The Issue of Blogging: Using Visual Network Analysis to go Beyond Self-reporting Studies of Blogging

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ABSTRACT

Given the increasingly prominent position of digital technologies in the Higher Education classroom, this paper takes a concurrent triangulation mixed method approach to explore the ways in which blogging might be used to support student learning through a large MA dissertation module, comprising students from five courses. Taking as it impetuous the idea that blogging can create a community to support students in the writing of their own dissertation. The research saw 179 students invited to undertake blogging over a 10-week period, with proscribed activities for eight of these weeks. The networks built by students were modelled through Gephi, and this data was supplemented with two surveys carried out before and following the module. The results showed a mild trend towards the blogs not producing a community, nor creating an environment in which self-reflective practice was forthcoming. The role of the teacher also appeared to become solidified as the sole motivating factor, leading to a low uptake in posting on the blog, and even lower in commenting. The work also highlights the two-fold issue of students being fearful of giving negative, coupled with the sense that peer feedback was not worth as much as staff feedback, significantly reduced the development of the community, and of critical thinking. The work concludes that while blogs might have some potential, this case demonstrates that they need to be more deeply embedded within the pedagogy of the course, and not used as an 'add-on'.

Keywords: Blogging, Community, Technology Enhanced Learning, Digital Learning, Higher Education.

INTRODUCTION

Technology is taking an increasingly central role within Higher Education in the United Kingdom (Kirkwood and Price, 2004), with initiatives such as EDUCAUSE and The New Media Consortium being indicative of this shift. Alongside this there has been an increase in the recognition of the importance of self-directed learning in the Higher Education classroom (Robertson, 2011). This combination has seen a rise in classroom activities that blend digital technologies and self-directed learning. This has, in various conceptualizations, often taken the form of blogging related tasks (Sim and Hew, 2010; Osman and Koh, 2013; Halic et. al., 2010). Primarily blogs have been seen as a way to promote self-reflection (Osman and Koh, 2013; Robertson, 2011). The pedagogical underpinnings of these activates suggest that blogging can promote learner-centered approaches to education, allowing students to drive the direction of their studies (Kang et. al., 2011). Yet, while this is this often put forward in support of these tools, there is still a great deal to understand about the way in which blogging, and the affordances it offers, can be utilized in the classroom. Given that this is the case, this research aims to explore the way in which blogs can be used to support students on a large Masters level dissertation module in a London based university. Its seeks to understand the extent to which blogging is able to promote self-reflection around dissertation topics, enhance skill sets, and to develop communities that are conducive to supporting student learning.

While much previous research has identified the potential for blogs to enhance student learning (See Halic et. al., 2010; Churchill, 2009), this research has typically relied solely on interviews with students and their perceptions of their own learning and network making (Sim and Hew, 2010). Students have often reported through these studies that not only did they enjoy the blogs and found them to be useful (ibid.), but they also seemed to have an uncanny ability to report the same often cited benefits of blogging as teachers. These include the benefits of collaboration, developing critical thinking, and exposure to multiple perspectives (Bennett et. al., 2012). So, while some scholars have lauded blogging as being able to open up new possibilities for communication and collaboration in the classroom (Pavo and Rodrigo, 2015), it is perhaps necessary to take a more cautious approach. To this end this research goes beyond self-reporting from students, although this is also an important part of the process, to use Visual Network Analysis (VNA) to establish the extent to which communities have been created. Students in this research were also surveyed before they knew they were to undertake a blogging activity with the hope of being able to eliminate, or highlight, biases

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towards blogging that might appear once the teacher has informed students of its benefits.

To conduct this research a new blog was established for an MA dissertation module within the Creative Industries Management cluster in a School of Media Arts and Design. The module itself is a yearlong module that is made up of 16 taught sessions and two summative assignments; a research proposal and a final dissertation project, and brings together 179 students from five different MA courses, all of which blend theoretical and practice based work. This blend is one of the reasons that this module and the course it contains were salient for this research, as it has previously been suggested that online technologies are of particular importance in removing the sense of isolation felt by those on more practice based courses (Herrington et. al., 2006). Furthermore, reflection, one of the key affordances of blogging (Osman and Koh, 2013; Robertson, 2011), is also seen as a key part of both dissertation writing (Moon, 2013), and professional development and practice based courses, such as those selected for this work (Osman and Koh, 2013).

A blog has been likened to a learning community, where students can become involved in their own learning (Yang, 2009). Furthermore, it is suggested that blogs offer a space for allowing students to express their own voices (Williams and Jacobs, 2004), as well as being able to provide a space for personal reflection and the development of self-directed learning (Osman and Koh, 2013; Robertson, 2011). Finally, it is also reported that blogging can develop communities through the sharing of tacit knowledge and ideas (Ardichvili et. al., 2003; Robertson, 2011; Williams and Jacobs, 2004). Given all these claims for the pedagogic values of blogging, the trial blog was established as an integral part of the learning schedule for this module, following the practice of Farmer et. al. (2008), and sought to provide answers to the following questions; (RQ1) To what extent are blogs able to foster and support a community in which students value respond to the ideas of their peers?; (RQ2) to what extend are blogs able to offer a space for self-reflection, while also being established as a peer learning tool?; (RQ3) what is the role of the teacher within these environments, and how does this affect the development of the blog, and the communities within in the blog, contributing to, or damaging the above aims?

The rest of this paper will be set up as follows; first an overview of literature will be given, before setting-up the methodology. Results are presented in two parts, Visual Network Analysis, and an interrogation of data collected from surveys. This will be followed by a discussion of the implications from these findings, reinforced with qualitative responses from the survey. Finally, the paper will conclude that there is much to

still learn about blogging and how to implement such practices, before offering some recommendations for teachers and researchers.

LITERATURE REVIEW

Blogging is often theorized in two oppositional ways, following the duality of cognitive constructivism and cognitive growing, or, individual and communal. Bloggers both express their own ideas and identities, but are also engaged in networked thinking and working (Farmer et. al., 2008). In an educational setting blogs are seen as a space in which discourse can occur between learners, teachers, and peers, as well as reaching into the wider digital community (Sim and Hew, 2010). This is supported by Robertson (2011) who reported that of 104 MBA students who blogged as part of their course, 77% of them believed it increased 'meaningful intellectual exchange between students' (145). This sense of meaningful exchange is created, it is argued, through the learner-centered nature of blogging platforms and exercises (Yang, 2009), and the immediacy of discursive interactions (Williams and Jacobs, 2004). While blogging may appear to align easily with learning needs (Robertson, 2011), caution must be taken in understanding the potential of Technology Enhanced Learning (TEL). Research should not assume that these tools are being entered into a 'pristine environment in which it can find its niche wholly on its own merits' (Kerawalla et. al., 2009: 32). The question of whether technology enhances learning is perhaps the wrong one, rather the question might be how can we design and implement technologies in classrooms to enhance learning, and how might that be measured (Kirkwood and Price, 2014).

Blogs can be used to create a self-regulated learning environment in which learners have control over their own cogitative resources (Robertson, 2011). Using them to go beyond personal reflection, allowing for communication and interaction with others (Pavo and Rodrigo, 2015), building a vibrant community that supports peer learning and which reflects a Community of Practice (Ardichvili et. al., 2003). It is clear that blogging may elicit a range of pedagogical implications (Kang et. al., 2011), yet the body of literature surrounding blogging, including its potential to create inclusive learning environments remains contradictory (Kim, 2008).

