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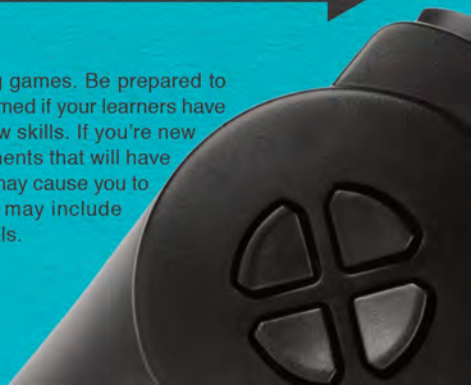
Play to Learn



SHARON BOLLER
and KARL KAPP

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WARNING: This book will cause you to become very good at creating learning games. Be prepared to never look at your role in instructional design the same way again. Don't be alarmed if your learners have their minds blown as they play, cementing new knowledge and cultivating new skills. If you're new to learning games, be aware that this book contains the terminology and elements that will have you designing like a pro. If you've dabbled in learning games before, this book may cause you to perfect your design process with a foolproof nine-step guide. Side effects may include performance boosts, increased productivity, and achievement of business goals.



● **Everything You Need
to Know About Designing
Effective Learning Games**

Play to Learn

**SHARON BOLLER
and KARL KAPP**

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ATD Press is an internationally renowned source of insightful and practical information on talent development, workplace learning, and professional development.

Information and images for the Feed the World and TE Town case studies in chapter 6 are courtesy of The Mosaic Company and TE Connectivity, respectively.

ATD Press
1640 King Street
Alexandria, VA 22314 USA

Ordering information: Books published by ATD Press can be purchased by visiting ATD's website at www.td.org/books or by calling 800.628.2783 or 703.683.8100.

Library of Congress Control Number: 2017930322
ISBN-10: 1-56286-577-3
ISBN-13: 978-1-56286-577-1
e-ISBN: 978-1-56286-772-0

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Printed by Versa Press Inc., East Peoria, IL

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Preface

Mind-blowing.

That was the one-word description a player gave a few years ago when asked to share his reaction to a learning game called *A Paycheck Away*. The feedback perfectly captured the “why” of learning games. Most of us have not heard learners use the adjective *mind-blowing* to describe their reaction to any other sort of learning activity we’ve developed. Clearly, for this learner, the learning game he played had achieved its potential. It gained and kept his attention, fully immersing him in a learning experience.

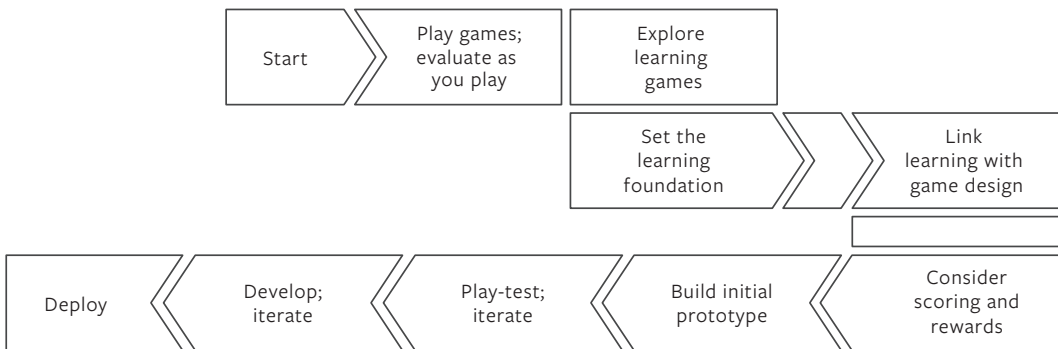
There is a large body of research that shows that games are more effective than lecture-based approaches to learning. In addition, games offer compelling ways to help people learn strategy, resource allocation, and innovative thinking. They can help people understand alternative points of view. They provide an opportunity for each learner to have a personalized learning experience in which the learner can choose to review content, attempt different strategies, experiment, and experience the game differently from co-workers and still reach the same learning outcome. On the more mundane issue of simply remembering key knowledge, such as product facts, industry information, and process steps, learning games can provide critical spacing and repetition of content, which helps cement memory.

If you’re reading this book, you probably already believe that games can be effective learning tools. Your challenge is in execution, and that’s where *Play to Learn* can help. Instructional design and game design are different disciplines. Most instructional designers and training professionals do not possess game design skills or even game literacy, which is knowledge of game lingo and structure. This book will help you systematically acquire game literacy and build learning-game design skills.

