



THE GAMER'S BRAIN: HOW NEUROSCIENCE AND UX CAN IMPACT VIDEO GAME DESIGN¹

HODENT, C.: *The Gamer's Brain: How Neuroscience and UX Can Impact Video Game Design*. Boca Raton : CRC Press, Taylor & Francis Group, 2018. 250 p. ISBN 978-1-498-77550-2.

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Hodent Celia is a consultant and a leader in the application of user experience and psychology in video game design and in the development of UX strategy and process in game studios. She is also the founder and curator of the Gam UX Summit, which was launched in Durham, NY, in May 2016, hosted by Epic Games. She has worked on many projects across multiple platforms (Pc, console, mobile, and VR) including Tom Clancy's Rainbow Six franchise, Star Wars, Paragon, Fortnite and Spyjinx. Her main goal of interest is to share knowledge and experiences about how psychology can help offer a better experience for players, in the most concrete and applicable way possible. Offering a better UX also means making a video game (or other products or services) more likely to be successful and reach business goals.² Nowadays, she is a freelancer.

The title of the book suggests an invaluable overview of the human's brain and UX neuroscience. The book is divided into two parts: part I. *Understand the brain* focuses on the current understanding of the brain and on cognitive findings, while part II. *A UX Framework for Video Games* focuses on the user experience mindset and practice and how to implement this in game development. At the beginning, before the first part, is an introduction written by Brenda Romero (Game Designer, Ireland).

In the first part entitled *Understand the Brain*, the author explains and describes general information about the human brain. The first part consists of nine chapters. *Chapter one* is the description of what the book is about and who it is intended for. Moreover, some interesting data are presented here, such as what revenues were in 2015. *Chapter two* really exactly explains the five different myths about how much of our brain we actually use if video games rewire our brain. The author refuses this information and brings exact scientific explanations. She describes cognitive biases and explains how the brain works. *Chapter three* is dedicated to perception. In this part, the Gestalt laws of perception, figure/ground principle, multistability, closure principle, symmetry, similarity and proximity can be found. The specific last example of perception is explaining the Weber-Fechner law with a graphic illustration. *Chapter four* provides findings about memory and how memory works, i.e. how the human brain remembers something (passwords, emails, etc.). The detailed explanations of short-term, long-term, work and sensory memory are given and the author uses interesting characteristic statements. In the penultimate part of the chapter, a reader learns about the limitations of human memory, e.g. how many percent of the content we forget in twenty minutes, after one day etc. In the last part, the attention is focused on the spacing ef-

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2 Remark by the author: More information about Celia's experiences can be found on her blog: HODENT, C.: *Upcoming Game UX Masterclasses: San Diego & Paris*. Released on 13th August 2018. [online]. [2018-11-21]. Available at: <<https://celiahodent.com>>.

fect when teaching two features (we read in this regard how Nintendo games or super Mario Bros. are often efficient at introducing new mechanics while consolidating a previously taught mechanic, until both can be combined and another mechanic or a feature is being introduced). Chapter five analyses the term 'attention', meaning how our senses are continuously invaded by multiple inputs from the environment. The terms 'active' and 'passive' attention are explained here, and also into which categories the attention can be divided.

Chapter six brings facts about motivation and the author points out that without motivation there can be no behaviour, no action, and that actually everyone needs to be motivated. Furthermore, she analyses environmental-shaped motivation, reveals that many things we do not want to do are actually done by us anyway etc..., and explains different types of intermittent rewards with graphs. Then, personality and individual needs follow and a description of traits using the Big Five Personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) is given. The next *Chapter seven* is focused on emotion. Here we can find the results of a research comparison between American and Japanese participants in a study aimed at watching stress-inducing films, an explanation why emotion can exist without cognition, and the relationship between emotion and cognition. *Chapter eight* analyses learning principles. Some books on behavioural psychology principles by Pavlov, Skinners and Thorndike are quoted here. Finally, the last *Chapter nine* offers a summary of the first part of the book. It contains information about neurons, why neural networks are separated into independent modules etc. Actually, each chapter from the first part of the book is mentioned here.

