The use of mobile technology in lectures: Using an Audience Response System (Padlet) to enhance the student learning experience

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Abstract
This paper explores the usefulness of mobile technologies in the classroom, focusing on the Audience Response System of Padlet used during a specific module. Questionnaires (with both closed and open ended questions) were used to research how students engaged with this technology, particularly whether it encouraged greater participation as well as deep learning. Overall, the students had positive responses to Padlet as highlighted by the statistical findings. The comments in the open ended sections, though, noted that there are some issues with using such technology in classrooms. Importantly, it is worth noting that the technology should be embedded into the sessions within a variety of different methods in order to encourage deep learning.

Introduction
In teaching using the traditional lecturing method, I have found that when I ask the students questions, the same regular students participate. Whilst this could be because some students need time to reflect before synthesizing information, it could also be because some are shy or find the idea of speaking in public daunting (Mortiboys, 2010). This research is aimed at finding out whether using the Audience Response System (ARS), Padlet, via their mobile phones, could help increase participation and engagement in learning. Research already suggests that active (with the right technology) and collaborative learning is effective in engaging students (Biggs, 2003; Kahn, 2014) and can make learning meaningful and enjoyable (Blessinger and Wankel, 2013).

This study uses activity theory to try and understand the use of technology in learning. Activity theory builds on the work of Vygotsky (1978, 1986), which conceptualises learning as involving a subject (the learner), an object (the task or activity) and mediating artefacts (computer, smart phone).

The objectives of the study are stated below:

- To examine the efficacy of mobile technology (Padlet) in enhancing student participation and engagement in learning
- To assess if students feel they learn more when they participate in discussions through the use of technology (Padlet).

Research Context
This research was carried out at the University of Worcester (UK). Data was collected from second year students that I teach on the module title: Media and Social Change. The students on this module are registered for a degree in-Media and Cultural Studies or a joint degree including Journalism, Sociology and Film Studies. The module is designed and taught in line with constructivist pedagogies that encourage active learning and draws on students' experiences of their use of media to see how media has changed and/or is changing society (see McLuhan, 1964 and Williams, 1974). Whilst a number of technologies have been used in teaching this year group, including blogs, Blackboard and Facebook groups, there has been minimal use of mobile technologies for learning. Most students (being digital natives) on the module already have smart phones which allow them to use Padlet to respond to questions and, as Oblinger and Oblinger (2005) suggest, also have a wealth of online experience and skills that can be easily harnessed for this study.

Literature Review
Action research entails an 'iterative cycle' of problem identification, diagnosis, planning, intervention and evaluation (Cassell and Johnson, 2006: 784). The purpose of action research is to address a problem or a theory, with the researcher using an intervention on participants to improve or remedy the perceived problem (Dickens and Watkins, 1999). As argued by Leitch and Day (2006) it can be usefully combined with reflective practice to enhance the learning experience in the classroom. Kemmis (2010: 420) describes action researchers as being people that can be part of the endless production, reproduction and transformation of practices that is the process by which collective practices evolve to meet the needs, circumstances and opportunities of new times and new circumstances. In this case this is me, the researcher trying to explore new ways of engaging and encouraging participation in the new media era.

Activity theory (AT) comes from Vygostsky's (1978) concepts of mediated action, where he argues that human action is more than a function of internal biological processes. It is also mediated culture and artefacts. Atwell and Hughes (2010:20) contend that AT model contextualises the interaction between people and computers (in this case the smart phone). It can best be

understood in the context of its defining terms which include subject, object, tool, process (transformation), community, rules, division of labour and outcome, making up what is known as an activity system (Mlitwa, 2007; Atwell and Hughes, 2010). The subject is an individual, the object is the reason or motive for the action, the tool is an artefact while the community represents social groups (Mlitwa, 2007). Human interactions with each other and with objects of the environment are mediated by the use of tools, rules and division of labour (Atwell and Hughes, 2010). Vygotsky's (1978) theory is that interactions with the social environment are an important way in which knowledge is acquired and cognitive growth takes place. He argues that learning stimulates a number of internal developmental processes that are able to take place only when the learner is interacting with people in his environment and in cooperation with his peers. As this project aims at examining whether ARS help increase participation and engagement of learners AT seemed an appropriate theory to use.

