Gamifying Sakai: Understanding Game Elements for Learning

Completed Research Paper

Kingsley Ofosu-Ampong
University of Ghana
kingofosu11@gmail.com

Richard Boateng
University of Ghana
richboateng@ug.edu.gh

Abstract

In recent times, the use of game designs in a non-game context known as gamification has been postulated to encourage learning and business engagement. This paper explores the perceived understanding of students and administrators concerning game elements as a precursor to gamifying Sakai which is a Learning Management System adopted by the University of Ghana. Survey data was gathered from both undergraduate and postgraduate students (N=40) and interview granted to the Sakai management team. The study examined their gaming experience, expectation of gamification in Sakai and perceive usefulness of game elements as an engagement and interactive tools. The findings show that gamification is a new concept and the data also revealed a positive attitude towards adding game elements to Sakai. Further, students opted for leaderboards and teams in Sakai to encourage teamwork, excitement in learning and an incentive to visit Sakai frequently. The findings implications are discussed.

Keywords

Gamification, game elements, sakai, learning management systems, motivation, interaction.

Introduction

The use of game design in a non-game context (Deterding et al 2011) has become an important tool for learning and a strategy in engaging customers. Experience gained through game design is termed Gamification. Unlike serious games, gamification is the application of game elements for purposes other than their expected use for entertainment (Deterding, Khaled et al 2011; Deterding, Sicart et al 2011). In learning, the domain of gamification has a considerable number of published works (Lee and Hammer 2012) likewise in a business context (Sever et al 2015).

However, in the field of learning, gamification is believed as not fully explored to include the perception of players (Cheong, Filipou and Cheong 2013). In this study, the users or players are the students and the existing IT artifact is the Sakai Learning Management Systems (LMS) adopted by the University in Ghana. It is designed to support teaching and learning, and is an open and community source software. By incorporating the views of players in a gamified system, it improves engagement and motivation to behavioral change (Cheong et al 2013).

Adding elements of game to learning software reveals the fun aspect and thus is encouraged to be part of the game design (Fitz-Walter 2014). Funology as a concept was proposed to include the user experience in the play (Monk et al 2002). Among user experience, motivation is only an aspect, others include ease of use, learnability, and efficiency (Fitz-Walter 2014). This makes gamification implementation quite complicated and not a simple process (Cheong et al 2013). Thus, emphasis on understanding the players (students), the objective of the players (Deterding et al 2011) and motivating players with appropriate game elements (Werbach and Hunter 2012) should be properly considered in implementing gamification. Teaching and learning innovations should focus on students’ enhancement, transformation and an unforgettable educational experience, not the mere use of new technologies in education.

This work forms part of a larger study “Gamification: Creating Stakeholder Value”; as gamification is a new concept the larger study would adopt an open-mindedness into researching the phenomenon in
Gamifying Sakai: Understanding Game Elements for Learning

Ghana. However, in this present paper, we focus on opportunities to adopt some elements of gamification proved successful and applying them to Sakai LMS to enhance learning at the tertiary level. Thus, we focus on the perception of students and administrators on gamification elements to find their experiences with games and how learning can be more enjoyable with game elements. The rest of the paper is structured as follows: Games elements, Sakai LMS and motivational theories are the next section for discussion. Section three emphasizes on methodology followed by the study findings and discussion (section four). Section five finally focuses on the study conclusion.

Gamification, Sakai LMS and Theory

From Games to Gamified Experiences

Video games are played more than going to watch movies by Americans (Marchand and Hennig-Thurau 2013), and the average teen spends 25 hours and over playing games per week (Griffiths and Cole 2007). A record-breaking sale in the gaming industry is as a result of young adults’ and teens’ intense interest in games. In 2012, revenue from video games exceeded $81 billion dollars, compared to music was five times higher (Marchand and Hennig-Thurau 2013). Likewise, in recent times the film industry was overtaken by the video game industry in profitability (O’Brien 2016). Innovations and dynamism in the video or computer game are of high degree and this has characterized its fastest growth of the mass media category (Marchand and Hennig-Thurau 2013). South Africa recorded a landmark in the video gaming industry, reaching a revenue US$109 billion in 2017, representing a notable growth in the industry of almost 56 per cent in the past five years (Dentons Report 2018). This attest to how firms in Africa are creating improved business models to suit the ever-changing digital age and also entertaining and engaging consumers in new ways.

