THE GAMIFICATION OF LEARNING AND INSTRUCTION

GAME-BASED METHODS AND STRATEGIES FOR TRAINING AND EDUCATION

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About This Book

Why is this topic important?

Games and gamification experiences are not going away. The engagement achieved through games means that gamification is a concept that needs to be part of every learning professional's tool box. Games provide meaning and context to learners, they provide a set of boundaries within a "safe" environment to explore, think, and "try things out."

Gamification is the ideal process for creating engaging learning environments. Game elements such as providing learners with permission to fail, encouragement of out-of-box thinking, and fostering a sense of control create rich learning experiences. The addition of game elements on top of traditional learning environments is a way of creating learning that aids in retention and is impactful. Learning professionals, managers, and others need to own the term "gamification" and use it to improve learning and performance within organizations.

What can you achieve with this book?

This book has a heavy emphasis on creating games for learning and not artificially incentivizing people through external rewards. The real value of game-based thinking and mechanics is to create meaningful learning experiences. This book is based on solid academic research conducted over dozens of years by many different researchers. Conclusions are based on peer-reviewed

studies, and key takeaways are the direct result of empirical research. My goal was to bring together what is known about learning, games, and instruction and place all that knowledge in one place and to create design guidance for professionals who want to create impactful experiences for learners. With this information you can create engaging, exciting learning that impacts behavior and achieves desired outcomes.

As gaming concepts become more mainstream, organizations have begun to leverage games for instruction, but often the games are ill-conceived, linear in their approach, and not well designed. In other organizations, gamification of instruction is resisted because management is not aware of the growing body of research studies indicating the effectiveness of using game elements for enhancing learning.

How is this book organized?

This book is organized around four central themes. The first describes and defines the concept of gamification and dissects games to determine the elements that provide the most impact for the players and why these elements are critical to the success of games. The next theme is the research and theoretical basis for the use of games and game-based thinking. This theme provides results from dozens and dozens of studies providing insights into when game-based thinking and mechanics make for powerful learning tools. The third theme is that of matching game content with game design. Not all games are the same; the gamification of learning and instruction requires matching instructional content with game mechanics. This concept is explored in several chapters in the book. The fourth theme of the book is the actual design and development of the gamification of learning and instruction. The creation of a

game design document is discussed, and a model for managing the entire process is described.

ABOUT THE AMERICAN SOCIETY FOR TRAINING & DEVELOPMENT

The American Society for Training & Development (ASTD) is the world's largest professional association dedicated to the training and development field. In more than 100 countries, ASTD's members work in organizations of all sizes, in the private and public sectors, as independent consultants, and as suppliers. Members connect locally in 130 U.S. chapters and with 30 international partners.

ASTD started in 1943 and in recent years has widened the profession's focus to align learning and performance to organizational results and is a sought-after voice on critical public policy issues. For more information, visit www.astd.org.

List of Figures and Tables

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Contents on the Web

The following materials are available to download from:
  www.pfeiffer.com/go/kapp.
  password: professional

Articles

Basic Games for Teaching Different Types of Content
  Five Elements that Make Games Engaging
  Obstacles to Adoption of Games in Corporate Environments

Worksheet

Simulation/Game Development Worksheet

Foreword

AS I SIT DOWN to write this foreword, I reflect on how many games I encountered in the previous week.

I saw my youngest daughter playing Club Penguin on the Internet, my son playing Mario Super Slugger on the Wii, my oldest daughter playing Zoo Tycoon on a laptop, my sister-in-law tending her Farmville crops on Facebook, a friend playing Angry Birds on her iPhone, a Cancun cab driver explaining how he plays Call of Duty with others from around the globe, and the U.S. Naval War College describing to me their war game to assess their ability to deal with new conflicts that might arise from the climate crisis.

All of this just in the last *seven days*!

And I hesitated to actually list all those games by name, knowing that it will instantly date this book, just as the games I grew up with—Pong, Space Invaders, Zork—instantly date me.

Yes, from casual games to serious games, from smart phones to consoles, from toddlers to retirees, games and gamification are everywhere. Although games themselves are not new—they've been played in the earliest civilizations—we have reached a confluence of technology and design where games have become ubiquitous and seem to have a unique ability to *engage* when we most need it.

In my book, *We* (Wiley, 2011), I explore the roots of the current employee engagement crisis, showing that job satisfaction around the world is at a record low, with stark consequences on business profits and individual health alike. Informed by survey research of over ten million employees in 150 countries, I also reveal what people need to feel engaged at work: growth and advancement, recognition and rewards, a higher goal to pursue, and a

sense of teamwork. These are among the things that well-designed games and gamification efforts excel at.

It is this power of modern, digital games to engage that has caused "gamification" to become somewhat in vogue. Just as many industries benefited from the principles of industrial design, and interface design, and experience design . . . smart industries and businesses will quickly learn and adapt the principles of game design (or game "mechanics"). Game design indeed has broad utility for learning and development, for changing health behaviors, and for motivating at-work behaviors, among other things.

