

tive process. Using the notion of the *auteur* in filmmaking, he points to the role that the mythologies built up around certain game creators have played in the cultural imaginary surrounding game creation. Fourth, he suggests that we think of game creation as an analytical process in which the game creator conceives of and tests hypotheses about how a tool's affordances will implement game ideas. Werning calls for tools that incentivize experimentation with the affordances of the tool to inspire the imagination. Finally, Werning suggests that we think of game creation as a communicative process in which game creators are in dialogue with their development tools and through which game creators can communicate novel ideas to game players. The last section of the chapter identifies game distribution methods as an area for future cultural studies research.

If you are looking for a book with practical instruction, tips, and advice about game creation, this probably is not the book for you (although there are many useful game creation tools described, which had me constantly looking things up). On the other hand, as a cultural studies text, *Making Games* is thought provoking, and the focus on tool use will get you thinking about game creation in new ways.

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How Pac-Man Eats, Software Studies

Noah Wardrip-Fruin

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bibliography and index. 384 pp. \$35, paper. ISBN 9780262044653

Exploring the connections between the development and design of video games and their cultural capital within a world that often considers them merely as entertainment is a growing area of game studies research. This is the focus of Noah Wardrip-Fruin's *How Pac-Man Eats*. The overall argument in *How Pac-Man Eats* is to name and explore the foundational elements of video games as meaning-producing structures on which other aspects of video games are built. Wardrip-Fruin argues that to have a richer understanding of how video games produce meaning for players, we must focus on how video games are designed at a basic level, which he defines as operational logics. These operational logics enable the act of play to commence by providing the ground on which playable models, aesthetics, and potential narratives are built. Operational logics are the elements of a game space in which both the system of the game and the communication function of the game work together. It is the relationship and negotiation between the two that form the foundations of the play experience.

The book is laid out into two parts, each part focusing on differing but complementary aspects. Part 1 focuses on defining operational logics and associated playable models. Wardrip-Fruin explores these logics and models via a number of examples ranging from larger AAA games to small indie and art game examples. Part 2 focuses on using operational logics as the framework thinking about play and making meaning from a game experi-

ence. Wardrip-Fruin uses historical timelines and specific games to examine this framework.

How Pac-Man Eats is well researched and straightforward, which should appeal to readers from a variety of disciplines and with different research interests. Wardrip-Fruin provides a different perspective on game design by using operational logics and playable models. Works such as Ian Bogost's *Persuasive Games*, Mary Flanagan's *Critical Game Design*, and Bonnie Ruberg's *Video Games Have Always Been Queer* help him explore how meaning is made from existing frameworks such as procedures, mechanics, representations, and even queer theory, Wardrip-Fruin takes his analysis down even further to the game space underneath these elements. Operational logics are the game structures that other game design elements use to make meaning and therefore need more research using Wardrip-Fruin's suggested analytical framework. Wardrip-Fruin structures his definitions and connections of the meaning-making process of operational logics and their associated play models in such a way that their meanings are clear and backed up with several game examples to illustrate their use and impact.

One especially insightful area of analysis in *How Pac-Man Eats* is Wardrip-Fruin's examination of agency in relation to operational logics and playable models. Building on his previous research, and re-examining Janet Murray's influential work *Hamlet on the Holodeck*, Wardrip-Fruin argues for an updated understanding of agency in video games based on the use of operational logics (or lack of available ones at the moment). Agency in gaming

is absent or very constrained, and this is accomplished by the use of operational logics and playable models that are available to game designers. This analysis and perspective can change the meaning making of many arguments relating to some of the higher-level elements that Wardrip-Fruin bases on operational logics.

The analytical framework described within *How Pac-Man Eats* is an impressive feat that bridges the gap between the computational media product of which video games are structurally made and their larger cultural impact on those who experience them. However, some of the language and depth of Wardrip-Fruin's argument seems to forget the human element of play and interpretation. The psychology of the player pops into the analysis through some of the examples used throughout the book but often feels like a side effect of the analysis. Hence, some of the analysis can feel ludologically bound rather than be seen as a bridge to the larger play experience. Despite this, the analytical framework Wardrip-Fruin proposes through operational logics is solidly researched and is already being examined by game researchers.

Operational logics and playable models as a game analysis and meaning-making framework is excellently argued in *How Pac-Man Eats*. Examining how the development and design of video games can lead to larger cultural meanings and capital by starting at the foundations of the games themselves broadens the horizons of game research, game design, software studies, and the psychology of play.

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