Iterative approach to implicit student-generated mobile learning to promote visual literacy and peer mediated learning

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This paper aims to report early findings of the second iteration of an implicit student-generated mobile learning project that promotes visual literacy and peer mediated learning. The first iteration was conducted with first year health science students at the University of Queensland, Australia, in 2013. We found that while the video assessment task may have aided learning for each student around their specific chosen topic, overall course learning outcomes did not improve. This was perhaps due to a failure of the peer mediated learning aspect of the learning activity. Furthermore, the labour intensive nature of the task may have attenuated overall performance in the course. Acting on these findings, we adjusted the visually based, peer-to-peer mobile learning activity accordingly. The revised assessment task was reintroduced in 2nd semester 2014, and early findings on the efficacy of the revised task on learning will be presented at the ascilite 2014 conference.

Keywords: mobile learning, student generated learning, visual literacy, peer mediated learning.

Rationale

Mobile devices are now ubiquitous in business, communication, health, entertainment, and learning; both in terms of penetration (now at 127% in Australia), and in terms of data download volumes (PwC, 2013). Our own institutional data shows that 98% of students at The University of Queensland (UQ), Australia, own and use smart mobile devices, and that the accessing of UQ's institutional learning management system via mobile devices had quadrupled by 2012 (Hendy et al., 2012).

We agree with arguments made previously, that "[Mobile learning] must view the learner as the one being mobile and not his/her devices! What needs to move with the learner is not the device, but his/her whole learning environment," (Laouris & Eteokleos, 2005), that "mobile learning [in biomedical sciences] can make valuable contributions to linking different learning environments" (Andrews, Smith & Caladine, 2010, p. 71), and that mobile learning is "part of a new mobile conception of society" (Traxler, 2007, p. 5). Furthermore, our own work offering 'anywhere, anytime, with any device' mobile learning experiences has established, through evaluative research and iterative processes over the past five years, the viability of mobile devices as a learning tool, particularly with respect to scenario-based learning (Ernst, Harrison & Griffin, 2013; Ernst & Harrison, 2012; Ernst, Harrison & Colthorpe, 2012; Ernst, Harrison & Griffin, 2012; Harrison & Ernst, 2012).

The development of authentic summative mobile assessment is both timely and necessary, as this is the area of greatest demand in the current transition from elearning to mlearning [mobile learning]; an area that recognises the learner's need to be engaged in active, authentic and contextualised learning and assessment activities.

Thus, summative mobile assessment tasks should:

- mobilise student demand for mobile learning, as evidenced by Andrews, Tynan and James (2011) and Andrews (2010); ensuring currency and relevance in ongoing technological developments;
- leverage diverse but student-owned technology for academic benefit [BYOD] (Ernst, Harrison & Griffin, 2013);
- recognise the near ubiquity of internet-enabled handheld devices using multiple operating platforms and systems (Johnson, Adams Becker, Estrada & Freeman, 2014), and their application in engaging learners in high-impact, mobile learning assessment opportunities.

Given current levels of digital literacy and mobile device penetration among students, the present shift from students as consumers to students as creators and the integration of online, hybrid and collaborative learning (Johnson et al., 2014), afford considerable potential for visual literacy, as well as for peer mediated learning to be incorporated into the learning process (Brandon & Hollingshead, 1999; Dyson, 2012; McDonald & Hoban, 2009).

Visual literacy requires students to be proficient in their ability to identify the message behind a constructed image, as well as produce material with a visual component that conveys an intended message of its own (Avgerinou, 2009; Hattwig, Burgess, Bussert & Medaille, 2011; Metros, 2008); and its benefit in education has been discussed (Chanlin, 1998, Rossetto & Chiera-Macchia, 2011; Wakefield, Frawley, Dyson, Tyler & Litchfield, 2011; Wilson, Niehaus, White, Rasmussen & Kuchel, 2009). Further studies provide insight into the value of visual communication specifically for higher education in biological and health sciences (Hall & O'Donnell, 1996; Watson & Lom, 2008). In addition, university students in the biological and health sciences seem to benefit from peer mediated learning (Hanson, 2011; Trautman; 2009): students share their knowledge and understanding with one another, as a means to further learning or understanding of relevant content.

The Pilot Project

In 2013 the authors assessed the efficacy of a student generated, animated video task on health science topics, set within a framework that promoted sharing of videos amongst peers, in a first year health science course at the University of Queensland, Australia. Detailed findings of this pilot project have been submitted for publication elsewhere (Ernst, McGahan & Harrison, submitted). The purpose of this video task was to make physiological information accessible, and aid in "sense making", for both students and audience. We anticipated that students would experience deep learning while creating their video, and that students would benefit from the other student-generated videos as learning resources. Similar to studies conducted by Dyson (2012) and McDonald and Hoban (2009), the pilot project was evaluating the effect of the visual literacy and peer mediated learning on learning of a particular topic. The novel purpose of this pilot study, however, was to examine the effect that such a task would have on overall student performance as measured by other intra semester assessments, end of semester examinations and final grade distribution.