But we should also be cautious, as consultants and gurus treat "gamification" as a personal gold rush and try to add points, rewards, and badges to everything we do. Those things are elements of most games, and among the easier to implement, but those things alone do not a game make. The more challenging and beneficial aspects to gamification include the story, the challenge, the sense of control, decision making, and a sense of mastery—these are the elements of games that are of the most value.

When it comes specifically to learning events, we need to understand that, while we can benefit from the thoughtful application of gamification techniques, not every learning activity has to be a fully fledged game. Learning professionals can add game elements like curiosity, challenge, avatars, distributed practice, or storytelling to the learning we develop. Designers should strive to take the best of games—not the worst like points and badges—and leverage that to create successful engaging programs.

Karl Kapp has written a book that is empirically solid. He shares peer-reviewed research to back up claims, assertions, and ideas. Several meta-analysis studies conclusively show what is successful for game-based learning and what is not. His years of experience as a graduate school professor, consultant to government and

industry, and National Science Foundation investigator enables him to share the most relevant, applicable conclusions.

Yet, this is no dry academic tome; Karl has written the definitive guide to gamification, which itself is accessible and engaging. He brings trends to life and illustrates the principles of gamification through numerous examples from real-world games. Whether he's describing the Cisco "Binary Game," the U.S. Navy's multi-player anti-piracy game, or even the importance of aesthetics in a simple chess piece, Karl captivates the reader and ensures comprehension page after page.

There is no doubt that "gamification" is an important and powerful weapon in the arsenal for learning, marketing, and behavior change of any kind. This book is a valuable guide for all who are trying to understand or adopt these important design principles.

Kevin Kruse

New York Times best-selling author of *We: How to Increase Performance and Profits Through Full Engagement*

Preface

GAMIFICATION IS A BIZARRE word. What does it mean? Why does it matter? How can it be related to serious learning? Questions I find myself discussing with my students and clients all the time. The only people I don't have to explain it to are my kids. They get it. They got it. They are part of it. When my one son gives my other son 10 points for getting him a soda, that's gamification (where those 10 points go and what they are used for, I have no idea). When my son times himself to see how quickly he can rattle off the definitions of economic terms as a study technique, that's gamification. When my son sits down to learn algebra in a first-person game, that's gamification.

On its surface, gamification is simply the use of game mechanics to make learning and instruction more fun. It seems "fake" artificial or like a shortcut. It's not. Underneath the surface is the idea of engagement, story, autonomy, and meaning. Games give experiences meaning, they provide a set of boundaries within a "safe" environment to explore, think and "try things out." Games provide motivation to succeed and reduce the sting of failure. You can always hit the reset button or strive to be in the championship game again next year—only this time you'll win.

Games are the ideal learning environment with their built-in permission to fail, encouragement of out-of-box thinking, and sense of control. The addition of game elements on top of traditional learning environments is a way of leveraging the power of engagement and imagination. In e-learning we need to use games instead of presenting text and multiple-choice questions on an endless parade of screens with little feedback or assessment of knowledge gained. In the classroom, we need gamification to avoid the endless stream of bullets we hurl at trainees in an uninspiring lecture format.

Don't think of gamification as only the use of badges, rewards and points; instead, think of the engaging elements of why people play games—it's not just for the points—its for the sense of engagement, immediate feedback, feeling of accomplishment, and success of striving against a challenge and overcoming it.

This is what learning is about. We learning professionals (academics, teachers, corporate trainers, instructional designers) know gamification; we've done it, we've turned boring content into engaging classroom activities, we've immersed learners in case studies, we've set the bar. Now is not the time to walk away from the concept of gamification; now is the time to take it back to add richer meaning and depth to the term. Let's make gamification mean something to learning and instruction. Let's situate learners in authentic environments in which they can practice their skills and gain immediate feedback on progress and accomplishments, earn recognition for doing well, and feel good for overcoming a challenge. All that sure beats the heck out of answering a multiple-choice question.

This book has a heavy emphasis on creating games for learning and not artificially incentivizing people through external rewards. The real value of the game-based mechanics is to create meaningful learning experiences. This book is based on solid academic research conducted over dozens of years by many different researchers. Conclusions are based on peer-reviewed studies, and key takeaways are direct results of empirical research. My goal was to bring together what is known about learning, games, and instruction and place all that knowledge in one place and to create design guidance for learning professions who want to create impactful experiences for learners.

What's Coming in This Book

This books looks at several aspects of gamification from its definition to examples to determining how to match instructional content to specific game design features. Gamification is a multifaceted concept, and each chapter in the book examines one of the facets.

The first chapter introduces terminology. What is a game? What is gamification? What does that mean to faculty members, college instructors, instructional designers, and other learning and development practitioners? The chapter provides examples of gamification and parses the term into its component elements.

Chapter Two examines the individual elements that make up a game from the rules to the aesthetics and describes how they all contribute to game play. It is important to note that it takes more than just one game element to make a game; the combination of many of these elements makes playing a game engaging.

In Chapter Three, the theories behind the elements of gamification are presented. The chapter covers operant conditioning and the reinforcement schedules, but only as one of many elements that make games engaging. Self-Determination Theory is described and related to games. Also explored are the concepts of distributed practice, social learning theory, achieving the flow state, scaffolding, and the power of episodic memory.