Before the advent of blogging, the internet had demonstrated an ability for sharing of information and connections between people, allowing for the engagement of new ideas and diverse perspectives (Kang et. al., 2011). The advent of Web 2.0, or the read/write web, saw this capacity grow exponentially, allowing for individual and collective publishing of video, audio, images and text, along with the creation of

online social networks via a more decentralized system (Bennet et. al., 2012; Hemmi et. al., 2009; Kang et. al., 2011). One of the boons of the Web 2.0 was the ability to create content without the need to know HTML or web scripting, this lowered the technological bar to entry and saw a proliferation of blogs appearing across the internet (Yang, 2009). Blogs were fast to build and easy to maintain, utilizing trackbacks to allow for easy commenting on works and linking of pages, leading to a rich network of pages, posts and feedback without the need to code (Kang et. al., 2011). Collectively these masses of blogs, all hyperlinked and joined through comments and sharing, became known as the Blogosphere, a term coined to reflect that of Public Sphere, a place for public communication (Farmer et. al., 2008; Calhoun, 1992).

This architecture allows for blogs to be used for a wide range of purposes, from online diaries and reflections, through to professional journalism (Kang et. al., 2011; Downes, 2004). Blogs are also discursive platforms in which the author receives and provides comments in relation to posts (Dennen, 2009), in this way they have created a 'genuinely new literary/journalism form' (Udell, 2001: 2), that O'Reilly (2004) has referred to an architecture of participation, meaning the participatory nature of the blogosphere is baked in at the deepest level.

This increase in the popularity of blogging in the public realm (in 2010 it is estimated that 12 million Americas were maintaining a blog (Halic et. al., 2010), and that there are now over 440 million blogs online, attracting 22.3 billion page views per month [a]), did not go unnoticed in educational circles, and its potential for supporting learning has been widely explored since the early 2000s (Robertson, 2011). Institutions such as the Open University had used digital platforms to engage distance learners (Kerawella et. al., 2009), and Virtual Learning Environments (VLEs) are widely used. These, though, are limited in scope, failing to engage with the richness web 2.0, instead they recreate conservative pre-digital spaces online, following liner hierarches and one way knowledge transfers through predominantly textual interactions (Hemmi et. al., 2009; Kang et. al., 2011). Blogging, however, offered both teachers and learners an alternative, which many see as having the potential to foster meaningful negotiation and communication (Yang, 2009)

The Educational Benefits of Blogging

While it was noted at the top of this paper that there is a great deal of controversy around the perceived benefits of blogging for educational purposes, there is a

concerted effort by both educators and the creators of educational platforms to push blogging to the fore. The two main reasons for blogs being of use in the classroom follow the cognitive development of students, (i) reflection and (ii) interaction. A third benefit is also put forward in the form of allowing the teacher to (iii) monitor student work in a continuous manor.

Reflection (i) is well recognized as an important part of the learning process, and especially in more self-directed learning, such as when undertaking a dissertation (Robertson, 2011). By using blogs as a platform for reflective writing, students are not only engaging in self-reflection as they write, but are also able to reflect on the ideas of others in the community (Yang, 2009), generating new ideas and applying acquired knowledge through the writing process, going beyond being purely reflective, to accommodate metacognitive processes in the construction of knowledge (Pavo and Rodrigo, 2015). Further studies would appear to support these notions; Stiler and Philleo (2003) noted that the breadth and depth of student reflection was significantly enhanced through their blogging use. Downes (2005) reported that the blogs observed in their research went far beyond being a diary, and became a pedagogical tool creating a learner-centered, community based system. Helic et. al. (2010) found that the majority of participants in their blogging experiments felt the blog 'offered them opportunities to reflect on course-related concepts outside of the class' (211). And Robertson's (2011) students reported similar enjoyment in using the blogs to put forward and reflect upon ideas. This would suggest a great deal of potential for blogs to provide a reflective space for logging what has occurred in class, helping them to better organize ideas and consolidate knowledge (Sim and Hew, 2010). In each of these cases it is likely that the positive responses of students is in some part due to the additional time afforded by blogging, allowing students to think deeper before fully voicing their opinions (Zhan et. al., 2011; Halic et. al., 2010). Likewise, students are also confronted with their own opinions and are required to contemplate more fully on how they might be seen by others (Williams and Jacobs, 2004), which provides a basis for the second proposed benefit of blogging.

The interconnected nature of blogging clearly allows more opportunities for students to be confronted with alternative viewpoints and additional materials (Hemmi et. al., 2009), and through this process are able to create an environment for interaction (ii) and the creation of new knowledge. Work by Pavo and Rodrigo (2015) found that students were especially keen on the interactive elements of blog work, with interview

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[a] http://mediakix.com/2017/09/how-many-blogs-are-there-in-the-world/#gs.BvwTAh8

respondents citing interacting with peers, taking examples from peers, emotional support, and commenting on other works, as the most useful elements of using the blogs. These students are using the blog to scaffold their own learning, creating behavioral and learning changes within themselves (Tang and Lam, 2014), going beyond just comparing their experiences with others (Pavo and Rodrigo, 2015). These findings are again supported by the work of Sim and Hew (2010) whose students perceived their blogs as being able to provide different viewpoints and helpful advice from both peers and staff.

Monitoring (iii) the progress of students and being able to provide feedback and support where needed is a crucial part of the teaching role. Blogs, through their administrative functions can provide tools to help in these processes (Farmer et. al., 2008). A blog can create a transparent space in which a greater understanding of the students learning needs can be observed by the teacher (Halic et. al., 2010). Though regular reading of blogs, as opposed to waiting until end of semester exams or coursework, the teacher might better understand a students' difficulties with course materials. Furthermore, it is possible to see where gaps in learning have occurred and to fill these either through a response online, or in class (ibid.). It has also been suggested that blogs might play a pastoral role, enabling staff to highlight disengagement from class and courses, allowing for support networks to be activated, improving retention and morale (Trafford, 2005).

Many studies have found that students reported a generally positive response to blogging tasks (See Sim and Hew, 2010; Helic et. al., 2010; Hemmi et. al., 2009; Robertson, 2011). It is worth noting however, that these studies relied heavily on the self-reporting of students to draw their conclusions – For example Stiler and Philleo (2003) provide no rubrics in their evaluations. These studies were also carried out at least eight years ago, and even then, Sim and Hew (2010) worried that a significant amount of the enjoyment factor came from the novelty of the medium, rather than from true pedagogical benefits. Blogs have become an important part of the educational toolbox, the concern though, posited by Halic et. al. (2010), is that their application has preceded in-depth critical research into their effectiveness. A number of studies have taken a more critical approach, dismissing technological determinism and applying metrics and rubrics that move beyond self-reporting by. Several of these studies have suggested that blogging might actually impeded student development (Zhan et. al., 2011; Pavo and Rodrigo, 2015). Numerous studies have also noted a lack of engagement from students (Robertson, 2011), and that the volatile nature of online interactions might sit more uncomfortably in higher education than other studies have suggested (Hemmi et. al, 2009). One of the key

factors here might be the attempts to replicate existing teaching practice through blogging, rather than using the affordances of blogs themselves (Kirkwood and Price, 2014), leading to students engaging at a minimal level to meet the requirements of assessment (Kerawalla et. al., 2009). Furthermore, the technical competence of students is a crucial factor in successful blogging practices, and it is too often assumed that students already have the digital skills required to engage (Halic et. al., 2010). When this is not the case there is a great deal of additional work involved in learning new skills (Meyer, 2010).

