Advances in Game-Based Learning

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Gamification in Learning and Education

Enjoy Learning Like Gaming

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Preface

In the current landscape of learning and performance, the use of educational games and gamification instructional strategies has received significant attention as a means of engaging learners across age groups, cultures, and contexts. Though game-based instruction is not a new concept, the more recent proliferation of recreational video games and ubiquitous adoption of personal computing technologies have accelerated the exploration and application of such games for educational purposes.

Enjoying Learning Like Gaming provides a comprehensive look at the rationale behind using games for learning, as well as detailed guidance on the features and processes of effective educational game design. The book begins by exploring the psychological and behavioral aspects of gamification, with a focus on concepts related to learner engagement and fun, along with some of the potential negative states associated with the use of games, such as addiction. The connection to learning and performance is also detailed, offering evidence regarding the potential for positive outcomes associated with the use of gamification strategies.

The book also includes an overview of what defines a game, exploring the evolution of how games have been defined and a variety of considerations in such definitions. Common features include goals, rules, and interactions. A wide array of different kinds of games have developed over the years; therefore, a classification of game types is also provided, describing the defining characteristics and purposes of each category.

The concept of "gamification" itself is examined in light of its role in education and learning. It is also helpful to understand how this approach is fundamentally connected to various kinds of economic systems, including the industrial economy, experience economy, and the related role of behavioral economics in the use of games for education and learning. Specifically, we examine theoretical propositions that underpin the use of games for learning, such as dual processing, anchoring, conformity, and punishment. The effects of using gamification are also discussed in terms of improvements in learning and behavioral change.

Awareness of the various learning theories associated with educational game design is helpful when planning game-based learning environments and in decision

making related to specific gamification strategies. The theoretical features and research related to self-determination, achievement goal theory, social learning theory, and situated learning can help guide understanding of student engagement and behavior within educational games. The role of feedback and its effectiveness in learning and performance is also critical in planning learner interactions and outcomes within game-based learning programs. Knowing how and when to integrate feedback into the activities can impact the effectiveness of learning outcomes and learner engagement.

Learners have different perceptions of gamified learning activities, which in turn drives learner behaviors within such contexts. A variety of psychological states can be experienced within game play, necessitating our understanding of possible reactions and responses within such learning environments. Feelings of control, competition, discovery, fellowship, and relaxation are only a few of the many conditions in which learners may perceive when engaged in games for learning. Awareness of these conditions, along with guidance on how to elicit (or avoid) them through design strategies, is key to effective planning for gamified learning experiences. It is also important to consider how to manage challenging player behavior within such programs as well, posed by "griefers" and rule breakers.

Development of educational games can be assisted through awareness of different gamification frameworks and their elements. Gamification platforms are also plentiful, so a checklist for evaluating which may be most appropriate is provided. So many tools and systems are available for supporting the creation of innovative and effective game-based learning programs. Descriptions of different development apps and software systems are included, as well as detailed guidance on strategies for the instructional design process related to the creation of effective game-based experiences for learners.

While research has supported the positive outcomes related to the use of games for learning, there are also some legal and ethical issues that must be considered before choosing to integrate such systems into classroom use. The acquisition of personal data for analytics can result in some privacy issues, for example. Other challenges can relate to copyright and ownership when utilizing existing materials for game production. These kinds of issues can often be avoided through sensitivity about their implications before the use of games in the classroom.

Examining how others have employed educational games can offer models for adoption within our own contexts. A variety of cases are provided from educational settings, including STEM education with virtual laboratory environments for biology, chemistry, and general science explorations. Other exemplars include computer coding environments, mathematics, and disaster relief, as well as integrated programs that teach various math concepts alongside human body systems, genetics, and evolution. Cases in the liberal arts and social sciences include language learning, politics and government, economics, and leadership programs. These examples reflect both self-directed and collaborative kinds of approaches with mechanisms for self-assessment and also teacher monitoring. Exploring these stories of gamified learning utilization will hopefully inspire the reader's own unique and creative implementation strategies!

