Gamification in Business: Designing Motivating Solutions to Problem Situations

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Abstract
Designing a gamified solution to a difficult business problem requires informed application of game design patterns, with an understanding of the unique corporate environment. We present a framework that can be applied in other gamified endeavors. Our approach includes a systems-oriented process describing environmental conditions affecting intrinsic motivation and game design patterns. Objectives considered the 16 basic human desires [11], along with the human need for autonomy, competence, and relatedness [4].

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Introduction
Our research introduces a *gamification* design model aimed at improving project staffing in business. Goals were not focused on delivering "fun", rather to offer a positive and engaging experience deemed interesting and important to employees. Approaches addressing the primary research question, "*Do applied game elements improve a problem situation?"* eventually led to founding of a gamification process and motivation framework.

Once the business problem and common language were established, the project followed "game" design advice of Schell [15]. Numerous brainstorming sessions were

hosted where we "documented everything we could think of" (p. 71); game design principles alone were insufficient. In games, players are generally compelled to play for intrinsic reasons. In the corporate context, additional considerations were necessary to give a positive, connected experience beyond just building a game and hoping people would play. Object-oriented systems development processes were customized to include contextual elements and psychological needs of employees. A gamified use case and class diagram provided structure to align game design patterns with operational conditions and employee motivation factors. This paper highlights key milestones along our path to gamification design.

Theoretical Foundations

Our evolving gamification design model emerged from a study of corporate wiki collaboration [7]. Two intrinsic motivation theories guided an understanding of psychological aspects associated with participation behavior. Specifically, the theory of 16 basic desires [11] was employed to understand innate human desires, and the self-determination theory [4] to understand internally regulated action along a spectrum of extrinsic motivation. The motivation theory along with foundations for collaborative engagement in business, are introduced below.

Theory of 16 Basic Desires

The theory of 16 basic desires [11], a psychological content theory of motivation, provides utility for analyzing and predicting human behavior. Reiss' model, derived from Maslow's [10] theory of human needs, and William James' [9] theory of internal desires, describes basic desires for: Order, Power, Independence, Curiosity, Acceptance, Saving, Idealism, Honor, Social Contact, Family, Status, Vengeance, Romance, Eating, Physical Activity, and Tranquility. While basic desires are largely genetic in nature, the manner in which humans act upon these desires is shaped by the intensity of innate desire, cultural influences, and individual experiences. Intensity of each individual's desires falls on a spectrum, assessed using the Reiss Profile of Fundamental Goals and Motivational Sensitivities.

Self-Determination Theory

The self-determination theory (SDT) [4] framed a motivation model for understanding what and how human behavior is initiated and regulated [4,13,14]. The SDT recognizes social and environmental conditions that affect personal volition and engagement in activities. The SDT combines both content (psychological needs) and process (cognition) motivation describing needs for autonomy, competence, and relatedness. An individual's motivation for action is defined along a spectrum of amotivation, extrinsic motivation, and intrinsic motivation measured by perceived locus of causality (external to internal regulation) [6]. Needs for autonomy and competence allow the "prediction of the social circumstances and task characteristics that enhance versus diminish intrinsic motivation" [3 p. 233].

Collaborative Engagement Foundations

In a study of wiki collaboration in the workplace, Gears [7] employed both the theory of 16 basic desires [11], and the SDT [4], to understand factors motivating employee participation behaviors. Strong basic desires for power, independence, idealism, and curiosity were found to prompt engagement behaviors such as adding,

changing, and commenting on content. Contextual influences were associated with participation and non-participation wiki behavior along the SDT continuum ranging from external control to internal autonomy. Deployed in a grassroots and egalitarian manner, employees participated in the wiki when they perceived value, were not concerned about malicious wiki behavior, found time to participate, and for some, received support from their manager.

Approach

Our multidisciplinary team began with *analysis of candidate business problems.* Several challenged areas were identified and evaluated for risk, benefit, scope, impact, and feasibility. Following numerous interviews, focus group discussions, analysis, and design team collaborations, a business situation was targeted for *gamification*.

Our understanding of *gamification* followed Deterding, Dixon, Khaled, and Nacke [5], defined as a process that incorporates game design elements in non-game contexts to improve the user experience, and in this research, improve a challenging situation. The consequence of gamification was not a complete game, rather purposefully deployed game design patterns [1] in conjunction with psychological motivation theory, and environmental conditions. Conversations about design elements (independent building blocks) centered on game design patterns used in gameplay.

Systems Analysis and Design

An object-oriented systems analysis and design process was instrumental in guiding the project. Use cases, class diagrams, and process models were developed to gain understanding of the domain, define requirements, and design gameful interactions.

A "gamified" essential use case [2] (refer to Table 1) specified goals, objectives, beneficiaries, business rules, behavioral norms, preconditions, actors, and system interactions. The use case provided a canvas to articulate business rules that could not be broken; personal, social, and corporate norms that could be challenged; and conditions necessary for a successful outcome.