Privacy is also found to be a concern, these concerns led some students in Osman and Koh's (2013) study to not engage with the activities due to fear of criticism or exposing their own perceived misunderstandings of the work. This concern was not just over how peers or the outside world would see them, but manifests most starkly in relation to the tutor and managing expectations (Hemmi et. al., 2009; Robertson, 2011). Assuming privacy issues are solved there remain issues of motivation. The way in which students appear to engage with digital media outside the classroom has excited educators to what to use it in their classrooms to create learning tools (See Hughes, 2009; Bennett et. al., 2012). This though does not lead to intrinsic motivations, even if it reduces the barriers to skill development (Bennett et. al., 2012). Tasks in which students are engaging must be meaningful learning activities in order to create motivation to participate (Kang et. al., 2011). In Kolb's (1984) experiential learning cycle, a meaningful learning activity would need to engage students in (1) concrete experience; (2) reflective observations; (3) abstract conceptualization; and (4) active experimentation. Yet, while on the face of it a blog would provide each of these, at least in part, the experiences of students is reported to be rather different. One limiting factor is the quality of feedback provided by peers, and in some cases staff. Robertson (2011) noted that the majority of peer comments on work were 'friendly reassurance and encouragement to persist' (1636), hardly a reflective observation or experimentation with ideas. These types of comments are, posits Robertson (2011), due, at least in part, to not wanting to dent the confidence of peers through critical feedback. Halic et. al. (2010) went as far as reporting that students who received the most feedback were actually the least motivated, and registered consistently lower levels of reflection than those who did not get feedback. Feedback though is seen by Osman and Koh (2013) as key to motivating students to engage, however, the students they surveyed wished for increased tutor feedback, rather than peer feedback. So, while a constructivist approach to learning suggests that students benefit most significantly from experiencing a divergent range of ideas and opinions (Pavo and Rodrigo, 2015), students appear both reluctant to

provide those diverging opinions, and being on the receiving end of these can also significantly impact motivations for participation in blogging.

The implementation of blogs in higher education then is not a silver bullet to inclusive and exciting learning environments, but instead risks appearing tacked on to the curricula or producing additional workloads for students who are unable to see the pedagogical underpinnings (Halic et. al., 2010). So, while there is much to be said about the benefits of using blogging and the Web 2.0 in teaching and content creation a more cautious approach to it implantation is needed to truly engage with the potentially radical nature of these technologies (Hemmi et. al., 2009). The technology must be implemented within structural changes to the curricula, rather than attempt to recreate it, or to merely operate alongside it (Kirkwood and Price, 2014), with additional time given to train students not just how to use the platforms technically, as well as how to write, provide feedback and share ideas (Kerawalla et. al., 2009). Furthermore, key educational practices are still required, face-to-face contact time, responsive communication, and supportive mentors (Herrington et. al., 2006) have all be found to increase motivations to participation in the online community.

METHODOLOGY

In order to establish the extent to which blogging can support the needs of students on a Masters level dissertation module – understanding its suitability to supplement for face-to-face teaching, to increase student engagement and attainment, and to a lesser extent to determine if it is possible to create a community of practice through online interactions – a series of analyses were carried out on a live class (n=179) over the course of an eight-week teaching period. Given the live nature of this research a predominantly quantitative approach was taken in this study, allowing for the minimal interference of student work and to alleviate the potential biases that may occur when interacting with students known to the researcher. A mixed method, concurrent triangulation method (Creswell et al., 2003) was used to ensure the validity of the study, and to eliminate some of the issues seen in other research that has relied solely on self-reporting surveys (See Halic et al., 2010; Sim and Hew, 2010). Data was collected through two surveys, one carried out before the dissertation module began (n=126), and one carried out following the submission of student dissertation proposals at the end of the taught element of the module (n=94). A Network Analysis Visualization (NAV) was also undertaken, creating a map of all student and staff interactions on the class blog over the course of the module.

The Class and the Blog

This research involved 179 MA students who were enrolled on a collective dissertation module that spanned five separate courses. The students comprised a diverse and international group, with 90% reporting that English is not their mother tongue (n=133 /126responses)[b], with a range of experiences in having previously studied English (n=89/126 responses)[c]. All students were encouraged to participate in the blog on a weekly basis, both creating posts and commenting on other submissions, and the majority of students established a blog account and identity (n=146 /179 enrolled on course) although engagement was varied (See results). The class blog was established on the WordPress platform, a free and open-source content management system (CMS) based on PHP and MySQL. WordPress was selected due to its intuitive interface allowing students to quickly engage. More than half of the respondents to the pre-module survey described themselves as at least somewhat confident about using WordPress ahead of the task (n=70 /126), with very few self-reporting that they had not used WordPress previously (n=6 /126). While some class blogging studies have allowed students to blog as they see fit (See Robertson, 2011), the blog for this class was set-up to encourage the students to carry out specific writing tasks for each week, and to categorize these under pre-determined sections of the website (following Sim and Hew, 2010). Furthermore, each of the five courses posting to the blog were asked to do so in areas dedicated to their course, although it was possible for students to view and comment across the board. This setup was designed to allow for course leaders to easily identify the work of their students, and also followed the suggestion of Herrington et. al. (2006) that it is better to build upon existing communities rather than creating new ones.

Survey Design

Two surveys were carried out in support of this research, one prior to the module starting (Pre-MS), and one following submission of the research proposal, at the end of the blogging process (Post-MS). Each survey was made available online only, through Google Forms and each was completed anonymously, with no requirement for students to login or to provide self-identifying data. A two-week window for submitting responses was given for each survey, and students were encouraged to participate through emails and in-class reminders. Pre-MS was a 10-question survey that was used to establish the skill levels of students entering the module. This survey was carried-out in the two weeks preceding the start of the dissertation module. It is an established survey that has been used previously to help

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[b] Data from Pre-Module Survey conducted October 2017

[c] Data from Pre-Module Survey conducted October 2017.

frame the upcoming teaching. In order to ensure that the survey was also useful to this research a number of additional questions were added asking specifically for students to self-report their experience in using blogging tools, and especially WordPress.

Post-MS was presented to students following the receiving of results related to their dissertation proposals. Post-MS comprised 18 questions, reflecting those of Pre-MS survey, with additional questions related to the specifics of the blog, building on the work of Williams and Jacob (2004) and Al-Fadda and Al-Yahya (2010). The survey was laid out as such; a) Self-reporting 18 skills using likerd scale questions, b) blog specific questions covering perceived usefulness of blog (likerd scale), self-reported changes in dissertation topic related to the blog (Closed questions), and comments on the process (Open questions), c) non-identifying course and language questions. Following the work of Richmond et. al. (1987) and Halic et. al. (2010) students perceived learning and ideas about the blog were deemed an appropriate measure, with students being expected to be able to estimate with 'considerable accuracy the amount they learn in a given class' (Richmond et. al., 1987: 581). This of course does not mitigate attempts by students to tell the researcher 'what they want to hear', but the anonymous nature of the survey, and the results collected, would suggest that this did not occur. The two surveys, Pre-MS (n=126) and Post-MS (n-94) where analyzed using IMB SPSS Statistics (v24.0.0.1). Data was extracted from Google Forms and converted to numerical values to comply with the requirements of SPSS, this was carried out automatically through SPSS to ensure consistency of coding. Spearman's rank correlation coefficient was used to analyze comparisons of Scalier data sets. While Chi-Squared was undertaken to establish links between groups of students (Nominal data) and numerical outputs (Scale). Again these tests helped to ensure the validity of the data and to spot any anomalous cases.

