Scoring a 50-point word in *Words with Friends*, playing *Call of Duty* over the Internet, and even winning at *Solitaire*—games like these appeal to many of us because they challenge our abilities and stimulate our imagination. Recent research has focused on the connection between game-playing and learning. Can playing games make a difference in our ability to learn, and can this learning transfer to new situations?

Richard Mayer is one of the most productive and influential scholars in psychology, multimedia design, and learning. His latest book, *Computer Games for Learning*, raises important questions about rigorous research on learning sciences, and is one of Mayer’s newest contributions to establishing rigor in the scientific inquiry of game effectiveness in learning environments.

In the first chapter, Mayer introduces his evidence-based approach to inquiry into games for learning, explores the potential benefits and drawbacks, and provides a historical overview of research on this topic. The second chapter introduces three research approaches, which he refers to throughout the book. Mayer shares his research design model, some goals of game research, and the experimental research method that supports his approach, and also explains why some types of game studies are excluded from his overview. Chapter Three focuses on how basic theories of learning and motivation are related to learning with games. Chapter Four provides examples of three genres of experimental game research, each of which is further explored with additional reviews of experimental studies in Chapters Five through Seven. The final chapter explains where we are, and where we should—and should not—go next with inquiry into games for learning.

The systematic organization of this book makes each chapter approachable and understandable as a freestanding text for beginners, as well as advanced game researchers. Mayer reaches out to a multi-disciplinary audience, including—but not limited to—those in education, psychology, and technology. He includes tables and figures throughout the book to provide helpful and succinct summaries of arguments, syntheses, and resources. Mayer selects his reviews of the studies using an evidence-based approach and categorizes them into three genres.

The evidence-based approach consists of collecting, selecting, coding, summarizing, and interpreting evidence. Mayer discusses game research exclusively through experimental designs with control groups, and focuses on how computer games affect improvements in cognitive skills. He highlights the results and effect sizes, and reports what works best and what he senses does (and does not) constitute true learning gains.

### THREE GENRES OF GAMES FOR LEARNING

One of the most important contributions of this book is categorizing existing research studies on games for learning into three genres: the value-added, cognitive consequences, and media comparison experiments. Mayer defines the value-added approach as “comparing the learning outcome measures of students who learn
with a base version of a game versus with the base version plus one additional feature” (p. ix). The cognitive consequence approach, on the other hand, “involves comparing the pretest-to-post-test change in learning outcome or cognitive skill for students who played off-the-shelf games” (p. x). The media comparison approach “involves comparing the post-test performance on measures of learning outcomes of students who learned by playing a game versus students who learned the same material with conventional media” (p. x-xi). By comparing pre-test and post-test changes, and comparing control and experimental groups with either additional features or different media, the three-genre approaches provide a clear and insightful lens into experimental research. Compared to other ways of categorizing games for learning, Mayer’s three genres provide a systematic and research-oriented approach.

CONSIDERATIONS

Mayer refers to Cohen (1988) and points out that it is important to have the minimum number of 25 participants in experimental studies to ensure validity; however, Mayer does not discuss this consistently throughout the book. A suggestion for future editions is to add a chapter that collects all the pieces needed for good experimental design, including the methods to conduct such studies successfully and even the potential drawbacks with this design. Such a chapter would help readers to better understand what constitutes rigorous experimental research, and how to undertake this kind of study.

The experimental approach emphasized in the book provides highly systematic control and delivery of results. Yet, it also has its limitations. Researcher have noted that experimental studies can be poorly designed; they may overestimate the effect sizes or misinterpret results (Fanelli & Ioannidis, 2013; Miller, 2012), and they have limited ecological validity (Parsons, 2011; Sternberg, 1997). Experimental designs often capture short-term snapshots of physical and mental states, as opposed to providing a holistic picture of complex issues like learning; as a result, findings may have limited credibility across contexts (Lin, 2009). While it is certainly defensible to focus on quantitative experimental research, we suggest that it would be beneficial to encourage—rather than dismiss—other research paradigms. For instance, the studies which Mayer calls “let’s-see-what-happens research” (p. 262) may in fact add richness to data and support true knowledge through the dialectic process. Our concerns also apply to the exclusive discussions of the three genres. As much as we see the significance of this classification, we suspect that some important studies on games for learning may have been overlooked because they do not fit into any of the three genres.

CONCLUSION

In summary, Mayer’s new book Computer Games for Learning provides a comprehensive and up-to-date review of experimental studies on games for learning. The book concludes that there is limited evidence on the effectiveness of games to promote learning. The book adopts an evidence-based approach and categorizes the current studies into three genres, all of which are important and insightful for the research community. The book serves as a great reference for both new and seasoned researchers on games for learning. It sets a good foundation to further explore the educational values of game design, development, use, and assessment for learning.

References


