



The Gamification of Learning and Instruction

Game-Based Methods and Strategies for Training and Education

Karl M. Kapp
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Take-Aways

- A game is a system of “abstracted reality” that guides its players by using “rules, interactivity and feedback.”
- “Gamification” is the application of game-based dynamics to an educational effort.
- “Challenge, relevance, confidence, curiosity, control and fantasy” motivate players.
- “Intrinsic motivation” is more effective than “extrinsic motivation” – the best games contain both.
- “Measurement achievements” are more motivational than “completion achievements.”
- Divergent personality types express themselves differently in the “game environment.”
- The four primary player types are “achiever, killer, explorer and socializer.”
- Gamification can teach “declarative, conceptual, and procedural” knowledge.
- The two main models of gamification development are “ADDIE,” a step-by-step process, and “Scrum,” where team members pursue different steps simultaneously.
- A comprehensive “design document” greatly helps guide the process of game design.

Rating (10 is best)

Overall	Applicability	Innovation	Style
7	7	9	4

Relevance

What You Will Learn

In this summary, you will learn: 1) How to use games and gamification to teach professional knowledge and behavior, 2) What types of game dynamics are most motivational and edifying, 3) How to manage the development of gamified instruction.

Recommendation

In this comprehensive manual, instructional technology professor Karl M. Kapp delves into gamification in all its varied applications. Kapp heeds his own advice: He offers not just the “how” but also the “why,” giving readers procedural knowledge and creative wisdom. The book is repetitive and even awkward, but well informed and thorough. You’ll learn how to build a gamification team, inspire players to follow the game and learn, and develop the gamified education package that best fits your teaching goals. *getAbstract* recommends this utilitarian, forward-thinking guide to learning professionals who want a doorway into game-based teaching.

Summary

What’s in a Game?

Gamification is a powerful tool for delivering corporate training and education. Consider the formal definition of a “game” in an educational context: Such a game is a space where certain factors converge – “players,” “abstract” thinking, “challenge,” rules,” “interactivity,” “feedback,” “quantifiable results” and “emotional reaction” – all within a “system” that provides structure.

Games are abstract – they exhibit only certain characteristics of real life – and they present a different reality. The element of challenge keeps the players pushing to achieve a particular goal. Rules structure the game’s reality. Interactivity in games occurs between a player and the game system and among players. Feedback – positive or negative – influences the players’ game behavior. Players react emotionally to different parts of the gaming experience. Since a game is a system, each of these factors influences the others.

Gamification uses these game-based dynamics to engage and educate an audience. Gamification presents an engaging aesthetic interface that affects how players experience a game. The most critical component of gamification is how it promotes “game thinking,” the conversion of an everyday activity into an opportunity for learning and growth. Gamification does not trivialize learning; it is an intensely motivational method for conveying corporate training and education.

Better than Reality

The abstracted reality of a game offers certain advantages over real life. It reduces and simplifies the concepts you’re teaching in scale and complexity, and compacts them into the world of the game. This makes it easier for players to spot cause and effect, since lengths of time do not separate the cause from the effect as happens in the real world. Games make the connections among events easier to understand.

Goals-Driven Games

Games have achievement goals, which add purpose to the players’ experience. To attain goals, players must follow different types of rules. “Operational rules” tell players how

“Games provide the license to think outside of normal parameters, to add a little bit of fantasy or surrealism, and to force people to think in different ways.”

“Everyday occurrences...make for uninteresting game play. Few games force a player to...get a haircut or go to the dentist. Important in real life, removed in games.”

“Grok’ means that a person understands something so thoroughly that he or she has become one with it and even loves it...to move from intellectual understanding to intuitive understanding.”

“The simple introduction of a goal adds purpose, focus, and measurable outcomes. You now have a method to measure the quality of play or, at least, certain aspects of the play.”

“When people are intrinsically motivated, they tend to be more aware of a wide range of phenomena, while giving careful attention to complexities, inconsistencies, novel events, and unexpected possibilities.”

