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# **Mobile Learning Futures – Sustaining Quality Research and Practice in Mobile Learning**

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*Mobile Learning Futures – Sustaining Quality Research and Practice in Mobile Learning, Proceedings of the 15th World Conference on Mobile and Contextual Learning, mLearn 2016*

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# Reboot Your Course – From Beta to Better

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**Abstract.** This paper investigates the efficacy of gamifying educational resources to increase student engagement, with a view to improve the learning outcomes, as seen through the lens of three teaching academic. Firstly, this paper will briefly discuss some industry concerns about the benefits that gamification has in educational settings, followed by the solutions that the Media Design and Development team at the University of Southern Queensland (USQ) offer for developing mobile friendly resources. Lastly, three case studies of gamification will be reviewed with reference to a series of semi-structured interviews involving the lecturers who drove the development of these gamified resources. Although further detailed feedback is required from students, the conclusion will be proffered that, from the teacher’s perspective, gamification improves the likelihood of success by enhancing student interest and engagement, which intrinsically improves outcomes.

**Keywords:** *multimedia, gamification, mobile delivery, user interface, user experience, mobile first, interactive, digital, engagement, understanding, cognition.*

## 1 Introduction

Gamification, “the process of adding games or game-like elements to something (as a task) so as to encourage participation” (Merriam-Webster 2015) is an ever growing field of development utilised in an increasing variety of applications, particularly in educational settings (Losup & Epema, 2014)). This paper will demonstrate, through the lens of three academics (content experts), how the development of resources, have been underpinned by a methodology for using gamification to motivate and engage students with a view to improving knowledge retention (de Santana. et.el. 2016, p.915).

## 2 Gamification in Learning

Taito’s Space Invaders introduced the world to digital gamification, and although the term ‘gamification’ wasn’t officially defined until 2002 (Marczewski, 2013), the concept has continued to increase in popularity.

Although promising when used with an appropriate level of scaffolding, Marquis (2012) raises a number of concerns when placing too much reliance on this method in education. Issues such as a lack of knowledge about technological integration and working with resources that may not have appropriate content for the curriculum all need careful consideration. Clarke & Feldon (2014) also state that “multimedia courses may be more attractive to students and so they tend to choose them when offered options [yet]...student interest does not result in more learning” (p.154). This inherently implies that multimedia used in courses i.e. including gamified resources, is worse in terms of education than courses without multimedia.

While these are valid counterpoints, experience has shown some interesting practical trends when developing gamified resources to augment key concepts within courses.

Gamified resources can allow greater access to knowledge in various formats to accommodate different learning styles (Grünewald, Meinel, Totschnig, & Willems, 2013). They can be more attractive to students and that attraction should be harnessed to encourage user engagement. Or, as one lecturer at our university put it, “Traditional methods such as pad and paper, lists etc. haven’t tended to engage the students to the level they’re engaged now. Students seem to be more interested, they’re finding it more relevant to them and...unless it’s relevant to them – they’re not going to engage.” (USQ, 2016a)

The three case studies featured in this article are all self-paced learning activities developed by the Media Services team at the University of Southern Queensland (USQ). They were all designed to augment the main content being addressed within a course. In other words they are smaller contextualised activities, designed not to overwhelm or detract students from the core information, but clearly focus on specific learning outcomes within a course. As highlighted by one content expert, together “we can make what can be seen as quite dry content at times, more interesting.” (USQ, 2016a). This paper will briefly describe the resources that were developed, the rationale behind why gamification was pursued and any outcomes that have been recorded to date.

In these cases, technological integration concerns include designing and programming for the technology readily available to students, as well as considering whether students have limitations to online access. Knowing how to work with mobile-first responsive design is integral, as is knowing where to host the resources and implementing database creation. As one lecturer stated, “It’s very easy to make practical sessions boring” (USQ, 2016c). So while using the skills of in-house experts to gamify their content, lecturers can concentrate on developing sound pedagogical foundations upon which to base their games which are more often than not, used to enhance traditionally static concepts.

