement

### *Methodology*

The aim of focusing on a small cohort of students in a humanity course – Australian History – was to observe and analyse the ways female

and male part-time enabling students engage online during their first semester of studies. Enabling students who enrol in a 10 unit-course were expected to spend between 120 and 140 hours studying, which included one weekly two-hour lecture, and one-hour weekly tutorial. In a humanity course without weekly tests or quizzes, it can be difficult to maintain a regular online presence. Yet previous research demonstrated how a lack of social interaction can be seen as the most important barrier in online learning (Muilenburg & Berg cited in Whannell & Whannell, 2012: 28). Further, recent research on the teaching of history emphasises the importance of listening to students and providing them opportunities "to voice their ideas and process rational arguments" (Gare, 2015: 189).

This case study was based on data found in two main sources of information: the reports powered by Blackboard Learn™ and an online discussion board. Its aim was to learn about students' engagement by monitoring different kinds of behaviour and gauged not only students' online presence but also their communications. While the process of analysing the reports produced by Blackboard Learn™ can be time-consuming, the detailed data revealed how long each student stayed on different areas of the Blackboard site and how often he/she accessed them. The first report called All User Activity inside Content Areas Report was the most useful as it specified the number of hits as well as how each student spent his/her time online (as a percentage) between the different folders available: Assessment, Resources, Study Guides, Tutorials, Contact and Course Overview. We focused on the first four folders, as they were the most consulted and the most interesting pedagogically. The second report called Student Overview for Single Course broke up each student's activity per day and listed all items consulted, specifying the number of hits as well as the time spent on each item (See Appendix 1). This report was specifically used to calculate the average time spent online and observe students' presence in relation to tutorials. As the only online synchronous activity offered, the tutorials were an important component of the course that offered a platform to encourage discussion and exchange of ideas.

The third source of information used to understand students' online behaviour was the online discussion forum called 'History Matters Blog' and the posts written. We investigated the different ways female and male students interacted with their learning community and

communicated with each other or with their lecturer and classified the interactions as either communication or information. The blog was a space where students were encouraged to engage by asking questions on any aspects of the course as well as sharing their thoughts about specific aspects of history. We also wanted to observe the consistency of these two kinds of interaction during the semester.

### *Results*

At the end of their first semester of study, 22 students were enrolled in the online Australian History course: 15 were female (68% of the cohort) and seven were male (32%). The small scale of the sample enabled a thorough study of enabling students' journey during their first semester of online studies in a part-time course. The report on the Content Areas revealed that women stayed online on average longer than men (51 hours versus 23 hours, see Figure 1). Interestingly, the distribution of hits between all folders demonstrated that female and male students navigated between them in similar ways: the Study Guides was the most often accessed area, followed by the folders Assessments, Resources and Tutorials (Figure 2).

***Figure 1**: Average Time spent on the Content Areas*

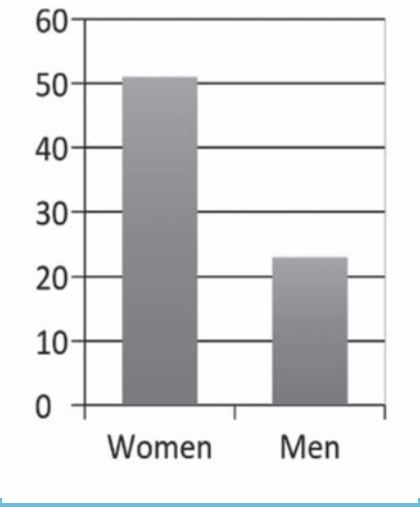
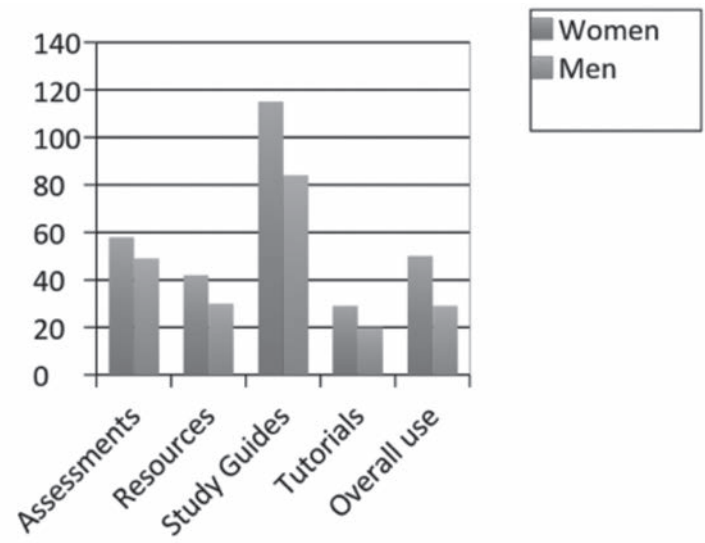


***Figure 2**: Students' Average Hits per Folder*




While students distributed their time in similar ways (see Figure 3), there was a slight difference in the percentage of time female and male students dedicated to two folders: Study Guides and Assessment.

