

Back to the Gaming Board: Understanding Games and Education through Board Game Reviews

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Abstract: Recent academic research into the use of games for educational purposes has focused almost exclusively on *video* games. In this study, we explore player perceptions of *board* games with regards to education. We started with a large dataset of 7,806,486 reviews of 53,960 games collected from the BoardGameGeek website. We performed a keyword search for “education,” resulting in a working dataset of 1,978 reviews. First, we evaluated what games were being discussed with regards to education, looking at educational reviews per game title as well as educational games per subdomain and category. We also qualitatively coded a sample of 200 reviews to describe the perception of the educational value of these games and the perception of the quality of these games. We found, through a number of quantitative and qualitative measures, that reviewers were generally accepting of games’ potential for educational purposes.

Introduction

In recent years, scholars have described gaming as a “multimodal literacy *par excellence*” (Gee, 2007, p. 18, emphasis in original), as an opportunity to engage with rhetoric and persuasion (Bogost, 2010), as an interaction with “possibility spaces” that present problems to solve and lessons to learn (Squire, 2011), and even as an activity with the potential to fix a “broken” reality (McGonigal, 2011). Ritterfield, Cody, and Vorderer (2009) observed that these many conversations are influencing the topics covered in international conferences and inspiring organizations and movements focused on these benefits of games.

These conversations and efforts, however, have focused on *video* games, often overlooking the educational potential of board games (including card, tabletop, and other analog games). Yet, there are many reasons to consider the role of board games in broader conversations on games and education. For example, some of the first calls to use games for educational purposes (e.g., Abt, 1970; Raser, 1969) predated the wide availability of video games. Furthermore, recent years have seen a “Board Game Renaissance” (Roeder, 2015; “Not twilight,” 2015) that has been marked by steadily surging sales in board games as well as record attendance at international board gaming conventions such as Spiel (Germany) and GenCon (US). Finally, some initial scholarship has demonstrated that analog games share many of the affordances of digital games (Greenhalgh, 2016) and has called for greater consideration of their use in education (Copeland, Henderson, Mayer, & Nicholson, 2013).

A consideration of educational board games now can be augmented by player communities such as *BoardGameGeek* (BGG; <https://boardgamegeek.com/>) that actively encourage a participatory culture among visitors by reading articles, becoming members, selling/buying/trading games, and posting game reviews and comments to an existing database. BGG has been recognized as a premier hub for board gamers and may therefore lend valuable insight as to how they perceive board games’ educational potential.

Purpose and Research Questions

The purpose of this study is to understand player perceptions of educational board games using the large dataset provided by the BoardGameGeek community. From this data, we plan to examine how the community discusses educational games as a way of better understanding how educational board games are perceived and reviewed by active gamers. As educational board games are largely under-researched, and as BGG is a valuable source of player perspectives on board games, carrying out this study can help fill in some gaps in the literature on educational games. Furthermore, knowing how board game players define and perceive educational games will provide a foundation for future academic inquiry.

Specifically, this study is organized around three research questions about the discussion of educational games on BoardGameGeek:

- **RQ1:** What games are being discussed with regards to education?
- **RQ2:** What is the perception of the educational value of these games?
- **RQ3:** What is the perception of the quality of these games?

Method

Data Sources

This study is based on a dataset collected from BGG in October 2015, comprised of all of the games in the BGG database as of October 2015 and all of the corresponding information that was available through the application programming interface (API), a means of accessing the database information from an external computer program. For the purposes of this study, we focused on those games in the BGG database that had been described by reviewers as educational. To identify these games, we searched for the keyword “education” (including derivative words, such as “educational”) in 7,806,486 reviews of 53,960 game titles present in our dataset. Although all reviews provided a numeric score (on a scale from 1 to 10), only 1,935,541 (24.8%) also contained text comments. Of the reviews containing text, 1,978 (0.1% of reviews with text comments) contained comments with some version of the word “education”—what we will refer to as our *educational review dataset*.

Measures and Data Analysis

We used a combination of quantitative analysis and qualitative coding of BGG data to produce the measures for this study. Our first research question (RQ1) asked what games are being discussed on BoardGameGeek with regards to education; we answered this question using three measures. The first measure represented the number of *educational reviews per game title* and was determined by counting the number of reviews for each game that contained the keyword “education.” The second measure represented the number of *educational games per subdomain*; we calculated this measure by identifying the BGG *subdomain* (a broad game genre, such as “Family Games”) associated with each game in the educational review dataset; we then calculated the total number of times each subdomain appears. Finally, the third measure identified the number of *educational games per category*. This was calculated in the same way as the second measure, except that we calculated the number of games per BGG *category* (i.e., a collection of similar games, such as “Fantasy”).

