

Orc-based Learning – Evaluating a Game-Based Learning Approach

Lisa Orszullok¹ and Kathrin Knautz¹

¹ Heinrich-Heine University Düsseldorf

Abstract

Using game mechanics to improve the motivation and efforts becomes a popular approach. Especially in higher education many projects have been realized to create a greater engagement of students in learning processes. Because of these innovative ideas there is a lack of corresponding evaluation methods which respect all relevant aspects. For this we created an evaluation model to meet the needs for evaluating a game-based learning approach.

Keywords: didactics, evaluation, game-based learning, gamification

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Contact: Lisa.Orszullok@hhu.de, Kathrin.Knautz@hhu.de

1 Introduction

The use of game elements - also called gamification - in non-gaming contexts becomes more and more popular. The idea for example is used to encourage users in social online services like Foursquare or to get them involved in health and ecology issues. The main aim is to increase the motivation of users to deal with specific subjects or to create user attention (Deterding, Dixon, Khaled, & Nacke, 2011). To illustrate the conception of gamification, typical game mechanics are listed and explained in the following:

- quests
- (experience) points
- level systems
- leaderboards
- achievements

According to a computer game, people have quests, a kind of exercises, they have to solve. This can be a fight against a monster or the task to classify a book correctly in a library. The central point is that there is no punishment if the quest is not solved or if the answer is wrong. Instead of this the user has the possibility to retry and test another solution strategy. For fulfilling the quest successfully the user gains experience points (XP). Based on the reached XP you can state your abilities and knowledge. Furthermore the points are connected directly to the level system. By reaching a pre-defined number of points the user progresses to a higher level which is often related to new abilities of the character. The levels and the points are not only an indicator for yourself to present your accomplished aims but can also be used for leaderboards. In this way on the one hand the user is motivated by solving quests and on the other hand there is the competition with the other users.

Moreover the achievements represent another game mechanic. Achievements are little successes that are not linked directly to the quests, for example you have to fulfill a dozen quests or to be online for two hours non-stop to gain an achievement (Zichermann & Cunningham, 2011).

2 Game-Based Learning in Education

Even in higher education or in the field of e-learning we can find the use of game-mechanics (cf. Papastergiou, 2009; Ebner & Holzinger, 2007). In this context the term game-based learning is often used and is targeted on the increase of students' motivation as well as their learning engagement. According to

the OECD a high motivation during the learning process improves the learning outcomes (Artelt, Baumert, Julius-McElvany, & Peschar, 2003).

There is a wide variety of realization possibilities. On the one hand you can bring game elements to in-class courses by e.g. arranging students in constant learning groups (so-called guilds) to compete. There again you can focus on digital game-based learning (Prensky, 2003) and implement a whole online game with a virtual world or an online learning platform with partial elements of gamification. In addition there are also combinations of both kinds possible.

A well-known example for game-based learning in higher education is the teaching method of Lee Sheldon (2011) who organizes his seminars similar to Multi-Massive-Online-Role-Playing-Games (MMORPG). His main aim is to reach students in a way they are familiar with. Like in a computer game the students can choose an avatar to fight together with their co-students for better grades in the final exams. By doing homework, handing in their tasks early or reviewing texts from other students they can gain extra points to improve their grades. In this way the students have many little milestones during the semester which can be achieved easily and therefore there are a lot of possible and encouraging senses of achievements. The feedback of the participants concerning the course structure shows that there are positive effects on the motivation as well as on the learning results (Sheldon, 2011). The approach of Sheldon (2011) alludes to online-platforms like World of Warcraft (WoW) or similar games. Another example that does not put emphasis on the game mechanics in its entirety is Quest to Learn, a school in New York. This public school aligns its complete curriculum with learning by playing. In cooperation with teachers, parents, game designers and students they focus on “rule-based learning systems, creating worlds in which players (students) actively participate, use strategic thinking to make choices, solve complex problems, seek content knowledge, receive constant feedback, and consider the point of view of others” (Quest to Learn, n.d.).

3 Evaluation Model for Gamified Concepts

In accord with Fricke (2004) we asked if the existing evaluation models are sufficient to evaluate a game-based learning approach or if we need new forms for the evaluation. Because of the innovative and complex course designs normal evaluation methods for learning environments and didactics do not cover all relevant aspects. For this reason we developed an own model to illustrate the gamification approaches and all adjacent areas (Figure 1). Our work serves as a window to an understanding of the evaluating process of game-based learning concepts.

Against this background, the central evaluation aspects of this paper are:

- the game-based learning course design
- the participants
- the acceptance
- the environment and the time.

