Gamification: A Sharing and Storing Information Model at The Malaysian Institute of Teacher Education

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Abstract. Gamification is a new technique utilising game mechanisms or elements in non-gaming contexts for commercial or educational purposes. While gamification seems to be easy to use in a variety of daily activities, challenges will arise when online digitizing processes are created and combined with educational apps. Therefore, this article describes the concept of online gamutation for the purpose of storing and sharing information. The online model is designed to involve all members of the Teacher Education Institute (IPG) and the public to form a group in the collection and dissemination of academic knowledge. The information management process at the Teacher Education Institute (IPG) is often found to be problematic because there is no systematic information storage system. Lecturers and students at IPG mostly keep their teaching and learning materials individually. This situation results in the loss of information resources and difficulty in recovering and also tracing information when needed. To solve the problem, the “Information Sharing for Learning” (iS4L) model was developed to manage teaching and learning resources at IPG. This model is expected to motivate and encourage users to use this application and will further increase the amount of collection of stored information sources.

Keywords: Resource as a service, Information management, IPG, Information sharing, gamification, iS4L

1. Introduction

The arrival of the Industrial Revolution 4.0 (Industry 4.0) which emphasizes on the development of virtual reality technology without much use of manpower definitely affects many aspects of life. In this context, tertiary education is among the most important areas that inevitably receives the impact of this latest development. The emergence of Industry 4.0 is a new development that affects many parties, especially the Institute of Higher Education (IPT). The establishment of HEIs, especially the Public Higher Education Institutions (IPTAs) throughout the country generally aims to produce quality
human capital to fill future manpower needs [1]. Gamification, the latest trend that uses gaming mechanisms in non-gaming contexts to enhance the motivation of audience or user engagement, requires high expertise to integrate game components with non-gaming components that are entertainment oriented. For example, video games should be able to create other apps through combination with non-gaming apps to make it fun and engaging [2]. In other words, gamification has the potential to add user experience to game elements in various contexts found in the commercial or educational market [3]. Jegatheeswaran (2018) states that gamification is a method of bringing science out of the game and using it in other environments to motivate people to do something continuously.

Although gamifications can be easily used in daily activities such as a lucky draw for the promotion of a product or a small gift for students in completing the task first, the challenges will come when we apply the concept of gamification online. Take for example gamification in education where in most cases only physically implemented in the classroom. In this context the teacher can easily regulate or change the gamification strategy in a controlled environment where the students are known to the teacher. However, to digitize the gamification strategy or to put a mechanism on line is very different [4].

In this article, we expand the scope of gamification from the context of class to higher education, focusing on storing and sharing information. The Teacher Education Institute (IPG) is an institution that plays the role of training teachers in Malaysia. There are 27 IPG campuses in the Peninsula including Sabah and Sarawak. The information management process at the Teacher Education Institute (IPG) is often seen problematic because there is no systematic and centralized information storage system. All IPGs have their own portal built according to their respective expertise and is not characterised by information sharing. Majority of lecturers and students at the IPG keep their teaching and learning materials individually. This situation may result in the loss of information resources and difficulty in recovering and tracing information when needed. The Resource as a Service approach or (RaaS) is used to enable all users to easily access information and share various resources via internet facilities. Information sharing has become the second most important thing in our lives be it personal or professional affairs through Facebook, Twitter and Linked applications [5].

2. Objective
The main goal of building this model is to store and share sources of information based on gamification. To achieve that goal, the three objectives of this model are to:
   i. Motivate and encourage users to store and share information in the developed model.
   ii. Design and develop an information storage and sharing model to be adopted by the IPG.
   iii. Implement and evaluate by testing the validity and usability aspects of the information storage and sharing model that has been developed.

3. Target Group
The contents of this model are from teaching and learning materials, modules, notes, examination questions collection and lecture and student research. Therefore, four categories of users are classified under the IPG administration:
   i. Lecturers - use the platform to introduce, promote teaching aids or teaching notes and assign courseworks.
   ii. Students - use the platform to discuss, download any information and upload their project and get feedback from friends or lecturers.
   iii. Top management - use the platform to contact faculty and students and have the opportunity to collaborate or download any material.
   iv. Public users - use the platform to access educational materials and interact with IPG citizens.

4. Methodology
4.1 System design

The 'Information Sharing for Learning' model (iS4L, http://www.is4l.com.my) has been developed as an academic information storage and sharing platform. This model is to support the process of collecting and dissemination of information, thus enhancing academic activities in the IPG. In order to implement and test the strategies used in improving gamification practices, the iS4L-based promotional plan as shown in Figure 1 was constructed based on the model developed by [6]. With the growing number of new staff and students each semester, as well as visitors to this site, we hope that this platform will continue to operate and meet the needs of all parties and further assist the development of IPG.

