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Gamification to Engage Students in Higher Education

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According to the 2014 Horizon report, gamification is a significant development in higher education. Gamification refers to the application of gaming mechanics in non-gaming contexts such as education to increase participants' engagement. Given that gamification in higher education is still nascent, there is a lack of literature on this. This paper attempts to narrow this gap by documenting the use of gamification in the teaching of a foundational course called "Leadership and Team Building (LTB)", from the LKC School of Business at Singapore Management University. The objective of introducing gamification was to engage students in learning beyond the classroom, in an interactive manner. To this end, a mobile application called "GameLead" was designed, developed and used in the LTB module. The GameLead application, accessible on mobile and desktop platforms, presented students with various weekly challenges on topics relevant to leadership and teambuilding. By participating in these weekly challenges at their own convenience, students could earn points, collaborate with peers, be rewarded with special privileges and compete against each other via a leaderboard. Student participation and the earned points from the GameLead application were then integrated with the face-to-face lessons. To understand the impact of the Gamelead application on student engagement, an online survey was conducted at the end of the course in the second semester of AY2014/2015. A total of 164 students from four classes responded on the survey. Of these 76% responded that they would like such a gamification in other modules in SMU and over 87% agreed that GameLead made them think deep, learn from peers, and relate course content to real-life context. Overall, the feedback revealed that gamification had a positive impact in engaging students in learning. This paper presents findings from the study and explores how such application could be used in teaching and learning in higher education.

Key words: Gamification, Higher Education, Leadership and Team Building, Student Engagement.

Introduction

The field of education in Singapore is no stranger to technology. With the advent of wireless connectivity and the commoditization of smart technology, formal education has had to adapt to the capabilities of the empowered, savvy modern student. In a fight to stay relevant, it is no longer enough for learning activities to be confined within the walls of a classroom. More has to be done to reach out and engage students in ways that are more meaningful to them.

As a remedy to this, blended or ‘hybrid’ learning has paved the way forward for many educators in recent years, and is a teaching model to be advocated. Commonly understood as the mix of both traditional classroom experiences and online platforms to teach students, blended learning introduces some measure of flexibility to accommodate the unique ways each student understands and assimilates concepts taught (*Blended Learning Definition*, 2014). Delivering blended learning is by no means a ‘one-size-fits all’ tactic. Adopting these new technologies is multi-faceted; educators have not only had to use new modes of teaching, but interweave new methodologies and pedagogies within and outside the classroom environment in ways that would best resonate with their students.

At the forefront of new technologies used in this context is gamification. By definition, gamification is the application of game psychology and game mechanics into non-game settings in order to improve engagement amongst a defined target audience (*Definition of gamification*, 2014). According to various empirical studies¹, gamification has had a proven track record in benefitting learning contexts in which it has been applied through improved engagement, motivation and enjoyment. It was for this reason that the primary author of this paper chose to adopt gamification in the course of her teaching sections of the module, Leadership and Team Building (LTB), which is a university core module at SMU.

The gamification industry first took root in 2010, and has since been on a steady incline. Gamification services are distributed amongst a variety of industry verticals, most notably entertainment, retail, enterprise and media & publishing (Meloni and Gruener, 2012). In testament of its ability to boost engagement, its use within corporations to improve business operations have shown a paralleled increase of late, with 25% of market share for gamification

¹ Hamari, J., Koivisto, J., & Sarsa, H. (2014). "Does Gamification Work? – A Literature Review of Empirical Studies on Gamification". *Proceedings of the 47th Hawaii International Conference on System Sciences*, Hawaii, USA, January 6–9.

initiatives as of 2011 (Meloni & Gruener, 2012). Corporate powerhouses such as Delta Airlines and IBM² are but a few of the global organizations that have integrated gamification into employee training for sales and business process management respectively. Similar to its business-to-employee (B2E) applications, gamification has been found to increase knowledge retention and engagement in popular business-to-consumer (B2C) e-learning platforms such as Khan Academy³ and Duolingo⁴. Some B2C applications such as Adobe have also jumped on the bandwagon, using the gamified elements of progress, achievement and instantaneous feedback as a fun and easy way of orienting new users to their features⁵.

