Royal College of Surgeons in Ireland

repository@rcsi.com

Collaborative Tools to Enhance Engagement in a Blended Learning Master's Programme.

AUTHOR(S)

Lisa Donaldson, Anne Matthews, Aisling Walsh, Ruairi Brugha, Lucinda Manda-Taylor, Victor Mwapasa, Elaine Byrne

CITATION

Donaldson, Lisa; Matthews, Anne; Walsh, Aisling; Brugha, Ruairi; Manda-Taylor, Lucinda; Mwapasa, Victor; et al. (2017): Collaborative Tools to Enhance Engagement in a Blended Learning Master's Programme.. Royal College of Surgeons in Ireland. Journal contribution. https://hdl.handle.net/10779/rcsi.10774577.v2

HANDLE

10779/rcsi.10774577.v2

LICENCE

CC BY-NC-SA 4.0

This work is made available under the above open licence by RCSI and has been printed from https://repository.rcsi.com. For more information please contact repository@rcsi.com

URL

https://repository.rcsi.com/articles/journal_contribution/Collaborative_Tools_to_Enhance_Engagement_in_a_Blended_Learning_Master_s_Programme_/10774577/2

Collaborative Tools to Enhance Engagement in a Blended Learning Master's Programme

Lisa Donaldson[†], Anne Matthews[†], Aisling Walsh[‡], Ruairi Brugha[‡], Lucinda Manda-Taylor[§], Victor Mwapasa[§], Elaine Byrne[‡]

[†]Dublin City University

[‡]Royal College of Surgeons in Ireland

[§]University of Malawi

Abstract

This paper explores the contribution of collaborative tools towards enhancing engagement with online learning in a blended learning MSc. in Community Systems Health Research by an Irish/Malawian partnership. The MSc. utilized a number of technologies to support a collaborative and effective online learning environment. These included Padlet, Twitter, and Wikispaces, - tools specifically selected to enhance learner-content, learner-learner and learner-instructor communications.

The aim of the case study reported in this article is to explore the contribution of collaborative tools to enhance student engagement with online learning in the context of a blended learning programme delivered to students in Malawi. Physical distance from students can make engagement challenging. Specifically, this case study explores the extent of engagement and the influence of learning technologies, staff, and other factors on student engagement. Participation across online activities was measured, and the influences on that participation were investigated. Additional factors impacting engagement in this MSc included learner and teacher capabilities, the development of informal collaboration and the limited technical infrastructure in Malawi.

The lessons learned from the programme included the importance of developing social online presence for all, the collaborative affordances of specific learning technologies, and the need to adopt best practices for facilitating learning in the online space.

Keywords: : e-learning, educational technology, Africa, web 2.0, collaborative tools, engagement, online, Twitter, Padlet, Wikispaces, blended learning.

URL: http://ojs.aishe.org/index.php/aishe-j/article/view/292

Creative Commons Attribution-NonCommercial-ShareAlike 3.0

1 Introduction

The demand for online learning and the numbers of learners earning qualifications through blended programmes is increasing. One in four students in the US now participate in at least one course online (Allen et al, 2015), whilst the Asian and African markets for elearning are estimated to grow at 17.3% and 15.4% respectively (Pappas, 2013). With the acceptance and growing popularity of blended and online higher education programmes, developing motivated and engaged learners despite physical distance is the Holy Grail for educators.

Engagement can be defined as "*the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution"* (Trowler, 2010 p5). Maintaining engagement in blended and online programmes is continually cited as a challenge as the issues of social presence, unfamiliarity with the technical medium, lack of clarity around online instructional methodologies and the lack of a classroom community can cause students to disengage (Dixson, 2010, Young & Bruce 2011, Fuchs 2014).

Chickering and Ehrmann (1996) consider active learning to be key to engaging learners in their online environment. Active learning requires students to do meaningful learning activities and think about what they are doing. Active learning includes collaborative learning, participation in which ties enables learners to learn from and share with each other. The quality of these interactions directly influences the success of teaching and learning (Nandi et al, 2012). Real world activities and novel assessments can spark enthusiasm and learner interest (Mandernach, 2009). Technology can be used as an enabler to host these activities and to build a sense of community and connectedness, which is vital for student learning and success (Young & Bruce, 2011).

