The Potential of Collaborative Mobile Learning: Experiences from a Design-Based Research Cycle in Singapore Schools

Ivica Boticki, University of Zagreb, Faculty of electrical engineering and computing, ivica.boticki@fer.hr
Mia Carapina, Polytechnic of Zagreb, mia.carapina@tvz.hr
Jelena Baksa, University of Zagreb, Faculty of electrical engineering and computing, jelena.baksa@fer.hr
Peter Seow, National Institute of Education, Singapore, peter.seow@nie.edu.sg
Chee-Kit Looi, National Institute of Education, Singapore, cheekit.looi@nie.edu.sg

Abstract: This poster presents a cycle of a mobile learning design-based research (DBR) in Singapore schools. A smartphone application was evaluated in terms of how its features, including usage time, badge score, number of experience updates posted, number of answers given, comments given, likes given, comments received and likes received contributed to the student science summative assessment score. The analysis is then used to inform a new cycle of system redesign offering new and updated collaboration features.

Keywords: mobile learning, collaborative learning, learning system design, tablet computers

Introduction

As a part of the Seamless Mobile Learning (Zurita & Nussbaum, 2004; Looi, Wong and Song, 2013) research project in Singapore, mobile learning system SamEx which supports seamless, mobile, self-directed learning activities for primary 3 school students in Singapore (Figure 1) entered into the 5th phase Design-Based Research (DBR) cycle (Barab & Squire, 2004). Although the application was at first developed to support individual collecting, storing and access to multimedia artifacts with no intentional design for collaborative learning, a thorough analysis of how its main features might contribute to the students' learning suggests the need for including more collaboration features.

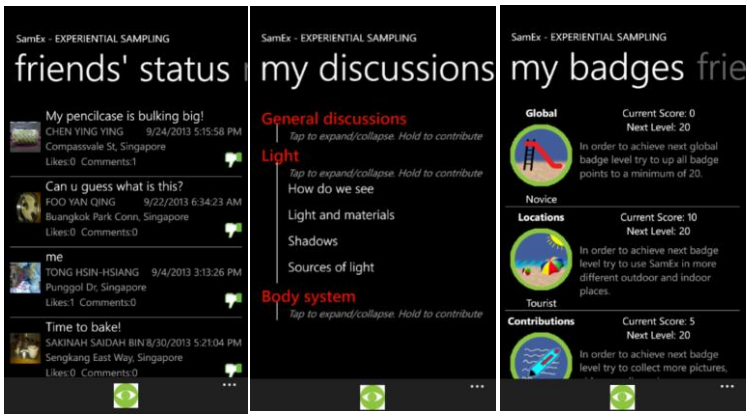

Figure 1. Main SamEx (smartphone version) features (left to right): (1) experience updated, (2) threaded discussions and (3) virtual badges

Methods: identifying key mobile learning software features

Data was collected from 306 students during the 1-year window (mid-2012 to mid-2013) and coded into several categories according to the following software features: *usage time*, *badge score*, *number of experience updates posted*, *number of answers given*, *comments given*, *likes given*, *comments received* and *likes received*. Amongst all potential variables, three of them were found to be correlated with the *students' summative assessment results*: *usage time*, *badge score* and *likes received*.

In the multiple linear regression, answers given and likes received statistically significantly predicted the total assessment score, $F(2, 287) = 20.090$, $p < .001$, $R2 = .117$. Two variables (answers given and likes received) added statistically significance to the prediction, $p < .05$.

Designing for collaboration: new technology affordances

Design of collaborative tasks for each group that have elements of positive interdependence and individual accountability, and that requires interactions, social skills and group processing (Johnson, 2003) are more likely to foster collaborative learning. In the framework for assessing Collaborative Problem Solving, the tests assess personal competencies in taking initiatives (being proactive), in teamwork, in planning, and in coordination of group work (OECD, 2013) and in social and task regulations (Hesse, Care, Sassenbrg, Buder and Griffin, 2014), amongst other dimensions of these skills. Considering that these driving principles for creating opportunities for fostering these competencies are related to collaboration, we envisage future designs that can make use of the affordances of the SamEx platform that allows groups of students to work on a common task to collaboratively co-construct higher-level meaning making, such as like adding and elaborating conceptual linkages between using the artifacts created individually. Therefore, a new collaborative software module for asynchronous small group work was implemented and included into SamEx. Students use the collected experiences (pictures, video, audio and text) to contribute to a group task assigned to them by their teachers using the free from sketching tool to annotate the group artifact (Figure 2b).

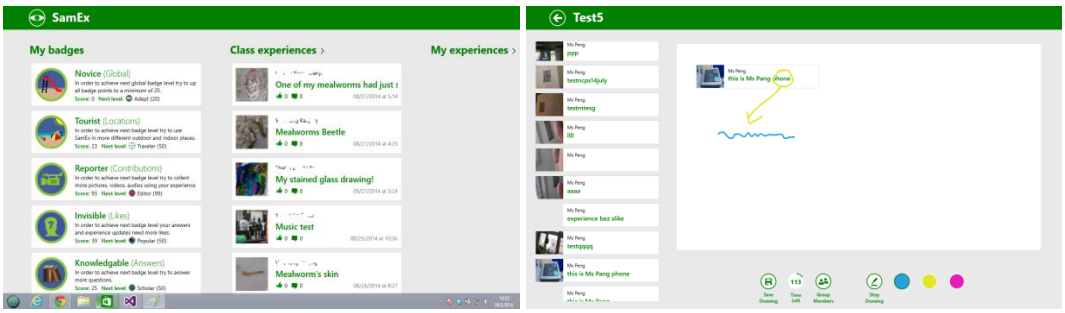

Figure 2. (a) New Windows 8 tablet application main screen and (b) asynchronous group work area

Conclusions

This brief illustration shows that students might leverage standard software features to do collaborative work, even if that is not intentionally set up by its designers or teachers. By themselves, these features strongly correlate with the final assessment results Feedback from the iterative research implementation suggests that the collaboration opportunities can be better supported if the students can work synchronously on the artifacts they created, thus providing more affordances for diverse collaborative learning scenarios.

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Acknowledgments

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