### Case Study 1: Employability Memory Game

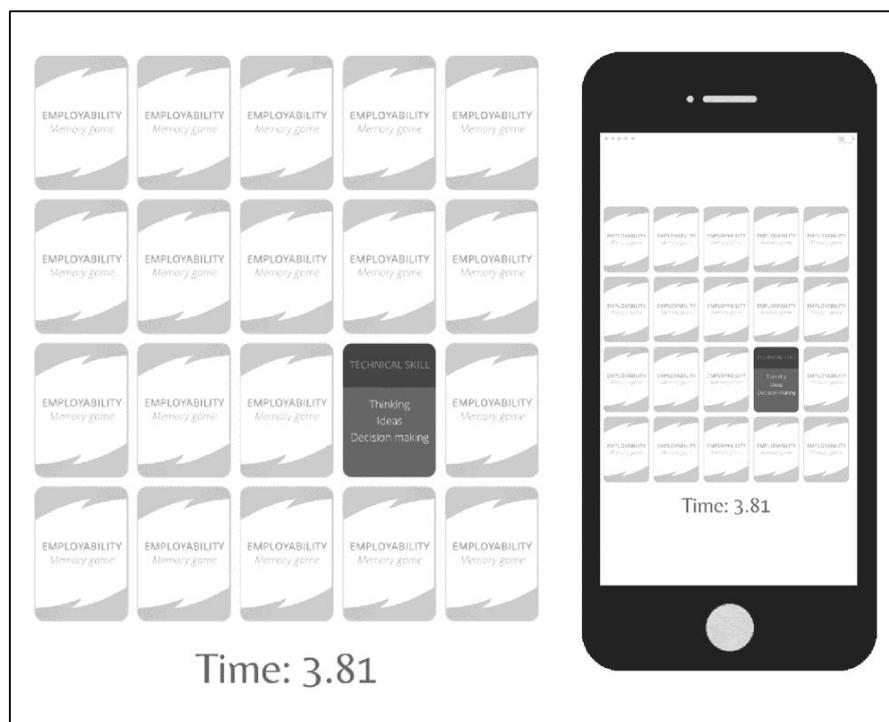


Figure 1. Employability Memory Game Desktop and Mobile User Interface

The employability memory game is similar in nature to the traditional memory game, the user must match up the pairs using the content on the cards. They are encouraged by a time counter to complete the activity quickly and challenge themselves to beat their record. As described by the content expert, this interactive game replaces printed cards designed to provide low socio-economic students and early school leavers with a “literacy of career to better prepare them for interview situations to promote their skills in an appropriate language” (USQ, 2016c). The game is designed to be platform neutral to make it easier to access from any device; an important consideration when designing for a low socio-economic cohort (McKenzie, et.al., 2014).

#### Rationale

The original paper-based game was a well-used resource with the major shortcoming of portability. This limited use outdoors and while travelling, meant that the information wasn’t disseminated terribly effectively. Now digitally gamified, this resource allows for far greater portability and dissemination throughout

schools, to parents, and universities. This resource was designed with simplicity in mind, to appeal to the target demographic. By designing the card-pairs to be matched by their content, students are encouraged to engage with the content more effectively.

### Outcomes

The content expert reports that the target demographics for this resource have responded extremely well with students liking it as well as educators with some schools integrating the resource into their year 10 set plans. Parents are also finding it very useful in increasing their knowledge and understanding of how to talk to their children about careers (USQ, 2016c).

### Case Study 2 UV&U

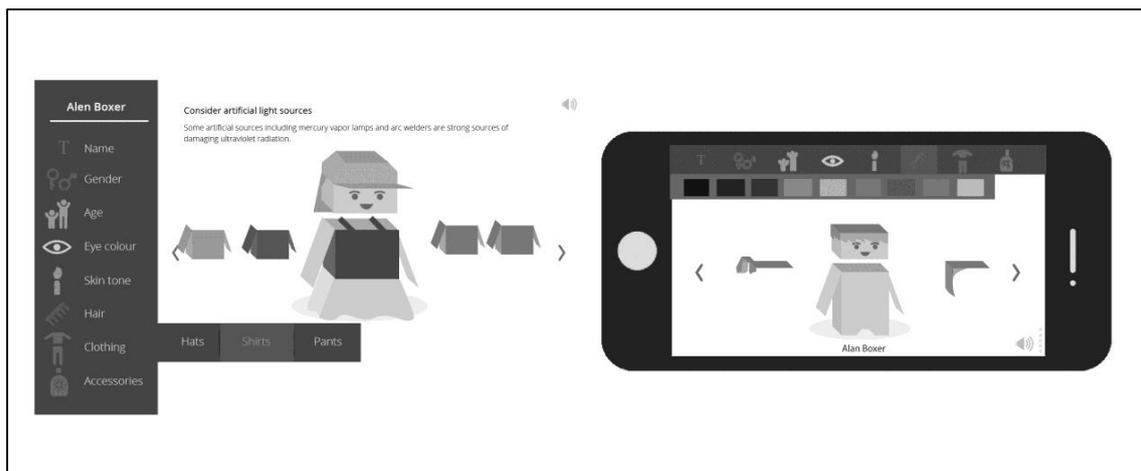


Figure 2. UV&U Desktop and Mobile User Interface

Originally designed by the content experts specifically to engage primary school-aged students, the UV&U game (Figure 2) is also beneficial to a far wider age bracket. It is designed to encourage self-paced learning about the effects UV radiation has on the body. The user is instructed to create an avatar from an extensive range of interchangeable options. These are not restricted to representing the user's own attributes in order to encourage a deeper understanding of the effects of UV radiation on a broad spectrum of people.