Garrison and Anderson (2003) argue that there are no specific rules or constructs for designing and delivering an effective online learning experience. It is the interplay of content, the community built by learners and instructors, and the pedagogically sound use of reliable and transparent technological resources that enable learning to take place. A successful online learning experience will contextualize these elements to create engaged and satisfied learners.

Chen, Lambert & Guidry (2010) argue that there are significant correlations between the use of learning technologies and learner engagement. Emerging technologies can be used as a lever to support a collaborative and effective online learning environment. This can lead to better student outcomes and more satisfied students and teachers (Young & Bruce, 2011).

The aim of the case study reported in this article is to explore the contribution of collaborative tools to enhance engagement with online learning in the context of a blended learning MSc delivered to students in Malawi. Specifically, we explore influence of learning technologies and other factors on the extent of student engagement.

Case study: MSc Community Systems Health Research

Higher education institutions (HEIs) in Ireland (Dublin City University (DCU) and the Royal College of Surgeons in Ireland (RCSI), and Malawi (College of Medicine (COM)) as well as a non-governmental organization (NGO) (Concern Worldwide (CWW)) have collaborated on the Community Systems Strengthening for Equitable Maternal, Newborn and Child Health (COSYST-MNCH) project (2012-2015). As part of this collaboration, a blended learning Master's programme was launched in March 2014 with a pilot group of five students (3 women and 2 men) from Malawi.

The Masters in Community Systems Health Research was targeted at practitioners and students with a background, experience or interest in community development, who wished to develop and/or build on existing expertise in health research. It aimed to provide students with:

- A high level of capacity to understand, commission, interpret and undertake community systems health research; and
- Lifelong digital literacy skills that can be used in their learning and their practice.

RCSI led the project with DCU providing technical and academic support, and academic and logistical input being provided by COM and CWW.

The MSc combined technology enhanced online modules with face-to-face sessions delivered in Malawi. An Orientation module providing a programme overview and technical skills development was delivered online in advance of the programme start. The MSc itself comprised six modules, with two delivered in each of 3 semesters over an 18 month period and a final

dissertation conducted over another 18 month period (Byrne et al, 2016).

As approximately 80% of the programme was delivered online, the ability to remotely collaborate and communicate with colleagues was of paramount importance. The limitations of local technical infrastructure and the emerging technology-enhanced learning (TEL) strategies of each partner required careful planning and consideration.

Teachers needed to re-imagine the learning experience for the online students to build an interactive environment which provided a supportive structure with collaborative activities enabling discussion and feedback with and between learners. A Learning Technologist was employed to guide and support the programme development and to assist faculty with understanding the affordances of collaborative technologies.

The course design was an iterative process involving initial development by teachers, technology enhancement discussions with the Learning Technologist and the subsequent development of course files. Cloud based technologies such as Dropbox were utilized to streamline file sharing and collaboration across institutions. The final materials and supporting activities were hosted in a Moodle learning management system (LMS) and a CD version was burned for students to provide offline access to content when access to the Internet was unavailable.

Asynchronous discussion forums were a key element of every module of the MSc. Hosted on Moodle, the forums allowed learners and faculty to interact regardless of time or distance. Padlet walls were also extensively used to brainstorm and support commentary on learning materials. Other web 2.0 tools were integrated into the programme and additional tools were used spontaneously by students. These can be seen in Figure 1.

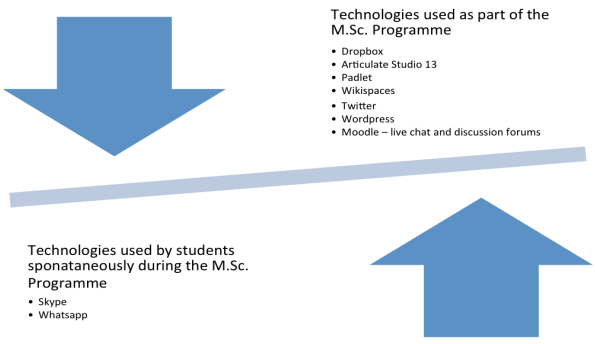


Figure 1 – *Collaborative technologies used in the Msc*

Throughout the MSc, learners were given the opportunity to contribute to exercises relevant and useful to their studies and career interests. Learners developed community maps and posted them to Padlet, contributed to disease control wikis and created eportfolios in Wordpress, as well as utilizing social media to follow real life experts on Twitter.