Network Analysis Visualization

While a survey of students proved useful for establishing the perceptions of students who use the blog, it does not allow us to see the interactions that are made or the nature of the blog itself. Instead Visual Network Analysis enables us to see trends and patterns in student posting and commenting on the blog, allowing for easy identification of emerging communities, isolated students and interaction with staff. These visualizations are important in helping to avoid confirmation biases that may occur through more subjective estimates about student interactions. Visualizations were built using Gephi (v.0.9.2), the WP

All Export plugin, developed by Soflyy[d], was used to run two data scraps, outputting in Comma-separated Values (cvs) format, readable by Gephi. These two data sets (a. Posts and b. Comments) were then used to created tables of Nodes and Edges respectively (See table 1 and 2)

Mobile devices have seen a surge in both interest and availability in the last few years. Indeed the number of users of mobile devices has increased by 41% from 2010 to 2015 and reached 5.2 billion people. Additionally, for the first time, design and use of mobile media has surpassed design of desktop applications with almost 300 million apps downloaded in 2015. In the mobile environment, Google Android and Apple iOS have the lion's share of the market with a little more than 94% of mobile phones running one of these mobile operating systems (Leswing, 2015). Mobile applications (apps) usage also increased by 76% in 2014 (Perez, 2015), and recent reports have shown that people are using mobile apps for activities that involve financial transactions, such as shopping, checking bank or credit card accounts, paying mortgages (Smith, 2015). Indeed, numbers show that iOS sessions using shopping applications have increased by 174% in 2014, while on Android; the same sessions were up by 220% (Perez, 2015). As the use of mobile devices is spiraling up, this situation has also drawn the attention of hackers and mal intentioned programmers who are now devoting their efforts to designing malware for mobile devices. Between 2013 and 2014, there has been a notable 136% growth in mobile adware to 410,000 apps. Additionally, cyber-attacks are also becoming more sophisticated and dangerous, such as phishing attacks that give access to personal information stored in the device (Zorabedian, 2014), or ransomware attacks, that lock the mobile device and request a ransom for it to be released to its owner (Chickowski, 2016). Investment in technology to prevent security risks on mobile devices has not been accompanied with a similar growth in skilled labor within the field, so much so that 30% of organizations complain of lack of experts in the topics of security analytics and mobile security (Solis, 2015).

The purpose of this paper is to present teaching modules that aim at alleviating this problem by presenting material related to mobile security and privacy. The material is organized as independent modules that can be used by an instructor to introduce the topic to his/her students. The modules have been designed so that they can be used off-the-shelf, without requiring much customization on the part of the instructor. We believe that the modular approach will encourage an easy adoption by instructors and will offer students the opportunity to learn about this important topic in an

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[d]While it is not possible to guarantee the quality of this scrap due to the closed nature of the software used, the 60,000+ downloads of this tool,

along with its high amount of five star ratings suggest that the data would have been scrapped in its entirety and without loss.

easy and concise way. The rest of this paper is organized as follows; in the next section, we will discuss the characteristics of modular teaching and how suited it is to our work. The following sections will introduce in details the modules in terms of coverage and topics. We will next present an evaluation of the modules by two cohorts of students, discuss the results and then conclude.

Table 1. Nodes as imported to Gephi (extract of dataset). Data scraped using WP All Export. Id has been anonymized, but in full dataset mirrored usernames provided by students on the blog. PostCount = number of blog posts made by student.

Id	Label	PostCount	Course
student1	student1	3	MM
student2	student2	8	MM
student3	student3	6	IMB
student4	student4	1	FBM
student5	student5	1	FBM
student6	student6	8	PR
student7	student7	2	MM
student8	student8	5	FBM
student9	student9	6	IMB

Table 2. Edges as imported to Gephi (extract of dataset). Data scraped using WP All Export. Source and Target have been anonymized, but in full dataset mirrored usernames provided by students. Weight = number of comments made in the same direction.

Source	Target	Type	Id	Weight
staff1	student1	Directed	35	3.0
student21	student1	Directed	38	1.0
staff1	student2	Directed	39	7.0
student10	student2	Directed	46	1.0
student35	student2	Directed	48	1.0
student47	student2	Directed	49	1.0
student124	student2	Directed	50	1.0

Once the data was imported into Gephi it was subjected to Modularity (See Lambiotte et. al., 2009) and Undirected Network Diameter (See Brandes, 2001) tests to confirm their validity. Node diameters (d) were then weighted by number of posts (p) made by each student ($d=5 \Leftrightarrow p=1$; $d=15 \Leftrightarrow p=10$). Nodes were also coloured by course (See Figure 2). Edges were weighted (w) related to the number of comments (c) made ($w=1 \Leftrightarrow c=1$; $w=0 \Leftrightarrow c=10$). Following this, visualizations were created to demonstrate (multi-directional) information flows and staff reliance, using Circular Layout. Network groupings and communities were visualized using the Fruchterman-Reingold algorithm (Fruchterman and Reingold, 1991).

It is important to note that Edges are used to identify connections made between students (as nodes) rather than between posts and comments. Thus, each network map shows the extent to which each student was interacting with other members of the blog, but it does not demonstrate the specifics of which blog posts were most interacted with. The aim of the network maps in this research were to identify clustering of students and patterns related to inter-course interactions, and communities, and thus the student interactions are brought to the fore, with the level of commenting and posting being more subtly represented though the weighting of graphic elements.

RESULTS AND DISCUSSION

The aims of this research were two-fold, firstly to establish whether blogging could improve the performance of students in some key areas of dissertation work, stemming from the reflective practice that blogging promotes (Osman and Koh, 2013). The second was to establish if a blog might be able to help form a communities, in which students support each other's work and seek to work towards a common goal (Ardichvili et. al., 2003; Robertson, 2011). This section is presented in two halves, firstly examining results related to the self-perceived improvement of skills, testing these changes for significance in relation to reflective blogging activities, providing a baseline as to whether the blog had any impact at all. The second section examines a combination of NAV and statistical analysis carried out on the survey data to draw out whether a community has been established, and will follow the research questions as set out at the top of this paper.