Gamified applications in education often take the form of blended learning⁶- However, such applications are rare. Traditionalists have raised noteworthy concerns that the use of game elements such as points, leaderboards and badges may cheapen the motivation to learn amongst students, and that effort will only be applied if the learning activity is deemed ‘fun’ (Lee & Hammer, 2011). Educational researchers Lee and Hammer believe that the solution to student disengagement lies with gamification, but warn against blind and blanket applications within schools (Lee & Hammer, 2011). What seems to be lacking is an understanding of how to best apply gamification in formal education, and the specific contexts it serves to bring the most value to schools (Lee & Hammer, 2011).

Gamifying Leadership and Teambuilding in SMU

The module on Leadership and Teambuilding (LTB) is a University Core module. That is, all first year students, regardless of their specialization, will need to complete this module in order to meet the requirements for graduation from their chosen field of specialization. The overall objective of the LTB module is to build and develop students’ competency in leadership and teamwork skills. Students will gain knowledge and skills on leadership and team-building

² Cook, W. (2013, May 8). *Five Reasons You Can't Ignore Gamification*. Retrieved from <http://www.clomedia.com/articles/five-reasons-you-can-t-ignore-gamification>

³ Khan Academy is a non-profit organization that provides free video tutorials for learning a variety of topics on their website. For more information: <https://www.khanacademy.org/about>

⁴ Duolingo is an online application that teaches foreign languages such as French, German and Spanish with the use of gamification. For more information: <https://www.duolingo.com/>

⁵ Paharia, R. (2011, September 21). LevelUp for Photoshop- Gamification of Learning Complex Software. *Bunchball Gamification Blog*. Retrieved from <http://www.bunchball.com/blog/post/10510323510/levelup-for-photoshop-gamification-of-learning>

⁶ These include (but are not limited to) online learning platforms ClassDojo and Socrative. More information can be found at <https://www.classdojo.com/> and <http://www.socrative.com/> respectively.

theories, principles, concepts, skills through application, exercises/class activities, self-assessments/instruments, and experiential learning in the form of a group project that entails social innovation.

There a number of challenges faced in teaching the LTB module. As the module is a compulsory for all students, some students may fail to see the value or relevance of the module to their chosen field of study and hence may not be enthusiastic about it, especially in the beginning. Another common observation is that students in general are highly concerned about their grades and tend to be driven by grades. Students may also limit themselves to recommended materials for learning with the objective to score in their assessments. As leadership and team building skills bear profound implications in the everyday lives of students, and is beyond the limit of classroom and recommended curriculum, there was also a need for greater application of these concepts outside the boundaries of class-based activities.

To address these concerns, the primary author of this paper had incorporated experiential group projects in teaching the LTB module. These projects offer an opportunity for students to work in groups to collaborate with a leader of their choice from a non-profit organization or profit-based organization that upholds community development and/or corporate social responsibility or sustainability initiatives. Students will value-add to the needs of the respective beneficiaries that leaders of the organizations will want to impact. Students will act as idea champions for social innovation, working in groups, to develop or invent a product or service/program or put into place a process such as a business plan that will contribute to the organizational leader's goals of impacting community or society at large.

While inclusion of experiential projects was found to be useful, it was noted over the semesters that some students faced challenges in working in teams effectively. The student profile for such a foundation course is diverse, in terms of prior knowledge, experience and even cultural background as there are a number of international students. Hence there is a need to introduce team building activities. However, the class hours are limiting and team building activities require time and resources. Thus, to build in opportunities for team building, student engagement, collaborative and interactive learning, the primary author of this paper decided to harness the potential of technology in the form of a gamified application and use this in addition to the experiential group project and class activities.

To this end, the author, together with her teaching assistants designed a mobile application called GameLead in the year 2013. This application was developed by her then teaching assistant who eventually went onto set up his own Gamification Company called Gametize. The project was funded and managed by the Centre for Teaching Excellence. Since then, the application has been utilized in the teaching of the LTB module over four semesters, with continual improvement to the application and activities. To understand how this application could be used effectively to enhance teaching and learning, a systematic study was then undertaken by the co-author from the Centre for Teaching Excellence. This paper reports on the findings from the implementation of the GameLead application in Semester II of AY 2014/2015.

