Roles, Rules, and Uncertain Outcomes: Redefining Games for Learning

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Abstract

Existing definitions of games fail to differentiate between regular academic activities and games in any meaningful way. According to existing definitions either all graded academic activities are games, or serious games and game-based learning are not games. In this paper existing definitions of games are explored and expanded upon to create a new definition that can draw a necessary line between a math exam and learning games. A discussion of surrogate roles, participants as actors, and uncertainty explains how these terms can be added to existing components of games as being an activity that contains rules to more meaningfully differentiate between what is and is not a game, particularly in the context of learning games. This article does not attempt to define what makes a game good or fun, but rather it includes a new definition of games that includes core elements that can be utilized to adapt academic content into games.

Roles, Rules, and Uncertain Outcomes: Redefining Games

A math exam is definitely not a game, yet it contains many gamelike elements such as rules, goals, even a scoring system. Existing definitions of games either rule that games can not be used for purposes other than entertainment, or that they are unsuitable to effectively distinguish between traditional learning activities and serious games (Stenros, 2016). One of the core concepts concerning what is and is not a game is the idea of play (Koster, 2005). While a game can include serious outcomes such as winning a professional match or gambling for life changing sums of money, there is a differentiation between placing a bet on the roll of the dice and investing funds in a particular stock in hopes of a similar outcome of increased wealth. While Deterding (2013) includes the word “safe” when defining games, there are many forms of games that pose a significant physical risk such as boxing or professional football. To properly understand what separates serious games from traditional education, we must understand the underlying concept of what it is that makes a game. If we fail to do so, educators are free to claim that any graded classroom activity should be called a game or that no activity undertaken for the purposes of learning can be called a game. In either of these cases, the term game, in particular serious games and game-based learning, have no meaning. In this paper, I argue that previous definitions of games have been insufficient to meaningfully break down the concept of games into its core elements and they have not focused on exemplifying the components of a game in a way that would allow for separating learning games from any other academic activity.
Additionally, I will propose a new definition of games with added elements to further clarify the
distinction between academic activities and serious games.

Definitions of games

It is generally accepted that games require a set of rules (Koster, 2005; Schaffer, 2007;
Stenros, 2016). Schaffer (2007) proclaimed simply that what “makes a game a game is that it has
a particular set of rules” (p. 12). Additionally, he applied this definition through an example and
stated that two children playing house as playing a game. In using the improvisational acting
game house. Schaeffer suggests that while a game needs a particular set of rules those rules do
not need to be particularly well-defined. Furthermore, it implies that a game does not need to
have a particular goal or winner to be considered a game. A game of my own experience was the
endless game of football on the playground during my fifth and sixth grade years which
resembled a professional touch football league in all ways except that the teams were constantly
in flux and no one ever kept score. Early versions of the popular game Minecraft did not include
a way to win the game, but it was still considered to be a game in every respect. This would
suggest that while a game may need rules, it does not need clearly defined rules that determine a
winner or loser.

The limits of Schaffer’s (2007) definition exist in every classroom in which a teacher
gives students a test with certain rules, goals, and even a scoring system. Yet no student should
be forced to accept that their math test is a game. If the teacher were to inform their students that
they would be playing a game and they would be given a score, only to be handed a typical
academic test, a mutiny would likely ensue as students would likely not only feel tricked but also
betrayed by the notion that a test is any form of a game. While this test may meet Schaffer’s
definition of a game, it clearly is insufficient to meet what society accepts as a game.

Others have tried to define games as voluntary, unproductive, and make-believe (Caillois,
2001) or as a free activity outside of ordinary life (Huizinga, 1949). Huizinga (1949) even went
so far as to indicate that there could be no profit from a game. If there is to be any link made
between games and learning as literature on learning games suggests (Stitzman, 2011; Wouters
et al, 2013; Zhoggen, 2019) the notion that games are limited to profitless or free activity needs
to be overcome. However, other definitions include important components of what is lacking in
Schaffer’s definition that helps to differentiate between a traditional learning activity and a game.
Many definitions of games include the idea of the adoption of roles (Avedon 1971; Juul, 2005;
Stenros, 2016; Suits, 1978). Avedon (1971) includes roles for participants as a required element
of a game and Juul (2005) describes a game as a representation of an alternate system; these
components are largely missing from a rules only approach to defining games. Suits’s (1978)
definition of a game requires an acceptance of the rules by participants, attempts to overcome
obstacles must be voluntary, and that the rules and goal set must be unnecessary. Therefore, even
the simplest games require that the participants adopt arbitrary rules and rules that are somehow
outside of the necessities of ordinary life. This suggests that the primary reason that test-taking is
not a game is because the student is really a student, the test is really a test, and the teacher is
really a teacher. There is no make-believe and the situation is only arbitrary in that the teacher
has assigned it to the student instead of some other activity. It is not an activity in any way
outside of the ordinary life of any of the participants, nor is it particularly voluntary. By
voluntarily accepting the rules in attempts to overcome obstacles, participants are adopting a
surrogate role outside of their ordinary life. Seeing who can run one hundred yards the fastest is a
game because the rules that determine the winner and the loser are voluntarily adopted by the
participants. In a true life or death situation, an individual trying to outrun a hungry tiger has not adopted the surrogate role of lunch, but has in fact become it--involuntarily.