The methodology and process we cover in *Play to Learn* is what we use and teach to others in workshops we’ve conducted over the last several years (Figure I-1). As you go through the book, you’ll see that it progresses through the nine steps, devoting a chapter to each one. We show as well as tell, and we provide you with lots of “work on your own” activities to help you build your skills in learning-game design. Chapter 1 introduces you to some basic game lingo, such as what a game is and common game design terminology. Chapters 2 through 5 take you through the first four steps of our process. You’ll learn how

to play and evaluate commercial and learning games, the basic instructional design requirements you need to have in place before you begin designing your game, and the game design components you need to plot out. Chapter 6 provides you with case studies of two learning games, breaking down their instructional design and their game design. Chapters 7 through 11 then take you through the remaining steps in the process, guiding you from your first game prototype through deployment of a learning game. Chapter 12 summarizes the entire experience and how to move forward in creating more learning games.

Figure I-1. The 9-Step Process to Learning-Game Design and Development



Many designers ask the question, “When should I use games for learning?” Armed with the skills you gain in this book, you can shift the conversation to, “Which games should I use for this specific learning situation?” You will have the skills to design and develop games for all types of contexts and situations, from a simple, experiential game to a much more complex digital game or tabletop simulation. You, too, will be able to develop a learning experience that a player describes as “mind-blowing.”

Sharon Boller and Karl Kapp
March 2017

Part 1

Playing Games to Learn About Games

The Basics

In This Chapter

- ✓ What is a game?
- ✓ What is the difference between “play” and a “game”?
- ✓ What game lingo do you need to know?
- ✓ Guru game play opportunity

What Is a Game?

It seems like a simple question: “What is a game?” But when you think about it, there are many variations on what is called a “game”: Simple activities like tic-tac-toe, card games like Go Fish or poker, and board games like Monopoly and Stratego. Mobile games like Angry Birds, and console games like the *Assassin’s Creed* series. Even large-scale, complicated computer-generated game worlds like *World of Warcraft* or *EVE Online*, and live sports games like soccer or lacrosse.

So asking “What is a game?” isn’t so simple.

When you dig deeper, games of all kinds tend to have certain elements in common. The commonalities among different types of games can be studied and used for designing a learning game. Stop for a moment and write down your definition of the term *game*.

The definition of the term *game* is:

How did you do? Did your definition include the concept of fun? Did it include the idea of competition, of winners and losers? Did it include rules or goals? While there may not be a perfect definition that covers all types of games, here is the one we use:

A game is an activity that has a **goal**, a **challenge** (or challenges), and **rules** that guide achievement of the goal; **interactivity** with either other players or the **game environment** (or both); and **feedback mechanisms** that give clear cues as to how well or poorly you are performing. It results in a **quantifiable outcome** (you win or lose, you hit the target, and so on) that usually generates an **emotional reaction** in players.

Let's examine each bolded element to see how it supports the idea of a game.

- **Goal:** One difference between the terms *play* and *game* is the introduction of a goal. If kids are running around at recess, they are playing. However, the moment one child says to another, "Let's race to the big tree," play changes into a game, because a goal has been introduced. Goals provide a clear outcome and a delineation of completion. They are an important element in all types of games, especially learning games.
- **Challenge:** The challenge in a game could be against another player, the game itself, or your own high score from the last time you played. A game without a challenge can be boring, but a game with too much challenge is frustrating. Learning-game designers need to strike a balance between providing a challenge and supporting the players' ability to quickly and easily master the game.
- **Rules:** Rules are the structure that creates the game space and gives all players an equal chance of succeeding. Learning-game designers should strive to create simple, easy-to-understand rules that contribute to the learning outcome of the game.
- **Interactivity:** Good games provide many opportunities for the players to interact with game content, other players, and the rules of the game. Games that do too much "telling" and not enough decision making or interaction quickly become boring. The higher the level of interactivity created within the game, the more engaged the players and the more likely they will learn from the game.
- **Game Environment:** Every learning game is a self-contained space. The game space—the area in which the players play the game—has its own rules, challenges, and social norms. Some people call the game space a "magic circle," because game design typically includes creating constraints in the form of rules that only work within that circle. Consider Pictionary. It would be far easier if players could simply write

the word they are trying to convey instead of drawing a picture of the word. However, the game space does not allow them to write the word; it only allows them to draw a picture. This rule is particular to the game; in most situations outside the Pictionary game space, if you need to explain an object to someone, you can either say the object's name or write it down. The constraint in Pictionary makes the game challenging and creates an environment different from other social spaces.