### Rationale

This approach encourages engagement beyond what would traditionally have been a text-based or auditory resource. Historically television, newspaper and radio advertising is how the populace has been informed of the UV index. These delivery methods lack the more detailed and customized information such as why different people are affected differently. Multimedia is the missing link to get the idea across in a different, very powerful medium. Especially for young people, this [gamification] is worth trying. (USQ, 2016b) By encouraging personalized engagement with this gamified resource, students are able to increase their knowledge about how UV radiation affects them and those around them.

### Outcomes

One of the content experts describes, the students as being better engaged with the content through this alternative mechanism as they increasingly feel more and more comfortable using multimedia to learn "I think it can help to break down those barriers in the beginning...if you're getting an alternative offering to understand something, it might be that one thing that helps get them past that confusing little step that they don't understand." (USQ, 2016b)

### Case Study 3: Endocrinology Game

Designed for university students studying the endocrine system in a biomedical science course. This resource (Figure 4) uses a scoring system to motivate students to actively engage with the resource. By naming the 52 parts of the skin model and their 52 locations correctly, students earn points that are displayed on a leaderboard if they are within the top fifty of participants. Feedback is instantaneous and progress is saved for each student for portability and ease of access for learning at any time. In developing this tool the content expert believed that they were helping their students to engage at a deeper level, as “it’s very easy to give the students a diagram...and say “label this”. So they take a textbook or some sort of resource and just copy it out. And that means that they haven’t understood, they’re just doing the exercise without engaging with it.” (USQ, 2016c).