With the advent of Web 2.0, technology is increasingly being used for learning and teaching in universities all over the world (Bor, 2014). Students of Media Studies often go on to pursue careers in communication, broadcasting and media (Wenger and Owens, 2012) and as Bor (2014) argues, it is imperative that they be comfortable with using a wide range of technologies. Whilst the Media and Cultural Studies course at the University of Worcester does not claim to train students for media careers (Programme Specification, 2014), pedagogical theorists contend that **the** curriculum should respond to the social, cultural and workplace values in order to provide students with career skills (Bor, 2014). Using mobile technologies, as intervention in learning is not only in keeping with the bid to promote social inclusion in Europe (Sourbati, 2012), the University of Worcester (http://www.worcester.ac.uk/elearning/) and HEFCE (HEFCE, 2009) e-learning strategy to enhance learning, but is also another way of embedding employability skills into the curriculum. Indeed clickers and electronic voting systems are already in use by other colleagues in the University (http://www.worc.ac.uk/ils/cult/cult.html). However the advantage of Padlet over clickers is it allows users to enter text rather than just click on the right answer hence helping to bring out more in-depth answers.

Research already suggests that using technology in learning can enhance the student experience both on and off campus (Biggs, 2003). McLuhan (1994) contends that it can extend human capabilities to solve problems and Mlitwa (2007) posits that it can be used to empower teachers and tutors to stimulate learning more effectively. However there are any numbers of conflicting views when it comes to gauging the gains made by students when technology is used. Kvavik et al. (2004) contend

that whilst the use of technology in higher education gives more time for reflective teaching, it does little to improve student learning. Saunders and Klemming (2003) also posit that using technology can lead to a strategic learning approach aimed at satisfying specific course objectives. Of course it is important to bear in mind that some of these conclusions are down to the different forms that technology may take, as it varies from PowerPoint, to websites, discussion boards, wikis, podcasts and blogs (Alexander, 2007) to mention a few. From the examples cited above, it is evident that some forms of technology are used to merely provide access to information online with little in the way of measuring students' engagement with the learning material. In-fact research suggests that some forms of teaching with technology (e.g. online learning) have actually led to attendance of lectures and seminars declining (Saunders and Klemming, 2003). This reinforces the argument that for technology to be useful in education it must be used in a way that meets the requirements of the course (Blessinger and Wankel, 2013). Muianga (2004) adds that technology should allow the learner to actively engage in the construction of knowledge and free them from being passive recipients of knowledge. This echoes a study by Beetham et al. (2009) on the use of technology by learners, that found that learners want meaningful choices about how they learn, with or without technology and that while many learners use technology to multi-task some find being online a distraction from study:

> Learners are attached to their technologies emotionally and in terms of personal organization and practice: they benefit from being able to use personal technologies and access personalized services in institutional contexts […] Informal collaboration is widespread, often facilitated by technology that is under learners' ownership and control (Beetham et al., 2009:24).

Constructivist approaches to which I subscribe, advocate for active learning which may include the use of technology in learning (Attwell and Hughes, 2010). Attwell and Hughes (2010) note that the fundamental element of constructivism is that learners actively construct their own knowledge and meaning from experiences and that learning should involve social negotiation and mediation. Using ARS such as Padlet in learning, has the added advantage of allowing students to participate anonymously and may be useful for quieter students who may not feel confident about speaking out (Blessinger and Wankel, 2013). As Blessinger and Wankel (2013) argue, this helps the instructor concentrate on the learning needs of the students, rather than on personality differences. They summarise some of the benefits of ARS as supporting:

- non-intrusive ways of monitoring students,
- immediate responses by both the instructor and the students
- promoting student centred learning that encourages collaboration
- collection and analysis of responses over longer periods that allows for assessment of the group (Blessinger and Wankel, 2013: 8)

Methodology

As the aim of this project was to find out whether participation and engagement of students could be improved through the use of ARS, I decided that data would be collected from the students using evaluation questionnaires with both tick box and open ended questions. Qualitative analysis is particularly useful where more in depth information is needed (Norton, 2009), and helps the researcher gain more insight into the issue at hand while quantitative analysis relates to magnitude and counting and hence gives a statistical element to the data (Wimmer and Dominik, 2006).