“Create a paper prototype before programming the gamification product. The process will help avoid inevitable problems moving the concept to actual game play.”

to advance through and succeed in a game; “constitutional or foundational rules,” which typically only programmers understand, are the mathematical structures that enable the game to function; “implicit rules” or “behavioral rules” advance the proper interactions among players; and “instructional rules” embody the information players should learn from playing the game. That is the primary purpose of gamification. Players usually compete against one another though sometimes they cooperate; in both cases, rules delineate their actions.

In gamified instruction, time can motivate players and, more significantly, so can feedback. Games give players “informational” feedback that indicates the correctness or incorrectness of an action, and directional feedback that guides the player toward the correct action. These may overlap. The most effective feedback is “juicy” – players can sense it inviting them into the game; it offers “repeatable” information; it fits the game and flows intrinsically from it; it doesn’t overwhelm the game’s play; and it is “fresh” or even surprising.

Levels and Stories

Games may feature three different kinds of levels: “game levels,” in which the player accomplishes a different set of evolving goals in each level; “playing levels,” where the difficulty of accomplishing the same goals increases; and “player levels,” which mark a player’s progress through the game by offering steady advancement from one level to the next.

Gamified learning may feature “storytelling” – a narrative thread that weaves throughout the game, making it more engaging and compelling. “The hero’s journey” is a form of game storytelling. The hero acquires a new set of skills, solves an overarching problem or completes a quest, then returns to ordinary life. Learners find an epic quality in the lessons they glean from their game.

Gamification’s “curve of interest” concept, which is closely related to storytelling, refers to a sequence of events deliberately crafted to generate a feeling of flow and to hold the players’ interest. The “aesthetics” of game design – the artistic presentation of the game – is a critical factor in maintaining player interest. The “replay” function encourages continued engagement by reminding players that if they fail they can begin again.

Player Motivation

Motivation can be intrinsic or extrinsic. “Intrinsic motivation” occurs when a reward arises from the performance of an activity. “Extrinsic motivation” fuels behavior performed specifically to get an external reward. Intrinsic motivation typically has greater educational value. Well-designed games feature both types of motivation.

Game developers follow different theories about how games should motivate players. The “Attention, Relevance, Confidence and Satisfaction” (ARCS) theory of innovation relies on those four forces. Researcher Thomas Malone prefers “challenge, fantasy and curiosity” as motivations. Another expert, Mark Lepper, believes instructional design should evoke a player’s sense of “control, challenge, curiosity” and the “contextualization” of learning in an authentic, real-world environment. “The Self-Determination Theory” says players feel especially motivated when they believe they have autonomy over the game environment and a relationship to the other players.

Instructors can use “operant conditioning” as motivation. This refers to the use of “badges, rewards and points” to impel good gaming behavior. “Distributed practice” calls for

“Working with multiple variables causes the players to consider cause-and-effect relationships, weigh multiple options, and prioritize efforts.”

“In game design, strive to create tasks, missions, and activities that force the learner to synthesize knowledge from several sources.”

“Situating the learner in as realistic a situation as possible increases on-the-job recall, knowledge transfer, and reinforcement of appropriate behaviors.”

“Higher-order skills are best taught with games that have large elements of the real world.”

spacing out the game’s content over time – repeating the substance of it as necessary – to increase motivation and absorption of the material. Game builders provide “scaffolding,” allowing an instructor to offer extensive guidance at the beginning of a game and then to provide a diminishing amount as the game progresses. Games should evoke their earlier content at later stages to reinforce learning. These mechanisms motivate learners to move through a game and solve problems.

Achievements and Game Types

In-game achievements are similar to feedback and similarly motivational. “Measurement achievements” show players the extent of the task they’re performing. Players receive “completion achievements” for finishing a task. “Measurement achievements” provide the players with intrinsic motivation. Achievements should be difficult to attain. Game design should incorporate “alternative achievements” for players who have already mastered the main achievements.

“Expected achievements” give players motives for finishing levels. “Unexpected achievements” encourage learners to play creatively. Games should show players an immediate notification of each achievement – except for games with discrete segments that require intense focus, so delayed notifications are appropriate.