- **Feedback Mechanisms:** Games are great tools for providing feedback, because players usually receive feedback immediately. In Monopoly, you can see if you are ahead or behind simply by comparing the number of hotels you have with the number other players have. Feedback is usually unambiguous; players typically know where they stand in relation to the outcome and other players. It also lets players continually adjust their own game play and actions. Immediate feedback and constant adjustments are two game elements that make them great tools for learning.
- **Quantifiable Outcome:** The result of a well-designed game is that players know, without a doubt, whether they have won the game and whether the game is over. There is a clear score, a clear leveling up, or a clear winning state that allows everyone to agree that the game has ended. In contrast, play often has no clear end line or finished state. Instead, people get tired or bored and move on to something else. But games have a clear point at which the game is over. In fact, as players move through the game environment and accomplish goals during the game, they are also moving closer to the state where the game ends.
- **Emotional Reaction:** Often games trigger an emotional response in players as they work through the game's challenges or achieve the game's goal. They may experience fun, frustration, excitement, anger, enthusiasm, happiness, or contentment. Learning-game designers should be conscious of the emotions they hope to evoke and make sure they aren't generating unintended ones (such as anger or frustration).

One element is missing from the above definition: competition. While many games have competition, it is not a defining factor because many excellent games require cooperation. Many people's default idea of a game is one person or team competing against another. But games like Forbidden Island and Pandemic require cooperation. And often, in a work environment, the concept of cooperation and teamwork is a better design for a learning game than competition.

Learning the Lingo of Games

Learning certain lingo in the field of game design will help you effectively communicate with your teammates about the game's design because you will have a common language to express ideas. It will also help you communicate with vendors and others in the field who will be using terms and concepts related to game design and development, especially if you create a game that requires help to design and develop. And finally, learning the lingo helps you when reading other game design books or articles, because this terminology is common to game design.

Game Goal

The game goal is the win state. It's the objective of the game. It's any achievement or activity that ends the game. Without a game goal, you'd have no game.

In a running race, for example, the game goal is to be the first one to cross the finish line. In Monopoly, it is to finish with the most property and cash. In Risk, it is to achieve world domination. In a learning game, it might be to sell more than a million dollars of product, successfully navigate a compliance maze, or correctly identify and eliminate incorrect passwords.

Core Dynamic

The core dynamic is what the players must do to achieve the win state or accomplish the goal; it is tightly linked to the game goal. The core dynamic answers the question, "What do I need to do to win?" When you tell someone about a game, you typically describe it in a sentence or two: "In Risk, you try to take over the most territories and achieve world domination." The core dynamic of Risk, therefore, is territory acquisition.

Players' enjoyment of the core dynamic contributes hugely to their evaluation of how engaging the game is to play. People play a game because they like its core dynamic. This is one reason why some people like one type of game and others like another. Some people like the core dynamic of alignment found in games such as Candy Crush, Timeline, or Bejeweled. Others like a core dynamic of outwitting an opponent, such as in chess or Stratego.

Choosing the right core dynamic is critical to the success of the game. Most games have one to two core dynamics. If you are first starting to design learning games, it's easiest to select one core dynamic and design your game around it. As you add dynamics, you add complexity, and the game can become confusing to the players. They will not understand what they are supposed to do to achieve the game goal.

Table 1-1 describes common core dynamics and identifies specific games in which they're used. Any learning game you design will likely use one or more of these dynamics. Some games have only one, while others may use two or more.

Table 1-1. Descriptions and Examples of Core Dynamics

Core Dynamic	Example
Race to the finish: Get to the finish before anyone else or time runs out.	Life, Candy Land, Mario Kart
Territory acquisition: Acquire or take land, typically to create an empire or own the most of something.	Risk, Catan, Monopoly
Exploration: Wander around and check out various aspects of your game world to see if you can find things of value.	<i>Minecraft, Legend of Zelda</i>
Collecting: Find and acquire specified objects.	Trivial Pursuit, Checkers
Rescue or escape: Get out of a situation or place.	<i>City of Heroes</i> , Forbidden Island, Capture the Flag
Alignment: Arrange game pieces in a particular order.	Tic-Tac-Toe, Connect 4
Forbidden act: Get fellow players to break the rules, make a wrong move, or do something they shouldn't.	Twister, Operation, Great Divide
Construct or build: Create something using specified resources.	<i>The Sims, Roller Coaster Tycoon, Jenga</i>
Outwit: Use specialized knowledge or skills to defeat an opponent.	Stratego, Chess
Solution: Solve a problem or puzzle.	SpellTower, <i>The Room</i> , Portal, Clue
Matching: Recognize things that are alike or that fit a specific description; create pairs or groupings.	Spot It!, Guess Who, Go Fish!

