

Annotated Bibliography Assignment

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LIS6603 – Fall 2019, Online

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Source Type:

- ☐ reference book ☐ website ☐ popular magazine article ☐ dissertation
☐ book ☐ interview ☒ scholarly journal article ☐ gov't document
☐ other: _____

Full MLA Citation:

Qian, Meihua, and Karen R. Clark. "Game-Based Learning and 21st Century Skills: A Review of Recent Research." *Computers in Human Behavior*, vol. 63, 2016, pp. 50-58.
ScienceDirect, <https://doi-org.ezproxy.lib.usf.edu/10.1016/j.chb.2016.05.023>

Brief summary & critical analysis of content:

This article addresses the need for a systematic review of game-based learning's ("GBL") impact on the development of 21st century skills. These skills include critical thinking, creativity, collaboration, and communication. To understand the relationship between GBL and 21st century skills, this article delves into the empirical evidence supporting the relationship as well as looks at several learning theories underlying GBL's successful game design elements. Methodology involved conducting a keyword search using Academic Search Complete for the date range January 1, 2010, to December 31, 2014; 3118 articles resulted from the search. Six journals were chosen for the sample, and 137 studies met the three criteria needed for the study. The main results showed an upward trend in the number of quantitative GBL studies over time. A majority focused on K-12 learning (54%), which is great since this generation of

kids is being raised in the digital world. Half used GBL as an educational game and a majority (42%) of studies focused on behavior as a learning objective.

As for GBL's impact on 21st century skills, 29 of 137 studies reported their influence, and the majority zeroed in on critical thinking. In the future, studies need to delve into the other three equally important aspects of 21st century skills – creativity, collaboration, and communication. Of the 29 studies focusing on GBL and 21st century skills, sixty percent were devoted to K-12 students. GBL that utilizes complex game designs rather than rote memorization and quizzes led to greater engagement. The best game designs involved collaboration, role-playing, narrative, exploration, and complexity. Learning theories were addressed in 22 of the 29 articles, which creates better learning outcomes. The 97 outcomes reported in the 29 articles were stated as being “statistically significant” by the authors, but without practical application beyond the studies themselves. The article recommends that educators who seek to increase students' 21st century skills using GBL should focus on “collaboration, competition, complexity, exploration and discovery, role play, self-expression, and interactivity.” Evidence suggests GBL has a positive effect on students learning 21st century skills.

The researchers state that using quantitative research instead of qualitative is a limitation of this study. Perhaps it would better to discern the effectiveness of GBL and 21st century skills using the latter. As stated elsewhere in this annotated bibliography, another limitation is that technology and GBL are rapidly changing so a new review should be done for the most recent time period.

Evaluation of source using criteria & rationale for selection:

Authors: Meihua Qian is an Assistant Professor in Clemson University's College of Education.

She holds a dual PhD in Educational Psychology and Inquiry Methodology from Indiana University. Her curriculum vitae lists 11 peer-reviewed journal articles in the fields of creativity, game-based learning, and gifted education as well as more technical modeling and theories. Specifically, she has two papers in progress extending her research on game-based learning, *Promoting Creativity through Game-Based Learning: A review of recent research* and *Game-Based Learning and Science Education*. The second author, Karen R. Clark, appears to be a PhD candidate at Clemson University's College of Education at the time of the article's publication. I could not locate much information about her online, with the exception of her entering Clemson's program in 2014.

Date: This article was published in the year 2016, which somewhat illustrates its currency.

Three years have passed since the publication of the article; presumably additional research has occurred since then. A more-timely article will be needed to fill in the research gap between this article's publication and the current date.

Publisher: *Computers in Human Behavior*, first published in 1985, is a peer-reviewed journal published monthly by Elsevier Ltd., a global information analytics business focusing on science and health issues. Elsevier publishes journals in the areas of life sciences, physical sciences and engineering, social sciences and humanities, and health. Its global business is headquartered in Amsterdam, Netherlands, with regional locations in Australia, Brazil, Canada, China, Denmark, Egypt, France, Germany, India, Ireland, Japan, Jordan, Malaysia, Mexico, Philippines, Poland, Russia, Singapore, South Africa, South Korea, Spain, Taiwan, Thailand, Turkey, United Arab

Emirates, United Kingdom, and United States. Elsevier began in 1880 as a small Dutch publisher producing text and images, and has changed into a technology business assisting professionals with their work. Its science division merged with the North-Holland Publishing Company in 1970, and became one of the largest science publishing companies in the world. It acquired Excerpta Medica in 1970, which introduced computer technology to Elsevier. In 1993, it merged with Reed International, and later helped launch *ScienceDirect*.