The main conclusions of the pilot project were that while the video assignment may have aided learning for each student around their specific chosen topic, overall course learning outcomes did not improve perhaps due to a failure of the peer mediated learning aspect of the learning activity. Also, the labour intensive nature of the animated video task actually may have diminished overall performance in the course as students spent too much time creating the animations, thereby not paying enough attention to concurrent course content.

The subjects of that pilot study were students enrolled in second semester of 2012 and 2013 in the University of Queensland's Bachelor of Health Sciences course "Physiology of the human body" (BIOM1000). In both years more female students were enrolled than male students (2012: n=102, 71 female students, 31 male students; 2013: n=113, 78 female students, 35 male students). The course covered basic concepts in human physiology, delivered through lectures and laboratory classes. Knowledge and understanding of course content was assessed in an end of semester examination, worth 60% of the student's overall grade. Alongside the end of semester examination, additional intra-semester assessment items included quizzes performed at the end of each laboratory class to test specific concepts learnt in that class (adding up to 16% of the student's grade), as well as an assignment task focused on a specific pathophysiological concept of the student's choosing (19% of the student's grade), and an assessment of the student's group work as marked by their peers (worth 5%). The independent variable used to test the effect of visually oriented peer mediated learning in this case was the assignment task.

Methodology

The methodology of the subsequent iteration reported here is based upon that used in the initial pilot study. For both situations, this entailed teams of 3-4 students being asked, in consultation with community-based health interest groups, to create a 4 min health science video on selected topics. The videos were to highlight how a disruption of homeostasis may lead to an acute illness, a chronic health disorder or death. Students were to use simple but accurate animations, or techniques such as "slowmation" or "stopmation", to convey physiological causes and mechanisms that lead to a chosen disruption of homeostasis, and the consequences of this homeostatic disruption. Students were introduced to the student generated, animated video task during a 3 hour introduction session at the start of the semester during which the processes of creating animations and videos were explained, and examples of animations, "slowmation" and "stopmation" were shown and discussed.

All video and audio footage was to be captured using student-owned devices such as smartphones, tablets or digital cameras. Assessment of the videos was based on criteria including scientific rigour, evidence-base, inclusion of up-to-date findings, clarity, succinctness and evidence of logical reasoning. It was emphasised that equipment beyond that to which an ordinary person would have access, was not required, and that production values were not assessed. Thus, the mobile learning aspect of this project was entirely implicit, but visual

literacy and peer mediated learning were explicitly promoted to the students. Following submission, students were encouraged to use each other's videos about various diseases to aid their own learning, and prepare for the course end of semester examination.

Students doing the exact same course in 2012 engaged with the exact same teachers and learning activities however submitted an assignment that was purely written in nature. They also were not given access to each other's submissions. The level of understanding about their chosen topic that students demonstrated in their assignment submission, as well as overall performance in other assessment items in the course were compared between 2012 and 2013 for the pilot study, and will similarly be compared across the years from 2012 to 2014 for this iteration.

The revised iteration

Acting on the findings of the pilot project however, the authors have adjusted the visually based, peer-to-peer mobile learning activity for this iteration to:

- Limit the workload required for students to complete the task as the added labour necessary for students to generate and edit a video in the first iteration appeared to be deleterious to overall learning in the course;
- Manage video topic selection as the majority of learning happens around the chosen topic students choose to present on;
- Strengthen the exposure of students to other peer generated visual texts;
- Time appropriate scaffolding for learning activities in the weeks leading up to the submission date.

This revised visually-based, peer mediated mobile learning assessment task has been reintroduced in 2nd semester 2014 in the first year Health Sciences course "Physiology of the human body" (BIOM1000) at the University of Queensland, Australia. As in previous years, more female students have enrolled in this course than male students (113 female students, 40 male students). We expect improved student learning not only around their chosen health science topic, but also a better understanding of health science topics covered by other students leading to an overall improved understanding and appreciation of the link between human physiology and disease processes.

Early findings on the efficacy of the task on learning and retention will be presented at the ascilite 2014 conference in November 2014. The findings will include student performance and assessment outcomes, qualitative and quantitative student feedback, mobile devices used, and the effect the task may have had on learning and retention of course content, for the entire learning program of a semester long health sciences course.

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References

Andrews, T. (2010). Developing a whole of university approach to adopting hand held student response tools. In M. Montobello, V. Camilleri & A. Dingli (Eds.), *mLearn2010: 9th World Conference on Mobile and Contextual Learning*. Valetta, Malta, 19-21 Oct 2010.

Andrews, T., Tynan, B. & James, R. (2011). The lived experience of learners' use of new media in distance teaching and learning. *On the Horizon*, 19 (4), 321-330

Andrews, T., Smyth, R., & Caladine, R. (2010). Utilising students' own mobile devices and rich media: Two case studies from the Health Sciences. In *ELML '10 Proceedings of the 2010 Second International Conference on Mobile, Hybrid, and On-Line Learning*, 71-76. Washington, DC: IEEE.