Our second research question (RQ2) investigated players’ perceptions of the educational value of games in our BGG database; we answered this question using an *educational value* measure derived from qualitative coding. Table 1 describes the codes associated with this measure, which are not mutually exclusive. To start, two raters read the same 10 reviews and discussed possible codes until they reached agreement. Together they created a codebook to list the measures, categories, definitions, and examples. After establishing this mutual understanding, the raters trained on 20 reviews by coding them separately and later reconciling any differences. Finally, the raters coded a simple random sample of $n = 200$ reviews from the educational review dataset. Inter-rater reliability was *substantial* (Landis & Koch, 1977), with percent agreement ranging from 87.5% to 94.5% and Cohen’s kappa ranging from .71 to .75.

| Code | Description | Representative Quotes from Game Reviews |
|------|-------------|---|
|------|-------------|---|

| | | |
|-------------------------|---|--|
| Educational Affirmation | Reviewer argues that a game has educational value | <i>Surprisingly fun educational game.</i> |
| Educational Critique | Reviewer argues that a game does not have educational value | <i>This is not a good game. And it tries to be educational. It fails spectacularly on both these counts. I got a copy at a thrift store for \$3. Played it. Then I sold it on eBay for \$161. That was more fun AND educational than actually playing this game.</i> |
| Content Specification | Reviewer connects a game to a particular content area | <i>Geography trivia. Identify the state or territory that is the subject of all three questions --- in three levels of difficulty --- on the card.</i> |
| Age Specification | Reviewer connects a game to a particular age group | <i>An educational game, not much more. All I can say is that *I* remember finding it fun as a kid of about 5-6.</i> |

Table 1. Codes Corresponding to the *Educational Value Measure*

Our third research question (RQ3) investigated players' perceptions of the quality of games in the BGG database; we answered this question using three measures. First, we used analyzed the *game rating*, the numeric value between 1 and 10 that players assigned to games in their reviews. Second, using the same procedures as above, two coders developed codes for *game value* and *player sentiment*. Table 2 lists these codes, which are not mutually exclusive (with the exception of the "Neutral" code), for player sentiment. Inter-rater reliability for these sets of codes was also high. For game value, percent agreement ranged from 85.5% to 86.5% and Cohen's kappa from .70 to .73 (*substantial*). For player sentiment, percent agreement ranged from 91% to 99%, and Cohen's kappa from .82 to .85 (*almost perfect*).

| Code | Description | Representative Quotes from Game Reviews |
|-------------------------------|---|---|
| Game Value Codes | | |
| Educational Affirmation | Reviewer argues that a game has entertainment value | <i>IMHO, one of best casual wargame ever made. Simple to learn, great depth, easy to play.</i> |
| Educational Critique | Reviewer argues that a game does not have entertainment value | <i>As a game, this is clearly sub-par - but as an education tool - 10.</i> |
| Player Sentiment Codes | | |
| Positive | Reviewer made positive comments about game | <i>Fun, like splashing rocks into water is fun. Not challenging, not educational, just fun.</i> |
| Negative | Reviewer made negative comments about game | <i>A bit long but since a lot of players take LONG turns to determine which move will get them that "I more point". [...] This one is LONG, LONG, LONG, LONG, LONG, LONG and then some.</i> |
| Neutral | Reviewer made neither positive nor negative comments about game | <i>This an educational game at its purest. You have to be able to count to six. And you will discover what "Push your luck" mean. Before you are five years old.</i> |

Table 2. Codes Corresponding to *Game Value* and *Player Sentiment Measures*

Results

In this section, we discuss the answers to our research questions, as determined by the measures described in the previous section.

RQ1: What games are being talked about with regards to education?

Table 3 lists the ten games with the highest number of *educational reviews per game title*. Of particular note is the presence of four of the five titles from the *10 Days in* series of geography-focused games.