But, how does one get started with gamification in the classroom? There is no better way to understand the benefits and challenges of game-based learning than by becoming a player yourself. We close with guidance on how to initiate your own learning experiences so that you are well-prepared to plan effective and engaging gamified programs for your own learners. We wish you good luck and good gaming!

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Contents

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Chapter 1
Beginning of Journey

Quest
Let's explore a simple example of gamification.
Let's figure out why we need gamification in learning and education.

1.1 Complete Your Mission

Many educators have been interested in motivating their students and helping them to engage in their learning. There are various approaches to student motivation. Gamification is one of them. This book describes some simple approaches for educators to gamify learning and instruction in the classroom. Your mission, as a reader of this book, is to ultimately be able to demonstrate your understanding of the concepts described in each chapter by applying the skills necessary to gamify instruction in your classroom. Sometimes learning by doing is more effective than just reading or listening alone. Before reading through the rest of this book, let's first design a simple game for motivating our students.

1.1.1 Background

Let's assume that you have two daughters. They both have something in common; neither of them is interested in learning math or using the self-teaching math books that you bought in order to enhance their math interest. They consider the books "boring" and do not want to read them. Another thing they have in common is that they both want to own princess dolls. In your efforts to find a solution that can help to motivate them to finally read their books, you discover gamification and believe that it may be the answer you've been looking for. You decide to develop a program

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using gamification that can motivate your daughters to read their textbooks. You name the program, "Saving the Princess."

1.1.2 Rules of the Game

The "Saving the Princess" program requires a game board, math books, virtual currency, and store that accepts the virtual currency. On the game board, there is a path made up of circles containing numbers (see Fig.1.1). These numbers represent the number of math questions (from the math books) that the players (your daughters) will need to answer before moving to the next circle. The players move forward on the game board, one circle at a time, after solving the requisite number of practice questions from their math books. The quantity of questions to be answered is determined by the number inside the circle. A player's game level goes up, and the number of practice questions to answer goes down, once they hit a lottery space. Finally, when players arrive at the castle space, they have completed the game requirements, and you have to buy the princess dolls for your daughters!

There are other incentives built into the game. Players receive virtual currency at each move (see Fig. 1.2). They can use the money only at the store accepting virtual currency. This "store" can be run by a parent or one of your friends. The store should be stocked with snacks, sweets, stickers, and small toys for the players to buy with their virtual money throughout the game.

At each lottery space, your daughters may pick one of the cards shown in Fig. 1.3. You must join in the activity on the drawn card with your daughters. For example, if they pick the kite-flying card, you have to help your daughters make and fly kites. If they choose the bonus 100 VC card, they can receive 100 VC in virtual currency.

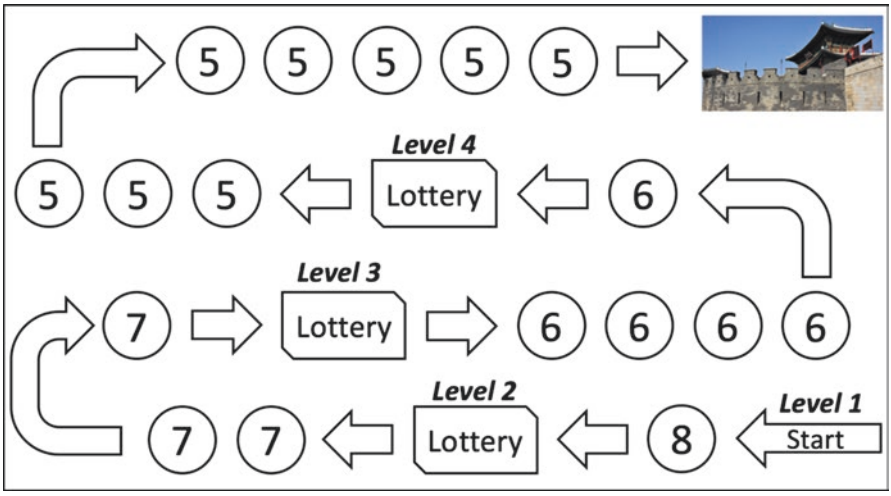

Fig. 1.1 Game board of "Saving the Princess"