About GameLead Application

GameLead is a mobile and desktop application that is compatible with android and apple devices (Figure 1). This application presents students with weekly quests of 8-9 challenges on content related to leadership and team building, over a period of 10 weeks. To help the students in using the application, they were given a set of orientation screens (Figure 2) at the start of the first lesson

<Insert Figure 1 and 2 here>

Subsequently, weekly quests were made available at the beginning the week for students to participate in, with preceding quests being left unlocked for them to review. Each week's quest contained a series of challenges that prompted students to reflect, apply and act upon ideas that were brought up during class for that week. Examples of challenges included watching of videos on exemplary leaders, snapping photos of team activities, answering simple quiz questions, and reflecting and sharing of thoughts and insights. The challenges were designed with the objective to interest the students, make students relate the theoretical content they have learnt in class to real-life contexts, think critically, get to know their team members and work collaboratively with their team, learn on their own and from their peers (see Figure 3).

<Insert Figure 3 here>

Upon completing a challenge, students would receive points within GameLead. With these earned points, students had the option of redeeming attractive rewards such as choosing presentation slots, that is, the week they wish to do their group presentation assignments in class. The application interface also included social features such as a newsfeed section, where students could view, vote, and comment on the past submissions of their classmates. To introduce a degree of competition within the app, students were ranked accordingly on a live leaderboard based on the number of points they had received by completing the given challenges.

The application was used by the students outside of class and their online reflections and discussions (using the application) were integrated into the in-class sessions through weekly discussions. It should be noted that the use of GameLead application as part of the course is voluntary and not graded. Yet all students participated actively.

On the Use of GameLead Application for LTB

To evaluate the use of GameLead application for the LTB module and to understand how to improve its use in teaching and learning, the co-author of this paper conducted an online survey at the end of the course in Semester II, AY 2014/2015 and analyzed the results based on theoretical models and frameworks of gamified learning. The survey consisted of 13 quantitative questions and 5 qualitative questions. The quantitative questions queried on students' perceptions of the usability of application, gamification features, engagement and learning. The qualitative questions explored support needed from teaching assistants and instructor, design of activities, positive experiences, and suggestions for improving the application.

The results show that 95% of respondents found the application to be easy to use and this was attributed to clear instructions given. Of the total respondents, 76% indicated that they will recommend the use of such an application in another module and over 90% indicated that the application made them think deep, relate content to real-life situations and contexts, and that it helped them to learn from their peers. In addition, 80% respondents found the challenges to be engaging. In fact, 72% reported that they would complete the tasks even without the rewards. This is despite 45% noting that the challenges required too much time and effort. Students reported that they spent 3.24 hours on average every week in GameLead challenges outside class. On top of that, only 54% found the rewards to be appealing. Taken together, these results are

suggestive that students are in fact intrinsically motivated in using this application for their learning despite the challenges of the activities and learning associated with it.

To understand more, qualitative comments from the survey were analyzed for commonly occurring themes. Students cited the use of interesting, relevant videos and the questions following the videos to be engaging. They also noted that also socializing activities such as taking photos together in the team helped to bond the team together. They found activities requiring reading of other's post and voting or commenting to be useful in learning from their peers and in guiding them to consider alternative perspectives.

On the other hand, students felt that more could be done to integrate the online discussions and activities on the application with the face-to-face class room learning for that week. They also suggested inclusion of polling questions, an element of competition and more challenging questions to make the learning experience even more engaging. To enhance the usability features of the application, they requested for a prompting service about the release of weekly quests and a 24/7 user support - which is not available at present. Student feedback also suggested that the team needs to rethink and develop a better reward scheme.

Overall, the results indicated that the objectives of the GameLead application, to build in opportunities for team building, student engagement, collaborative and interactive learning, had been met beyond expectation. Despite the fact that students did not get any additional grades for using the application, and that the rewards were only appealing to half of the respondents, an overwhelming population found the application to be useful for the intended purposes.

Lessons from GameLead on Using Gamification in Teaching and Learning

While the focus on the use of GameLead like applications in teaching and learning tend to be on the use of technology tool since it is novel, it should be noted that the underpinning pedagogy is critical. It is essential that the challenges, activities and rewards are and carefully planned so that engagement is not merely in "fun" or "socializing" activities. It also requires a good understanding of what sort of activities would drive team building and collaborative activities towards learning.

From the student responses, it could be inferred that the success of this tool in teaching and learning can be attributed to three factors outlined in Koole's model of Framing Mobile Learning (Koole, 2009): (1) technological, (2) pedagogical, and (3) sociological factors. (See

Figure 4). Technological factors in this case include the ease of using the tool and the user interface of the application while pedagogical factors are aspects of the application concerned with the instructional value such as relevance, level of challenge, and extent of authenticity. Sociological factors refer to opportunities created for the students to bond with their team, interact with others and participate in collaborative learning activities through the use of the tool. From the survey results, it could be deciphered that students rated all three factors high for this application, with some suggestions for continual improvement.