Broadcasting players’ achievements on something like a leaderboard lends desirable “permanence” to game accomplishments. Avoid games that punish players for not completing a task. Space out “incremental achievements,” such as those for completing the same task in increasing levels of difficulty, so players do not feel too controlled. If you award competitive achievements for victory against other players, institute the rewards only after the players know the game’s basics and are comfortable in its world.

“Alternate reality” games combine the real world and a pretend one, and use an engaging narrative to involve players. Closely related, but different, are “augmented reality” games, which use technology to enhance real life and enable play. Both alternate and augmented reality games have a “puppetmaster” – often the game designer – who controls the game experience and sparks the players’ feeling that “this is not a game” or “TINAG.” Players retain lessons more effectively if they have game-world “avatars,” especially if their avatars approximately resemble them.

Instructional games should include debriefing so learners recognize what took place in the game and what they were supposed to glean from it. Game players have more positive attitudes about corporate education than those who receive ordinary instruction.

Player Types

The four main types of players are differentiated by how they play. The “achiever” has one goal: to win, to come out on top in the technical sense. The “explorer” spends extra time feeling out and learning the game environment. The “socializer” devotes attention to forming relationships with other players. The “killer” just wants to kill as many game-people as possible.

French writer and philosopher Roger Callois identifies the following four patterns of play in games. “*Agôn*” refers to competition – people aim to defeat one another. “*Alea*” denotes chance, another mechanism that adds excitement to games. “*Mimicary*,” or role-play, occurs when players pretend the game’s imaginary world is real. “*Ilinx*,” or dizziness, means destabilizing a player’s sensory perception to pique his or her curiosity and heighten the challenge.

“The skill of effectively solving problems faster than competitors is one of the last sustainable competitive advantages left in a flat world.”

“Don’t use negative achievements as a punishment for failure.”

“Leaders in the future will need to understand leadership as a task and not a position.”

Facts, Concepts and Procedures

Games facilitate reasoning and planning. They also teach facts traditionally learned by memorization – “declarative knowledge” – via various gamification techniques. These include: “elaboration,” or associating new information with earlier information; “organizing” facts into logical clusters; associating a word with an image; repeating content; incorporating information into stories; sorting information into different groups or matching terms to their definitions; making a game replayable so the learner can see the content multiple times; and creating a “trivia game,” which promotes basic memorization of declarative knowledge.

Gamification teaches “conceptual knowledge” – groupings of related ideas. Techniques include: 1) “metaphoric devices” that link known information with the unknown; 2) examples and nonexamples that explain a concept; 3) lists of attributes that various pieces of information share; and 4) items the learner can sort and match.

If you need to teach a procedure – a step-by-step protocol for completing a task – provide an overview, like a flowchart, of the entire process. Teach the “why” of a procedure, not just the “how,” so learners can assess procedural aberrations.

An instructor may want to teach soft skills – the social guidelines that learners implement as needed, like negotiating abilities. Or the goal may be to teach “psychomotor” skills, including physical skills. To teach psychomotor skills, use “observation, demonstration, practice” and “haptic devices” – human-computer interfaces.

Managing Gamification

Designing instructional games is a complex process that requires an entire team. The two primary models for a gamification team’s activity are “ADDIE” and “Scrum.” ADDIE stands for a step-by-step process: “analysis” of the problem to be solved by gamified instruction; “design” of instructional objectives; “development” of the actual game programming; “implementation” of the instruction process; and “evaluation” of the game and its effectiveness.

In a Scrum, a team – usually seven people – meets daily. One person is responsible for each component of the game-development process. At each meeting, each team member goes through his or her part of the game’s development. Thus all parts of the process unfold more or less concurrently. An effective team has a “project manager, an instructional game designer, a subject-matter expert, an artist, a programmer, an information technology representative, a representative learner, a music and sound technician, an animator, and a level designer.”

The best development projects typically hybridize ADDIE and Scrum. Any game development project must generate a design document. This road map describes the intended outcome of the gamified instruction; the characters in the game and their environment; how a player plays the game; the game’s “reward system”; the aesthetic look and experiential feel of the game; and the game’s technological underpinnings. The design document keeps a development team on track and ensures successful game creation.

About the Author

Karl M. Kapp teaches instructional technology at Bloomsburg University and has written four books about combining learning and technology.