Enhancing skills through reflective blogging

As noted earlier, data were collected through two surveys, Pre-MS (n=126), and Post-MS (n=94). These surveys collected data about the way in which students perceived their ability to undertake 18 key tasks related to dissertation writing, critical thinking, and blogging. Students were also asked to report on their background in English use, their attendance of additional – and optional – study skills classes, and the extent to which they had thought about their research project ahead of starting the dissertation module.
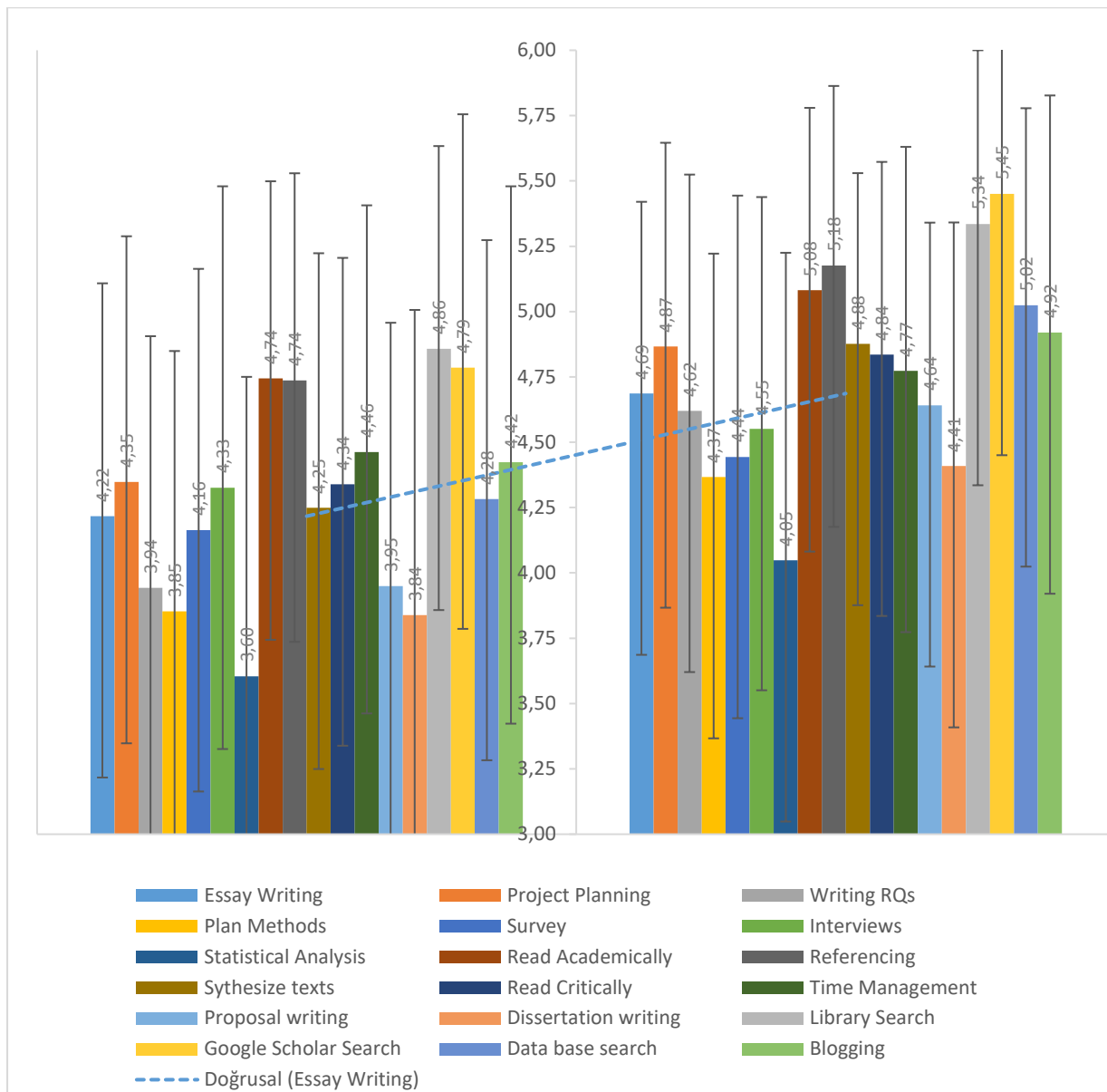
Figure 1. Averages of self-reported skills on likert scale (1-5), before and after module. Standard deviation is also shown, along with average increase in skills.

Examining the full skills set it is possible to see (Figure 1) that the general trend is for all skills to improve over the course of the module, when all self-perceived scores are averaged for each of the skills. It was deemed appropriate to compress the scores in this manner as the course taken by students showed no significance in relation to the perceived ability to undertake a skill. The standard deviation (SD) at for each skill however does not shrink for all skills. While some reductions in SD suggest that not only is there a general rise in the skill levels of students, but that this rise accords across the board, creating a cohort with a more similar level of skills going into the writing of their dissertations. Other skills see an increased standard deviation, suggesting that in some area there became a larger gap between perceptions of skills, leading perhaps to a class that was over all more divided in their abilities.

While it is impossible to directly trace a student from Pre-MS to Post-MS (due to the anonymous nature of the survey), inferences can be made about whether using the blog helped to enhance any of these skills through correlating the numbers of blog posts made and the self-reported skill scores. When comparing the number of posts made, there were no significant relationships with the self-reported skills at the end of the module. Very weak correlations were seen between time management (0.289) and planning a method (0.202), all other correlations were less than significant, or in the case of synthesizing texts, saw a small negative correlation (-0.081), suggesting that those who posted the most to the blog might have become more confused about how to synthesize texts. Even fewer correlations can be made between the number of comments made and the self-reported skill levels, with numerous skills showing a

negligible negative correlation, and all others showing a negligible correlation. Results were a little more reassuring when examining the overall perceptions of the blog compared to skill levels, with low positive correlations reported in all skill areas. This is perhaps explained though students having their own average internal metrics which are higher or lower, but are equal in terms of self-perception of skills and engagement.

It is impossible to delineate whether the blog had any influence on the improved skills of students using the data to hand. What is clear though, is that skills did indeed improve, and while the numbers do not hold up to scrutiny, numerous students reported in the open-ended section of the survey that the blog helped them to 'get used to writing' and also helped with 'planning the project' and 'thinking through ideas', all of which were skills questioned in the survey.

RQ1: To what extent are blogs able to foster and support a community in which students value respond to the ideas of their peers?

The second half of this work sought to establish whether blogging might be able to create a supportive online community that would help to enhance the skills of students (Vurdien, 2013), their reflective practice (Osman and Koh, 2013), and to reduce levels of isolation that are often an issue in dissertation courses (Herrington et. al., 2006). It has already been reported above that there was a general overall trend of skill improvement throughout the time the blog was running, however, to see the influence of the blog on student work it is necessary to examine more closely the links students have made online.

Before examining the self-reported student notions of closeness, Gephi has been used to create a number of visualizations of student interactions on the blog. Figure 2, built using the Fruchterman-Reingold algorithm (Fruchterman and Reingold, 1991), and omitting nodes with < 1 edge, and for the moment ignoring the central position of staff, shows four distinct groupings or various degrees of closeness. FBM Students appear to have created the closest and deepest set of interactions, although this is far from inclusive of the whole cohort (n=19/48 total FBM students). PR and MM students have also created small networks (n=11/27 total PR students and n=10/28 total MM students respectively). IMB students have created the most dispersed, and largest network (n=21). What is stark is the lack of

interaction between these groupings, leading us to suspect that these online networks mirror offline networks (Herrington et. al., 2006). This could also be related to the architecture of the blog (See Methodology).
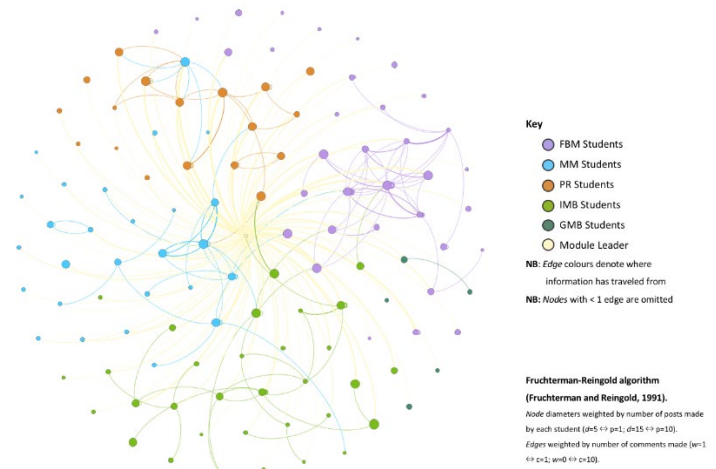
Figure 2. Map of student comments by course. Modelled with Gephi

These observations would suggest that some online networks were created in order to support peer student learning and peer support, particularly by FMB students who demonstrated the closest ties, and IMB students who developed the most far reaching network. When asked about the usefulness of peer feedback, 32% of FBM student and 33% of IMB students rated peer feedback between 4 – 5 (on a likert scale of 1 -5 for usefulness), compared with the average of all students on the module (27%, Chi2 sig.= 0.524). Suggesting there is some relationship between these factors. However, MM students reported the highest sense of usefulness in relation to peer feedback, with 35.7% rating it 4 or above. The results here are reasonably inconclusive in relating the extent of networks to the preserved usefulness of peers on the blog, and this is perhaps due to the small number of interactions that have taken place, and the smallness of the networks.