Chapter Four reviews research studies describing the effectiveness of games as well as the effectiveness of specific game elements such as the use of avatars and third-person versus first-person perspective. The goal of the chapter is to provide support to the argument that game-based learning and gamification are effective for changing behavior and creating positive learning outcomes.

The fifth chapter looks at how gamification can be used for learning and problem solving. The chapter explores how games help with hand-eye coordination, how they are good

for young and old learners, and how they have been used to encourage and promote pro-social behavior. The chapter explores how game interfaces and mechanics are being used to solve difficult scientific and geo-political problems.

Chapter Six is a discussion of both the different types of game players and the different types of games that exist. Cooperation, competitive, and the self-expression aspects of games are addressed, as are the different needs of novice, expert, and master-level players.

Chapter Seven presents a framework for developing games that teach higher order thinking skills from predicting outcomes, to synthesizing content to ultimately problem solving. The chapter also presents suggestions to help with the process of developing a game to solve a specific problem.

In Chapter Eight methods are presented for creating game-based learning in the cognitive domains of declarative, conceptual, and procedural knowledge as well as rules-based learning. Also covered are the affective or emotional domain, the psychomotor domain, and the teaching of soft skills like negotiating and leadership.

How does one manage the process of designing and building a game? Chapter Nine addresses those issues by contrasting two project management methods, the ADDIE method and the Scrum method. The chapter also provides an outline that can be used for the creation of a gamification-design document.

The first guest contributor appears in Chapter Ten. Lucas Blair, a game designer at MAYA Design and Ph.D. candidate in modeling and simulation at the University of Central Florida. Lucas carefully outlines a taxonomy for building game reward structures.

The next guest contributor is Nathan Kapp, who wrote Chapter Eleven. Nathan has been playing video games his entire life. He provides an insider's perspective on what

games mean to the upcoming generation, the games he has played, and what he has learned from games and how he has applied that knowledge to other areas of his life. The chapter nicely "validates" the theory and research presented earlier. Nathan provides living proof of the impact of games.

The third guest contributor, providing Chapter Twelve, is Alicia Sanchez, the "Games Czar" of Defense Acquisition University, where she oversees the use of games and simulations in their curriculum. She describes how they have established a games common designed to reinforce concepts that should be known throughout the organization and not aimed at one particular task.

Koreen Olbrish is the final guest. She wrote Chapter Thirteen. In the chapter she outlines how alternative reality games are moving game concepts into the field and out of classrooms. She provides basic definitions and describes how they can augment traditional instruction and learning.

Chapter Fourteen provides two final examples of gamification in action and provides a couple of next step action items to further your research and study on gamification. The best way to experience gamification is first-hand.

The Best Way to Read This Book

This book provides the research-backed recommendations to change how organizations look at games and to provide a method of creating effective learning through gamification. It can be used as a primer or introductory text to introduce the topic of gamification, but it is also designed as a practical field-book to help teams in the midst of gamification projects.

If you are reading this book as a primer, it makes most sense to read the chapters in chronological order. Pause

after each part to ensure you understand the key arguments, research findings, and positions in each chapter, and then move on to the next part.

Another approach is to cover the contents of the book as a team. Divide your team, department, or faculty into reading clubs and read a chapter each week. Then, once a week, the group should get together and discuss the salient and thought-provoking points. Can you implement the takeaways? How can you help the organization design meaningful games for learning? What guidelines should you establish for the gamification of learning in your organization? How can you get this data about the effectiveness of these game elements in the hands of upper management? How can you implement these ideas?

This group approach will spark discussion, provide insightful solutions, and guide you to develop your own methods of applying the ideas and concepts in this book to your own organization or classroom. It will also begin discussions about the future of learning within your organization that may not have occurred otherwise. These conversations, even when slightly off-topic, will be valuable in strengthening your organization in terms of maximizing the use of game-based methods for learning.

If you are in the midst of designing a gamification project, I encourage you to become intimately familiar with the key takeaways at the end of every chapter. Work with your peers on the design team to ensure that everyone understands each of these takeaways and what they mean to the creation of gamified learning and instruction.

Graduate and undergraduate students will particularly find this book of interest as a foundation to building dissertations, pursing lines of research, and as a generation that have grown up playing video games.

Continuing the Discussion

A topic like gamification does not remain static, it is continually evolving as technology and our understanding of how gamificaiton can foster learning and collaboration continue to grow. In an effort to continue the dialogue in real time and to make real progress in helping others I've created a Facebook page for easy collaboration, posting of games and interactions among readers. The page is http://tinyurl.com/gamificationLI.

  Enjoy the book. I hope you have as much fun reading it as I did writing it. I wish you all the best in your quest to bring a gamification to learning and instruction. And have fun doing it!

Karl Kapp

Danville, Pennsylvania

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Thanks also to all the readers of my blog who challenge, inspire, and motivate me to do the best work I can. This includes great conversations about gamification I had on my blog with Kathy Sierra and Sebastian Deterding. Those were