Definitions of games that address the gap between reality and games show that games must be separate from reality but connected to it (Stenros, 2016). The insufficiency of Schaffer’s (2007) definition regarding reality and Caillolos (2001) and Huizinga’s (1949) definitions which eschew the very premise that games can serve a primary purpose other than entertainment, makes it is necessary to clarify what can be considered a game in a way that is inclusive of learning games, but not math tests. I propose that a game is defined as:

\[ \text{a voluntary activity involving participants who take on surrogate roles, with rules that define an artificial conflict in which the outcome is uncertain.} \]

**Participants and actors**

The first piece of the definition that I will discuss is likely the easiest to gloss over, the inclusion of participants. The use of the plural word ‘participants’ is incredibly important in understanding what is taking place in a game. While an assumption may have been made that participants would require multiple conscious beings, this is not the case. The word participants is designed to be read as the term agent was used in Sicart’s (2008) definition of game mechanics. Sicart used terminology from computer science’s object oriented framework to define agents as actors in a game that are either human or artificial. So too should participants include both human and artificial participants in a game with one caveat: without at least one conscious participant, there can be no game. If two computers are set up to play *Chess*, it is the human that sets them up who is playing a game.

Having multiple participants would allow for a randomized deck to serve as one participant in a game of solitaire in much the same way that the computer is a participant by randomizing bomb locations in *Minesweeper*. The player has adopted the role as the player trying to order the cards or find the bombs, the deck or computer participates by providing a randomized challenge, and there are rules that must be followed in the process. It is even possible that the participants in a game could be a single individual taking on multiple roles or comparing previous scores making their past self into an opposing participant. Requiring multiple participants is not intended to rule out the gamification of self improvement. Comparing your own results is oftentimes considered a game where an individual is competing with their past self. In this case the two participants are the separate actions of an individual at two distinct points in time.

Game design theory allows for acceptance of a broad definition of the term participants to include automated actors which then should be extended to non-digital actors. Recent cooperative games such as *Pandemic* and *Forbidden Island* rely on a randomized deck to operate as the ‘computer’ providing various challenges for the player to overcome. Games from the 1980s, such as *Warhammer Quest*, include rules for automatic enemy movement as a form of early analog artificial intelligence. These games allow for single player play while the combination of randomization and automated enemy movement provide artificial participants as well as create a situation with unknown outcomes. Therefore, participants in a plural form must be involved in our definition of a game.

It is important that the human participant(s) be accepting of the rules and roles of the activity voluntarily. While some level of coercion may exist to encourage an individual to participate in the game, acceptance of the existing rules and roles are necessary to actually enter into the playing of a game. Individuals finding themselves in a desperate financial situation may
see gambling as the only way out, they are still voluntarily accepting the rules of the game and their roles within it.

**Adoption of surrogate roles**

The adoption of surrogate roles is a necessary component of separating a game from everyday life. When playing *Chess* or *Go* one player adopts the surrogate role as the black pieces and the other adopts the surrogate role as the white pieces. There may be an additional surrogate role as the commander of an army or perhaps playing as the king. Meanwhile, in *Go* the surrogate simply addresses which pieces will belong to a particular player. Similarly, in a game of chance such as *Roulette*, a player adopts a role by placing their bet on a particular square thereby adopting the surrogate role as desiring that number. In more complicated games the player may take on a surrogate role as an army soldier or mythological hero while the computer system handles the roles of villagers, monsters, and oversees the game board. In all of these games the adoption of a role is a necessary component of playing the game as it provides additional meaning to the activity beyond the activity itself.

**Surrogacy and reality**

Surrogate roles must be distinctly different from an individual’s real world roles, however, they can mirror them. Schaffer (2007) includes the example of his daughters playing house in which the older sister plays the role of the older sister and the younger sister plays the role of the younger sister. While his children are adopting roles equivalent to their actual roles, they are truly taking on a stereotype of their natural position in the family structure and in this way are acting as a surrogate for their own role in the family. If the younger sister were to stamp her feet and proclaim she doesn’t want to eat her vegetables, she is doing so as a proxy for the action that she imagines is within the appropriate rules for her role. If she were actually being forced to eat her vegetables, she would no longer feel that this was a game and likely wouldn’t want to play any more. However, the adoption of surrogate roles may be simpler than picking one color of marker or another.

In many basic rules systems, accepting the role of player or participant is all that is necessary to play a game. In a race, the game requires the participant(s) to adopt the role of racer and accept the rules that the first person to cross the finish line becomes the winner. An individual who does not accept the role of racer, is not playing a game. Surrogacy, in this form, is the attempt to overcome unnecessary obstacles (Suits, 1978) or create an artificial conflict (Salen & Zimmerman, 2004). If the conflict is necessary or not artificial (i.e. a math test or real military conflict) we can no longer define it as a game. Additionally, a game can be made of a common activity simply by setting unnecessary obstacles or artificial conflict. Attempting to stack more bricks in ten minutes than you previously did is an example of creating an artificial conflict. While stacking bricks may not be an activity outside of everyday life, the goal of stacking them faster than you previously did is turning your labor into a game--although, not a particularly fun one.

