Gamification

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General Overview

What is Gamification?

- the implementation of game design elements in real-world contexts for non-gaming purposes

What is the Aim of Gamification?

- to foster human motivation and performance in regard to a given activity

What did the Study Show?

- gamification is not effective per se, but specific game design elements have specific psychological effects

The Promise of Motivation through Gamification

- Video games inherently possess a high level of motivational potential and the point of gamification is to **harness the motivational power of games** and direct it toward real-world applications
- The central idea is to take the 'building blocks' of games, and to implement these in **real-world situations**, often with the goal of motivating specific behaviours within the gamified situation.
- Popular applications of gamification are education, crowd-sourcing, data collection, health, marketing, social networks and environmental protection

Gamification

Defined as “the use of game design elements in non-game contexts” (Deterding, Dixon, et al., 2011, p. 1)

- **Game**: “a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome”
- **Elements**: characteristics of games that are significant to the meaning of every game
- **Design**: deliberate design process
- **Non-Game Contexts**: by not specifying the potential areas in which gamification could be applied the definition leaves it open for all kinds of different usage scenarios

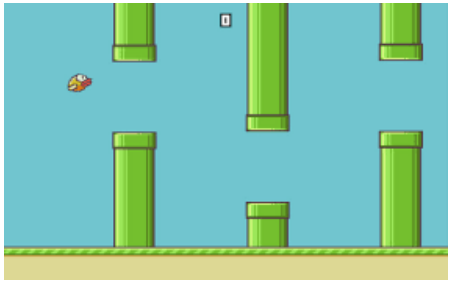
Examples:

- Khan Academy, Starbucks Rewards Program, Duolingo

Game Design Elements

- **Points**: rewarded for the accomplishment of specified activities within the gamified environment and they serve to numerically represent a player's progress
- **Badges**: visual representations of achievements and they symbolize a player's merits
- **Leaderboards**: rank players according to their relative success and act as competitive indicators of a player's progress
- **Performance Graphs**: often used in simulation or strategy games, they provide information about a player's performance compared to their past performance
- **Meaningful Stories**: embed narrative into the gamified application and contextualize activities and characters in the game
- **Avatars**: serve as visual representations of players within the game or gamification environment
- **Teammates**: whether they are other real players or virtual non-player characters (NPCs), can induce conflict, competition or cooperation

Psychological Need Satisfaction



Self-Determination is a key factor of gamification and there are three basic psychological and intrinsic needs of that theory

- **The need for competence:** feelings of efficiency and success while interacting with the game environment
- **The need for autonomy:** the feeling of making decisions on the basis of a player's own values and interests and without external pressure or enforcement to fulfill a certain task
- **The need for social relatedness:** a player's basic desire for coherent integration within the social environment of the game

Matching Psychological Needs to Game Design Elements

Game design elements can deliberately be used to modify non-game contexts such as working or learning environments

- **The need for competence:** points, performance graphs, badges, and leaderboards because all of these provide feedback and communicate the success of a player's actions
- **The need for autonomy:** avatars because they offer a player freedom of choice and meaningful stories because they help the player experience their own actions as meaningful and autonomous
- **The need for social relatedness**: meaningful stories an player's sense of relevance and shared goal

The Simulation Study: Questions and Hypotheses

Main Point of the Study: to better understand how and to what degree certain game design elements affect psychological need satisfaction

Question 1: To what extent do game design element groups affect competence need satisfaction?

- **Hypothesis:** Participants in a game condition with badges, leaderboards, and performance graphs (experimental condition 1) experience higher levels of competence than participants in a control condition

Question 2: To what extent do game design element groups affect autonomy need satisfaction in regard to decision freedom?

- **Hypothesis:** Participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of decision freedom than participants in a control condition

The Simulation Study: Questions and Hypotheses

Main Point of the Study: to better understand how and to what degree certain game design elements affect psychological need satisfaction

Question 3: To what extent do game design element groups affect autonomy need satisfaction in regard to task meaningfulness?

- **Hypothesis:** Participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of task meaningfulness than participants in a control condition.

Question 4: To what extent do game design element groups affect social relatedness need satisfaction?

- **Hypothesis:** Participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of social relatedness need satisfaction than participants in a control condition.