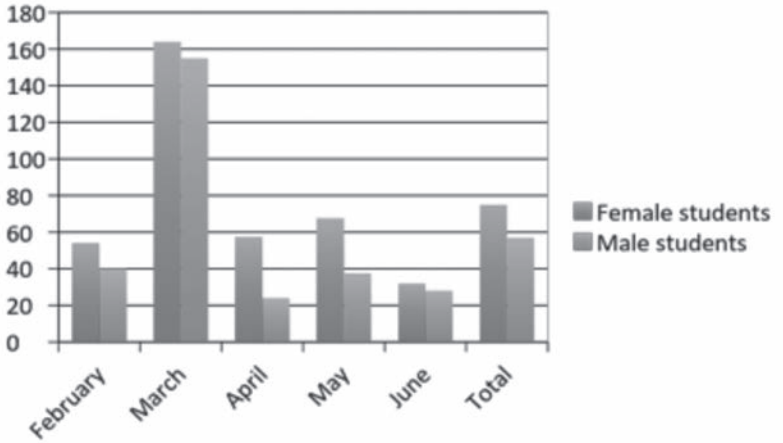
***Figure 3** - Activity inside Content Area as a Percentage (Men on left, Women on right)*

The Study Guides, which gave a weekly overview of students' tasks (recorded lectures, recommended readings, tutorial readings and questions, and advice on the work that should be done towards the assessments), was the most accessed folder by all students. Female students consulted this folder on average 115 times, while male students accessed it on average 84 times. This means that female students spent on average 41% of their hits on it while it represented 38% of male students' hits.

The two students who accessed the Guides the most often were female (370 and 351 times); the former spent 63 hours online while the latter spent 93 hours and both students had less than 60% as final results. The two highest numbers of hits for male students were 292 and 94; the former spent 66 hours online and was awarded 51%, while the latter spent 50 hours online and achieved 79%. These results exposed the difficulty of finding a correlation between the numbers of hits, the time spent online and academic results. Yet the gap between female and male students' highest number of hits confirms previous research: women spent more time online (Price, 2006). While a high level of online presence does not always ensure good marks, a very low presence and a lack of communication often lead to low marks. For example, a female student, who accessed the Study Guides five times and spent 14 hours online, failed the course.

The second most accessed folder was Assessment, where students could find documents that helped them understand and complete their assignments, which were well scaffolded and distributed over the semester[1]. Male students consulted it on average 49 times, the total number of hits ranging from 30 to 81. Female students averaged 58 hits, with a total number of hits ranging from 33 to 98. While female students spent 26% of their hits on Assessment, it represented 29% of male students' hits. Interestingly the graph on the average monthly access (Figure 4) indicated that the assessments' due dates did not greatly influence students' online access. This finding contrasts with students' interventions on the blog, which increased when assignments were due and declined sharply at the end of the semester.

***Figure 4*** *- Students' Monthly Average*




Analysing the data on the distribution of time exposed some of the problems online students face. Students who did not follow the average trend drew our attention. For example, the female student who consulted the Assessment folder the least (33 times or 7% of her total hits) consulted the Study Guides 351 times (71% of her hits). Her final mark for the semester was a pass (56%). Her engagement with the course revealed that throughout the semester she spent 93 hours online with a total of 496 hits – 12% of her hits were on Resources and 10% on Tutorials. This distribution of hits did not follow the average trend for female students, which was: 41% on the Study Guides, 26% on Assessments, 17% on Resources and 11% on Tutorials (Figure 3). She appeared to have accessed the Guides too often while not dedicating enough time to Assessment, which suggests either inadequate time management or difficulty grasping the course content and its expectations. Conversely, the male student who accessed this folder the least did it 30 times. He spent 11 hours online and was awarded 62%. Like the majority of students, this student spent most time on the Study Guides (36%), 25% on Resources, and 9% on Tutorials (or 10 hits or 7 minutes). While he had a credit for his progressive marks, his lack of engagement with the tutorials may have impacted on his exam mark (50%).