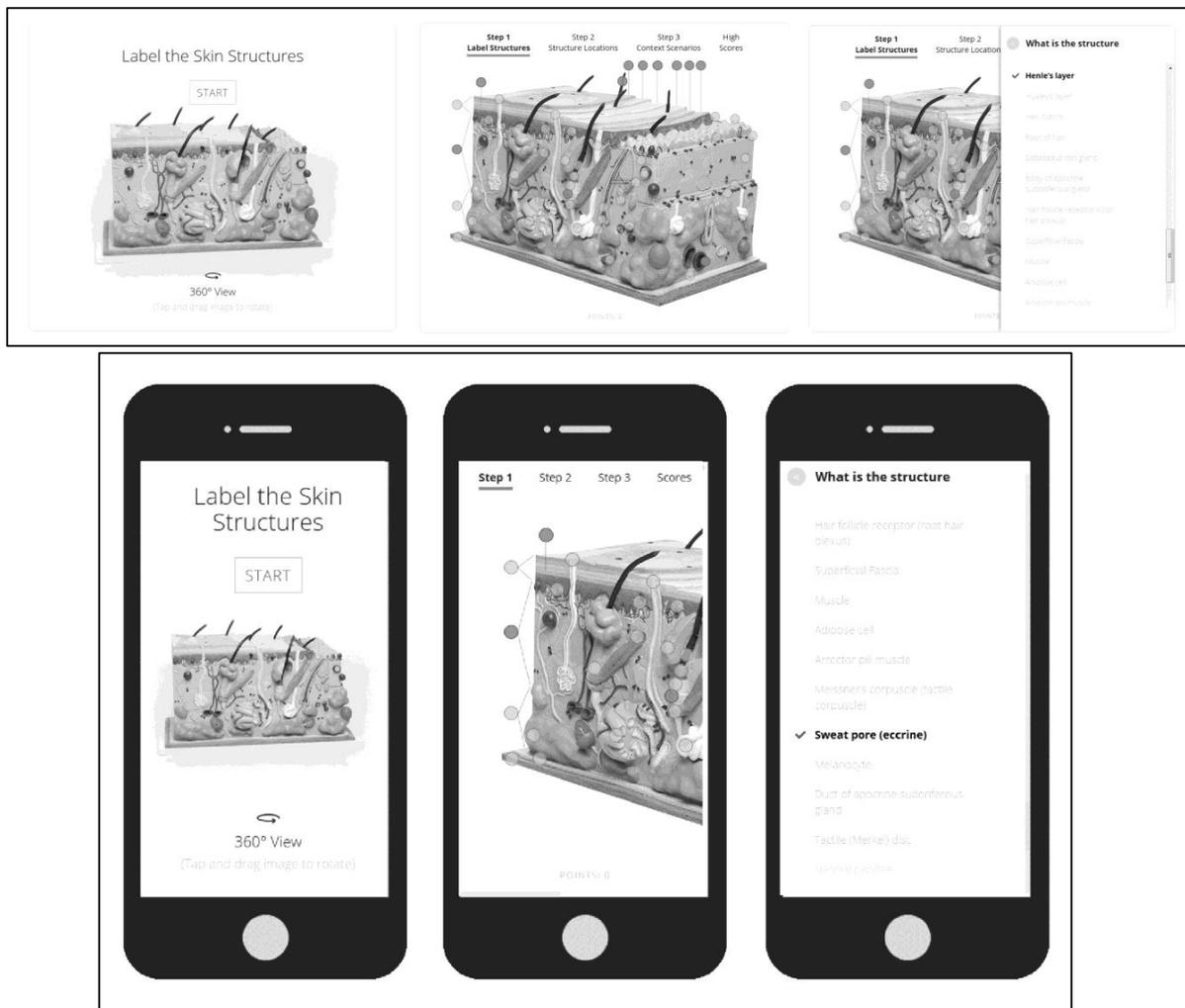


Figure 3. Endocrinology Game Desktop and Mobile User Interface

#### Rationale

Increasing student engagement is the biggest reason why gamification was pursued for this resource, or as the content expert said, “if it’s fun, the students will engage with it” (USQ, 2016c). As mentioned above, complex concepts can benefit greatly from being gamified. It allows more active engagement and the ability to segment information - “students learn more deeply when an information-rich multimedia lesson is presented in learner-paced segments rather than as a continuous unit” (Mayer, 2014, p. 326-328). Tests conducted over several years by various teams have proven that this principle consistently yields improved performance compared to non-segmented group trials (Mayer, 2014). Based on a physical model of the skin, this

resource offers students a more portable and engaging activity than a paper-based version. It is also “gamifying quite a complex structure...hopefully to encourage students to use it and to remember some of the more intricate aspects of the skin.” (USQ, 2016c)

### **Outcomes**

Further monitoring of student use will continue for this newly released activity, however, initial tracking data reveals an impressive cohort of students who are achieving high scores within the game. Scores are gained through correct answers being selected: 20 points for a correct answer on the first attempt, 10 points for a second attempt and 0 points for a third - which then reveals the answer to the student. A total score of 2080 is achievable if all answers are completed correctly on the first attempt for 20 points each. At the time of writing, the top 20 scores were all over 200 points with the highest score at 680. A mean score of 360 for the top 20 scores indicates that students are completing at least  $\frac{1}{4}$  of the entire activity before ceasing use. The higher the score is, means that more correct answers were achieved and more time was spent engaging with the activity.

## **3 Discussion**

Stemming from the interviews (linked in the Reference section) conducted with USQ lecturers in relation to the gamified resources they helped develop, it can be seen that there is a strong perception of ‘improvement’ in regards to extended support provided by these resources. It is noted by the content experts that Student engagement had increased, due to the transformation of the traditional text-based resources to a more portable and customizable environment. The most accurate representation of success lies with the students’ continued engagement with the resources. While encouraging feedback and analytics have been received for each case study continued monitoring will occur over subsequent semesters to measure their success, the finding of which will be published with the video interviews. It is also anticipated that the content experts themselves will seek extended student feedback in relation to these resources. However, the purpose of this paper was to see the efficacy of gamification through the eyes of the content experts.

## **4 Conclusion**

Gamification is not always viewed in a positive light, and sometimes integrates poorly and without defined benefits (Crane, 2011). However, gamification in an educational setting offers plentiful benefits – mainly in increasing student engagement which is of paramount importance to lecturers. The three case studies used in this paper were created to aid with engagement and cognition, “you would want to use every opportunity to engage with your learners.... Everyone learns in a slightly different way, so being able to broach things in a slightly different way can help people get past those barriers that reading or listening doesn’t help. ‘Doing’...sometimes helps.” (USQ, 2016b). While Marquis (2012) raised some valid points, when properly addressed, these concerns need not affect educational gamification in a negative way, they can instead be used to bolster the foundations for making successful games that encourage learning.

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