<Insert figure 4>

As Koole's classification did not provide in depth suggestions for improvement in our case, another classification of gamification, called Catalysis's Gamification Framework (see Figure 5) was employed. Student responses on areas' for improvement were classified according to the eight categories of the Octalysis's framework. The students' voices clearly suggested that an area for improvement is "rewards". Only 50 % were enticed by the rewards used in the application. While student engagement was high despite this, to improve student engagement further, it would be essential to address the other elements of gamification. Overall, the GameLead application was rated to be high on two factors of the framework :(1) meaning, and (2) social influences. This indicated that in future iterations, the team could consider gaming elements such as (1) empowerment, (2) scarcity, (3) avoidance, (4) accomplishment, (5) ownership and (6) unpredictability to make the use of the application more engaging and meaningful. For instance, there activities could involve the use of prompt feedback.

<Insert Figure 5>

Upon further reflection on the use of the application in LTB module, the authors postulate that a possible reason for the successful application of GameLead in the LTB module could be the structured use of the application. For instance, the application involved weekly quests of 8-9 challenges on a regular basis. Such regularity in use sets clear expectations and continuity. Also, the instructor and teaching assistants took effort to introduce the application and brief students every lesson about the weekly participation. This helps to blend the online and

face-to-face learning seamlessly. Contrastingly, if students are left to their means to use the application without integrating into classroom teaching, it is likely that the application may not have been that useful. Over 92% respondents have indicated that they value the instructor's and teaching assistants support in integrating the online discussions using GameLead in classroom activities. Thus, educators planning to use such applications in teaching and learning should also consider how the application is going to be integrated in a blended format.

Overall, this study suggests that successful application of GameLead like application in education could be attributed to well-planned, pedagogy informed constructivist learning approaches that harness the potential of technology such as mobile platforms. Significance of this study is that it shows how gamification could be coupled with blended and mobile learning in higher education to engage learners. Results from this study sheds light on how to design effective gamification applications and the method of analysis used in this study informs us how we could possibly measure the characteristics of gamified applications using (1) Koole's framing of mobile learning and (2) Octalysis's gamification framework. This helps us to decipher possible ways to improve this application as well as design other gaming applications. In addition, this study demystifies the myth that gamification will only work for younger children and adds evidence to the use of gamification in higher education (and possibly adult learning).

Nevertheless, this study has its limitations. One is that the application was only used in one module. It could be tested further in other modules and the authors are working with collaborators on this. The other limitation is that this study involved only students' perception of their learning. In future studies, the authors plan to collate additional indirect measures such as students' responses/comments on peer's posts to study interactive learning pattern , and correlate the use of the application with learning (for instance, by analyzing the quality of work submitted by students through GameLead). The authors also plan to study the impact of different type of activities on student engagement and learning.