Interestingly, the male student, who accessed the course area most (463 times), spent the longest time online (66 hours) and wrote three

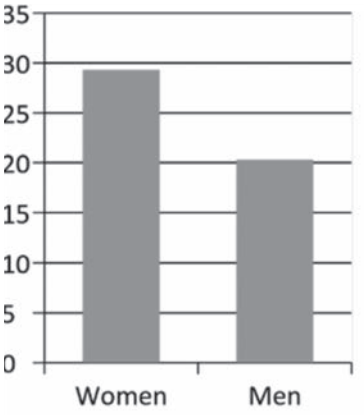
posts (one communication and two information). Yet, his final result (51%) illustrates how the time spent online does not automatically equate with success, and may indicate that the student was experiencing difficulties. The male student who was awarded the best mark (79%) spent 50 hours online and wrote one communication post on the blog. These different approaches to online studies support the need to further investigate students' online presence to guide the improvement and renewal of the online courses offered to our diverse enabling cohort of students.

Female and male students consulted the Resources folder, the third most accessed area, in similar ways: it represented 17% of female students' hits and 16% of male students'. The average was 42 hits from female students and 30 from male students. The male student, who accessed Resources the most (70 times), spent 50 hours online and was awarded a Distinction. The female student who accessed Resources the most (99 times), checked the Study Guides five times and the tutorials twice, she failed the course. Her lack of engagement with significant aspects of the course was confirmed by her silence on the blog throughout the semester. This demonstrates the importance of distributing well studying time throughout the semester, but also the need to encourage students to discuss the important issue of time management.

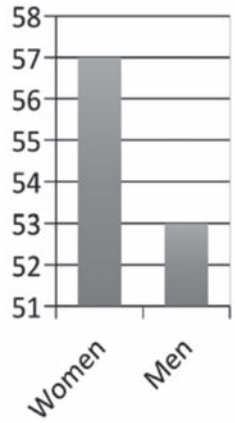
Analysing the three most used areas (Study Guides, Assessment and Resources) gave us an indication on the ways students navigated Blackboard and managed their time online during their first semester. While it is difficult to draw a correlation between the time spent online and the overall mark awarded, a necessary minimum amount of engagement appears important. This is confirmed by the analysis of the data on the tutorials. Students were told that the tutorial material would be tested in the end of semester exam. Interestingly, both female and male students spent 11% of their hits on the Tutorial folder. Female students accessed it on average 29 times spending 57 minutes on that folder while men did so, on average 20 times (or 53 minutes). The minima and maxima numbers of hits on the Tutorial folder by female students ranged from 2 to 54, and from 7 to 26 hits by male students. As for the other aspects of the course, female students were more engaged than male students. The tutorials were the only online synchronous communications during the semester but many students did not join

them. The ability to access the recordings later made them an important source of information that was quite readily used by students, even if they had joined the tutorials. This is a reminder that some students chose to study online because they were time poor and some did not wish to interact with their learning community.

***Figure 5**: Tutorial hits and minutes (women and men)*




*Tutorials (hits)*




*Tutorials (minutes)*

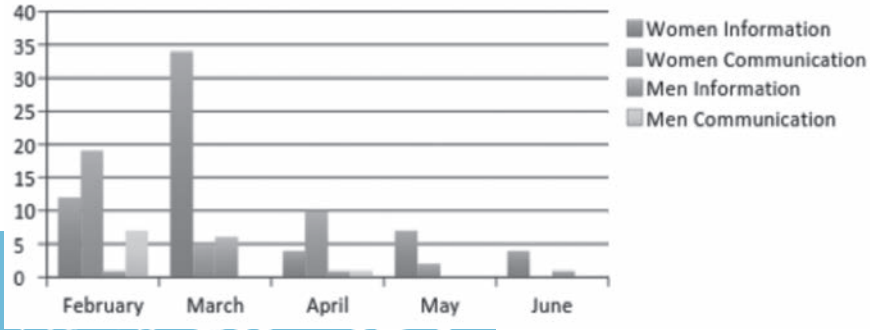
Another way to gauge students' engagement was to examine the posts written in the forum called 'History Matters Blog'. As an asynchronous mode of communication, the forum aimed to facilitate interactions between their lecturers or peers and create a learning community. The blog can be used as an information tool or a way to communicate or establish human-to-human interactivities. Accordingly, students' monthly engagements were evaluated depending on their purpose: either information or communication. Over the semester, female students wrote ninety-seven posts while male students authored 17 posts. February was the best month in terms of communication on the blog with 19 women and seven men writing a post. Most students seemed to enjoy answering the invitation to introduce themselves to their lecturer and peers. Some female students suggested the organisation of study groups and wrote about their eagerness to attend the Face-2-Face days.[1] Both female and male students commented

on their anxiety about starting a new journey and also mentioned their other commitments (work and families), which impacted on their engagement. As an enabling, part-time cohort, our students have multiple identities that may complicate further the building of a learning community. The blog aims to generate a sense of community by encouraging students to interact and hopefully support each other.