Gamification, on the other hand, is different in objective from computer or video games. Promoting intrinsic motivations for participants to producing better outcome or results is the goal of gamification, whilst video games seek the entertainment aspect of an activity. A game is a “rule-based formal system[s] with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable” (Juul 2003). Solving problems in a non-game context by using game mechanics and game-thinking to engage an audience is the concept of gamification (Zichermann and Cunningham 2011). Solving problems and changing behaviors are integral to gamification and mostly applied to learning, training programmes and marketing campaigns (Barata et al 2013).

Gamified Learning

Game features and mechanics used as game elements in education (Deterding et al 2014), has gained much popularity in today’s environment. An example is a gamified course at Indiana University done by converting activities and metrics of the course to a version more game like. At a corresponding grade of F, students start at level 1 and by participating in class activities students earn experience points to take them to a higher level which translates to a higher grade. Major attainable level and points are completing quests, crafting and fighting monsters.

<table>
<thead>
<tr>
<th>Level</th>
<th>Assignment or Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competing Quest</td>
<td>Student give presentation</td>
</tr>
<tr>
<td>Fighting Monsters</td>
<td>Students complete quizzes and exams</td>
</tr>
<tr>
<td>Crafting</td>
<td>Student completes project</td>
</tr>
</tbody>
</table>

Table 1. Level and Task

There was an improvement in student’s reaction due to the addition of game elements to course work (Tay, 2010). Significant positive effect of game elements was recorded, and students enjoyed the game elements (badges, points and leaderboard status) rewarded as a contribution to their course efforts. By
Gamifying the course, behaviors of learners can be identified and moderated by adding achievements and narrative elements (Nicholson 2013).

**Sakai Learning Management System**

Higher education in its quest to be relevant in today’s academic environment are leveraging technology and delivering education with the adoption of learning management systems. Sakai LMS promotes meaningful interaction with students and lecturers to comprehend the conventional face-to-face teaching. Learning Management System is defined “as a web-based technology, which assists in the planning, distribution, and evaluation of a specific learning process” (Alias and Zainuddin 2005). Dawson and McWilliams (2008), suggest four categories to classify LMS use: (a) administration; (b) assessment; (c) content; and (d) engagement. These categories correspond to broadly understood definitions of LMS use by academic technologists in practice. The learning management system breaks the barriers of limiting teaching and learning to the confinement of the traditional building (Chang 2008) and also has made students learn at every point in time without limitation in location, time and even medium. To add to this, the users are able to evaluate the course and lecturers giving the institution the ability to respond to these issues speedily and this helps to improve the delivery of the institution to their respective users.

**Game Elements**

Game elements are components of a game identified in different kinds of games. Due to its common features, they are easily identified by players as it relates to other game designs (Xu et al 2013). Points, levels or leader boards and badges are examples of game elements, mostly called BLP gamification (Nicholson 2012) or PBL (Werbach and Hunter 2012).

Another form of classifying game elements are dynamics, mechanics, and components. Hunicke et al (2014), postulate that game designs pattern and mechanics are mostly adopted by education, marketing and businesses in a gamified system and modeled around MDA (mechanics, dynamics, aesthetics) framework. In creating a player experience (aesthetics) using decision tools called mechanics, the MDA model considers the design from the perspective of the developer or game designer. The interactive play (dynamics) resulting from these two perspectives (aesthetics and mechanics) garner to meeting the player’s abilities and expectations (Xu, Weber and Buhalis 2013).

Game mechanics facilitate actions forward by engaging players in the gaming processes and also describing behaviors and actions of players; examples include feedback, rewards, challenges, and cooperation (Werbach and Hunter 2012; Zichermann and Cunningham 2011). Game dynamics mostly are not implemented directly into games but are of high-level aspects of games and requires to be managed and considered; examples include relationships, emotions, constraints, and progression (Werbach and Hunter 2012).

Game components are tools for managing games and classified as forms of mechanics or dynamics and set as the basis for every gameplay. These components include avatars, quests, badges, social graph, quests, levels and points (Werbach and Hunter 2012).