Title: According to the *Distinguishing Scholarly from Non-Scholarly Periodicals: A Checklist of Criteria* LibGuide on Cornell University's website, the title of the article is scholarly and not popular because it contains language of the discipline and reports on research in the field from 2010-2014. There are a few non-flashy graphs and four tables that are data-driven. Many references are used, and there is an abstract at the beginning of the article. The article's serious look is evident.

Objectivity: The information provided in this article are facts discerned from careful research into the field of game-based learning. Although the focus of the study was the years 2010 to 2014, other articles cited within this one were published before this time period thus giving a substantive literature review of the field. For example, on p. 51 the authors began first with a definition of game-based learning and then moved through the current literature in the areas of "Evidence of impact and outcomes for games in education" and "Designing games for education[.]" The authors systematically laid out the status of the field of game-based learning in 2016 using previous studies. Their own study is an extension of what has come before it.

Further, each step of the research process is laid out starting with the large number of articles returned upon the researchers' first search, and narrowing down that number to the

small sample studied. The method analyzed the data objectively, without bias. This is evidenced by the breakdown into several categories of learning outcomes, age groups, learning theories, game design elements, and effect sizes, and the interplay between them.

A final demonstration of objectivity is the researchers' acknowledgment of the study's limitations. Due to ever-changing technology and more research being done in the field of game-based learning and 21st century skills, as soon as this study was published it was time to begin another study. A further review is needed for the period from 2015 to 2019. The researchers also noted that an additional qualitative study could prove useful to determine the impacts. The first author is currently continuing her research into this field of study.

Writing Style: The authors have organized this study in an easy to follow way. The introduction leads the reader into the nature of the field and the literature review gives a background on game-based learning, major theories, and defines 21st century skills. The methodology is clearly described, with results being written out as well as provided visually using graphs and tables. This is particularly helpful for understanding the statistical analysis of effect sizes. Limitations are noted and the conclusion wraps everything up.

Rationale: I selected this article because of its overview of the field of game-based learning, which is the focus of my group's LibGuide. Without knowing much about this field of study, I thought it would be a good introduction to the literature and could hopefully lead to other sources and keywords that would strengthen my understanding of the field as well as make our project more substantial. I hoped it would give me direction into vital characteristics of game-based learning that would be necessary to add to our LibGuide. This article focused on six journals to draw out its sample; when creating my group's LibGuide, it will be helpful to use

these journals as a starting point for finding scholarly resources. These journals include *Computers & Education*; *Computers in Human Behavior*; *Information Sciences*; *Journal of the Learning Sciences*; *Learning and Instruction*; and *British Journal of Education Technology*.

Moreover, I wanted to look at a study that covered K-12 students, not just a grade level or group like elementary or middle schoolers, because I think game-based learning can benefit all students. Also, it seemed to be easier to find articles on a specific grade level and I wanted to look at this issue more globally. I particularly was interested in learning more about 21st century skills and their application within game-based learning, because they are skills that everyone needs to master in order to thrive in our constantly-changing world. This study confirmed my thoughts that it is possible for game-based learning to benefit everyone, but more research needs to be done.

Reflection:

Since this was the first scholarly article I have read on the subject of game-based learning, the literature review proved immensely helpful. Starting with a basic definition of game-based learning and then building on it utilizing prior literature, I learned that most educational game studies focus on knowledge acquisition. I agree that it is important to see if students are learning from games, but games should also offer additional learning metrics like influencing positive attitudes and instilling problem-solving skills. I had not thought about the attitudinal aspect of this before, so I am glad this is now on my radar.

The authors point out that game-based learning and its effect on 21st century skills has not been fully researched, but I think this article does a good job of setting the stage for future work into the four identified skills relevant to our life today. This skillset involving critical

thinking, creativity, collaboration, and communication seems to run counter to how American schools currently teach students with their focus on rote memorization and everyone learning how to do things the same way. If enough evidence is presented in the field supporting 21st century skills' relevance to learning, our system of education could be changed. Studying game-based learning and its effects is just one way we can do this.

Finally, I learned the value of background research into the validity of the article, including its author and publisher. Prior to this, I had not done external research to ensure the authors were engaged in scholarly work, and if only the second author had been named I would be hesitant to use this source since she is not an expert in the field (yet). I also had not previously researched a publishing company to see where their intentions fall. The publisher of this article has long been in the business of scholarly work, but also has branched out over time to include more income-producing work, which is something to consider when checking the validity of a source.