The blog experienced a peak in March. The gradual release of material on Blackboard throughout the semester and the fact that two assessments were submitted in March encouraged students to access the course on a regular basis. Few male students wrote posts about their assignments and rarely socialised. In accordance with previous research, female students were more likely to communicate and foster relationship building (Price, 2006). Overall, female students were prevalent on the blog: they wrote 82% of Communication posts and 87% of the Information posts. Both female and male students communicated enthusiastically on the blog, but after the first weeks the blog entries decreased.

***Figure 6:*** *Australian History Blog post statistics*

| Gender | Type | February | March | April | May | June |
|---|---|---|---|---|---|---|
| *Women* | *Information* | 12 | 34 | 4 | 7 | 4 |
| | *Communication* | 19 | 5 | 10 | 2 | 0 |
| *Men* | *Information* | 1 | 6 | 1 | 0 | 1 |
| | *Information* | 7 | 0 | 1 | 0 | 0 |



The case study demonstrated how female students made more efforts to engage socially with their peers, writing more posts, and checking the blog on a more regular basis. They did so not only to ask questions, but also to answer queries from their peers. This engagement confirms that women are more likely to reach out (Anderson and Haddad, 2005). Yet, male and female students showed a reluctance to use the blog as a learning tool and a preference for using it as a platform to enquire about specific aspects of the course, often related to assessments. Despite the lecturer's encouragements to reflect on the course and their learning, only two students – female – answered her promptings. Both wrote a comprehensive post that might have intimidated others, resulting in fewer posts. Explaining to students how building a community of enquiry and learning can improve their learning outcomes and their satisfaction (Luhrs and McAnally-Salas, 2016:32) could entice them to make more efforts.

***Figure 7**: Correlation between Average Marks and Time*

| Grades | HD | D | C | P | F |
|---|---|---|---|---|---|
| Time (hours) Women/Men | 76/NA | NA/50 | 46/NA | 53/28 | 14/15 |

***Figure 8**: Students' Marks and Engagements over One Semester*

| | Total Mark (Average) | Average Hits | Average time (hours) | Average posts |
|---|---|---|---|---|
| Female students | 65% | 253 | 51 | 4.86 |
| Male students | 56% | 195 | 23 | 0.93 |

The data compiled in the above tables compared the average marks with students' online various activities. Female students achieved highest marks with an average mark of 65% (Credit) versus 56% (Pass) for male students. Women had an average of 66% in their progressive marks and 62.5% at their exam; while men had an average of 60% and 52%. We can note that women's average exam mark did not decrease as much as men's, which might be explained by a more sustained engagement throughout the semester. Figure 2 linked grades with time spent

online and reminds us that women spent more time online. It certainly demonstrates firstly that female students spent more time online and secondly that students (male and female) who spent on average less than 15 hours online are less likely to succeed.

Although the Australian History cohort was small, the data confirm previous research on women's and men's online presence and engagement. Examining students' interaction patterns was instructive and suggests a need to find ways to encourage all students to be consistently active and facilitate their integration into their new learning community. Previous research demonstrated how such integration could positively impact on students' confidence. Enabling students often have doubts about their ability to succeed and it is important to facilitate and promote in different ways their engagement to build up their confidence – this is even more important in a course such as history where students need to discuss evidence and build rational arguments. More research on male students' expectations and engagement with a history course would help us understand how we can motivate them to interact more with their enabling community.

### Comments on Mathematics Students' Engagement

This case study analysed the engagement in the weekly Discussion Boards of the 124 part-time students who completed Introductory Mathematics Online in a semester 1. Of those, 80 (or 65%) were female and 44 (or 35%) were male. We chose to analyse the weekly Discussion Boards only, as Introductory Mathematics is a course that is far larger than Australian History, and the Discussion Boards serve as an important teaching space, and as a forum heavily used by some students. Students asked questions about Mathematics problems that were most often answered by the lecturer, although sometimes other students, usually women, supplied the answers. Students also 'let off steam' when they were struggling, or their results were not what they hoped. Students appeared very comfortable doing this, which is a tribute to the lecturer's endless patience and kindness, and highlights the critical role of the teacher in online courses. The Discussion Boards were valuable as they were where so much communication, both social and Mathematics-linked, took place.