**Motivational Theories and User Engagement**

The study is limited to motivational theories that focus on engagement as there are many theories on motivation to cite from. Engagement by stakeholders (students) necessitates the adoption of the following theories as explained below, and broadly classified as intrinsic or extrinsic. Behaviours that are driven by internal rewards (arise from within the individual) is intrinsic motivation whilst behaviors regulated by external factors are extrinsic motivation (e.g. rewards)

**Flow theory** was developed by Csikzentmihalyi (1975) to describe the mental state of an individual, where there are full involvement and engagement in an activity to a point of complete absorption. “The state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will continue to do it even at great cost, for the sheer sake of doing it” is called flow (Csikzentmihalyi 1997). During an activity, the area between the boredom and anxiety best describe flow theory and it is of intrinsic motivation.
Achievement, concentration, control over actions, task, clear goals, effortless involvement, concern for self-disappears and loss of sense in time are identified as the eight (8) dimensions supporting flow experience (Csikzentmihalyi 1997). For gamification to be successful, all the dimensions of flow theory are relevant to the evaluation of a gamified system or effort.

The theory of flow is extensive in IS literature and regularly cited in gamification context, incorporating the general understanding of games research and a match for this study.

**The theory of gamified learning** was developed by Landers (2014). Theory of gamified learning focus on the use of game attributes in affecting learning-related attributes or behaviors (Bedwell et al 2012). The theory recognizes two processes game elements can affect learning: mediating process (direct) and moderating process (less direct) as shown in figure 2. The fundamental premise of the theory of gamified learning is based on these two processes.

The relationship that occurs between a mediating process (influential learning), a moderating process (outcomes) and quality instructional design influence these behaviors or attitudes (Landers, 2014). Instructional tools must be effective to prevent students from learning irrelevant activities as motivation increases (Landers 2014).

Baron and Kenney (1986) description of moderation refers to the interrelationship among the constructs as illustrated above, and how outcomes are affected in the gamification process due to this primary mechanism. The potential of the theory to explain students continue use or use of a particular technology is probable, which for this study is the Sakai gamified application.
Method and Materials

The study purposed to understand student’s perception of game elements to inform the gamification of Sakai LMS. The motivation for the study was a precursor to engaging and making Sakai LMS adopted by tertiary institutions a fun activity for students use in completing more assignments, increasing student’s learning effort and engagement. There are many stakeholders in gamification of learning which includes faculty members, administrators, and students. A questionnaire was used to obtain responses from the students, as they are key stakeholders of Sakai.

On the other hand, administrators of Sakai situated at University of Ghana Computing Systems (UGCS) were interviewed (structured). As sakai is technology-mediated, the Sakai team was instituted at UGCS to champion the gradual training and adoption by faculty members and students. Hence a need for administrator’s perception of adding game elements to Sakai, who also serve as instructors. The objective of the study and what constitute game elements were describe to them. As game elements were not yet incorporated to the Sakai, their views on how to make the platform engaging and motivate learning outcome were needed. Four staff constitute the Sakai unit. Two were available for interview as of January 15, 2018, the other two were on leave and couldn’t be reached. The face-to-face interview (2) lasted for an hour at UGCS, each exhausting 30 minutes; and analyzed base on themes (content) that emerged from the interview.

Data Collection and Instrument

The questionnaire was the research instrument and was categorized into two parts. The first part related to demographic questions such as age, gender, level and mode of study. The second part was the research questions using Likert scale (4 points) relating to students’ attitude and interest in gamifying Sakai, gaming experience, game elements and frequency in accessing Sakai. The measurement of agreement includes, more than expecting, expecting, less expecting and not expecting.

Students using the Sakai LMS were preferred as communication is made easier than non-users of Sakai LMS. Participants were drawn from the Computer Science, Information Systems and IT departments due to their likeliness to play games and better understand games. Postgraduate and undergraduate students were sampled as they were likely to play games due to their association with the departments mentioned. Ninety (90) participants were invited for the survey and forty (40) responses were retrieved. Structured interview was conducted for the Sakai team (2). As gamification is a new concept, students and administrators were given the minimalist view of key terms.

Results

For this section the responses are categorized into two. The first focuses on the interviews with the Sakai management team and the second is the survey conducted to know student’s perception of game elements for learning.