To achieve the goals of the programme, the MSc needed to utilize technologies which would work with the existing infrastructure in Ireland and Malawi, build on current expertise and familiarity, and enable collaboration between instructors and students. The design of the programme sought to ensure that learning was active and socially constructed. Therefore, the learning technologies used in the programme were specifically selected to enhance learner-content, learner-learner and learner-instructor communications. The experiences reported in this paper relate to the five students who undertook the MSc and it explores the role collaborative online technologies played in their engagement with the programme.

2 Methodology

Within this case study, multiple methods were used to examine student engagement and the impact of collaborative tools on engagement. Online surveys using Kwiksurvey and qualitative interviews were used as part of this study with both students (n=5) and teachers (n=8). Students (n=5) were surveyed in advance of the programme launch, after each semester and were interviewed at the conclusion of the programme. Table 1 summarizes the data collected during the pilot phase of the Msc.

Data collection instrument	Number	Purpose
Phase 1		
Institutional baseline survey	4 (RCSI, DCU, COM and CWW)	To determine infrastructural capabilities of the institutions in terms of development and delivery of learning content.
Faculty baseline survey	8	To determine technological capabilities and experience of faculty.
Student baseline survey	5	To determine infrastructural support and technological capabilities of the students.
Online survey (end of each semester)	3 occasions	To monitor the content and technology used in the delivery of the 6 taught modules.
Interaction in collaborative forums	Forums included: • Moodle discussion forums • Padlet walls • Wikis • Twitter	To review level of participation in online activities across all 6 taught modules.
Phase 2		
Semi-structured interviews	8 Teacher/trainers (2 DCU; 6 RCSI)	To understand faculty experience, challenges and benefits and motivation with respect to the MSc.
Semi-structured interviews	3 students	To understand motivation and experience, challenges and benefits with respect to the MSc.

Table 1 *Data collection methods* (Byrne et al, 2016)

Before programme launch, students were surveyed to ascertain their knowledge of, and experience with, online learning and learning technologies. They were also asked to specify the degree and quality of their Internet access and capability to access programme materials.

The Classroom Survey of Student Engagement (CLASSE) (Smallwood, 2006) is derived from the National Survey of Student Engagement (NSSE). The NSSE measures engagement at an institutional level and is based on the Seven Principles of Good Practice in Undergraduate Education by Chickering and Gamson (1987). Drawing on the CLASSE and Mandernach's (2012) recommendations that online engagement may be better examined by monitoring self-motivated activities, the project team built a custom end-of-semester survey to assess experience with the 2 modules taken in that semester, including an evaluation of online student activities and a self-evaluation of student commitment and effort.

Students were asked to review the effectiveness of the teacher as a class leader, the availability of the teacher to the student, whether constructive feedback was received, whether there was a good balance of active learning, how actively they participated in online discussions and activities, and an approximation of time on task correlating with some of the Seven Principles of Good Practice.

Before and after the programme, teachers were also surveyed to understand their technical proficiencies with collaborative technologies. The final survey was designed to ascertain whether students were active and successful learners from their point of view.

Following the delivery and assessment of the six taught modules, online student contributions to Discussion Forums, Padlet walls, Wikis and Twitter were reviewed and participation by the students for each activity was analysed.

At this point, teachers, students and the learning technologist who were involved in the MSc were interviewed for an independent evaluation. They were provided with a Participant Information Letter describing the interview process, and how the data would subsequently be used.

Interviews were conducted either face-to-face or using Skype following informed verbal consent. A semi-structured interview guide was used, which had been developed in conjunction with programme administrators. Audio was then transcribed verbatim, and thematically analysed using a semi-inductive iterative coding approach (Sarantakos, 2012) using QDA Miner Lite. From this analysis, it was possible to identify factors such as the benefits of technology-enhanced learning for faculty and students, and the challenges encountered during the development and implementation of the Msc.

3 Findings

We present the findings from the various sources of data to examine the extent of engagement, as well as the influence of learning technologies, staff and other factors on student engagement.

3.1 Student engagement

In end of semester surveys, the average of student's ratings of their own active participation in online discussions and activities was 3.63 on a 0 to 5 scale. Only one module (Module 6) achieved full engagement by all students whereby all students participated in all online activities. A concern for teachers was a perceived lack of participation and communication from students. Multiple teachers felt a lack of engagement on behalf of the students: *"the students don't really interact" [Teacher 3], "you don't really get so much feedback out of it" [Teacher 2].* The teachers had difficulty in ascertaining the factors that prevented engagement with online activities, stating… "*We have that difficulty of separating technical issues from motivational issues, you know … I couldn't blame, say, one of the students for lacking motivation when there could be technical issues" [Teacher 1].*

3.2 Influence of learning technology

To investigate whether particular learning technologies support more engagement or not the different collaborative tools were analysed in terms of numbers of exercises and level of participation.

