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Why You Should Care about the Gamer's Brain

Have you ever wondered how magicians trick you? How they seem to defy the rules of physics or read your mind? I'm not going to give away magicians' secrets but, in reality, magicians and mentalists have a good understanding of human cognition, such as perception, attention, and memory. They learn to take advantage of brain loopholes, and when they master certain practices (such as "misdirection"—whereby the attention of the audience is distracted to deceive their senses), they succeed in tricking us (Kuhn and Martinez 2012). For me, a video game is also a type of magic: When it's done well, players suspend their disbelief, and they enter a state of flow. Understanding the gamer's brain will provide you with tools and guidelines to help you craft the magical experience you intend for your audience. And it is an even more important tool to master today as video games represent an increasingly growing competitive market.

In 2015, the revenues from the video game industry reached a whopping $91 billion worldwide and $23.5 billion in the United States alone (according to the Essential Facts 2016 report from the Entertainment Software Association). Although these numbers are encouraging, they are hiding a harsh truth: Making good video games that are successful is actually very hard. There are thousands of games that are now easily, in some cases freely, accessible with a click (or a tap on a touchscreen), and the competition is fie ce. The video game industry is volatile.

Video game studios, including established ones, are regularly hit with closures and layoffs. Small indie projects as well as AAA projects with large development budgets fail—even those made by industry veterans with considerable marketing and publishing support. The game industry, in the business of manufacturing fun, often struggles to accomplish its goal. Furthermore, even the games that are successful on their release may not sustain their audience's engagement over time.

This book is designed to provide you with an overview of how to identify the ingredients that contribute to the enduring magic of video games and the most common barriers to enjoyment and engagement. Although no recipe for success currently exists (and probably never will), identifying the ingredients and barriers drawn from scientific knowledge and game development best practices should help you increase the likelihood that your game will be more successful and enjoyable. To attain these goals, you need some knowledge and a methodology. The knowledge comes from neuroscience, which pertains to understanding how the brain perceives and processes information as well as retains it. The methodology comes from the user experience (UX) discipline, which offers guidelines and a procedure. UX and neuroscience combined will help you make the best decisions for your game faster and remain aware of the trade-offs you need to make to achieve your goal. It will help you stay true to your design and artistic goals and offer the game experience you intend for your audience. It will also hopefully help you meet your business goals, allowing you to sustain your passion and providing you with enough funds to keep making magic.

Anticipating how players will understand and interact with your game is very important. It's not an easy task, but it is somehow easier than to acknowledge another very important element: your own biases as a human being and a developer. We humans like to believe that we mostly make decisions based on logic and rational analysis. However, numerous studies in psychology, as well as behavioral economics, have shown that the brain can actually be quite irrational and that our decisions are heavily influenced by many biases (see, e.g., Ariely 2008; Kahneman 2011). Creating and shipping a game is all about making countless decisions. As a game developer, this raises difficulties that you must take into account if you and your team want to make the right decisions all throughout the development process and ultimately achieve your goals. This is why you need to understand the gamer's brain—and your own—in order to increase the likelihood of shipping the game you intended to create while also giving it the best chance to succeed.

1.1 Disclaimer: The "Neuro-Hype" Trap

There is a relatively new and increasing interest in the use of scientific knowledge and methodology in the video game industry—particularly related to neuroscience. This can be seen as a reflection of a broader public and business interest in anything using the word "brain" or the prefix "neuro" (such as "neuromarketing" or "neuroeconomics"). Articles allegedly explaining "your brain on dopamine,"

"how to rewire your brain for success," or "the role of oxytocin in persuasion" flood our news and social media feeds. Let me put it bluntly: Most of the clickbait neuro-articles that are circulating nowadays are at worst outright false and at best a gross simplification of how the brain—a very complex and fascinating organ—works (so much so, in fact, that neuroscientists consider these articles to be "neurotrash," "neurobullshit," or "neurobollocks," depending on how exasperated they are with seeing their complex fi ld being oversimplifi d to sell ad space or products that are supposedly enhanced by "brain knowledge"). The reason why these clickbait articles and companies have been invading our lives recently is because their narrative works. Who doesn't want to know the simple magic trick that will improve our lives, accomplish our endeavors, or run our businesses better? This phenomenon was not born with the neuroscience hype though. For example, who can resist the "five secret foods you need to start—or stop—eating to lose 20 pounds in two weeks"? The sad truth, however, is that there is no magic pill that can make you lose weight. You need to pay attention to what you eat every day and exercise regularly. This is what science tells us about losing weight. It involves hard work, sweat, and sacrifices. And even then, depending on how lucky you were in the DNA and environment lottery, you could still have additional difficulty losing weight. You have to admit that this narrative is far less compelling than the clickbait smoke-and-mirrors one! Often, we do not like the more complex explanation, or we choose not to believe it because it implies more eff rt. We prefer to fool ourselves with inefficient but more seducing solutions. The same rule applies to neuroscience. If you do not want to be fooled or fool yourself, you have to remember that our brain is biased, emotional, irrational, and yet it is extremely complex. To paraphrase professor of psychology Steven Pinker in his book, *How the Mind Works* (1997), the problems that our brains are solving as we make it through our day-to-day lives are far more challenging than sending humans to the moon or sequencing our genome. So, as seducing as it may be, do not believe the hype—especially when it promises you a lot with little to no eff rts; that is, unless you prefer to comfort yourself by believing in convenient lies, but if you did you would have probably stopped reading this book already.