Game Mechanics

Game mechanics are the rules. In some games, the rules are specifically for the players. In other games, mostly online games, there are rules that govern the game system. The game mechanics define how people achieve the game goal.

Game mechanics interact to determine the complexity and flow of the game. A mechanic might be how turns are taken, how players move pieces across the game board, or how much damage players can take before they lose a life.

Mechanics are important in players' perception of the game. A game may have a great game goal but crummy rules, so the game won't be engaging. When you play a game, evaluate how the rules contribute to your engagement with the game and how those rules are structured to make it harder or easier to accomplish the game goal.

Game Elements

Game elements are the features or components that enhance the game play experience and help immerse the players in the game. Elements can range from the visual aesthetics of the game to the weight of the pieces or the arrangement of the cards. The consistency and alignment of the game elements help create its theme and “look and feel.” Table 1-2 lists and defines common game elements.

Table 1-2. Common Game Elements

Element
Aesthetics: The visual look of the game and the various game parts.
Chance: Elements you include to equalize the playing experience, add an element of surprise, or derail players. Chance can be useful; it can often be unintentional.
Competition: Players oppose one another, with one player attempting to gain the advantage over another.
Conflict: Something the player has to overcome; something to be conquered or to create a sense of urgency.
Cooperation: Players work together to achieve a goal, or at least manage a challenge within the game.
Levels: A game can be organized into levels of play to allow players to go from novice to mastery or to allow players from different experience levels to play the same game. Levels typically indicate a progression of difficulty through a game.
Resources: Assets such as money or objects that help a player gain an advantage. Typically, resources can be acquired or lost during a game, with some resources allocated to a player at the start.
Rewards: Achievements players earn based on performance or completion.
Story: A narrative that weaves throughout an entire game or sets up the reason you are playing the game and elaborates on the theme.
Strategy: Elements you include to force the player to analyze and consider various options. It gives the player high control over the game’s outcome.
Theme: A backdrop for a game. A theme might be “surviving in space,” “fighting zombies,” or “becoming a gunslinger in the Wild West.”
Time: In a game, time can be compressed (something that would take hours or days can take minutes), serve as a resource that players can gain and lose, or be a complete nonfactor. It can also be integrated into the game goal, with players racing against time to win the game.

An Example: Monopoly

Let's take a quick look at the game Monopoly and map it to the lingo just covered (Table 1-3).

Table 1-3. Definitions of Game Lingo

Term	Monopoly Example
Game Goal	<ul style="list-style-type: none"> ● Finish the game with the most property and cash
Core Dynamics	<ul style="list-style-type: none"> ● Collection (you collect properties) ● Territory acquisition (you form monopolies)
Game Mechanics (a sample of the rules)	<ul style="list-style-type: none"> ● You collect \$200 every time you pass Go. ● If you land on a space owned by someone else, you pay that player rent. ● If your opponent fails to ask you for the rent before the next player rolls the dice, you do not have to pay rent. ● You must own all properties within a color grouping before you can purchase houses. ● You must purchase four houses before you can purchase a hotel.
Game Elements	<ul style="list-style-type: none"> ● Chance: Dice rolls determine what space you land on, which, in turn, affects what you can buy or what you might have to pay out in rent. You can draw Chance or Community Chest cards. Depending on what card you draw, you may have a good or bad event happen. ● Competition: You are working to defeat your opponents. ● Cooperation: You can work out deals with your competitors to acquire property or make trades. ● Strategy: Most players develop a preferred strategy for winning. Some opt to acquire utilities and railroads. Others want to occupy Boardwalk and Park Place. Still others negotiate special terms in exchange for trading away a specific property. ● Aesthetics: The visual look of the board has inspired a wide range of spin-offs, such as college-themed versions of the game. ● Conflict: You often get into head-to-head conflicts with other players. Many a game has ended in anger as people's frustrations with one another supersede any enjoyment. ● Time: Monopoly's instructions offer a timed version of the game, in which players compete for 45 minutes to see who's richest at the end of the period.