## Overall use of the 14 Discussions Boards – Information and Communication

Student posts were divided into those that were predominantly about requesting, or supplying, Information, and Communication posts which were predominantly about more social matters. This is a breakdown of that interaction over the course of the semester:

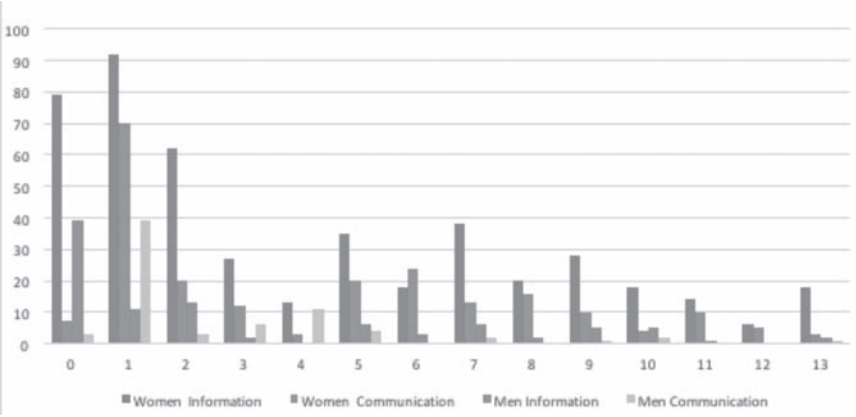
***Figure 9**: Communication Type by Week*

| | | Week | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Type | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Total |
| Women | Information | 79 | 92 | 62 | 27 | 13 | 35 | 18 | 38 | 20 | 28 | 18 | 14 | 6 | 18 | 468 |
| | Communication | 7 | 70 | 20 | 12 | 3 | 20 | 24 | 13 | 16 | 10 | 4 | 10 | 5 | 3 | 217 |
| Men | Information | 39 | 11 | 13 | 2 | 0 | 6 | 3 | 6 | 2 | 5 | 5 | 1 | 0 | 2 | 95 |
| | Communication | 3 | 39 | 3 | 6 | 11 | 4 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 72 |
| | | | | | | | | | | | | | | | | |
| | | 128 | 212 | 98 | 47 | 27 | 65 | 45 | 59 | 38 | 44 | 29 | 25 | 11 | 24 | 852 |

Predictably, there was a high level of activity of both types in the first three weeks of semester but it then dropped significantly. Gradually student posts in the Communication category decreased, and those in the Information category increased, as both men and women grappled with the various assessment tasks. In Week 7, posts by women increased, most likely reflecting the perceived difficulty of that week's topic. Overall men made only one-fifth of the Information posts while constituting one-third of the students. This supports Caspi, Chajut and Saporta's (2008) finding that females generally post more messages than males. That women made the majority of posts also suggests that they are less confident in their mathematical ability, and/or are more willing to ask for help than males.

The Mathematics course had weekly quizzes (worth 20% in total) and three other larger assessment items due in Weeks 5, 9 and 13 (each worth 10%), plus an exam (50%). The weekly quizzes caused women to ask for assistance, as did the Weeks 5 and 7 large assessment items. As women tend to participate more actively online than men (Chyung, 2007, cited in Yoo and Huang, 2013) it may have seemed obvious to many of them to ask for assistance while men's participation did not increase to the same extent when large assessment items were due. This may reflect men's greater confidence in their mathematical ability.

***Figure 10:*** *Communication Type by Week*




We will turn now to the correlation between online engagement by male and female students and the overall marks.

***Figure 11****: Summary of Student Online Behaviour and Marks*

| **Category of student** | **Average mark** |
|---|---|
| Men who never posted – 18 (40% of all men) | 84.9% |
| Men overall – the whole group of men – 44 | 80.3% |
| Men who posted from Wk 1 on – 18 (40% of all men) | 77.3% |
| Men who posted in Wk 0 only – 10 (22% of all men) | 77.0% |
| Women who posted from Wk 1 on – 50 (62% of all women) | 77.2% |
| Women overall – the whole group – 80 | 71.4% |
| Women who posted in Week 0 only – 18 (20% of all women) | 67.5% |
| Women who never posted – 21 (22% of all women) | 59.3% |

Twenty-two percent of the women and 40 percent of the men never posted on Discussion Board, and there is a 25-mark difference between the average results of these men and women, the largest variation of the four groups. If we accept that women tend to reach out more for online interaction, why did this group of women who gained the lowest average marks of all the groups, not do so? We can only assume that a

multiplicity of personal factors produced this behaviour. While three levels of Mathematics are offered on campus there is only one offered online (the introductory or lowest level) which results in students with a particularly wide range of abilities taking this course. Some men were aiming for courses such as Engineering, or high school Mathematics teaching, suggesting that they already had highly-developed skills in the discipline. Conversely, many women wanted to gain entry to degrees such as primary school teaching and nursing, requiring lower-level Mathematics, indicating that they began with a lower level of proficiency. Of those students who never posted on Discussion board, the men's average marks were very high, indicative of students requiring neither the assistance nor the social aspect the forum offered.