Interview Findings

Both interviews gave a vivid view of Sakai and a positive outcome of gamification as a motivational tool for learning. To them as Sakai is underutilized with its many functions, this development would really reveal its varying functions for learning as an open source.

Interviewee I

“I would rate the success of Sakai very high, emphasizing on the ease of use, impact and accessibility. Gamification is a new term to me. But for the description privy to me it would be a great addition to learning. As we know learning should be fun and interactive. The game elements suggested are all useful but in a context. Teams and leader boards would be most appropriate. Portfolio of students which in a similar way can relate to game profile is existing as a component of Sakai. Adding game elements would increase learning motivation, effectiveness and much more fun in completing assignments and tasks to students. I look forward to these exciting components to be added to Sakai”. 
Interviewee II

“Obviously, it is a huge success since implementation. Not achieving full target but has encouraged researches in Sakai for better improvement. Currently two departments namely School of Public Health and Distance Education are fully operating on Sakai - students taking exams, submitting assignments and checking plagiarism. Gamification I have heard off but can’t speak much to it; but it is an application used to boost learning interactions. For game elements, points systems and teams would be appropriate to start with. The others like badges, teams and leader boards the team would need time to learn around them for incorporation in Sakai. If Sakai could be made challenging and effective with fun, then gamification should be looked at very well as a motivational tool for learning.

Adding gamification to Sakai would be a perfect development because Sakai is an open source and UG is not even 10% of usage. Notwithstanding there is a challenge with connectivity and user pressure on the system which would hamper gamification. But the team is working fervently to resolve these issues in time”.

Survey Findings

This is a precursor research to the development of a gamified Sakai for learning. The motive is to seek the perception of students on game elements.

Demographic Questions

<table>
<thead>
<tr>
<th>Demographic Information</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Age group</td>
<td>15-20</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Above 35</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Level of study</td>
<td>Level 100</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>Level 200</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Level 300</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Level 400</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Postgraduate</td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td>Mode of study</td>
<td>Regular</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Distance</td>
<td>10</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 2. Sample Distribution of Demographic Characteristics of Respondents

With regards to the sampling distribution of sex of respondents, the result showed more males than females were sampled representing 75% and 25% respectively. In addition, with the issue of age of respondents, the result indicates most of the respondents within the 21-25 years age bracket representing 40%, followed by those within the bracket of 15-20 years representing 27.5%, next to this were those within the bracket of 26-30 years representing 20% and the least represented were those who are above 35 years and between 31 and 35 years representing 7.5% and 5% respectively. On the level of study, most were from level 300 forming 40%, followed by 20% who were from level 200, whiles 17.5% were from level 100. 12.5% of the respondents were postgraduate students and 10% were from level 400. As shown in Table 2.

Gaming experience

From the research question, respondents were asked whether they played computer game 95% answered in the affirmative. According to the respondents, the preferred game type is Adventure (25%), Puzzle (20%), Racing (15%), Strategy (10%) and Shooter (7.5%). On the frequency of playing computer, majority do so weekly 35%, whiles 27.5% rarely do so. Another frequency of playing computer is daily (17.5%) and monthly 10%. The reasons for playing computer games are to release stress and tension (25%), To keep my mind active (7.5%), relaxation (7.5%), for fun (17.5%), for challenge and curiosity (15%), for
entertainment (5.0%), for challenge and also curiosity of new games (15%) and improving learning (5.0%).

**Expectation of gamification in Sakai**

On the expectations of gamification, the following questions were asked as shown in Table 3. In terms of knowing about gamification majority answered in the negative representing 87.5%. whilst 12.5% said yes indicating their knowledge of the term. With the few who said ‘yes’ their comments on gamification are; application of game-design elements in non-game contexts (2.5%), it is an application of game principles and design in the non-game environment (2.5%), Use of gameplay mechanics for the game application (2.5%) and using games for learning (2.5%). Hence, generally, gamification involves the use of games in their context. With regards to whether respondents believe computer games can be used to learn in High Education environment a large number, 82.5% said yes. On whether respondents believe it would be more productive or get better results if their university learning were somehow made game-like, more than half (55%) agreed to this. However, 22.5% said Probable, 12.5% said not sure and 10% said no. With regards to the frequency respondents access Sakai in a month 32.5% said they do so weekly, whiles 22.5% rarely do and 22.5% do so only at submission time. Some 12.5% access Sakai daily and 10% access Sakai Monthly. In addition, on the Level of interest and attitude toward using Sakai most 40% were neutral on this. Another, 22.5% saw Sakai as somewhat interesting, 12.5% saw Sakai as very interesting, 12.5% saw Sakai as not very interesting and 12.5% saw Sakai as not at all interesting.