	Module 1	**Module 2**	**Module 3**	**Module 4**	**Module 5**	**Module 6**
Number of Twitter Exercises	9	11		1	0	2
Number of Padlet Exercises	11	8	4	8	2	6
Number of Discussion Forums	12	16	5	5	0	4
Number of Wiki/Wordpress Exercises	1	5	0	0	0	1
Number of Google Docs Exercises	0	2	0	1	0	1
Other: eg Live chat/glossary	0	0	1	1	0	1
Total Collaborative Opportunities	33	40	10	16	2	14

Table 2 *Breakdown of web 2.0 collaborative activities across the MSc programme*

The number of collaborative activities designed by teachers varied across modules (Table 2). From the analysis of student online activity at the end of the taught programme all discussion forums, Padlet walls and other online activities had some level of learner engagement and participation by students. Students showed no preference for one collaborative technology over another and there was equal participation across all mediums of Discussion Forums, Padlet and Twitter. All students committed to creating a Twitter account and the mean number of accounts followed was 15, most as a result of directed activities. Analysis indicates that students have not tweeted outside of module activities, however direct messages between students cannot be tracked. Discussion forums were used across all modules. The average number of forums per module was 7.

Two live 'chat' sessions were also incorporated into the programme. The chats provided significant interactivity. One synchronous chat session recorded 65 discrete interactions in 1 hour online although technical challenges resulted in some students needing to leave and return to the chat multiple times.

3.3 Influence of teachers

Teachers needed to develop their capacity to use the learning technologies before they could facilitate student engagement. The initial teacher survey indicated that the majority of the instructors involved in the project had not taught on a blended learning programme before. Results also showed that learning technologies, specifically collaborative web 2.0 tools were minimally used or not at all. However, at the end of the programme and following group and face-to-face training sessions on learning technologies, the teachers appeared more able to integrate web 2.0 tools. *"I like the fact that we, I learned so much in terms of the technology, I'll be able to use quite a lot of the material again [Teacher 1]"*

Students also noted that the support of teachers facilitated their engagement. When students were surveyed at the end of each semester, student satisfaction with the online nature of the learning was rated at an average 3.8 on a 0 to 5 scale across all modules. When students were asked to respond to the following question "I received feedback that helped me see ways that I could improve my learning", results were 3.77 on the same scale.

The value of the feedback from the teachers online was noted in student interviews. *"They are very, very easy to reach them and very helpful" (Student 3), "Yeah, it really helped a lot because the feedback was very important that you could make progress … When you're stuck, you could refer back to the instructors, then they'd give you direction" (Student 2).* However, the student survey after Semester 2 also indicated a need for "more open discussions to facilitate interaction between instructors and students" *(Student 1).*

3.4 Other influences

Technical infrastructure, rather than student technical abilities, was indicated as a key influence to student engagement with module activities. The results of the student baseline survey indicated that there was adequate Internet bandwidth to enable students to access course materials online. Three students agreed or strongly agreed that they had sufficient technical competencies to participate in learning online with the remaining 2 students being neutral. The survey also indicated that all students had access to pc's or laptops.

Despite predominantly low bandwidth tools being used, student interviews on completion of the programme indicated that Internet issues had a major impact on student learning *"The only challenge that we have here in Malawi is … strength of internet"* (*Student 1*), *"My overall challenge in participating in the course was the internet connectivity… it's very expensive to use IT here in Malawi" (Student 2).* The poor Internet infrastructure in Malawi was noted also by teachers as having an impact on the use of more collaborative technologies*: "in module 5, I gave up on a lot of things that I'd incorporated in Module 3, like the polls and so on, due to, you know, firewalls, web connectivity, so I was reducing the TEL to basically a voiced-over presentation" (Teacher 1).*

Student technical proficiencies with a range of learning technologies improved significantly as a result of the programme. In the end of progamme evaluation one of the students stated, *"my level of experience, I think, I have gone up since I started this course … before that, I didn't have much knowledge on the information technology, but now I've learned … a lot of technologies". (Student 1)*