Figure 1

User Interface of GameLead Mobile Application

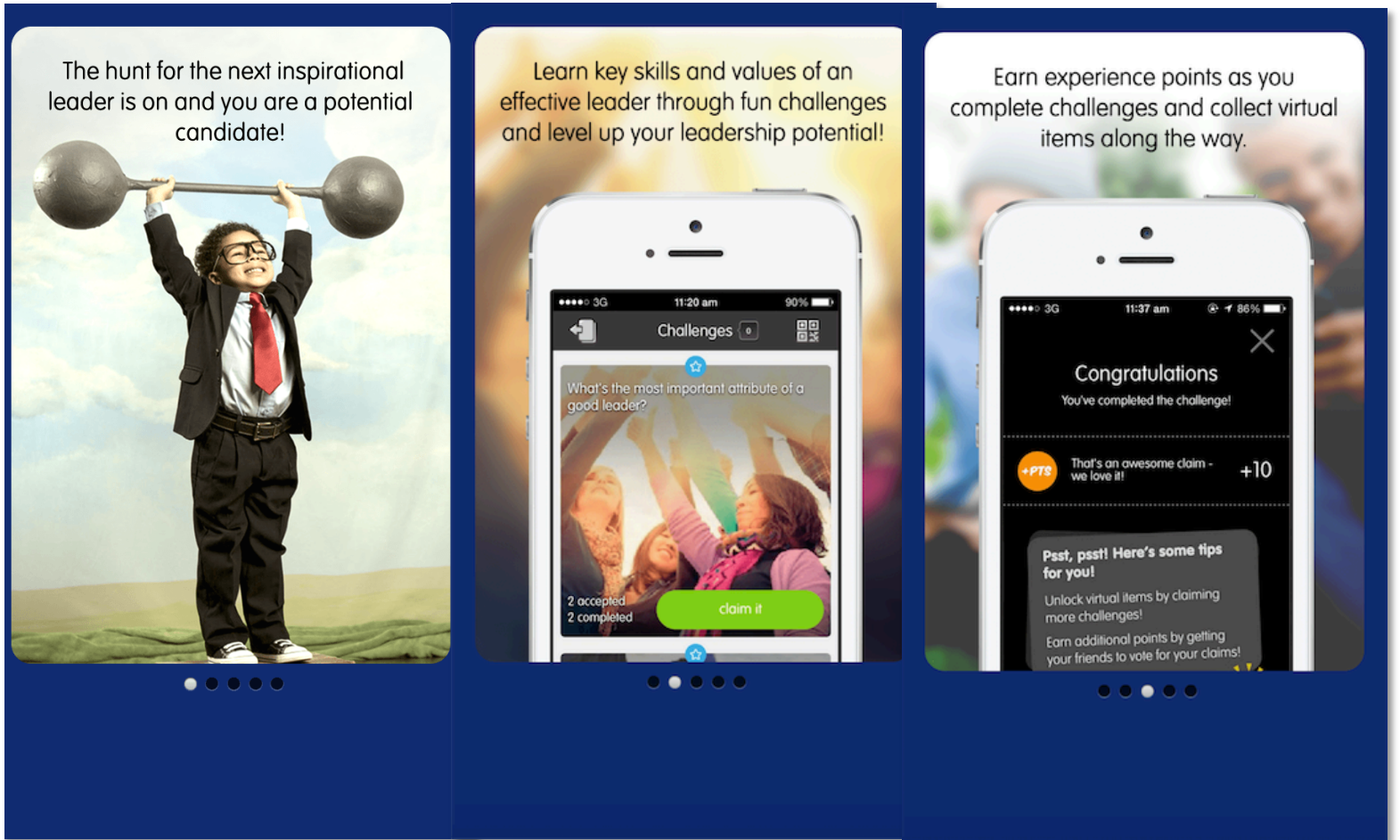


Figure 2
Introductory Orientation Screens