GAMIFICATION USE CASE
Goals: Primary purpose(s) of the experience. 1) Improve the problem situation, 2) Stimulate interest, increase communication, reduce frustration, 3) Create a gamified environment that would be taken seriously by employees.
Objectives: Derivable accomplishments offered in the experience. 1) Freedom and motivation to provide input into the process (autonomy) [4], 2) Feel a sense of accomplishment towards the business goal (competence) [4], 3) Feel a shared sense of purpose (relatedness) [4], 4) Allow opportunity to participate without negatively impacting employees.
Business Rules: Constraints or policy that ***cannot*** be broken. 1) Managers make the final disposition.
Behavioral Norms: Personal, social, and corporate norms that ***can*** be challenged. 1) Content ownership norm – ownership of corporate documentation belongs to the author [7].
Preconditions: Circumstances the domain that must be true before interactions to enable positive outcome. 1) Participation is not required [7]. 2) Participation should NOT be directly related to pay and performance. 3) Non-participants are NOT negatively impacted. 4) Participants recognize the value of the experience [7]. 5) Participants are given time to participate [7]. 6) Participants are not concerned about misconduct or abuse by others [7]. 7) The established environment is egalitarian (open, democratic, free of hierarchy and dictatorial control, etc.) [7]. 8) Managers support participation [7].
Actors: Performers involved in the problem domain. 1) Project Contributor 2) Project Manager
Normal Course of Action: Gameful interactions specified in the RMI Framework. Integrating game design patterns [1] with intrinsic desires [11].

Table 1. Gamified Use Case

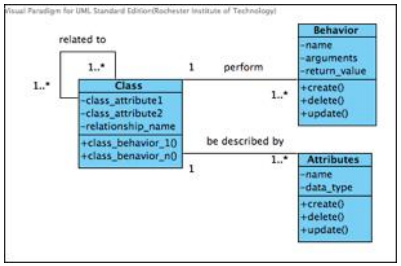

Figure 2. Class Diagram Meta-model

The class diagram in Figure 1 depicts domain objects, their attributes, behaviors, and relationships to other objects. Business rules were identified in the analysis, along with actor responsibilities. For example, "A Project Manager assigns Resources to many projects."

Objectives considered the human need for autonomy, competence, and relatedness [4]. Behavioral Norms and Preconditions considered domain settings associated with participation behaviors in open corporate wikis [6,7]. It is conceivable that the preconditions could apply in any gamified design.

Interactions in the Normal Course of Action considered intrinsic desires of actors described by Reiss [11] in selecting game design patterns.

Over time, the class diagram became a de facto game board where employees were referred to as players, responsibilities as actions, and the problem domain as a playing field. An intentional detour from systems thinking evoked a shift in mindset from business to game play, balancing creative thinking with corporate reality.

Framework for Gamified Design

A Role-Motivation-Interaction Framework (RMI) was introduced to facilitate the architecting of gameful interactions (refer to Figure 1). Designers projected the "basic desires" of employee described by Reiss [11]. This recognition, along with acknowledgement of employee/player psychological need for autonomy, competence, and relatedness [4,12] aided in the selection and customization of game design patterns [1] (specified in the Use Case Normal Course of Action). Consideration of intrinsic desires and extrinsic motivators created opportunity to design for meaningful choice. "Meaningful choice" in this context intends to stimulate a sense of employee inclusion and perceived benefit to the situation, without negatively affecting pay, performance, and relationships.

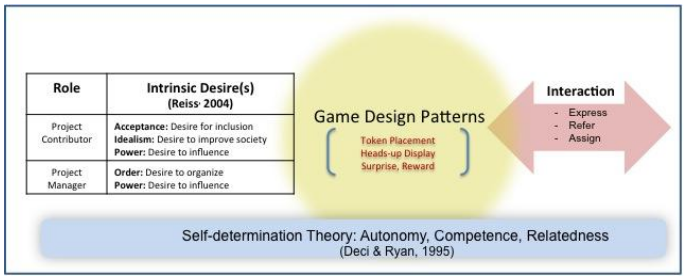

Figure 1. Role-Motivation-Interaction Framwork

Token Placement (refer to table 2) was selected to satisfied the desire for *Acceptance*, *Idealism* and *Power* by Project Contributors. Indicating *n* number of *interest* tokens, employees satisfy basic desires for inclusion (Acceptance), a sense of fairness and to promote ideas (Idealism), and to pursue challenges (Power). Participation is not required preserving autonomy when employees identify with an initiative to express interest.

Interaction	**Role: Basic Desire**	**Game Design Pattern**
Express interest	Contributor: Acceptance, Idealism, Power Manager: Order, Power	**Token Placement**-Distribute fixed number of tokens among interest areas. **Surprise or Award**-Complimentary unplanned action.
Autonomy: Employees choose to express interest if they identify with a project initiative; participation not required. **Competence:** Provides employees with the opportunity to express interest in projects that exercise and enhance skills (token placement); recognition for something valued (surprise or award). **Relatedness:** Enhances feelings of belonging in the organization; involved in matters that affect employees and the business. **SELF DETERMINATION**		

Table 2: Interaction Example

Employees feel a sense of competence through manipulation of the tool and knowledge in a project area, and relatedness through community collaboration

and inclusion. A surprise or reward for expression of interest(s) supports the desire for competence, mastery, and acceptance.

Conclusion

This research proposed a gamified system development process and role-motivation-interaction framework designed to improve a problem situation in business. The 16 basic human desires [11], along with the human need for autonomy, competence, and relatedness [4] anchored the framework influenced by corporate dynamics. Game design patterns [1] were customized to offer employees a positive and engaging experience.

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