The development of technical abilities is also evidenced by the additional channels developed by the students for themselves students outside of the formal online classroom structures included WhatsApp and Skype to share information. Students also initiated face-to-face meetings to

discuss coursework. *"Yes, we used to make our own meetings, we would arrange to, to meet, though we were staying in different districts, but thrice, if not four times, we have organized our own meetings, to meet so can discuss some of the issues" (Student 3).* This was probably as a student during an interview stated, "*I prefer to learn with other people. It's easier and faster that way, because you help each other" (Student 2).* The value of synchronous communications was also mentioned at interview with one student commenting, *"Yes chatting in real time is quite helpful. Problems are dealt with immediately" (Student 1)*

Overall, students were satisfied with learning via an online course although teachers felt that the level of engagement with learning activities across the programme could be improved. Multiple technology platforms were used for communication and collaboration which improved students overall technical abilities, however no significant preference was indicated by the students for any one particular technology. There were substantial challenges for both students and teachers due to the poor Internet infrastructure in Malawi, which affected collaborative activities. The importance of feedback was noted by the students, as was a preference to connect and learn with peers.

4 Discussion

In examining the MSc programme as a case study in blended learning, there are a number of significant themes which emerged from the study findings that impacted on student engagement. The key issues were challenges with technology infrastructure, the significance of strong teacher presence and e-moderation skills, and the importance of pedagogically appropriate learning technologies to support collaborative learning.

4.1 Challenges with technology infrastructure

Internet access and reliability was not flagged by the majority of learners as an issue at the outset despite Internet penetration in Malawi being only 4.4%. (Elletson & McKinnon, 2014). However, as the MSc progressed the reality was that the poor Internet infrastructure did have a significant impact on the learners' abilities to interact with online activities and each other thus limiting the potential for collaborative learning.

The students when surveyed initially indicated their technical infrastructure was sufficient to enable them participate in the online programme. When interviewed at the conclusion of the programme, the students repeatedly discussed trying to complete the MSc against a backdrop of infrastructural challenges. This perhaps points to a difference between the acceptability of Internet capacity in Malawi for day to day tasks versus academic work which has set timeframes for accessing content and completing activities. Struggles with expensive and unreliable Internet and local hardware to complete online activities proved a continuing challenge supporting Beldarrain's (2006) assertion that connectivity is still an issue with web based courses delivered in Africa.

Student ratings of their own participation in online discussions are satisfactory in the light of challenges with technical infrastructure (3.6 on a 5 point scale). Live online classrooms could certainly have helped build connections and interject a social element but were not feasible in this case due to bandwidth issues.

4.2 Pedagogically appropriate learning technologies to support collaborative learning

The technology applications that made up the learning design for the programme were predicated upon making the best use of the limited technical infrastructure in Malawi. This ruled out the use of live online classrooms and the programme was mainly reliant on asynchronous modes of delivery.

Padlet was selected specifically for its ease of use, a major factor when using learning technologies with a faculty and learner cohort of mixed technical competencies. Participation with Padlet wall collaborative activities was comparable with participation in discussion forums and no discernable preference for either tool was expressed by the students. This may indicate that ease of use was not a critical factor to participation, which supports Dixson's (2010) argument that there is no one best channel to promote engagement and maximum engagement will occur by encouraging authentic activities and assessment utilizing many media.

Dixson also argues that highly engaged students utilize online forums to interact and connect with each other. However, in most cases throughout the MSc, the forums were simply used to answer direct questions from the teacher and very few students critically discussed their peers' contributions. This was disappointing as Leflay and Groves (2013) argue that higher-order thinking skills occur through the processing of new information and in connecting facts during forum discussions. This deeper level of interaction on the MSc. forums was minimal.

As disappointed as some teachers were with the degree and type of interactions with online activities, especially considering the high teacher to student ratio, every module achieved at least 50% participation with online activities (participation being measured as activity completed). This compares very favourably with other studies which indicate a much lower rate of 25% (Robinson and Hullinger, 2008) and 20% (Mason, 2011).

Rich interaction media can help minimize the isolation that can impact online students (Kliger et al, 2011, Dixon, 2010). Teachers on the programme employed a number of approaches to support interaction including text chats, videos, Twitter posts, and Moodle discussions. Kliger also states the importance of building a social context for online learning and students were encouraged to use the VLE to create online biographies and upload pictures to make themselves visible to one another. Teachers also uploaded a video biography at the beginning of the programme.