However, Figure 2 also shows a very high level of interaction with the module leader, with all nodes having some relationship with the central node. In order to better see this relationship a second visualization was created (Figure 3), that helps to see the interactions with staff more fully. In this visualization all nodes are included, even where e<1.
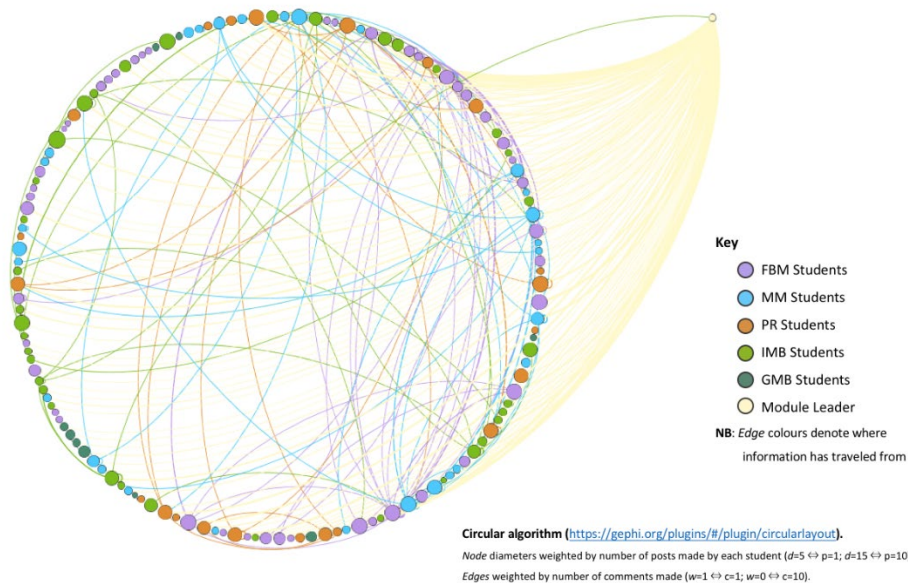
Figure 3. Staff student interactions. Modelled with Gephi.

Here the scale of interactions with the module leader are made clear. As is the direction of these interactions. It appears that just one (IMB) student interacted with a post presented by the module leader, while all other interactions stem from the module leader. It is important to note at this juncture, that this visualization does not include comments on comments, only single posts. This visualization suggests that the module leader's advice flooded the blog. In post-MS 60% (n=57) of students reported that they found staff advice to be helpful (rating 4) or very helpful (rating 5), with no significant relationships between course taken or these perceptions (Chi2 sig.=0.435), compared to the average of 27% for peer feedback, but with a significance by course (Chi2 sig.=0.524). Suggesting that staff feedback was consistent across the module, while peer feedback differed in quality depending on the course the students are on. These perceptions of usefulness of feedback also translated into the way in which students made changes to their work. 81.7% (n=77) of students reported that they changed and adapted their work following staff feedback, again with no significant differentiation between courses (Chi2 sig.=0.374), compared to 44% (n=42, Chi2 sig.=0.463) who changed their ideas related following peer feedback. This somewhat correlates with the work of Halic et. al. (2010) who found that students did not particularly values comments from their peers.

It is hypothesized that the amount of time students spent interacting with the blog and the number of comments they made will have also affected their perceptions of the usefulness of the blog. Here Spearmen Rho correlations are used to see relationships. Starting with examining at the numbers of posts made by students, it was possible to observe a small positive correlation

between the number of posts made and a perceived usefulness of the blog (cc. = 0.435). A similar correlation is seen between the number of posts made and the perceived usefulness of peer feedback (cc. =0.363). There was however only a negligible correlation between the number of posts and the perceived usefulness of staff feedback (cc. =0.240). This lack of correlation is likely due to every post a student being replied to by staff, thus there was seen to be some level of usefulness regardless of how many posts were made. Seeing the weak correlation between numbers of posts and perceived usefulness, and, peer feedback and the perceived usefulness of the blogs as a whole suggests that those who were more engaged were able to get more out of the community, but this is inconclusive. These analysis though are not representative of a community, as they merely equate the one way transfer of information (comments on posts) with usefulness. In order to understand better if a community formed or helped to stimulate ideas the comments made by students on the blog also need to be assessed.

The number of comments made by each student will be compared to how useful the student found the blog over all, and how much they valued peer and staff feedback. It was expected that there would be stronger correlation between each of these factors than the relationship between posting and these factors. Indeed, a weak positive correlation between the number of comments made and the overall perceived usefulness of the blog can be seen (cc =0.365). However this is a weaker correlation than that seen when examining posts verses overall usefulness. There was however a much stronger correlation, although still weak, between the perceived

usefulness of peer comments and the number of comments made by an individual (cc =0.468). There was however no correlation made between the number of comments and the perceived quality of staff feedback (cc. =0.162), again perhaps due to the ubiquitous nature of staff commenting.

Table 3. Summary of correlations between numbers of posts and comments made and the various types of perceived usefulness. Results of Two-tailed Spearmen Rho.

	Over all usefulness	Staff comment usefulness	Peer comment usefulness
Number of comments	0.365	0.162	0.468
Number of posts	0.435	0.240	0.363

These results and their relationship to the network model are interesting, even given their low correlation scores, and low levels of significance, it is possible to see some potential trends. Firstly, although the VNA shows a heavy amount of commenting from the module leader, and very small networks that remained within courses, survey results suggest that it was these smaller peer networks that were of more importance. The correlation between numbers of posts and comments bore no relation to how useful students found staff comments, but there was a weak correlation with peer comments. Taking this further, the relationship between the perceived usefulness of peer comments and the perceived usefulness of the blog over all was significantly stronger (cc. =0.531), than that between staff comments and over all usefulness (cc. =0.444). Leading to a conclusion, albeit with weak causality, that despite the vast amounts of staff comments, it was peer comments that were more closely related to an overall feeling of satisfaction about the blogs usefulness.

The results presented above are generally inconclusive in helping us to understand the way in which the blog has been used by students, and whether it supported the aims of building a community, reducing isolation among students, or enhancing their academic skills. However, coupling this with the more open questions from the survey does help present some insights as to the way in which the blog was seen by students, and this in turn tells us something of what the students might have gained from the experience – even if this returns us to a methodology critiqued earlier.

It has been suggested that a blog, through its modes of collective publishing, and multilayered interactions, would lend itself to community creation (Bennett et. al., 2012; Dennen, 2009; Kang et. al., 2011). One of the main strengths of blogs is the sharing of materials, that enable students to create the conditions to stimulate further contributions, or to (re-)consider their own position (Hemmi et. al., 2009). While the quantitative results did not show a strong relationship between viewing others work and over all satisfaction with the blog, many students responded to the open ended questions about what they most liked about the blog with suggestions that it was indeed this sharing of materials that was the most useful part of the process. 'Reading other blogs'; 'discussing ideas with the others'; 'I can see other people's ideas' are indicative of comments made by students in support of the blog. These postings though should not be a one-way channel for information, as Farmer et. al. (2008) note, the most potent reinforcement of blogging is people commenting on the blog. This notion was also reflected in the student's comments (although again not in the quantitative analysis); 'getting feedback'; 'having comment! Posts were not made in a vacumm (sic.)'. Theories suggest that combining these modes of posting and commenting, and allowing for a reasonably free reign on the content, should lead to conversations that are both personal, and stimulating (Yand, 2009). Yet, it is also noted that students can often feel uncomfortable when providing negative feedback, but that they conversely are also concerned by the absence of substantive feedback from peers (Halic et. al., 2010). These concerns were also reflected in the qualitative responses; 'Didn't' receive enough feedback from students or professors' noted one student. With others complaining that 'the interactions between peers are not enough', an issue caused at least in part by the low number of students who completed all posts and comments. This was observed by some students themselves; 'not many colleagues took part', something which another student, rather astutely, noted did not help in 'building a cycle of knowledge'. Clearly the theory was not born out fully in practice, and the supportive environment needed to create meaningful interaction was not reached. This is evidenced in Figure 2, showing that interactions were limited, but is perhaps must starkly illustrated by one student; 'in all honesty, knowing what other students are doing for their dissertation was not of interest to me, it was not of help at all', a clear indication that sufficient bonds across the group had not been formed. Bringing both concerns together another student reported that 'sometimes it felt like it was blogging for blogging. It could help more if prospective supervisors could give informal/formal feedback on some posts'. Dennen (2009) has suggested that when people operate within a blogging environment they will, to some extent, reflect the expectations of their audience, meaning that as the blog progressed, the expectations of both blogger and commenter appeared to be lowering. Some students offered their own suggestions of how to stem this, generally seeking more extrinsic motivation; 'students should be made compulsory to make comments on each other's posts, it would have been helpful have more conversation [sic.]'. And those who felt that even that