The Simulation Study: Design of the Simulation Environments

- The process of order-picking was simulated in a computer-based, cross-platform application using Java and then put on the internet
- The setting was a **storage depot** which players had to collect parts from, similar to a real life order-picking task in internal material handling. **Five orders** had to be fulfilled and each order consisted of three to six parts, which had to be picked from the specific places
- The simulated storage depot consisted of 10 aisles, with 16 shelves in each aisle and 30 parts on each shelf
- Players were **randomly assigned** to either a control condition or one of two experiment conditions at the start of the game

The Simulation Study: Design of the Simulation Environments

- **Control Condition:** the only activated game design elements were points which were also activated in all the experimental conditions
- **Experimental Condition 1:** included badges (for fulfilling a certain number of orders within a given time, or for fulfilling orders without making any errors), a leaderboard (compares player's to previous players), and a performance graph (compares player's own score over time)
- **Experimental Condition 2:** included avatars (players can choose from one of many futuristic warehouse worker characters at the start of the game), a meaningful story (the players on the team must help stranded people by supplying goods for a relief mission), and teammates (vi teammates were visible as computer-controlled NPCs)

The Simulation Study: Methods

- Participants in the study were **recruited online**
- A total of **669** logged in to the study and **419** of them completed both the game and a questionnaire which was presented at the end of the game

Demographics:

- **Women:** 204 (48.7%)
- **Men:** 215 (51.3%)
- **Average Age:** 22 years (M = 22.39, SD = 3.56)

The Simulation Study: Methods

- The questionnaire included items that assessed the **psychological need satisfaction** of the participants while they were playing
- Scales were used to assess psychological need satisfaction in the areas of competence, autonomy in regard to freedom of decision, autonomy in regard to task meaningfulness, and social relatedness
- The four variables consisted of three to four items which each used seven-point **Likert scales**, each asking participants for their level of agreement with a given statement

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(1)	(2)	(3)	(4)	(5)

The Simulation Study: Results

- The results were calculated using the multivariate analysis of variance (MANOVA) and post-hoc Scheffé-tests

Question 1:

- Regarding competence need satisfaction, there was a significant difference between the three conditions and the results **support the hypothesis** that participants in a game condition with badges, leaderboards, and performance graphs (experimental condition 1) experience higher levels of competence than participants in a control condition

Question 2:

- Concerning autonomy need satisfaction in regard to decision freedom, there was no significant difference between participation in the three conditions and the hypothesis that participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of decision freedom than participants in a control condition **could not be confirmed**

The Simulation Study: Results

Question 3:

- Concerning autonomy need satisfaction in regard to task meaningfulness, there was a significant effect of participation in the three conditions and the Scheffé post-hoc test indicated a significant difference between participants in the control condition and participants in the experimental condition 1 , but not between the control and experimental condition 2 so the hypothesis that participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of task meaningfulness than participants in a control condition **could not be confirmed**

Question 4

- Regarding social relatedness need satisfaction, there was a significant effect of participation between the experimental conditions and the Scheffé post-hoc test indicated a significant difference between participants in the experimental condition 2, in the control condition, and in the experimental condition 1 so the hypothesis that Participants in a game condition with avatars, a meaningful story, and teammates (experimental condition 2) experience higher levels of social relatedness need satisfaction than participants in a control condition **could not be confirmed**

The Simulation Study: Summary

- The game design element group with badges, leaderboards, and performance graphs (experimental condition 1) fostered **competence need satisfaction** and **autonomy need satisfaction** reading task meaningfulness
- The game design element group with avatars, meaningful stories, and teammates (experimental condition 2) fostered **social relatedness need satisfaction**
- **autonomy need satisfaction in regard to decision freedom** was not affected by any of the tested game design element groups
- The study showed that the concept of **need satisfaction** was able to be successfully applied to gamification
- In the future it would be worthwhile to investigate **autonomy need satisfaction** as a two-dimensional construct in the context of gamification because the game design elements in the study only affected certain aspects of autonomy

Key Takeaways

- **Gamification** is the implementation of game design elements in real-world contexts for non-gaming purposes
- Gamification can be a powerful solution to address **motivational problems** in the real world
- Different **game design elements** can trigger different motivational outcomes
- Competence and autonomy regarding **task meaningfulness** was affected by badges, leaderboards, and performance graphs
- **Social relatedness** was positively influenced by avatars, a meaningful story, and teammates

Thank You