Guru Game Play Opportunity

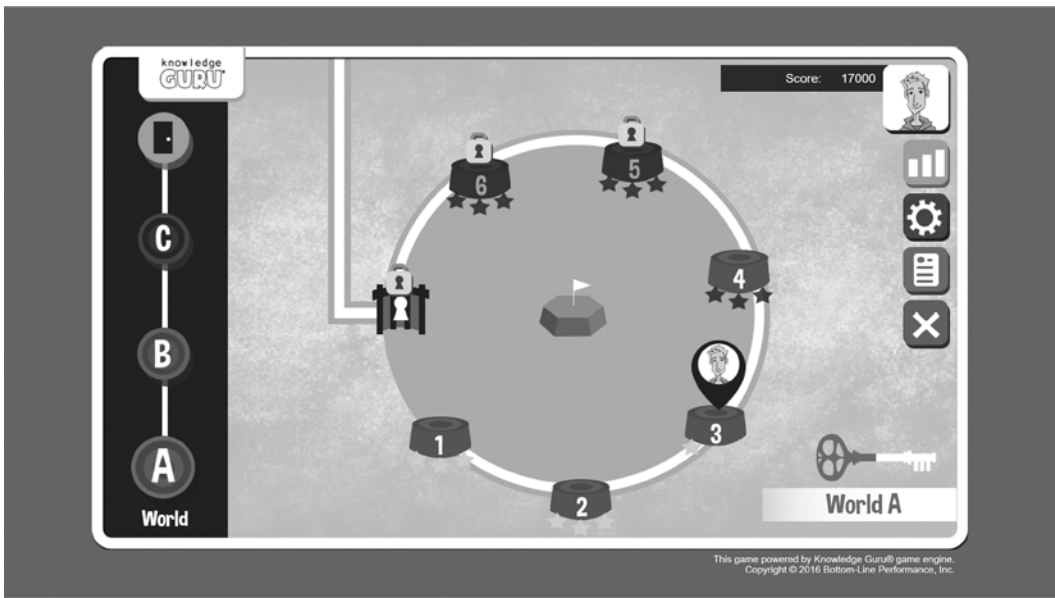
To help reinforce the information and concepts in this book, we have created an online game for you to play called Game Design Guru. Figure 1-1 is an image from the game.

Throughout this book, you'll be directed to play different levels of the game; the levels correspond with certain chapters. They provide a great opportunity to reinforce your knowledge while seeing an example of a learning game and how it gets incorporated into a larger learning endeavor (such as reading this book and completing the other activities within it).

The first level is about the game lingo discussed in this chapter. Create a game account at www.theknowledgeguru.com/ATDGameDesignGuru and start playing to learn!

If you prefer to play on your phone, you can. However, we recommend you first create a game account using your laptop or tablet. Then download the phone app for either Android or iOS by searching for “KGuru Quest,” a mobile version of the game.

Figure 1-1. Screenshot From Game Design Guru



Wrap-Up

You are now armed with the basics you need to get started on your game design journey. The next chapter introduces the steps involved in becoming a learning-game designer. (Spoiler alert: One of the first things you need to do to start the game design process is play lots of games!)

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Acknowledgments

Any book requires significant support from numerous people. *Play to Learn* is a truly joint effort, but we each brought unique experiences to it. We each have people we need to thank.

From Sharon

My spouse has to come first. Thank you, Kirk, for being supportive and positive and tolerating my stress when the deadline loomed, as well as for not complaining each time I bring home a pile of new games I want to play. Thanks to Steve Boller, Beth Boller, Kaitlyn Boller, and Nick Kirshner for always being willing to play a game.

On the professional side, I want to acknowledge all my teammates at Bottom-Line Performance (BLP) as well as some of our clients who let me share the games we created on their behalf. The work of these BLPers is represented within these pages. While I am fortunate to be the product owner for the Knowledge Guru platform and its suite of game-based apps, this platform is supported by a talented team of people who take and augment my ideas and produce amazing things from them. It's one thing to have an idea; it's entirely another for a team to take that idea and produce something from it. Brandon Penticuff, Corey Callahan, Jackie Crofts, and Bratt Conway are that team and they are amazing.

On the custom game development side, every game shown was a team effort involving many people. TE Town was produced by a large and talented cast of people. Laura Fletcher, Brandon Penticuff, Jackie Crofts, Jackie Lutzke, and Corey Callahan all played big roles. On the client side, a huge thank you goes to Diane Sweeney for working to secure permission for us to share TE Town in this book. I also want to thank Josh Kovalich, who has been an awesome project manager on TE's side, guiding us and getting us everything we needed. They both had a strong vision for how a game-based solution could benefit TE Connectivity, and they allowed us to partner with them in turning that vision into a reality.