The framework is derived from the model of Schumann and Stock (n. d.) focusing on an information service evaluation and supplemented by Knautz, Soubusta, and Stock’s (2010) evaluation aspect for IT system quality. Our model includes five different dimensions (Schumann & Stock, n.d.): the gamified concept represents only one dimension. According to the project the aspect of the concept can be divided into the existing elements e.g. the learning platform, the online game, the practical course with game mechanics or everything together. For each part we investigate the objective and perceived quality independently. The objective quality is usability, efficiency, effectiveness and functionality. The perceived quality includes usefulness, fun, trust, security and user-friendliness (Knautz, Soubusta, & Stock, 2010). Furthermore we survey the participants of the concept with their individual learning and information behavior as well as their needs. At this point we want to investigate which information demands do they have and how do they learn that they meet their needs. They have a reciprocal relationship with their co-participants concerning

the competition with them as well as the support by them. As another important aspect we look at the acceptance which is closely connected to the dimension of the course concept and the participants. The acceptance has a high influence on the learning outcomes which is a central aspect of the evaluation model (Quinn, Alem, & Eklund, 1999). It is furthermore based on the adaption of the concept as well as on its use. In correlation with the dimension of the users the acceptance creates a network economy effect “success breeds success” that refers to a permanent rising number of users as soon as the first users are convinced of the concept and share their experiences.

To go further the model does not examine the course concept uncoupled. For this reason the fourth dimension represents the environment. In this context we have a closer look on competition, subject area, governance and marketing. The subject area represents the direct setting of the concept. The aspect of the governance depicts the demands for the project - for example there are financial, personal or time restrictions. Competition and marketing are very close to each other. By offering competing course concept the participants can decide which one they would like to choose. In this case marketing is very important to convince them of one form. Marketing complies with the purpose to increase the attention for new didactic methods. The last dimension represents the time that has a high influence on the evaluation results. For example at the beginning of the project the participants do not have a clear imagination of how the new didactic concept works and if there are any advantages for them. By witnessing the concept they can form an own opinion - based on the experienced advantages and disadvantages.

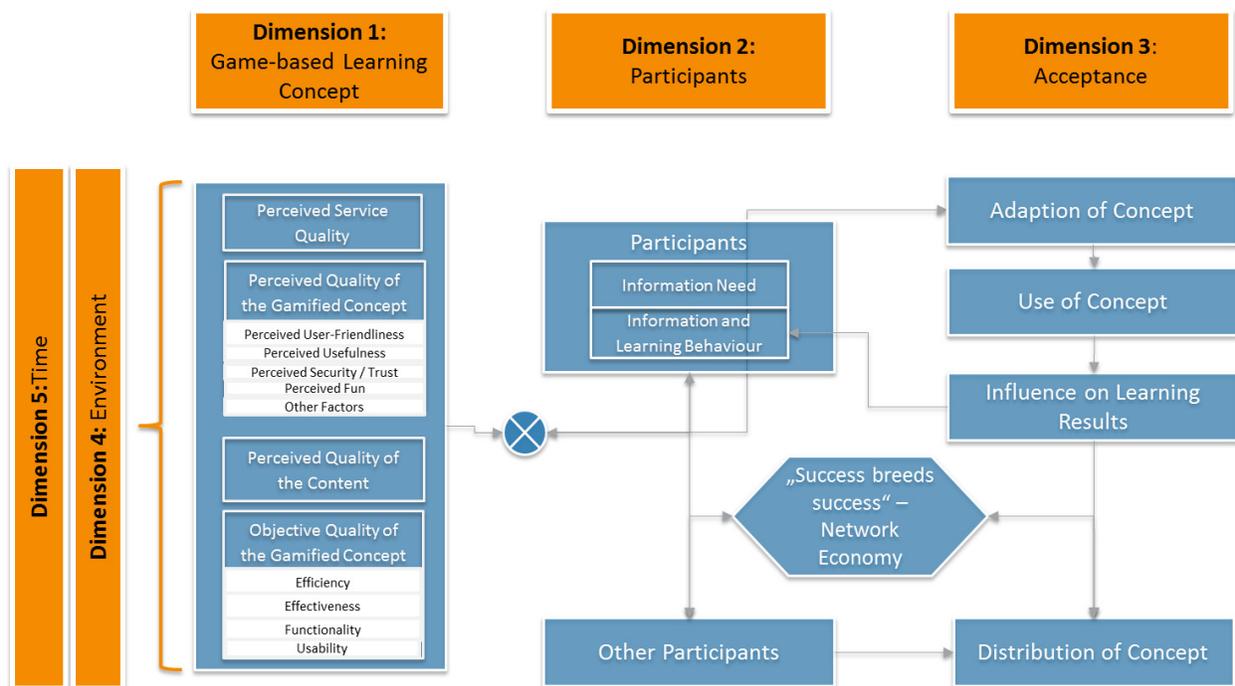


Figure 1: Evaluation Model for Game-Based Learning Approaches

4 Outlook for the Poster

All presented evaluation aspects were investigated in context of a gamified university course by quantitative and qualitative methods like questionnaires, log-file analysis and interviews. The data collection is analyzed through statistical methods. In doing so we have a diversified evaluation result - not only based on the course concept itself but also on the surrounding areas.

With the data we can discuss and answer the following questions which will be presented exemplarily in the poster:

How was the realization of game mechanics in the practical course and on the platform and how was the acceptance on the part of the students?

How was the feedback on the traditional performed lecture?

Are there any effects on the learning behavior and learning outcomes of the students?

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