There was another group of students (20 percent of the females and 22 percent of the males**)** who introduced themselves in Week 0 and never posted online again. These women's results were lower than the average of *all* females, and also 9.5 marks lower than those of the males in this category. We speculate that, like the women who never posted online, this group of women found the online environment daunting and, in addition, asking for assistance can be difficult for students who do not like their shortcomings to be aired in such a 'public' forum. Australian girls and women tend to absorb the cultural belief that females possess innate mathematical skills inferior to males, and thus, as adult students have a psychological hurdle to overcome before they even begin to study Mathematics (on the gendered perceptions of mathematics and related careers, see Forgasz, Leder & Tan, 2014).

Those students who posted consistently, from Week 1 onward (62 percent of the women and 40 percent of the men) constitute the only category in which men's and women's average marks were virtually the same. Evidently these students found the lecturer's assistance valuable enough to override the concerns experienced by those who did not post beyond Week 1. Such students clearly understood their weaknesses, and were prepared to seek help online. In the other categories, the two genders' average marks were a minimum of 10% apart, with the women always having the lower average mark. Interestingly, there was little difference in marks between those men who posted in Week 0 only and those who posted from Week 1 onward. These were likely to have been the more able male students for whom online interaction made little difference although, like the female students, their interaction

might have lifted the marks, and improved the mathematical skills, of individuals.

Of the ten top performing students, five were women and five men, while the top two places went to women. The highest achieving five women made a total of 60 posts and the five men, a mere 9 posts. This suggests that even high-performing women need more interaction with the lecturer and fellow students than did the corresponding group of men which is in line with other researchers' findings (Li, 2005a; Hermann Astleiter, 2005; Prummer, 2004; Li 2005b; Prinsen, 2007).

Ultimately, the total number of posts by women was 685, and by men a mere 167 thus women posted at four times the rate of men. Women made far more use of Discussion Board yet in every category in the table above, women gained lower average marks than did the men. Women's results were an average of 8.9 marks below those of the men. The women who interacted online gained higher marks than those who did not, while for men, the inverse was true, with those men who posted online gaining lower marks than the men who never posted. We speculate, however, that the women's interaction might have served to keep them in the course; to boost their confidence and IT skills, and to gain higher marks than they would otherwise have done.

In this course, generally the more women interacted, the higher their final marks, thus struggling women need to be persuaded that online interaction will pay dividends. Conversely men who never interacted online gained the highest marks which is likely to be an aberration peculiar to this course. Taught online at the lowest of the three levels offered on campus, the mathematical content was not found demanding by the highest performing men who thus pragmatically refrained from ever going online, as they decided they needed neither the support nor interaction on offer.

## Conclusion

Many questions were raised as a result of this case study; in some cases gender appeared to play a role in engagement, and at other times our results did not conform to the findings in the literature about how men and women participate online. A major feature of this case study was the extent to which choice and student individuality played a role in how and when a student engaged. These cannot be measured against some

university standard, yet they are aspects that impact engagement in an online course. This case study did not attempt to study what encouraged a student to participate, but rather endeavoured to see if gender had a significant effect on participation rates.

The findings from this study closely reflect current literature on gender in the online environment, but with some unexpected outcomes. Firstly, it was expected that due dates of History assessments would influence students' online behaviour; however, this was not the case. Students did not access their assessment folders more often or for longer periods of time when assessment tasks were due. Conversely, an impending assessment did seem to impact on student engagement on the blog and, as previous research suggests, women were more likely to blog than their male peers. In the Mathematics course, women posted more often when a large assessment item was due but the men did not, possibly reflecting men's greater confidence in their mathematical ability. The study of all History students' access to the different areas demonstrates that both genders behave on average in similar ways between folders. They progress through their studies in a linear fashion, which in turn may influence how they navigate online, and explain why on average they more often accessed all folders in the content area. This is confirmed by previous research by McSporran and Young in 2001.

Overall the online behaviour of female students confirms previous research, which has shown that female students who engage more with their learning community achieve better results. This also appears true for men who studied the Australian History course, but not so for the men who studied Mathematics. Further research into the perceptions that men and women hold about their mathematical abilities might shed some light on this finding, but this is outside the scope of this paper. In both courses, students were encouraged from the beginning of semester to interact with their lecturer and other students to gain information and establish a learning community. However, their presence decreased as they became more familiar with the courses and the expectations. This may demonstrate that students were becoming self-directed learners, yet research suggests that students who continue to engage with lecturers and students generally do better. Setting up online learning environments that allow students to interact in different ways may facilitate greater male student participation and improve the overall experience of all students.