A Paycheck Away was a labor of love for those involved because it was pro-bono work. Kristen Hewett, Steve Boller, and Matt Kroeger all collaborated with me to produce this game. Lori Casson and Cheryl Herzog of Dayspring Center in Indianapolis used their knowledge of homelessness and people who have been Dayspring clients to help us create a

compelling game for change. Kristen, Matt, and Steve have also been faithful game masters, volunteering their time on numerous different occasions when Dayspring has hosted the game.

Feed the World was produced for The Mosaic Company. A special thank you goes to Andy McGuire for working with me to obtain permission to use this game as an example of good learning game design within the pages of this book. Thanks also to Linda Anhalt, who was the project manager on the employee onboarding and compliance training project that included this game. The team members who helped create this game included Jennifer Bertram, Sarah Owens, Jackie Lutzke, Jackie Crofts, and Corey Callahan.

Thanks to Dow AgroSciences, especially Marc Fisher and Karla Simpson, for granting permission to use the game image from Formulation Type Matters as well as information about the game. Thanks to Roche Molecular Systems for granting permission to share Viropolis game information and to Joni Zurawinski for helping us secure this permission.

Thanks goes to every BLPer who has played a game, and who has tolerated my enthusiasm for games and tendency to try to turn any activity into one.

Finally, thank you, Karl. You've been a terrific partner in writing a book and in facilitating workshops on games. I've said before that we are Oscar and Felix, and that works just great. From the moment we met in 2012, you've been a gracious partner and become a wonderful friend. I'd make a game with you any day.

From Karl

The process of writing is simultaneously an act of recording and discovery. As I write, I learn. I'd like to thank the following minds for contributing to my gaining of knowledge, starting with family. To my wife, Nancy, who is nothing short of wonderful; my two boys (Nate and Nick), whom I love and cherish; my mother, who taught me to love learning; and my late father, who taught me the value of hard work.

I'd like to thank the folks in Bloomsburg University's Department of Instructional Technology. I couldn't ask to work with better faculty and staff at any university. Special thanks to the students in the program, and to students everywhere whom I've had the honor and privilege of teaching and who have taught me so much. Teaching is a wonderful two-way street.

Special thanks to Bonni Scepkowski, who is always so helpful; Jim Kiggins, who makes *Zombies Sales Apocalypse* and my visions of learning games a reality; and Justin Brusino, who helped to bring this book to life, along with Caroline Coppel and Jack Harlow.

Finally, a huge acknowledgment and thank you to Sharon Boller! Her love of games, enthusiasm for the industry, sense of organization, and willingness to harness my tangents makes her an awesome co-author and a wonderful person to work with for game development and workshop creation. Thanks, Sharon, it is always great working with you.

About the Authors



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Sharon Boller is president of Bottom-Line Performance (BLP), a company she founded in 1995, which is currently in its second year on the *Inc.* Fastest 5000 Growing Companies list. She is the product owner of BLP's award-winning Knowledge Guru platform, which enables users to author and distribute game-based learning solutions. This platform earned the coveted Brandon Hall Gold award for best innovation in gaming and technology in 2014. Solutions generated from it have earned corporate partners Gold and Silver awards. In addition, BLP has earned numerous

other awards for custom game-based solutions, including Horizon Awards, LTEN Awards, and Brandon Hall Awards.

Sharon partners with Karl Kapp in presenting the popular workshop Play to Learn: Designing Effective Learning Games for ATD LearnNow and for the eLearning Guild. She is also the author of *Teamwork Training*, and she wrote one of the chapters in Karl's *The Gamification of Learning and Instruction Fieldbook*. Additionally, she has written numerous articles, blog posts, and whitepapers on game-based learning, learning science, and instructional design.

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Karl Kapp

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Karl is passionate about sharing his knowledge and teaching others. To that end, he has authored or co-authored half a dozen books, including *The Gamification of Learning and Instruction* and *The Gamification of Learning and Instruction Fieldbook*. He has also authored several Lynda.com courses, including "Gamification of Learning" and "How to Increase Learner Engagement." Follow his widely read blog at <http://karlkapp.com/kapp-notes> or on Twitter @kkapp.

Sharon and Karl have traveled the country conducting private and public workshops based on the ideas and techniques within this book for many different organizations. Together they have helped many people create engaging and effective learning games.

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