This questionnaire was administered on the fourth week of teaching of the module. By this time the students were familiar with both the lecturer and each other and had trialled Padlet in a seminar session once before. Although all students were asked to use Padlet as part of their learning, on the day the questionnaire was administered, it was explained that completing the questionnaire was not mandatory and that those who were willing to answer questions had to fill in a consent form.

Findings and Discussion

There were 24 students present on the day and a total of 17 students agreed to take part by signing their consent and completing the questionnaire. Below is a summary of the responses to the statements on the questionnaire. Although the questionnaire had boxes where one could register strongly agree/disagree and just agree/ disagree, I combined the totals for the negative and positive responses in the table to get a clearer statistical reflection of those that found the technology useful and those that did not. The figures are shown in Table 1 below.

Table 1: Questionnaire responses

Statement	Strongly agree and agree	Neutral	Strongly disagree and disagree
Using mobile technology helped me develop an understanding of the content than when compared with lecture based classes	**8 (47%)**	**3 (17.6%)**	**6 35%**
I am more engaged when I use mobile technology than in a lecture without	**10 (58.8%)**	**2 (11.7%)**	**4 (23.5%)**
Using mobile technology helps me to pay more attention in the lecture	**8 (47%)**	**5 (29%)**	**4 (23.5%)**
Being able to see class responses on the screen helps to increase my confidence	**13 (76%)**	**1 (5.8)**	**3 (17.6%)**
Using the mobile technology helps the lecturer become more aware if students are finding a concept difficult and take action to address this	**11 (64.7%)**	**2 (11.7)**	**2 (11.7%)**
I found using mobile technology fun and enjoyable	**14 (82%)**	**2 (11.7%)**	**1 (5.8%)**
I found that using mobile technology had a positive impact on my learning	**10 (58.8%)**	**3 (17.6%)**	**4 (23.5%)**
I would like to use mobile technology more regularly in my lecturers	**13 (76%)**	**2 (11.7%)**	**2 (11.7%)**

Overall there was a positive response to the use of Padlet and mobile phone technology as indicated by the questionnaire. A majority of the students (47%) indicated that they found that technology increased their participation and helped them to feel more engaged (58.8%). There was also a strong indication that students would want to see more technology (76%) used in lectures. 76% also said that seeing their answers on the screen helped to boost their confidence. There was a buzz of excitement on the day that this research was carried out. Most students took to their smart phones as soon as a question was posed, perhaps driven by the thrill of

anonymity and immediacy. The positive statistics on engagement and participation are consistent with other findings that suggest that students find the use of audience response systems engaging and enjoyable (Porter and Tousman, 2010 and Guiller and Bell, 2011). In this case, 82% of students found mobile technology fun and enjoyable to use.

However the realisation that there was no way of identifying who had written what, prompted others to write irrelevant funny comments on the screen which caused a few giggles and irritated some.

Those that found this behaviour irritating appear to have felt so strongly about it that it was mentioned in the qualitative responses to questions on the questionnaire as

shown below in Table 2:

Table 2: Questionnaire comments

Do you think that using Padlet today aided your understanding of the material covered in class today? Please explain your answer	*Are there any ways in which the activity with Padlet could have been improved?*
I think it helped increase participation	Don't really know
Not really. It was too much noise for such simple questions	Don't use it
Maybe select the appropriate answers for the question before they appear	Do not use it
Yes-got an understanding of group response	Don't use it
Maybe select the appropriate answers for the question before they appear	Maybe select the appropriate answers for the question before they appear
Yes I understood and felt confident enough to participate	It should not give live updates of unfinished responses

Of the 17 questionnaires that were returned, 11 of them had no responses to the open-ended questions. Three of the suggestions were similar. However looking at the result of the 6 responses, 50% indicated that they found Padlet helped them to understand and participate in learning thereby corroborating research by others (Turney, 2009; Blessinger and Wankel, 2013).