was not enough, and pushed for it to be graded; 'many students didn't take it seriously because it wouldn't be assessed, so if you want to improve it, may be take it into the assessment could be helpful'. It is clear from each of the datasets, and the feedback from students, that a full Community of Practice that meets Lave and Wenger's (1991) definition of uniting people in action that has meaning for them and for the larger collective, was not achieved in this exercise.

RQ2: To what extend are blogs able to offer a space for self-reflection, while also being established as a peer learning tool?

If then a community did not develop from this work, did the other proscribed benefit of blogging appear as part of the process, namely reflective practice. Hemmi et. al. (2009) have described blogs as like confessional spaces in which students can explore their own learning, with both productive and problematic outcomes, but which, according to Osman and Koh (2013), can replace the traditional journal or notebook for such practices. The numeric data would suggest that there was a certain amount of reflection accruing through the blogging process. Eighty-two percent of students (77/94) reported in Post-MS that they had changed their project based upon feedback from staff, and 45% (42/94) changed their mind following peer feedback. These numbers also reflect the extent to which students found peer and staff feedback to be rated as 'useful' or 'very useful', 27% for peer back, 55% for staff feedback. These figures though do not tell us much about whether students have been able to develop the ability to think through ideas and to apply them to construct new knowledge around their project (Pavo and Rodrigo, 2015). Instead of creating critical literacies (Kerawalla et. al., 2009), it is perhaps more likely that students saw staff feedback as prescriptive and felt that it needed to be followed. This is perhaps seen in the distinct lack of student comments that challenge suggestions by staff, or peers. There appears to have been no development of continuous questioning (Osman and Koh, 2013) or self-directed learning (Robertson, 2011). There were some students who reported that the most stimulating parts of the blogging process was having the chance to reflect, citing the best parts as 'thinking a little bit in advance about the dissertation topic'; or 'makes you think about the dissertation', yet these are not high level critical thinking processes that are being brought to light in these responses, and they appear to be far from Farmer et. al.'s (2008) idea that motivation and reflection is about critical analysis.

It is reasonable to assume that the levels of reflection on the blog mirror the motivation of students. Engagement theory calls for activities to be meaningful and to engage others in interaction (Kand et. al., 2011), yet is

seems the blog was both too prescriptive and, simultaneously, too loose to create the self-motivation needed for meaningful reflection. Farmer et. al. (2008) found that students desired detailed guidelines of what to post, or for posts to be modelled. For some students, this was also the case, some reported that 'sometimes the subject was a bit vague', or that it 'felt a bit useless' due to the lack of a definitive answer as to what to write. Conversely, Sim and Hew (2010) found that forcing students to blog at certain times and about certain topics was problematic as it was overly confrontational to any apprehensions the students might have. This was also seen in this study, with some students starting the blog after they had seen others post. In that respect, the blog was supportive of motivating students and sharing ideas, however, the wording of the survey, which focused on peer feedback, was not able to capture this kind of support network.

A number of students reported that the blog 'pushed [them] to get started on [their] dissertation', and some did suggest the process was a useful tool in developing their project, suggesting that they liked 'the whole idea of making me work on the project', and that 'with every step of blogging I was closer to my dissertation'. Some would even go as far as to make the link between the blogging and the writing of the proposal; 'at the end, I actually had an overview of my dissertation already started as well being able to use some of the posts in my proposal'. However, over all, motivation was low, and with it engagement in reflective practice, the reasons for this being epitomized through this insightful, if depressing, comment;

> 'students will not give their all for any piece of work that isn't graded, no matter how useful it may be; we are time-scarce. So yes, the blog is great! But I have actual, real commitments; and so, they would always come first'.

Given this, most students reduced their engagement level to that of 'data mining', rather than providing solutions through discussion and building their critical capacities, something that Ardichvili et. al. (2003) see as a clear sign of a less successful community.

RQ3: What is the role of the teacher within these environments, and how does this affect the development of the blog, and the communities within in the blog, contributing to, or damaging the above aims?

One of the starkest findings of the mapping of blog interactions was to see the dominance of the staff in the development of the network (See figure 3). Hemmi et. al. (2009) had previously suggested that a blogging

platform could not change the role of the teacher as an authority, and that academic traditions are inherently reflected in any blogging programme. This was seen across the blog. The aim of the staff was to model good commenting on posts and to provide guidance on topic ideas so as to stimulate conversation. Essentially providing reassurance and encouragement in the early stages, that is crucial to building an environment (Robertson, 2011). As the blog progressed it was clear that these interactions have solidified the hierarchy of teacher and student, rather than fostering self-efficacy (ibid.). Despite this, some students still perceived that they did not get enough from staff; 'I didn't receive enough feedback from students or professors'. The role of the teacher in these blogging activities is debatable, and it is certainly something to be considered moving forwards. Blogging tools allow for staff to easily and quickly slip into the minds of the students to leave ideas or to model behaviors (Kang et. al., 2011; Farmer et. al., 2008), but these interventions might be damaging the development of self-reflective critical practice, and even more so do the development of a Community of Practice. Thus, the teachers position must be given a more nuanced place, that perhaps does not reflect traditional roles, but instead embraces a new pedagogy more suited to the tools in hand.

CONCLUSIONS AND RECOMMENDATIONS

This paper set out to use a concurrent triangulation mixed method approach to explore the ways in which blogging might be used to support student learning through a large MA dissertation module, comprising students from five courses. Taking as it impetuous the idea that blogging might support students on an otherwise very individual journey through their dissertations, and building on the work of numerous scholars, the research established a new blog in order to test these ideas. The results of this were less than impressive, showing a general trend towards the blogs not producing a community, nor creating an environment in which self-reflective practice was forthcoming. Furthermore, the project was hampered by the way in which the role of the teacher was solidified as sort of digital 'sage on the stage' (King, 1993); the intrinsic motivations of students, which led to a low uptake in posting, and even lower in commenting; and communities that did form mirrored offline communities, and did not see cross course interaction. Finally, the two-fold issue of students being fearful of giving negative, or critical feedback, coupled with the sense that peer feedback was not worth as much as staff feedback, significantly reduced the development of the community, and of critical thinking.

These conclusions refute much of the literature, which is rather more optimistic about the potential of blogging, seeing it as a tool for the promotion of deeper learning (Williams and Jacobs, 2004). However, this literature is often overly simplified in its understanding of blogging and pedagogical practice, and much of it relied on smaller groups of students and purely self-reported qualitative feedback. This larger project, with its network analysis has been able to draw some of the more critical thoughts about blogging to the fore, and has created space for a great deal of recommendations for those hoping to pursue similar projects.