The same is true for making games. There is no magic pill you can swallow, nor is there any known long-lasting recipe for success, especially if you are trying to innovate. Analyzing what made a game or a company successful in hindsight is always much easier than predicting which game will be successful, which one will fail, and which one will become the new *Minecraft* (originally published by Mojang) or *Pokémon Go* (Niantic) phenomenon. This book will not try to convince you that I have a magic wand that will solve all your development problems. However, it will give you some quality and time-tested ingredients that will help you make your own successful recipe, if you are ready to put in the eff rt it will take (and the pain, too, because analyzing the game you are lovingly crafting will be painful). Still up for the challenge?

Since you are still reading, I will now admit that I used the terms "neuroscience" and "brain" in the title of this book to surf on the neuro-trend. I did so only

to grab your attention so I can deliver sound scientific knowledge that can help you develop your game more efficiently, while also helping you detect and ignore the neuro-nonsense trying to seduce you. We have about 100 billion neurons, each of which can be connected up to 10,000 of other neurons. That makes a lot of synaptic connections, and we have yet to clearly understand how neural circuits impact our behavior or our emotion—not to mention the influence of hormones and neurotransmitters (chemical messengers transmitting signals between neurons), for example. Neuroscience, the study of the nervous system, is a very complex discipline. Most of the things I will talk about in this book actually have more to do with "cognitive science," the discipline that studies mental processes such as perception, memory, attention, learning, reasoning, and problem-solving. Cognitive science knowledge is directly applicable to designing games because all these mental processes are involved as players are playing these games. User experience, the discipline concerned with the experience users are having overall as they interact with a product or a game, relies heavily on cognitive science knowledge.

1.2 What This Book Is about and Who It Is for

Discovering a video game, learning about it, mastering it, enjoying it: It all happens in the brain. As a game developer, you can achieve your design goals—as well as your business goals—more efficiently by understanding the brain's basic mechanisms, which are also the foundation of UX principles. This book is not about telling you how to design a game, hampering your creativity, or dumbing down your game (see the main UX misconceptions in Chapter 10), it is about helping you achieve your objectives faster by understanding the mechanisms at work when someone interacts with your game. Part of the content of this book comes from my background in cognitive psychology (Part I) and part comes from my experience working with development teams at Ubisoft, LucasArts, and Epic Games (Part II).

Overall, this book is an introduction to game user experience and cognitive science as applied to video games and is accessible to anyone interested in these topics; it is *not* a specialized handbook dedicated to UX experts. This book is intended for a broad professional and student game developer audience. Part I is even appropriate for anyone interested in how the brain works as related to playing video games. Therefore, all disciplines should be able to find some useful information. However, creative directors, game directors, designers (game designers, user interface [UI] designers, etc.), programmers (mostly gameplay and UI programmers), and artists should probably be the most concerned audience because the content of this book is more directly applicable to their everyday challenges. Professional game UX practitioners (interaction designers, user researchers, UX managers, etc.) should already know many of the concepts tackled in this book, although I do hope it will provide them with some good reminders, as well as tips to develop UX maturity in a studio. The content of this book should also be valuable to UX practitioners not familiar with the game industry that are interested in learning about it. Upper management, producers,

and support teams overall (quality assurance [QA], analytics, marketing, business intelligence, etc.) should gain some perspective regarding the importance of considering user experience in shipping a more engaging game faster. Lastly, the main purpose of this book is not to deep dive into each of the subjects tackled, it is mostly to provide a thorough overview about game user experience in order to facilitate collaboration and communication across the whole studio. Along the way, I'm also hoping to be a good advocate for players.

This book is organized in two parts. Part I (Chapters 2 through 9) focuses on our current understanding of the brain and on cognitive science findings, while Part II (Chapters 10 through 17) focuses on the user experience mindset and practice and how to implement this in game development, which constitutes a UX framework for video games. We will discuss perception (Chapter 3), memory (Chapter 4), attention (Chapter 5), motivation (Chapter 6), emotion (Chapter 7), and learning principles (Chapter 8), which make up the main knowledge you need to have in order to understand how the brain works, what our human capabilities and limitations are, and what this implies when designing a game. Chapter 9 will offer a takeaway about the gamer's brain. In Part II, we will start by giving an overview of game user experience (Chapter 10), discussing its history, debunking the main misconceptions, and outlining a definition. To offer a compelling user experience, two components are critical: "usability," or ease of use of a product (Chapter 11), and "engage-ability," or how engaging the game is (Chapter 12). For each component, we will discuss the main pillars that can make a game both usable and engaging. Chapter 13 will discuss user experience through the lens of design thinking. Chapter 14 will describe the main tool used to measure and improve user experience: user research. In Chapter 15, another tool for user experience, analytics, will be touched on. Chapter 16 proposes some tips for building up a UX strategy in a studio, and we will conclude with key takeaways, overall tips, and some thoughts about educational video games and "gamification" in Chapter 17.

Throughout this book, I will use many examples from commercial games to illustrate a best practice or a UX issue. All the games mentioned are those that I have either worked on or have played extensively because I really enjoyed them. So please note that, when I'm highlighting a UX issue with one of these games, I am certainly not making a value judgment. I am well aware that making games is hard and that no game offe s perfect user experience when considering UX best practices.