The second part named *A UX Framework for Video Games* contains chapters such as Game User research, Game analytics and UX strategy, and many more. This part is divided into eight chapters including concluding remarks. *Chapter ten* provides a more or less general overview of game user experience. This chapter is focused on the description of the history of user experience – what UX means, why the human is at the centre of the design process etc. In the middle of the chapter, the statement made by Kim Libreri (Chief Technology Officer of Epic Games) is given. He states that UX gives to companies an unbiased, scientific view on how consumers are reacting to its product – the game. He recommends every company to carry out UX analyses, UX testing and UX feedback. As Libreri says: "Nobody wants to deliberately produce a title that misses the mark" (p. 102). In the last part of the chapter, some definitions of UX – user experiences can be found. The following *Chapter eleven* entitled 'Usability' brings an overview of reasons why it so important to spend time on making a game or software usable. According to the author, "usability is about considering the ability of the system image to clearly convey information about what the system means and how it can be used" (p. 109). The author mentions the ten usability heuristics: visibility of system status; match between the system and the real world; user control and freedom; consistency and standards; error prevention; recognition rather than recall; flexibility and efficiency of use; aesthetic and minimalist design; help users recognize, diagnose, and recover from errors; help and documentation. The following subchapter describes the seven usability pillars for game UX. The pillars are as follows: Signs and feedback – it informs the player of the system state, such as the avatar's level of health as represented by a green bar or red hearts on the HUD. The next pillar is clarity. Actually, clarity pertains to the player's ability to understand all the signs and feedback in a game in terms of their perceptibility. The author explains here why clarity is important, why to use a boring classic font rather than artsy font that is difficult to read, how to improve the clarity of the game interface – elements that are close to one another will be interpreted as belonging to the same group; the following pillar states that form follows function. Furthermore, consistency means that "overall conventions in a video game must be consistent" (p. 125). In terms of consistency in controls, it is very important especially because learning the movements one's hand or finger needs to do in order to control the game heavily impacts on implicit memory (p. 126). The three remaining pillars are minimum workload, error prevention and error recovery and flexibility.

Chapter twelve analyses the phenomenon of engage-ability. This chapter provides an overview of three engage-ability pillars for Game UX and the game flow model from Sweetser and Wyeth is analysed here. They recognize "that player enjoyment, the most important goal for video games, had similarities with the concept of flow, which outlines what makes experiences enjoyable and people happy" (p. 136). The following subchapter deals with human motivation that is the motor to satisfy our drives, needs and desires. A part of the chapter is devoted to motivation and serious games, where the author presents readers with the fact that serious games are usually not played for the pleasure of the activity itself but to gain benefits. Each benefit could be different in every serious game. Based on the perspective of self-determination theory, "a game should aim to satisfy the basic psychological needs of competence, autonomy, and relatedness to be engaging" (p. 138). The above mentioned three most important ways to satisfy players' need for motivation are described in more detail. The author points out that "if you have strong power motives, you might design a game that is highly competitive, therefore targeting players with strong power drives while alienating others" (p. 152). The pictures in the chapter try to make readers better understand the author's statements. *Chapter thirteen* analyses design thinking. The chapter is focused on strategies applied to build the design. In the next section of the chapter, John Ballantyne (Oculus Story Studios) gives an interesting example of a UX design challenge in virtual reality. *Chapter fourteen* entitled *Game User Research* is dedicated to scientific methods and user research methodologies and tools. As the author states, the main role of user research is to evaluate a game in terms of its ease of use and its propensity to engage players (p. 185). The author describes some of the experiments in the field of game research focused on players. The last part of the chapter discusses personas – fictional players who will represent the core audience for the game. Actually, this method is an excellent start for having a solid UX strategy.

Chapter fifteen, focused on game analytics, is about game data. Game studios use telemetry (i.e. gathering data remotely) which is a tool to collect anything possible about players' behaviour and what they are really doing once the game is live. The author explains the important role of user experience managers in building bridges among analytics. One subchapter is devoted to the wonders and dangers of telemetry and that 'big data' has become a buzzword nowadays. What is most important is to analyse data and seek improvement. It is worth pointing out that just having terabytes of data does not automatically mean a solution to improve something in a game. *Chapter sixteen* defines UX strategy, and explains the brain's general concepts and skills an individual needs to acquire to get into game development and land a job. The chapter further deals with UX in the production pipeline, and with conception and preproduction. There is an illustration of the Keikendo maturity model integrated in the text that offers a very usable visualization of the different maturity stages, which is helpful when discussing UX strategy with upper management – it clearly explains the benefits and barriers at each level and how to overcome the latter (p. 214). The last chapter of the book represents *Concluding remarks*. As the author herself points out, "the focus of this book is to identify the most impactful ingredients contributing to the success of a video game" (p. 219). One part of the chapter brings more information about serious games and gamification, e.g. how to transfer and make game-based learning truly educational, e.g. by putting cute animations. The author suggests that serious games should always be considered for the playful learning experience they provide.

This book is designed for students, game developers, academics, journalists, and other professionals, it describes processes and provides experiences with UX and neuroscience. Insights from this book could be helpful when preparing a unique gaming recipe for everyone and useful recommendations about UX strategy, game analytics etc. can be found here.

BIBLIOGRAPHY

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