Leaving aside the highest performing group of male Mathematics students, it appears that students need to spend a minimum amount of time online. In Mathematics the more often students posted in the blog, the higher their final mark although this relationship was not so clear in the History course. In History some students spent too much time in one area of Blackboard when other areas would have been more useful in successfully completing assessment items. With the increasing diversity in age and background of online enabling students, it is likely that some will find this particular online environment unfamiliar and therefore daunting. It is important that lecturers make clear what parts of Blackboard are relevant at various stages of the course. Additional online activities could be devised and utilised early in the year; the challenge is to make such activities useful and meaningful to both men and women.

Mullenburg and Berg (cited in Whannell & Whannell, 2012: 28) argue that a lack of interaction is the most important barrier in online learning. Many students are, however, time poor and pragmatically choose not to 'waste' time online unless they can see a good reason for doing so. This applies particularly to men in the Mathematics course (those 62% of men who did not post on the blog beyond Week 0 yet gained high marks), which suggests that they well understood the purpose of the blog, deciding they needed neither the assistance nor socialising on offer there. Of course, some students, both male and female, enrol in an online course specifically because they do *not* want contact with either lecturer or fellow students. This could explain the 22% of women in the Mathematics course who never interacted online and who went on to gain the lowest average mark of all the groups. It is also possible that a whole variety of life circumstances made it difficult for those women to spend time online. The nature of Mathematics and History seems likely to have resulted in some differences in behaviour. In Mathematics a student generally knew how to complete the content for that week, or they did not, whereas in humanities subjects that line is not so well-defined and students can be unaware of what they do not know, until an assessment task is marked. Thus the value of Blackboard participation is easier to ascertain in the Mathematics course than it is in History. While the rewards inherent in belonging to a learning community may seem clear to lecturers and researchers, some students – but particularly men – still need to be convinced of the value of

time spent online. This is an issue that could be investigated by future researchers.

Our results indicate that engagement is a highly individual and complex activity. The differences between how men and women engage varied between the two courses, suggesting that engagement is multifaceted. By understanding the complexity of the individual within our cohorts of enabling students and offer, if not compel, them to take the opportunities to engage in the challenging journey that is the first semester of study will, we believe, result in genuine engagement of both student and teacher.

## Endnotes

1 Students submit a workbook (20%) in Week 4, an Essay Plan with an Annotated Bibliography (15%) in Week 6 and an essay (25%) in Week 8. At the end of the semester students sit an exam (mid-June), which is worth 40%.

2 Online students are invited to come to the Newcastle campus twice per semester to attend lectures and meet their lecturers and peers.

## Acknowledgement

Special thanks go to our colleague Dr Scott Sciffer for generously allowing us access to his online Mathematics course so we could gather the necessary data on his students.

## References

Anderson, D.M. & Haddad C.J. (2005) 'Gender, voice, and learning in online course environments', in *Journal of Asynchronous Learning Network,* 9: 1, 3-14.

Astleitner, H. & Steinberg, R. (2005) 'Are there gender differences in web-based learning? An integrated model and related effect sizes', in *AACE Journal*, 13:1, 16.

Caspi, A., Chajut, E. & Saporta, K. (2008) 'Participation in class and in online discussions: gender differences', in *Computers & Education*, 50: 3, 718-724.

Di Xu & Jaggars S. S. (2014) 'Performance Gaps between Online and Face-to-Face Courses: Differences across Types of Students and Academic Subject Areas', in *The Journal of Higher Education*, 85: 5, 633-659.

Forgasz, H., Leder, G. & Tan, H. (2014) 'Public Views on the gendering of mathematics and related careers: international comparisons', in *Educational Studies in Mathematics*, 87: 369-388.

Gare, D. (2015) 'Subversion and Freedom in the Teaching of History', in *Studies in Western Australian History*, 29: 183-196.

Goode, E. & Clark, H. (2012) " 'Week Zero' in open foundation by distance: The successes and challenges of embedding an online orientation into an enabling distance program", in *Create & Collaborate. Foundation & Bridging Educators New Zealand Inaugural Conference 2012. Conference Proceedings*: 38-49.

Griffin, T. (2014) 'Online learning that lasts: How to engage and retain students' [transcript]. Magna Online seminars. Magna Publications Inc.

Hirschman, E.C. & Thompson, C.J. (1997) 'Why media matter: toward a richer understanding of consumers' relationships with advertising and mass media', in *Journal of Advertising*, *26*: 1, 43-60.

Johnson, G.M. (2015) 'On-Campus and Fully-Online University Students: Comparing Demographics, Digital Technology Use and Learning Characteristics', in *Journal Of University Teaching & Learning Practice*, 12: 1, 1-13, Education Research Complete, EBSCO*host*, viewed 2 June 2015.