| | Game Title | Educational Reviews | Average Rating (Standard Deviation) | Subdomain | Category |
|----|--|----------------------------|--|------------------|---|
| 1 | <i>10 Days in Africa</i> | 50 | 6.57 (1.17) | Family | Aviation/Flight; Travel |
| 2 | <i>Fauna</i> | 46 | 7.12 (1.20) | Family | Animals; Educational; Trivia |
| 3 | <i>10 Days in the USA</i> | 43 | 6.48 (1.16) | Family | Travel |
| 4 | <i>Timeline: Inventions</i> | 41 | 6.82 (1.15) | Family | Card Game; Educational; Trivia |
| 5 | <i>10 Days in Europe</i> | 29 | 6.62 (1.20) | Family | Aviation/Flight; Educational; Exploration; Travel |
| 6 | <i>1960: The Making of the President</i> | 22 | 7.56 (1.36) | Strategy | Political |
| 7 | <i>Travel Blog</i> | 22 | 6.22 (1.23) | Uncategorized | Educational; Real-time; Travel |
| 8 | <i>10 Days in Asia</i> | 21 | 6.70 (1.15) | Family | Aviation/Flight; Travel |
| 9 | <i>Cashflow 101</i> | 21 | 4.89 (2.24) | Family | Economic; Educational; Math; Number |
| 10 | <i>Scrabble</i> | 21 | 6.37 (1.61) | Family | Word Game |

Table 3. The Ten Game Titles with the Most Educational Reviews

Table 4 shows the eight *subdomains* in the BGG database, ordered by the number of *educational games per subdomain*. The subdomains with the highest number of games (i.e., Family and Children’s) are those with an intuitive connection to children, with the next three (i.e., Strategy, Wargames, and Abstract) often associated with critical and strategic thinking as well as—in the case of Wargames—history.

| Game Subdomain | Number of Games | Percentage of Total (n = 989) | Average Rating (Standard Deviation) |
|-----------------------|------------------------|--------------------------------------|--|
| Family | 161 | 16.3% | 6.78 (1.49) |
| Children’s | 134 | 13.5% | 5.39 (1.90) |
| Strategy | 123 | 12.4% | 7.35 (1.45) |
| Wargames | 85 | 8.6% | 7.07 (1.70) |
| Abstract | 62 | 6.3% | 6.61 (1.61) |
| Thematic | 39 | 3.9% | 7.10 (1.63) |
| Party | 38 | 3.8% | 6.58 (1.68) |
| Customizable | 4 | 0.4% | 7.26 (1.76) |

Table 4. The Eight Game Subdomains, Ranked by Most Educational Reviews

Table 5 shows the ten BGG *categories* with the highest number of *educational games per category*. Unsurprisingly, the Educational category is at the top of the list, though it should be noted that over two-thirds of the games described by players in terms of education have *not* been entered into the Educational category in the BGG database.

| Game Category | Number of Games | Percentage of Total (n = 989) | Average Rating (Standard Deviation) |
|----------------------|------------------------|--------------------------------------|--|
| Educational | 294 | 29.7% | 6.30 (1.76) |
| Card Game | 251 | 25.4% | 6.88 (1.62) |

| | | | |
|-----------------|-----|-------|-------------|
| Children's Game | 202 | 20.4% | 5.55 (1.84) |
| Animals | 110 | 11.1% | 6.72 (1.67) |
| Economic | 102 | 10.3% | 7.29 (1.62) |
| Wargame | 100 | 10.1% | 7.09 (1.71) |
| Trivia | 91 | 9.2% | 5.74 (1.81) |
| Party Game | 76 | 7.7% | 6.48 (1.75) |
| Dice | 72 | 7.3% | 6.80 (1.68) |
| Word Game | 69 | 7.0% | 6.07 (1.64) |

Table 5. The Ten Game Categories with the Most Educational Reviews

RQ2: What is the perception of the educational value of these games?

We answered this research question using the codes described in Table 1. Of the 200 reviews coded, 157 (78.5%) included educational affirmations, 12 (6.0%) included educational critiques, and 9 (4.5%) included both affirmations and critiques. Furthermore, 51 reviews (25.5%) contained content specifications, 39 (19.5%) contained age specifications, and 36 reviews (18.0%) contained both kinds of specification. Most age specification codes were focused on children or K-12 students; content specifications related to history, geography, numbers and math, and English and vocabulary.

As previously mentioned, these codes were not mutually exclusive; Table 6 therefore describes the interactions between these codes.

| | Educational Affirmation | Educational Critique | Educational Affirmation and Critique |
|-------------------------|------------------------------------|---------------------------------|---|
| Number of Total Reviews | 157 | 12 | 9 |
| Content Specification | 41 (26.1%) | 4 (33.3%) | 4 (44.4%) |
| Age Specification | 34 (21.7%) | 2 (16.7%) | 0 (00.0%) |
| Both Specifications | 28 (17.8%) | 2 (16.7%) | 5 (55.6%) |

Table 6. Interaction between *Educational Value* Codes

RQ3: What is the perception of the quality of these games?