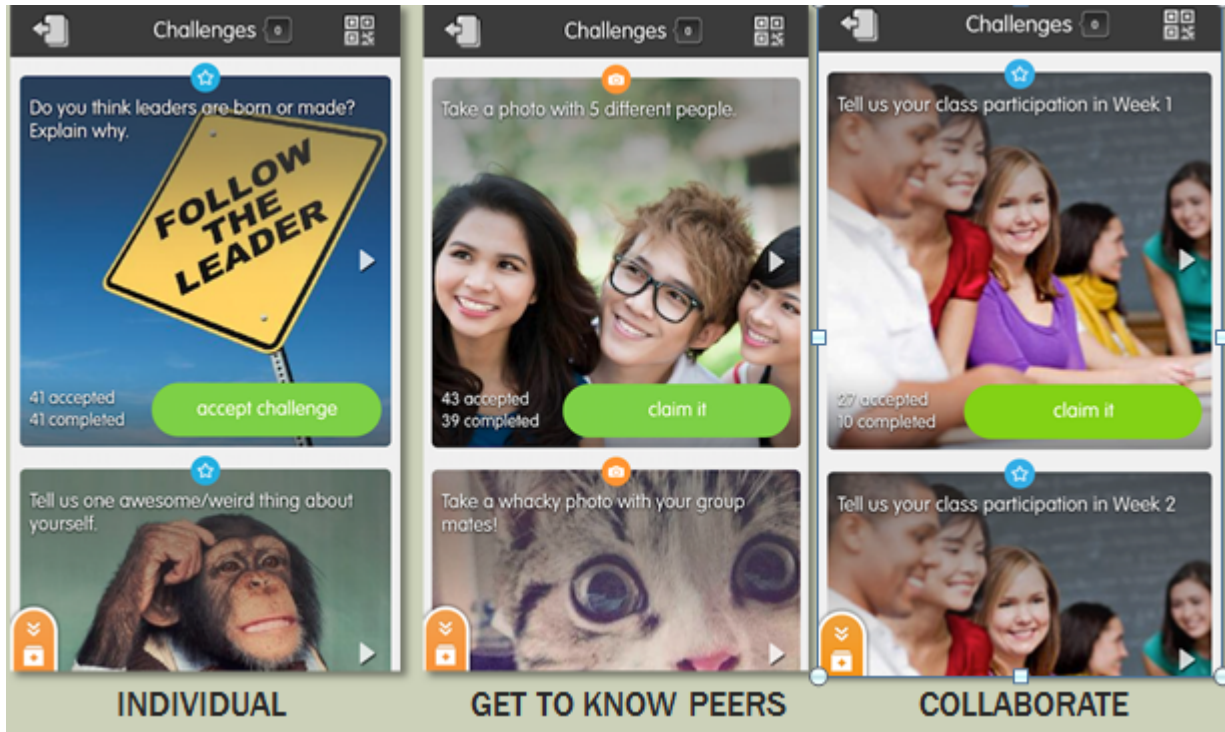


Figure 3
Examples of GameLead Challenges

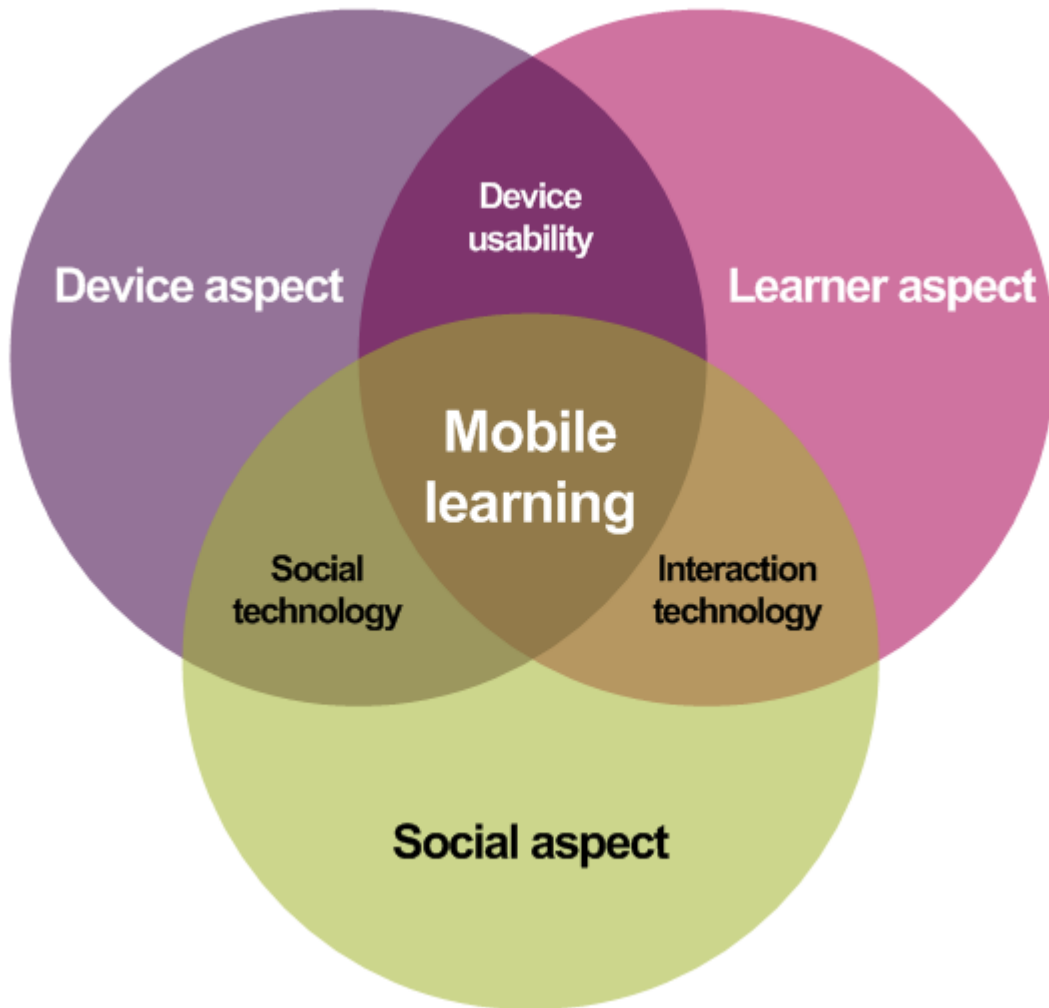