![Figure 1. iS4L continuous promotional plan](image)

Deterding, Dixon, Khaled, and Nacke (2011) state that gamification is limited to game-like elements and specifically defines this term for gamification design. Although the term raises debate over the characteristics of game, their level of game design (table 1) serves as a guide in the implementation of gamification design. Deterding et al. (2011) focused on the elements of game design which are mechanical and dynamic games.

| Level                                | Description                                                                 | Example             |
|--------------------------------------|-----------------------------------------------------------------------------|---------------------|
| Game interface Design patterns       | Common, successful interaction design components and design solutions for a known problem in a context, including prototypical implementations | Badge, leaderboard, level |
| Game design patterns and mechanics   | Commonly reoccurring parts of the design of a game that concern gameplay     | Time constraint, limited resources, turns |
| Game design principles and           | Evaluative guidelines to                                                   | Enduring play, clear goals, |
heuristics approach a design problem or analyze a given design solution

| Game models | Conceptual models of the components of games or game experience | MDA Model: Mechanics, Dynamics and Aesthetics (Hunicke, LeBlanc, & Zubek, 2004); challenge, fantasy, curiosity; game design atoms; Core elements of the gaming experience |
|-------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|

| Game design methods | Game design-specific practices and processes | Play-testing, play-centric design, value conscious game design |

4.2. Gamification Platform Structure

Gamification is the application of mechanical and dynamic game concepts in design aimed at enhancing user motivation and engagement [7]. Gamification is a very popular modern design technique and has also been used as a data collection method [8] and for tasks that require human intelligence [2].

Mechanical and dynamic games are two important techniques related to gamification [9]. The mechanical game deals with the rules and benefits gained in the game; features that make it challenging, fun, rewarding and emotionally rewarding for game designers [10]. The emotions generated by this engagement and motivation are called dynamic games. Mechanical games are responsible and function as components of the game. This allows the user to control the level of the game and will guide their actions. In other words, dynamic is the user's interaction with the mechanic [11] and what the user does either individually or in relation to another user is a response to the mechanical system designed. The mechanical games used in this model are:

- **Scores** - To reward and manage different user behavior within the same website or application. Scores are given to motivate someone to compete.
- **Challenges, Trophies, Badges / Medals** - Challenges represent the mission of the user to be accomplished and the reward will be given for their performance. A trophy, badge or medal is a recognition that can be seen when a user reaches a new level and solves a challenge. In this model, the accumulated scores will be replaced by gems.
- **Classification Table, Ranking, Score** - User rating over others. This table is usually used to display user scores. The advantage of implementing this schedule is to provide information about progress and motivate users [12]. In this model, the top 10 positions will be organized based on points accumulated.

Participation for each activity will be rewarded in the form of a score as in Figure 2. The accumulated points will be converted into larger bonuses, namely gems (ruby, emeralds and diamonds) according to the resolution, depending on the individual activity. The gems collected by the user will determine the highest achievement of the user and their participation in the process of information building. This gem is categorized according to the aim of the mechanical game. Based on the number of gems collected, users will be listed in the top 10 users list.

**Table 2.** Accumulated points will determine the users position in the list

| Accumulated points | Rewards |
|--------------------|---------|
| 100 marks = 1 ruby |         |
5 rubies = 1 Emerald

5 emeralds = 1 diamond

* The number of accumulated diamonds will determine the top ten list.

**Figure 2.** Accumulated points will determine the users position in the list.

The activities shown in figure 3 below are activities that support the iS4L platform as a gamification platform. This activity is designed to motivate and engage consumers with academic activities. Therefore, the more users interact with this application (such as uploading, downloading, forums) and achieving their goals, the higher their status and status within the organization (IPG).
The iS4L model is built on effectiveness, engagement, satisfaction and can be highly motivating to consumers. This objective can be achieved through the use of mechanical and dynamic game techniques in gamification. The construction of this iS4L model focuses on features that make users become motivated, satisfied, effective and efficient. The iS4L model shown in Figure 4 is modified from [13] which consists of six elements namely:

**Technology** - Technology is the infrastructure that enables the implementation of iS4L. The use of digital technology and social networks have increased dramatically over the last few decades, and it has grown in the educational and higher education systems [14].

**Design** - Lack of user profile analysis, appropriate design methods, and overly simplified gamification schemes can cause these applications to achieve less than expected results [15]. While it is clear that gamification has produced some satisfactory results, application design poses a significant risk [16]. Good design must provide useful, appropriate, searchable, accessible and flexible information [17].

**Administration** - The iS4L administration requires knowledge of the technology and its users. Knowledge of technology and consumers is made possible by using the Learning Management System (LMS) for teaching purposes that enables educators to provide students with learning activities [18]. Most importantly it enables lecturers to develop learning activities that use different learning content and are stored on the platform itself [19].

**Users** - The main objective of iS4L is to provide information through technology to consumers. The iS4L must be designed to be user-friendly. For good iS4L management, it is important to know user characteristics such as: level of education, area of expertise, age, occupation, gender, culture, skills, and more.

**Material** - The design of the electronic version is not much different from the traditional printed material. Material must be based on the same principle, which means the objectives must be clearly defined. The materials should be divided into separate sections or units of study and should be carefully planned in terms of content and topics.
5. Conclusion
The IPG is having difficulty in implementing the concept of sharing resources between lecturers and students in particular and also all IPG citizens. This article introduces the application of the concept of gamification on storage and sharing portals of academic information resources. The portal is expected to encourage IPG citizens to preserve their academic materials and thus becoming a digital information storage platform.

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