Avgerinou, M. (2009). Re-Viewing Visual Literacy in the "Bain d' Images" Era. *Tech Trends*. 53(2): 28-34.

Brandon, D. & Hollingshead, A. (1999). Collaborative learning and computer supported groups. *Communication Education*. 48(2): 109-126.

Chanlin, L. (1998). Animation to teach students of different knowledge levels. *Journal of Instructional Psychology*. 25(3): 166-175

Dyson, L.E. (2012) Student-Generated Mobile Learning: A Shift in the Educational Paradigm for the 21st Century, *anzMLearn Transactions on Mobile Learning*. 1 (1): 15-19.

Ernst, H., McGahan W., & Harrison, J. (submitted). Questionable benefit of visual and peer mediated learning on overall learning outcomes of a first-year physiology course. *International Journal of Mobile and Blended Learning*.
Ernst, H., Harrison, J., & Griffin, D. (2013). Anywhere, anytime, with any device - Scenario-based mobile learning in biomedical sciences. *Int. J. Mobile Learning and Organization*, 7(2): 99-112
Ernst, H., & Harrison, J. (2012). Active mlearning opportunities offered by a prototype template of a new web-based SBLi™ interface for smartphones. *Int. J. Mobile Learning and Organization*, 6(1); 1-7.
Ernst, H., Harrison, J., & Colthorpe, K. (2012). Mobile learning materials as a "prompt" for participation in physiology practical classes. *Int. J. Mobile Learning and Organization*, 6(1), 25–37.
Ernst, H., Harrison, J., & Griffin, D. (2012). Iterative design and delivery of high impact, multiple platform, scenario-based interactive mobile learning activities in the health sciences. *mLearn2012: 11th World Conference on Mobile and Contextual Learning*, Helsinski, Finland, 16-18 Oct 2012.
Hall, R.H. & O'Donnell, A.M. (1996). Cognitive and affective outcomes of learning from knowledge maps. *Contemporary Educational Psychology*. 21(1): 94-101.
Hanson, K. (2011). Blog Enabled Peer-To-Peer Learning. *Journal of Dental Hygiene*. 85 (1): 6-12
Harrison, J., & Ernst, H. (2012). First year communication and physiology classes collaborate for iTunesU content creation: A practice report. *The International Journal of the First Year in Higher Education*, 3(1).
Hattwig, D. Burgess, J. Bussert, K. Medaille, A. (2011). Visual Literacy Competency Standards for Higher Education. *Association of College & Research Libraries*. http://www.acrl.org/ala/mgrps/divs/acrl/standards/visualliteracy.pdf
Hendy, B., Long, P., Moffatt, R., Gerrity, B., Joughlin, G., & McManus, M. (2012). New Media Literacies and Personalized Learning. *Universitas21 EI Conference 2012, National University of Singapore*. Retrieved from http://www.universitas21.com/article/educational/details/149/ei-conference-2012.
Johnson, L., Adams Becker, S., Estrada, V., Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, Texas: The New Media Consortium.
Laouris, Y., & Eteolkeos, N. (2005). We need an educationally relevant definition of mobile learning. In *mLearn 2005: 4th World conference on mLearning*. 25-28 Oct 2005, Cape Town, South Africa.
McDonald, D. & Hoban, G. (2009). Science knowledge gained through the use of Slowmation. *The International Journal of Learning*. 16(6): 319-330.
Metros, S. (2008). The Educator's Role in Preparing Visually Literate Learners. *Theory Into Practice*. 47(2): 102-109.
PwC (2013). *Global Entertainment and Media Outlook 2012 - 2016. 12th annual edition*. New York: PricewaterhouseCoopers.
Rossetto, M. & Chiera-Macchia, A. (2011). Visual Learning Is the Best Learning--It Lets You Be Creative while Learning: Exploring Ways to Begin Guided Writing in Second Language Learning through the Use of Comics. *Babel*. 45(2-3): 35-40.
Trautmann, NM. (2009). Interactive Learning through Web-Mediated Peer Review of Student Science Reports. *Educational Technology Research and Development*. 57(5): 685-704.
Traxler, J. (2007). Defining, discussing, and evaluating mobile learning: The moving finger writes and having writ… *Int. Review of Research in Open and Distance Learning* 8(2), 1-12.
Wakefield, J.A., Frawley, J.K., Dyson, L.E., Tyler, J.V. & Litchfield, A.J. (2011). Increasing Student Engagement and Performance in Introductory Accounting through Student-Generated Screencasts, *AFAANZ Conference*, Darwin, Australia, July 2011 in AFAANZ Conference, ed None, AFAANZ, Melbourne, Australia, 1-27.
Watson, F. & Lom, B. (2008). More than a Picture: Helping Undergraduates Learn to Communicate through Scientific Images. *CBE Life Sciences Education*. 7(1): 27-35.
Wilson, R. S., Niehaus, A. C., White, J., Rasmussen, A., Kuchel, L. (2009). Using documentary video-making to enhance learning in large first-year biology classes. *Integrative and Comparative Biology* 49: E325-E325

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