Figure 4
Koole's Model for Framing Mobile Learning

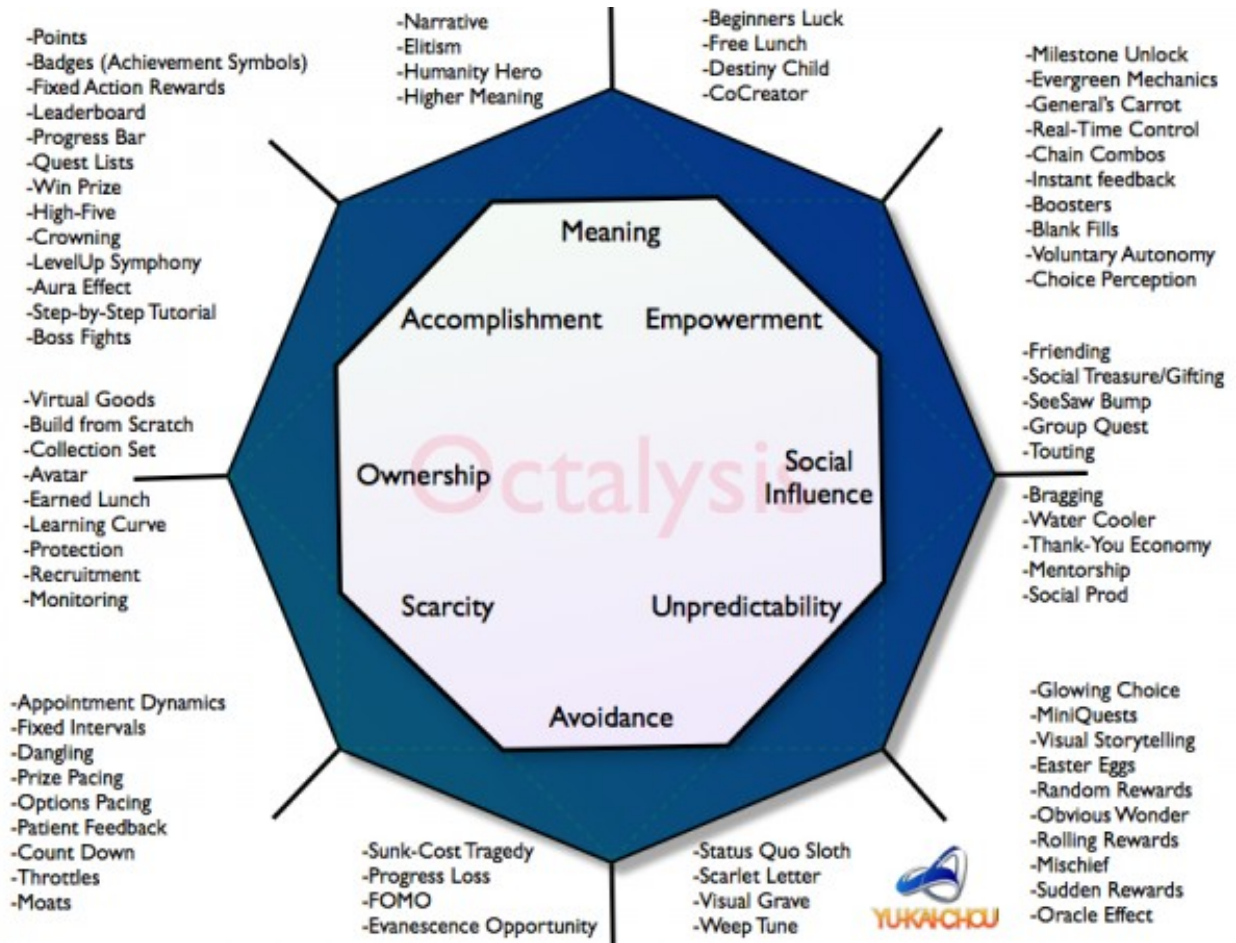


Figure 5
Octalysis's Gamification Framework