The students participated well across discussion forums, wikis, and Padlet wall activities. In addition, students were encouraged to expand their digital footprint to Twitter and connect not just with fellow classmates and teachers but follow others outside the MSc. Findings show that usage of Twitter was primarily as part of the course and has not continued outside required activities. This is disappointing as its usage during the programme may have forged interpersonal relationships within the group (Junco, Heibergert, Loken, 2010) as well as offer sustained learning through visibility of real life activities within the global health research community. It is possible however that the students continue to be 'lurkers' and still gain the benefits of the connections forged despite not actively tweeting.

The module with highest engagement came towards the end of the MSc when it can be suggested that the students were more familiar with the technologies and their appropriate use. Prior experience of using the different learning technologies in earlier modules may well have influenced their more comprehensive participation in Module 6. This would indicate that perhaps more scaffolding was required for students trying to understand the appropriate use of these tools earlier in the programme.

Findings indicate also that other more informal channels including Skype and Whatsapp developed spontaneously between students. Using other communication technologies and these channels supported ongoing engagement with the programme and the learning activities. The spontaneous use of these tools may indicate that it is beneficial to build learning activities around technology already used by students (West, 2013).

Skype and Whatsapp are more synchronous in nature than discussion forums and Padlet walls. Whilst the effectiveness of each specific intervention is difficult to assess, in this study the high engagement with the two synchronous 'chat' sessions and the student development of other informal channels seem to indicate a preference on the part of the students for real time learning activities and feedback. Numerous studies cited by Moallem (2015) argue that synchronous communication helps break down a sense of isolation and this may be a particular factor in the context of this programme where the students were physically distanced in Malawi from teachers in Ireland. However, in the context of this programme, the poor technical infrastructure in Malawi would prevent increasing the quantity and type of synchronous sessions.

4.3 Strong instructor presence and e-moderation skills

A strong instructor presence is one of the most important factors in creating a successful learning experience for the online learner. There is consensus in the literature that the teacher bears responsibility for promoting and maximizing student online interactions which can increase student motivation and engagement in the learning process (Mason 2011, Mandernach 2009, Beldarrain 2006, Nandi, 2012).

All teaching staff received training on how to appropriately use online and collaborative technologies over the duration of the programme, as the majority of modules were taught by teachers new to a blended learning environment. Training is important to alleviate technical anxiety, increase instructor confidence and encourage adoption (Georgina & Hosford 2009, Kliger and Pfeiffer 2011). Despite studies indicating reluctance on the part of teachers to take on new teaching methods, teachers in both locations[1] showed great interest in studying new media and new approaches to teaching with technology (Donaldson, 2014).

Differing levels of use of web 2.0 tools for collaboration and degrees of e-moderation were apparent across the programme due to the nature of the module content and each teachers' individual pedagogy. Some modules offered a plethora of teacher interventions and opportunities to work collaboratively and others less so. Despite this divergence, there was no conclusive difference in how the students viewed the efficacy of the different teaching strategies or the degree of support and feedback per module, as assessed by end of semester evaluations and interviews. This is an area that deserves further study to fully understand how differences in instructor presence and feedback did not impact student satisfaction.

Though satisfaction across modules was not influenced by the divergent levels of collaborative activities in the module, as noted above, module 6 had the highest rate of participation from the students. Module 6 was taught by an instructor who had previous practical experience of teaching online. The benefit of this prior exposure to facilitating learning in the online space may have resulted better usage of online technologies and a greater understanding of the role of the online teacher. The teacher for this module was particularly active and visible in forum discussions, responded quickly to posts and summarized contributions weekly. Nandi et al (2012) state that one of the most critical factors in online engagement is the student-instructor interaction and the online confidence displayed by the Module 6 teacher may have positively impacted student contributions.

Mason (2011) argues that awarding marks for forum participation encourages engagement. Module 6 also awarded a small percentage of the final assessment marks for participation in online activities and this may also have contributed to all students engaging with the forum and Padlet wall activities for this module.

1University of Malawi staff were involved in teaching some of the face to face sessions in Malawi and also received training in relevant learning technologies.