There were two main criticisms to the use of the technology, that is answers appeared on the screen before they were complete and that the questions were too simple for the hassle of using technology. The problems that arose can be viewed from the perspective of activity theory. The object of the project was to improve participation and engagement of students. However, contradictions arose for some students who found the instantaneous way in which Padlet screened answers annoying. This resonates with findings by Beetham et al., (2009) that some students find online technology a distraction. Although the students had been asked not to post frivolous comments, some failed to obey the rules. Others also found the questions too simple. In hindsight all these two complaints can be attributed to the lecturer. Inadequate familiarity with the technology meant that I chose for answers to appear instantly on screen hoping that this would redeem the time students took in responding. This meant some 'nuisance' comments were also screened before I deleted them. Padlet has the option of delayed screening of answers which I could have adopted and now use in my teaching. This allows me the opportunity to delete 'nuisance' comments that can be a distraction.

The simplicity of the questions posed was due to my lack of familiarity with ARS, something that has to be rehearsed and perfected (Blessinger and Wankel, 2013; Raes, 2015). The solution for me has been to combine group learning and ARS discussions when I am teaching to allow for simple and probing questions that can

facilitate deep learning (Biggs and Tang, 2011). Activity theory and reflective practice has been useful in highlighting the contradictions and perspectives that can arise when new technology is used in learning. It was the view of the majority of respondents that Padlet aided their learning but equally the concerns with its use have also informed my practice.

Teaching and Learning after the Action Research

The results of this research and subsequent mid-module evaluations and peer observations have influenced the way I use technology to engage and encourage participation from students. Student feedback has been that the use of Padlet in lessons has been one of the best things about the module. In line with QAA (2012) guidelines on 'closing the feedback loop' I have reported back to students concerning all issues raised about Padlet and discussed how it will be used in future. Further use of Padlet in lessons however, has shown me that technology cannot compensate for poor lesson planning. As Turney et al. (2009) also found, to enhance learning, technology must be aligned with aims and learning outcomes of the module. There have been instances in which I have been unable to solicit answers from students using Padlet and in times like these I have resorted to other means of engaging students. Hence, my approach is that technology does not replace traditional methods of discussion such as pair and group work, but instead it complements them. The advantage of using ARS is that the instructor can tell quite quickly if the students have not grasped a concept or understood a question. I have also been able to combat the problem of students posting frivolous comments by using a delay mechanism that allows me to screen responses before allowing them to appear on the screen.

Whilst there are still some students who do not like Padlet, continuing feedback from students is that the

anonymity gives them the confidence to express their ideas as also found by Raes (2015). Whilst it does not necessarily change the way students learn, it removes the focus from the lecturer and allows even the shyest of students to be able to participate without feeling like they have been put under a spotlight.

Conclusion

This action research project has used activity theory to explore the use of ARS in enhancing participation and engagement in lectures. The quantitative aspect of the questionnaire indicated that students felt they were more engaged and that their participation increased when they were using Padlet. However those who were not happy with this technology felt so strongly about it that in the qualitative section of the questionnaire they asked that the technology be dropped because it was distracting and did not promote deep learning. As argued by Simpson and Oliver (2007) ARS technologies such as Padlet are a tool and not an approach to learning. What has become clear to me whilst undertaking this project is that thorough preparation needs to be done in order to successfully embed the use of this technology into learning time. This not only just means preparing questions that allow for deep learning but also being flexible and ready to step in when technology fails to achieve the intended outcome (Kay and LeSage, 2009).

One limitation of this study is that the sample used was too small for results to be generalised. However, the findings do provide some useful insight into the perceptions of Media and Culture students at Worcester using ARS technologies in lectures. The findings also correlate with other previous studies that suggest the use of ARS increases communication and engages students in their learning (Turney, et al., 2009; Porter and Tousman, 2010). Although the use of technology may not translate into better grades for students, the sense of satisfaction and confidence that it builds potentially enhances the learning experience. This is more so, for students on a media course who may hope to be exposed to various forms of media in their learning. My approach to the use of technology in learning has also changed. Whereas previously I shied away from embedding technologies apart from the basic videos and PowerPoint, I am now confident enough to try new things and deliberately embed technology into lesson plans.

Acknowledgements

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Biography

Mercy holds a PhD in Politics and Communication from the University of Liverpool. Mercy has a wide-range of teaching interests and at Worcester has specialised in teaching gender and representation and crime and the media.