Kerawell et. al. (2009) noted that using blogs comes with a significant risk that student will not see the pedagogical underpinnings of the project, and like some students in this project, will see it as a 'tacked-on event' that tries to be modern, rather than grounded, and thus their motivation is damaged. Blogging can only work if it is embedded within a sound pedagogical conception. It is essential for the teacher to make some clear choices about what the blog is setting out to achieve, and to not leave these to chance, or to expect them to grow organically (Halic et. al., 2010). A more unstructured blog might lead to more conversation, or reflective practice, but may also result in low motivation to participate if these skills have not been sufficiently modelled. Conversely, a structured blog, like that implemented in this project, might result in some focused and directed work (as it did for some students), but likewise, it might discourage students who feel it is too prescriptive or narrow. It may shut down reflective practice, or the development of communities, if the pragmatic nature of the exercise means students always look back to the teacher. Higher education has long taken as read that technologies can 'enhance learning' (Kirkwood and Price, 2014), but the reality is considerable more complex. As seen in other studies (See Halic et. al., 2010; Sim and Hew, 2010), the majority of students enjoyed the blog, and self-reported that it was useful and that they engaged. However, analysis of these engagements tells another story in this case, one that reminds us that the online world, when used in this way, is really just a virtual classroom (Yang, 2009), and the pedagogical approaches of the classroom are equally, if not more, important to be aware of. Building a blog is not enough to foster meaningful interaction, and interaction does not in itself automatically foster cognitive engagement (Halic et. al., 2010). Instead, Higher Education should see blogging as a space in which pedagogical practices might be placed, rather than as a pedagogy itself. Only in this way will the online space be able to meet the learning needs of all students.

REFERENCES

Al-Fadda, H., & Al-Yahya, M. (2010). Using Web Blogs as a Tool to Encourage Pre-Class Reading, Post-Class Reflections and Collaboration in Higher Education. *Online Submission*, 7(7), 100-106.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of knowledge management*, 7(1), 64-77.

Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., & Kennedy, G. (2012). Implementing Web 2.0 technologies in higher education: A collective case study. *Computers & Education*, 59(2), 524-534.

Brandes, U. (2001). A faster algorithm for betweenness centrality. *Journal of mathematical sociology*, 25(2), 163-177.

Calhoun, C. J. (Ed.). (1992). *Habermas and the public sphere*. MIT press.

Churchill, D. (2009). Educational applications of Web 2.0: Using blogs to support teaching and learning. *British journal of educational technology*, 40(1), 179-183.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209, 240.

Dennen, V. P. (2009). Constructing academic alter-egos: identity issues in a blog-based community. *Identity in the Information Society*, 2(1), 23-38.

Downes, S. (2004). Educational blogging. *Educause review*, 39(5), 14-26.

Downes, S (2005). E-Learning 2.0.eLeaning magazine (10/15). Retrieved from http://www.elearnmag.org/subpage.cfm?section=articles&article=29-1

Farmer, B., Yue, A., & Brooks, C. (2008). Using blogging for higher order learning in large cohort university teaching: A case study. *Australasian Journal of Educational Technology*, 24(2).

Fruchterman, T. M., & Reingold, E. M. (1991). Graph drawing by force-directed placement. *Software: Practice and experience*, 21(11), 1129-1164.

Halic, O., Lee, D., Paulus, T., & Spence, M. (2010). To blog or not to blog: Student perceptions of blog effectiveness for learning in a college-level course. *The Internet and higher education*, 13(4), 206-213.

Hemmi, A., Bayne, S., & Land, R. (2009). The appropriation and repurposing of social technologies in higher education. *Journal of computer assisted learning*, 25(1), 19-30.

Herrington, A., Herrington, J., Kervin, L., & Ferry, B. (2006). The design of an online community of practice for beginning teachers. *Contemporary issues in technology and teacher education*, 6(1), 120-132.

Hughes, A. (2009). Higher education in a Web 2.0 world. *JISC report*.

Kang, I., Bonk, C. J., & Kim, M. C. (2011). A case study of blog-based learning in Korea: Technology becomes pedagogy. *The Internet and Higher Education*, 14(4), 227-235.

Kerawalla, L., Minocha, S., Kirkup, G., & Conole, G. (2009). An empirically grounded framework to guide blogging in higher education. *Journal of Computer Assisted Learning*, 25(1), 31-42.

King, A. (1993). From sage on the stage to guide on the side. *College teaching*, 41(1), 30-35.

Kirkwood, A., & Price, L. (2014). Technology-enhanced learning and teaching in higher education: what is 'enhanced'and how do we know? A critical literature review. *Learning, media and technology*, 39(1), 6-36.

Kolb, D. (1984). Experiential learning as the science of learning and development.

Lambiotte, R., Delvenne, J. C., & Barahona, M. (2008). Laplacian dynamics and multiscale modular structure in networks. *arXiv preprint arXiv:0812.1770*.

Lave, J., Wenger, E., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation* (Vol. 521423740). Cambridge: Cambridge university press.

Meyer, K. A. (2010). A comparison of Web 2.0 tools in a doctoral course. *The internet and higher education*, 13(4), 226-232.

Moon, J. A. (2013). *Reflection in learning and professional development: Theory and practice*. Routledge.

O'Reilly, T. (2004). Open source paradigm shift. *DiBona, C., Stone, M., Cooper, D.: Open Sources*, 2, 253-272.

Osman, G., & Koh, J. H. L. (2013). Understanding management students' reflective practice through blogging. *The Internet and Higher Education*, 16, 23-31.

Pavo, M. Á. H., & Rodrigo, J. C. (2015). Interaction analysis of a blog/journal of teaching practice. *The Internet and Higher Education*, 27, 32-43.

Richmond, V. P., Gorham, J. S., & McCroskey, J. C. (1987). The relationship between selected immediacy behaviors and cognitive learning. *Annals of the International Communication Association*, 10(1), 574-590.

Robertson, J. (2011). The educational affordances of blogs for self-directed learning. *Computers & Education*, 57(2), 1628-1644.

Sim, J. W. S., & Hew, K. F. (2010). The use of weblogs in higher education settings: A review of empirical research. *Educational Research Review*, 5(2), 151-163.

Stiler, G. M., & Philleo, T. (2003). Blogging and blogspots: An alternative format for encouraging reflective practice among preservice teachers. *Education*, 123(4).

Tang, E., & Lam, C. (2014). Building an effective online learning community (OLC) in blog-based teaching portfolios. *The Internet and Higher Education*, 20, 79-85.

Trafford, P. (2005). Mobile Blogs, Personal Reflections and Learning Environments: The RAMBLE Project. *Ariadne*, (44).

Udell, J. (2001). Tangled In The Threads. *Byte*, N-PAG.

Vurdien, R. (2013). Enhancing writing skills through blogging in an advanced English as a Foreign Language class in Spain. *Computer Assisted Language Learning*, 26(2), 126-143.

Williams, J. B., & Jacobs, J. S. (2004). Exploring the use of blogs as learning spaces in the higher education

sector. *Australasian journal of educational technology*, *20*(2), 232-247.

Yang, S. H. (2009). Using blogs to enhance critical reflection and community of practice. *Journal of Educational Technology & Society*, *12*(2).

Zhan, Z., Xu, F., & Ye, H. (2011). Effects of an online learning community on active and reflective learners' learning performance and attitudes in a face-to-face undergraduate course. *Computers & Education*, *56*(4), 961-968.