Web 2.0 tools and other learning technologies can provide an effective conduit for interactivity and discourse between teacher and student. The teachers on this programme were positive and enthusiastic about the potential of technology tools for feedback as well as for other learning activities but raised concerns regarding the time required for development of online material and activities. Freeman (2015) states that while developing online courses is indeed more time consuming than developing face-to-face courses, it is actually the pedagogical learning curve that is longer than the technological one.

As online and blended learning becomes more of a driving force in higher education, ongoing professional development in all aspects of teaching and facilitating activities online is critical (Young & Bruce, 2011). The teachers on this programme benefitted from ongoing training in learning technologies however it is worth considering if additional supports in online facilitation approaches should have been offered to those with less experience of teaching in the online environment.

5 Conclusion

Collaborative learning technologies have been at the heart of the MSc experience for both teachers and students. A rich mix of online tools were used to coordinate development of course materials across institutions, enable communications and collaboration on course work for learners, and to deliver vital support and feedback by teachers in an Internet poor context. Students were supported through a range of these formal and student generated informal channels.

Accurately measuring student engagement and ascertaining the degree of success the programme had in supporting engaged, satisfied and successful students is difficult. Three of the initial five students on the pilot programme successfully passed all taught modules. Whether completion of modules can be considered the ultimate or proxy measure of engagement is questionable, but deeper investigation into the challenges faced for the students who did not complete the modules would be valuable.

Overall, the students and teachers reported a rewarding experience with significant development of their technical competencies. The backdrop of poor Internet infrastructure had an impact on the potential of collaborative learning technologies to provide a platform for active learning. The

wealth of learning technologies available to enable online connections and promote active learning were carefully tailored to the individual programme context and the rich mix of media used was beneficial. In resource-constrained countries, even low bandwidth online activity options needs to be carefully considered to ensure that participation is viable for all learners.

Scaffolding the use of learning technologies through training and support is vital for the professional development of teachers. Guidance on a pedagogy for online teaching and in e-moderation skills would enable instructors to support learners in a consistent manner and facilitate ongoing engagement with students. However, notably the variability in these skills across the teachers involved did not impact the satisfaction ratings by the students and this deserves further study.

Whilst the complexities are vast, particularly in resource-constrained countries, the number of online and blended programmes being offered is growing significantly. Engagement between teachers and learners and between learners themselves in online programmes can be enhanced by harnessing the collaborative potential of web 2.0 tools. The design and delivery of this blended learning MSc has provided many lessons for successfully managing online interactions and highlights the importance of utilizing a blend of synchronous and asynchronous technologies as well as the necessity of e-moderation skills on the part of the teacher to support participation and engagement. The study also indicates that it may also be useful engage with students in programme design and build in student technology preferences to allow students to engage with the tools that they are using themselves on a day to day basis.

6 References

Allen, I. E., Seaman, J., Poulin, R., & Straut, T. T. (2016) 'Online report card: Tracking online education in the United States'. Babson Survey Research Group. Available at: http://onlinelearningsurvey.com/reports/onlinereportcard.pdf

Beldarrain, Y. (2006) 'Distance education trends: Integrating new technologies to foster student interaction and collaboration', *Distance Education*. vol. 27, no. 2 pp.139-153.

Byrne, E, Donaldson, L., Manda-Taylor, L., Brugha, R., Matthews, A, MacDonald, S., Mwapasa, V. Petersen, M., Walshe, A. (2016) The Use Of Technology Enhanced Learning In Health Research Capacity Development: Lessons From A Cross Country Research Partnership *Globalization And Health Vol 12, No. 19*

Bingimlas, K. (2009) 'Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature', *Eurasia Journal of Mathematics, Science & Technology Education*. vol 5, no. 3 pp. 235-245.

Chen P., Lambert A. & Guidry K. (2010) 'Engaging online learners: the impact of web-based learning technology on college student engagement', *Computers & Education* vol. 54, pp.1222–1232.

Chickering, A, Ehrmann S. (1996) 'Implementing the Seven Principles: Technology as Lever', *AAHE Bulletin*, October, pp. 3-6.

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE bulletin*, vol. 3, no. 7.

Dixson, M. (2010) 'Creating effective student engagement in online courses: What do students find engaging?', *Journal of the Scholarship of Teaching & Learning*, vol. 10 no. 2, pp. 1-13

Donaldson, L. (2014) 'Integrating Web 2.0 learning technologies in higher education: the necessity, the barriers and the factors for success', *AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education*. vol 6.no. 3 pp. 2021-2043.