**Users Views on Gamifying Sakai**

Table 3 further reveal other expectations of gamification on the following questions. Further, on how respondents are satisfied with the services of Sakai revealed most were of neutral stand, followed by 30% who were satisfied, next was 17.5% who were unsatisfied and 5% were very unsatisfied. With respect to the expectation of gamification in Sakai (thus using computer game elements in learning) most were expecting (47.5%), More than expecting (25%) and 12.5% are Less than expecting.

**Usefulness of game elements**

The section highlights the usefulness of game elements. On whether respondents believe game elements can be added to Sakai half said Yes, followed by 22% who said No and 3% don’t know. About a quarter did not respond.

Respondents were asked about game elements as shown in Table 4. The main game element was Leader boards to Sakai (4.36), next was Teams to Sakai group (3.3), achievement badges for submitted work (3.17), point system to Sakai assignment (3.14) and progress bars to Sakai (2.69).

<table>
<thead>
<tr>
<th>Games Element</th>
<th>Point system to Sakai assignment</th>
<th>Leader boards to Sakai</th>
<th>Teams from Sakai group</th>
<th>Progress bars to Sakai</th>
<th>Achievement badges for submitted work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.14</td>
<td>4.36</td>
<td>3.3</td>
<td>2.69</td>
<td>3.17</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.376</td>
<td>8.774</td>
<td>1.309</td>
<td>1.238</td>
<td>1.384</td>
</tr>
<tr>
<td>Sum</td>
<td>113</td>
<td>157</td>
<td>122</td>
<td>97</td>
<td>114</td>
</tr>
</tbody>
</table>

**Table 3. Game Elements by Respondents**

As to the reasons for the choice of game elements by respondents, 15% stated as an incentive to Sakai platform, it makes learning easy and with fun (7.5%), to know learning performance (5%), to know learning progress (5%), easy interactions (5%), level of achievement (7.5%). Other reasons include, compare performance with colleagues (7.5%), accomplishment of task badges (5%), points assigned to learning materials (7.5%), encouraging team work (2.5%) and creating learning groups (5%).

Finally, on other comments or views stated by respondents, 37.5% of them would like to witness the outcome of gamification in Sakai, 27.5% are expecting how it would work, 7.5% are in anticipation of how it would motivate students learning behaviors. 7.5% of the respondents conclude that these things are being used elsewhere so expect its implementation in Ghana.
Discussion

Gamification as a term is new a concept to 87.5% of the respondents. This is not surprising due to its insurgence in 2010 and new area of research (Deterding et al, 2011). The few that had knowledge of gamification related to it “as an application used to boost learning and encourage interactions”. The Sakai team were experienced in discussing gamification but not in practice. Majority of the respondents were of “age-playing-games,” thus 95% indicated they play computer games and were between 15-25 years (67.5%) offering undergraduate programmes at University of Ghana (UG). Adventure and puzzle were the most preferred games played among these students and mostly played weekly (35%) or daily (17.5%). Computer games are played for varying reasons, the most common were for entertainment, fun and recognition, releasing stress and relaxation, and for challenge and curiosity.

The data response regarding Sakai LMS was positive (averagely 32.5% weekly access), and 82.5% of the students believed computer games can be used in Higher Education and make University learning somehow game-like. There are certainly positives towards the interest and attitude in using Sakai by students (75%) and enough justification of a higher interest with the incorporation of gamification.

On expectation of gamification in Sakai, 47.5% of the students are expecting, 25% are more than expecting this implementation to take place. This confirms Eason’s view that the expectation of users to a technology is itself a boost to usage and a positive outcome prior implementation; and thus, technology should be implemented in parallel to users and should be revisited in time to meet these expectations (Eason et al 1996). Anticipated benefits of gamification to Sakai learning by administrators and students proved their knowledge in playing games. Top stated benefits were making Sakai more interesting, creative, fun, providing quick feedbacks, interactive and improving corporation among students and faculty.