Figure 1 compares the proportion of game ratings given to games described as educational and to games not described as educational. As the figure indicates, the patterns of ratings given to educational and non-educational games are similar; however, educational games have higher proportions of low ratings and lower proportions of high ratings. Consistent with this visual interpretation, the median rating given to educational games is 6, and the median rating given to non-educational games is 7.

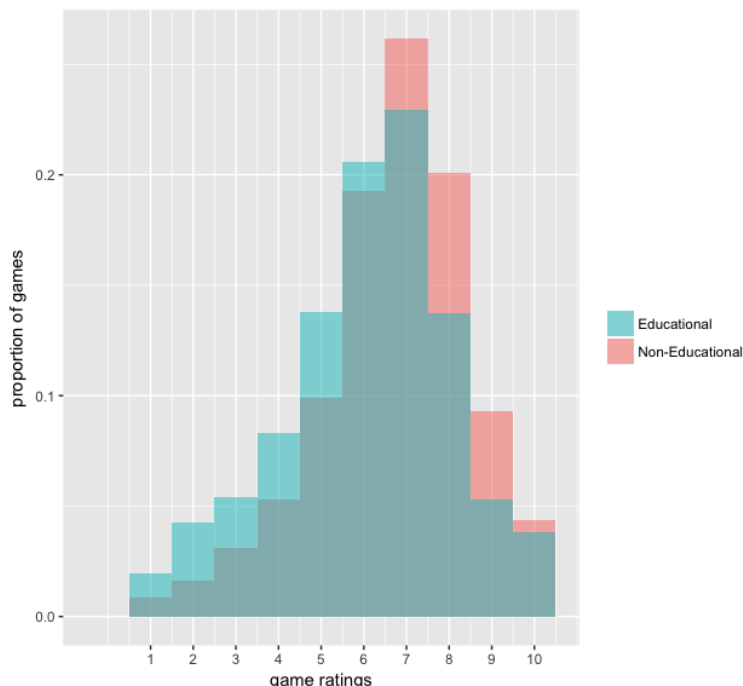


Figure 1. Comparison of Game Ratings for Educational and Non-Educational Games

Our *player sentiment* and *game value* measures allowed for a more nuanced look at player perceptions of educational games. Of the 200 reviews coded, 89 (44.5%) exclusively contained positive remarks and 18 (9.0%) exclusively contained negative remarks. However, 87 reviews (43.5%) contained both positive and negative remarks, and 6 (3.0%) were neutral (i.e., contained neither positive nor negative remarks). Similarly, 72 reviews (36.0%) affirmed the entertainment values of the games in question, with 45 reviews (22.5%) critiquing their entertainment value, and 46 reviews (23.0%) containing both affirmations and critiques.

Discussion

Where Are All the Educational Reviews?

Our exploration of players’ perceptions of the educational potential of board games has a number of implications for research and practice. Of particular note is the relative absence of such perceptions: Only 1,978 of the 1,935,541 text reviews in our dataset (0.1%) mentioned “education” in some way; furthermore, these reviews only represent 989 of the 53,960 games in our dataset (1.8%). Given that BGG is a hub for board gaming broadly, with no specific mandate or purpose related to identifying and commenting on educational games, these tiny proportions are not altogether surprising. Indeed, these findings may suggest that board gamers do not play educational games as frequently as other types of games and do not often think about or comment on the educational potential of the games that they do play.

However, when board gamers do comment on this intersection, they are generally accepting of the potential of games for educational purposes. Over three-fourths of the reviews containing the word “education” suggested that the game being reviewed had some educational merit; furthermore, over three-fourths of those reviews included comments on the age groups or content areas that the game may be best suited for. However, this acceptance is not without caveats. Reviewers also called into question the educational value of some games, even blending their critiques with general affirmations.

Educational Value for Whom?

In the reviews, the age group most spoken about was “kids” (i.e., K-12 students). This was reinforced by the game titles with the most educational reviews (Table 3), of which 8/10 were tagged with the game subdomain “Family.” This suggests that, when discussing educational value for games, most reviewers spoke of “kids” in a general sense and tended not to refer to specific ages or grade levels. For example, one reviewer wrote: “Average kids game. Good for the educational value, but not fantastic as a game. I'd buy this an [sic] play it with kids, but it doesn't excite me.”

The most common educational content areas specified in reviews were history, geography, numbers/math-related, and vocabulary/English language-related. This was reinforced by the game titles with the most educational reviews (Table 3) whose game categories included geography-related tags such as “Travel,” “Exploration,” and “Aviation/Flight;” biology-related tags such as “Animals;” math-related tags such as “Math” and “Numbers;” and language-related tags such as “Word Game.” This was also reinforced by the game categories with the most educational games per category (Table 5); the “Education” category was the most common, but also frequently represented were education-related categories such as “Animal,” “Economic,” and “Word Game.” These findings have implications regarding the types of educational content areas for which games are perceived to have the most value.