Lewis, A. (2007) 'Australian Women's Online Experiences: Why e-Learning doesn't Necessarily Guarantee an Inclusive or Egalitarian Communication Space', in *International Journal of Learning*, 14: 2, 81-90.

Luhrs, C. & McAnally-Salas, L. (2016) 'Collaboration levels in Asynchronous Discussion Forums: A social network analysis approach', in *Journal of Interactive Online Learning*, 14:1, 29-44.

McKnight-Tutein, G. & Thackaberry, A.S. (2011) 'Having it all: The hybrid solution for the best of both worlds in women's postsecondary education', in *Distance Learning*, 8: 3, 17-22.

McSporran, M. & Young, S. (2001) 'Does gender matter in online learning?', in *Association of Learning Technology Journal*, 9: 2, 3-14.

Price, L. (2006) 'Gender differences and similarities in online courses: challenging stereotypical views of women', in *Journal of Computer Assisted Learning*, 22, 349-359.

Prinsen, F.R., Volman, M.L. & Terwel, J. (2007) 'Gender-related differences in computer-mediated communication and computer-supported collaborative learning', in *Journal of Computer Assisted Learning*, 23, 393-409.

Richardson, S., & Radloff, A. (2014) 'Allies in learning: critical insights into the importance of staff–student interactions in university education', in *Teaching in Higher Education*, *19*(6), 603-615. doi:10.1080/13562517.2014.901960

Savicki, V., Lingenfelter, D. & Kelley, M. (1996) 'Gender Language Style and Group Composition in Internet Discussion Groups', in *Journal of Computer-Mediated Communication,* 2: 0. doi: 10.1111/j.1083-6101.1996.tb00191.x

Selwyn, N. (2007) 'The use of computer technology in university teaching and learning: a critical perspective', in *Journal of Computer Assisted Learning*, 23, 83-94.

Solomonides, I. (2012) 'A critique of the nexus between student engagement and lifelong learning', in *International Journal of Continuing Education and Lifelong Learning*, 5 (1): 65-82.

Tinto, V. (1988) 'Stages of student departure: Reflections on the longitudinal character of student leaving', in *The Journal of Higher Education*, *59* (4), 438-455.

Whannell P. and Whannell, R. (2012) 'Reducing the attrition of tertiary bridging students studying by distance: A practice report', in *Create*

*& Collaborate. Foundation & Bridging Educators New Zealand Inaugural Conference 2012. Conference Proceedings*: 26-37.

Yaghmour, S. (2012) 'Gender communication differences in synchronized distance learning lectures for users aged 18-60: a systematic literature review', in *Annual Review of Education, Communication & Language Sciences*, 9, 85-90.

Yoo, S.J. & Huang, W.D. (2013) 'Engaging Online Adult Learners in Higher Education: Motivational Factors Impacted by Gender, Age, and Prior Experiences', in *Journal of Continuing Higher Education*, 61 (3): 151-164. Available from: 10.1080/07377363.2013.836823. [2 June 2015].

Yukselturk, E. & Bulut, S. (2009) 'Gender differences in self-regulated online learning environment', in *Educational Technology & Society*, 12: 3, 12-22.

## About the Authors

***Annette Morante*** is the learning adviser for enabling students and works as part of the Learning Development team in the Centre of Teaching and Learning at the University of Newcastle. Annette has twenty-seven years teaching experience and has worked in the primary, secondary and tertiary educational sectors. In 2014, Annette was a member of a team that received the Vice Chancellor's awards for teaching excellence and contribution to student learning and the 2014 Office for Teaching and Learning's (OLT) 2014 citation for outstanding contributions to student learning. Annette is interested in teaching and her pedagogical interests include adult education, teaching students from disadvantaged backgrounds and teaching in the online environment.

***Valerie Djenidi*** teaches Australian History (part-time, intensive and online programs) for the English Language and Foundation Studies Centre at the University of Newcastle, Ourimbah campus. As a member of the Centre, she is interested in examining and understanding students' engagement (on campus and online) and the ways lecturers can help students belonging to minority groups feel members of a learning community.

***Helene Clark*** (retired) was formerly the co-coordinator of the Open Foundation online program with a huge interest in language and gender issues.

***Susan West*** (retired) has taught undergraduate History and for the past 11 years has taught in the Open Foundation programme. She is particularly interested in online teaching and has published on enabling education and also nineteenth century bushranging in NSW.

## Contact Details

*Susan West*
*New Lambton, New South Wales 2305*

*Email: susanclarewest@gmail.com*