Understanding of game elements proved easier as most respondents were used to badges, points, teams, leader boards and progress bars from games played. The issue was Solving problems in a non-game context by using game mechanics and game-thinking (Zichermann & Cunningham, 2011) to make learning interactive and motivating. Spanning from their experiences in games, incorporating game elements would make the Sakai fun, create an avenue for learning groups and encourage more users to Sakai. Instant rewards in gamification are awarded in the form of badges. Badges are awarded for nonlinear accomplishments within a game. A student pointed out that, “achievement badges indicates success and a milestone reached, a recognition that one’s effort is acknowledge and a boost for further success. These are encouraging in the learning environment and serves as a challenge worth motivating to students”. Points help a player identify how far they have progressed through a gamification experience. They can be used to award correct answers and progress, and unlock contents. Points system most acknowledge are the points awarded at any given stage and a total at the end of the gaming activity, mostly to increase entertainment. Students attested to the fact that in gaming playing alone can sometimes be boring and unencouraging, as such teams in games are vital for continuous play and urge relationships (Werbach & Hunter, 2012).

On a mean score of 4.36, majority of the respondents prefer the addition of Leaderboards to Sakai to signify the best competitor in the field of play. An accumulation of points is displayed in a leaderboard. It provides the bragging right and social capital to the individuals who achieve the high score. Fun according to students is increased by adding leaderboards. This was followed by Teams (3.3) and point systems (3.14). Progress bars most students attested to as similar to leaderboards but is much more of “graphics and motivates visual aids”. Progress bars improves gaming skills and learning experiences.

From a member of the Sakai team, “gamification incorporation would be a perfect development to learning”, the other stated that “I look forward to these exciting components to be added to Sakai”; this serves as a great opportunity to motivate learning with game elements in Ghana.

Conclusion

The study focused on understanding perception of students and administrators on game elements as a precursor to gamifying University of Ghana Sakai LMS. Interviews were conducted to ascertain the views of the Sakai Management team and survey conducted for the students on game elements. The questions
focused on students gaming experience, expectation of gamification in Sakai and views on game elements and its usefulness.

The results proved that 95% of the students from the IT departments play games. Spanning from this, positive perception of gamification was revealed by the data, even though gamification was totally a new concept to 87.5% of the respondents. Varying reasons were assigned to playing computer games, the most common were for entertainment, recognition, fun, stress release and relaxation, and for challenge and curiosity. The survey revealed a high weekly access rate of Sakai LMS among students and the likelihood of gamifying Sakai thus in a game-like manner would boost their learning.

Expectation of both administrators of Sakai and students to incorporating gamification in Sakai were positive (72.5%). The Sakai team were enthused about adding game elements as Sakai has more components worth utilizing to motivating learning. Thus, against the study backdrop the LMS for the university is vast underutilized for students and faculty use. Among students and faculty, gamification seeks to improve corporation, interaction and providing quick feedbacks with fun.

Students and the Sakai team were abreast a minimalist description of game elements notwithstanding their prior understanding of the terms. In incorporating game elements to Sakai, the administrators preferred teams, leaderboards and point system at the initial level. The survey revealed majority of the students opted for leaderboards and teams in Sakai. Students reasons for favoring game elements in Sakai is to encourage teamwork, fun/excitement in learning, interaction, performance tracking and as incentive to visit Sakai frequently.

As a precursor to gamifying Sakai, the future of the study seeks to measure courses gamified on Sakai platform as against courses not gamified by applying the game elements to Sakai. Thus, the development of a gamified Sakai for the University of Ghana is paramount to any further assessment. Key indicators would focus on motivation to learn, the ease of use, effectiveness of the system and whether game elements achieve what it claims to achieve. Among these responses there is a very small number of participants who actually knew the concept of ‘gamification’. This is a limitation of the study and future study should identify a gamified system known to the study respondents.

Also, on the study practical implication, ‘information on students of higher education and their gaming pattern behavior can be a ground for practitioners to develop certain services or policies for facilitating the use of game elements in learning management systems for users in educational communities’. For the theoretical implication, ‘in the field of information systems development methodologies (ISDM) this research is an addition …. as a methodology for a design science guideline to a gamified system, this study makes a good contribution also’.

REFERENCES