How Do Players Really Feel?

Overall, we found a large proportion (88.0%) of positive sentiment in the game comments we examined; however, over half (52.5%) of the game reviews included negative sentiment. In many cases, this appears to be evidence of the ways comments evaluated and balanced the educational value of the game with the game value (i.e., entertainment or fun). This suggests that while the games we examined were perceived positively by reviewers, this sentiment may be tempered in light of the qualifying context provided by many of the comments (e.g., “For educational purpose I would give this game 8 points. But if I rate it as a board game then I can not give it more than 6 points.”). In other words, it appears that for many reviewers, a game that is lacking in game-value elements (e.g., design, smoothness of gameplay, even fun) can still be perceived positively if it has educational value.

Although board gamers appear to agree with the general consensus that educational games are not as good as entertainment games (Koehler, Greenhalgh, & Boltz, 2016), our results suggest that they have not rejected the possibility that educational games can be fun. A game review that perfectly captured the complexity of balancing educational value and game value follows:

Terrible movement rules. We made some house rules permitting the use of either die instead of the highest die, and that you need not use both dice. You could use those house rules any time you *aren't* in one of the temples. That changes the game from a 2.5 to a 5.5. Serious movement rules (better than our house rules) are required. We'll work on it. A few bolded terms weren't in the glossary. Now that was insanely annoying. The purpose of this game is to offer bite sized chunks of education in the midst of a thematic game. I found myself on my ipad more than a few times. The theme is great. Pieces are beautiful. This is basically what happens when teachers with no board gaming experience make board games. The pieces are too beautiful to give up on. I will make a 7.5 out of this game.

This ambivalence in sentiment toward the games is not necessarily a bad thing; instead, it may suggest that players looking specifically for an “educational experience” (quoting a term used in by one reviewer) may be satisfied with a less entertaining or polished game than those who are looking to play games just for purely entertainment reasons. Indeed, different players would have different ideas of what would constitute fun.

Limitations and Future Research

Because this study relied upon the qualitative coding of online game reviews, meaning was drawn from static text. While our coding was trustworthy in terms of high inter-rater reliability and intuition (i.e., reviews coded for affirmation tended to have higher game ratings than reviews coded for critique), our coders acknowledged the difficulty of interpreting the colloquial language common in online writing. For example, at times we had difficulty identifying and interpreting sarcasm due to specific regional usages of language as well as potential cultural differences. We also acknowledge the presence of false positives related to ambiguous uses of the term “education.” This seemed to happen very rarely; we noticed just one or two instances while coding the sample of 200 reviews.

For example, a reviewer commented, “Well that was an education”—referring to lessons learned about playing the game itself, not educational aspects of the game.

In a future study, we would like to search for educational reviews of games by conducting a more thorough search of keywords likely to be related to education. Although technical education words like “pedagogy” return too few reviews ($n = 19$ from our original dataset of almost 8 million), keywords like “lesson” and “serious game” return far too many false positives (due to ambiguous uses of “lesson” and references to “serious gamers” which is not related to education) would require careful analysis. Another avenue for future consideration would be to take a social networking approach to studying the game reviews on BoardGameGeek; in other words, to what degree are reviewers talking to each other? What could be learned from investigating the BGG player forums? A final area worth additional research is a more thorough exploration of what content areas are the subject of educational game design and why others are not.

Conclusion

Although there has been a resurgence in recent years to research the educational potential of games, these efforts have focused on video games to the extent of leaving board games all but forgotten. While overshadowed by their digital counterparts, board games have seen both a financial and popular resurgence in their own. In this study, we gathered nearly eight million reviews of over fifty thousand board games and analyzed this dataset with both quantitative and qualitative measures. We realized that we gained a significant extra layer of understanding from qualitatively coding a sample of the dataset, an understanding that would have been missed had we just performed statistical analyses on the numeric game ratings. We found that game reviewers themselves often overlook the educational potential of games, associate educational games mostly with kids or certain content areas, and generally have mixed feelings about how games struggle to find a balance between educational value and game value. As we look forward to future research, we anticipate a more thorough collection of educational reviews by expanding our keyword search as well as exploring how game reviewers are interacting with each other. In sum, while there is plenty to be excited about for the future of educational video games, now is also an excellent time to go back to board games: to understand them better, to use them better for educational purposes, and ultimately, to be able to design them better.

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