Fig. 1.2 Virtual currency of the quest: Saving the Princess

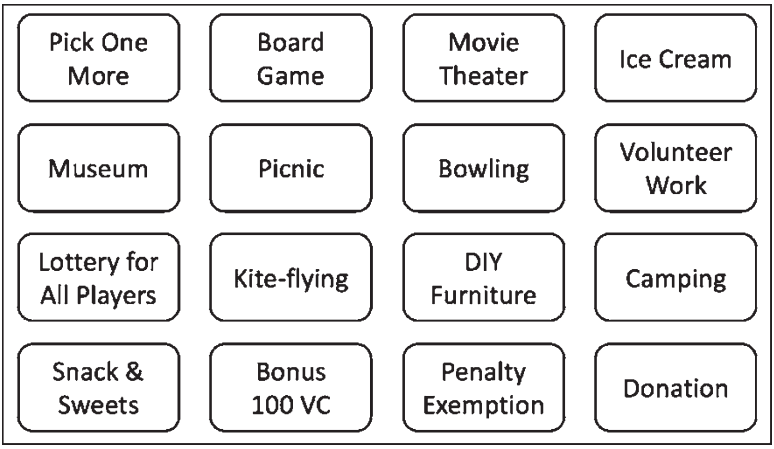

Fig. 1.3 Lottery of the "Saving the Princess"

The activities listed on the lottery card can vary depending on the outside conditions and your daughters' preferences. The most important rule here is to keep the game rules, including doing the activity, on the lottery cards.

1.1.3 Analysis of the Game

The number in each circle on the game board gradually decreases throughout the game. The number of circles in between lotteries increases as players move forward. In games, points, levels, and mechanics are frequently used. For example, if the sum

of a player's game points reaches a specific number, the game level goes up. The player can increase the number of game points more easily at higher levels than lower ones. However, it is harder to achieve the next level at higher levels than lower ones. Players perceive a quick increase in game points, in the beginning stages of the game, as an increase in skills or abilities. Similarly, when a player takes a long time to build points and level up, in the later stages of the game, players perceive the value of each level as higher than before. "Saving the Princess" follows these game mechanics.

The virtual currency is an effective means of reward since the players can exchange the virtual currency with items that have real value. The player can be motivated by the increasing amount of virtual currency they receive as they move through the game, as well as their chances to purchase real items.

There are two kinds of reward systems in the game. One is virtual currency, which is a fixed reward system. The other is a lottery which is a variable reward system based on luck. While game players can anticipate the type and amount of rewards in the fixed reward system (by completing a specified task), they cannot in the variable reward system.

There is a card called "Lottery for All Players" among the lottery cards in this game. If a player picks this card, all the players have the benefits of the card. This is Karma, one of the game mechanics. The player who picked this card can be happy with doing a favor for other players.

1.1.4 Responses

You may observe unexpected responses from the players despite your best efforts. While some players can be motivated and deeply engaged in the game, some players aren't motivated and psychologically reject participation in the game. You should conduct pilot tests with some students from your group to find opportunities to improve this game and collect more positive results. One or more of the following player responses can result from playing "Saving the Princess."

- The players exhibit positive responses to the game.
- The players are motivated to solve the practice math questions from the textbook.
- The players have interest in other players' progress and achievements.
- The players give the princess doll (or other designated reward) a higher value, and then it would have had, had they not played the game.

1.2 Reasons Why We Need Gamification in Learning and Education

There will be a variety of people reading this book, to include lecturers at higher educational institutions, students majoring in education, teachers at K-12 schools, and professionals in talent development teams. No matter who the readers are,