Elletson, H. and MacKinnon, A. (eds) (2014). *The eLearning Africa Report* 2014, ICWE: Germany.

Freeman, L. (2015) 'Instructor Time Requirements To Develop And Teach Online Courses',

Online Journal of Distance Learning Administration, vol. 18, no.1.

Fuchs, B. (2014) 'The writing is on the wall: Using Padlet for whole-class engagement', *Library Faculty and Staff Publications* [online] Available at: http://uknowledge.uky.edu/libraries_facpub/240

Garrison, D. & Kanuka, H. (2004) 'Blended Learning: Uncovering Its Transformative Potential In Higher Education', *Internet And Higher Education*, vol. 7, no. 2, Pp.95-105.

Garrison, D., Anderson, T. (2011) *Elearning in the 21st century a framework for research and practice,* 2nd edition Routledge.

Garrison, D., Cleveland-Innes, M. 'Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough', *The American Journal of Distance Education*, vol. 19, no. 3,

Georgina, D., Hosford, C. (2009) 'Higher education faculty perceptions on technology integration and training', *Teaching and Teacher Education,* vol. 25 pp.690–696.

Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). 'A measure of Promoting Student college student course engagement', *The Journal of Educational Research*, vol.98, pp.184-191.

Junco, R. Heibergert, G. & Loken,E (2010), 'The effect of Twitter on college student engagement and grades', *Journal of Computer Assisted Learning,* vol.27, pp.119-132.

Kliger, D., Pfeiffer, E. (2011) 'Engaging students in blended courses through increased technology', *Journal of Physical Therapy Education*. vol. 25, no. 1 pp.11-14.

Leflay, K. and Groves, M. 'Using online forums for encouraging higher order thinking and 'deep' learning in an undergraduate Sports Sociology module', Journal of Hospitality, Leisure, Sport & Tourism Education, vol. 13 pp. 226–232

Mandernach, B. (2009) 'Three ways to improve student engagement in the online classroom', *Online Classroom*. March. pp.1-2.

Mason, R. (2011) 'Student engagement with, and participation in, and e-Forum', *Educational Technology & Society*, vol.14 no.2, pp. 258-268.
Moallem, M (2015) 'The Impact Of Synchronous And Asynchronous Communication Tools On Learner Self-Regulation, Social Presence, Immediacy, Intimacy And Satisfaction In Collaborative Online Learning', *The Online Journal of Distance Education and e-Learning*. vol 3 no. 3

Nandi, D., Hamilton, M., Harland, J. (2012) 'Evaluating the quality of interaction in asynchronous discussion forums in fully online courses', *Distance Education*. vol.33no. 1 pp. 5-30.

Pappas, C, (2013) ' Top 10 E-Learning Statistics For 2014 You Need To Know' *ELearning Industry*, [online] Available At Http://elearningindustry.com/top-10-e-learning-statistics-for-2014-you-need-to-know

Robinson, C., Hullinger, H., (2008) 'New Benchmarks in Higher Education: Student Engagement in Online Learning', *Journal of Education for Business,* Nov/Dec pp.101-108.

Ruiz, J. Mintzer, M. Leipzig, R. (2006) 'The Impact of E-Learning in Medical Education', *Academic Medicine, vol.* 81no.3, pp207-212.

Salmon, Gilly (2003) *E-moderating: The Key to Teaching and Learning Online,*2nd edition, London: Taylor & Francis.

Sarantakos, S. (2012) Social Research. 4th edition. Palgrave Macmillan

Smallwood, B. (2006) 'Classroom survey of student engagement' *University of Northern Florida, Assessment*, [online] Available at: http://www.unf.edu/acadaffairs/assessment/classe/overview.html

Vlachopoulos, P., Cowan, (2010) ' Choices of approaches in e-moderation: Conclusions from a grounded theory study', *Active learning in Higher Education,* vol. 11 no. 3 pp. 213-224.

West, D. M. (2013). 'Mobile Learning: Transforming Education, Engaging Students, and Improving Outcomes', Centre for Technology Innovation at Brooking, [online] Available at: http://www.brookings.edu/~/media/research/files/papers/2013/09/17-mobile-learning-

education-engaging-student s-west/brookingsmobilelearning_final.pdf

Young, S., Bruce, M. (2011) 'Classroom community and student engagement in online courses', *Journal of online learning and teaching*. vol 7 no. 2, pp 219-230.