The added term of surrogate roles to the definition of games is vital to understanding how games operate as it clarifies the two primary sources of player interest in games. Imagine the simple game of throwing rocks into a paper cup on the side of the road. Clearly the objective, getting the rocks into the cup, is not particularly difficult without rules defining where one must throw from. In this way the rules define the challenge by defining the requirements to score. However, roles must be also defined such that I can only get points for rocks that I throw while my roadside companion only gets points for rocks that they throw. In this simple game,
entertainment is generated on one side from the rules, and on the other by the roles adopted by the participants.

Very simple games, such as not stepping on sidewalk cracks, use the rules to provide entertainment primarily by nature of the challenge of meeting them. Other games, such as house, draw entertainment primarily from the roles adopted. Generally it is in the confluence of roles and rules that games use to provoke interest. While it is roles and rules that cause a game to exist, it is the interaction of roles and rules that determine the overall quality of a game. It is not the individual quality of roles and rules that create a great game, but the ways in which they support one another in the form of game mechanics (Hocking, 2007; Ke, 2016).

**Puzzles and games**

The nature of surrogacy is incredibly important to the nature of what is and is not a game but this definition seems to run contrary to the theory that games are puzzles (Koster, 2005). More accurately, we suggest that puzzles are not games, unless one wishes to consider even attempting to solve a puzzle to be a surrogate role. While puzzles do contain a clear set of rules, they fail to include the adoption of surrogate roles. In a puzzle, you play yourself trying to solve the puzzle. While a maze puzzle may suggest that you are a rat attempting to find the cheese, the reality is that you are just you, trying to solve a maze with a picture of a rat near the entrance and a picture of the cheese near the exit. The maze is no more or less a game than is attempting to solve a particular algebraic equation. In algebra, you have not adopted the role as ‘x’ simply because it is the variable for which you are attempting to solve. Lacking in surrogate role adoption, puzzles are not, in and of themselves, games.

However, most games include a number of puzzles within their rules structure. In a game such as tic-tac-toe, every turn represents a puzzle to be solved, followed by the unknown response of your opponent, which in turn presents another puzzle. But Koster’s (2005) definition does not account for the game that is the bane of my parenting existence, Candy Land. While I often rant about Candy Land not meeting the requirements of being a game to my game design students, they firmly hold to the belief that it is, in fact, a game. My argument with my students is intended to be thought provoking because any five year old familiar with it will insist that Candy Land is a game and that you should probably be playing it with them right now. However, Candy Land is not a puzzle; it is not even a solved game like Tic-Tac-Toe in which every outcome is predictable. Candy Land is a scripted randomized adventure. There is no strategy, there is no decision tree, there is no puzzle. There is a deck, there are colors, and there are little gingerbread men who act as your surrogate on a bright and happy sugar-filled adventure. Much as I hate to admit it, Candy Land is a game.

Considering the necessary addition of surrogate roles we find it necessary to expand beyond a rules set in order to call something a game. The existence of surrogate roles is the delineation of something that is real and something that is a game, as rules sets can be found in all manners of human experiences we would not consider a game. But rules and the adoption of roles alone is insufficient to fully define what is or is not a game. In all games we must look to uncertainty in our outcome.

**Uncertainty and unknown**

The primary source of entertainment in Candy Land, if one is to be found at all, comes from the unknown order in which the deck will be revealed. Children delight at suddenly and inexplicably pulling ahead and bemoan falling upon a licorice square and losing turns because these outcomes are unknown. Meanwhile, adults are unimpressed as these successes and failures
have little to do with their skill at flipping the top card of the deck. Uncertainty plays a vital role in our understanding of what is a game and what is not.

Most commonly uncertainty in games is provided through randomization. Game designer Mark Rosewater (2012) labels “surprise” as one of the 10 necessary components of games and Shelton and Scoresby (2011) note that learning game elements “includes motivation-inducing attributes of challenge, proclivity, and uncertainty, yet directs [students] toward the learning goals” (p. 119). Table games will commonly use dice, a randomized deck, or a spinner as a method to inject uncertainty into games while video games may randomize enemies, loot, or game maps. But many classic games do not need any form of randomization in order to contain uncertainty. Games without inherent randomness rely on another participant to provide uncertainty absent dice, cards, or a spinner. While a game of Chess between a grandmaster and novice will have a predictable result, the exact steps to reach that outcome is unknown to both players. While experts at fighting video games may have very similar matches against the AI, their ability to press the button at the exact right time still remains uncertain each time they play. Even in a game such as Tic-Tac-Toe where the result can be determined, the space in which an opponent will place their mark is unknown.

The uncertainty aspect of games is important because a theatrical play would generally not be considered a game. In this case the outcome of the play is predetermined by the actors and the audience would not be considered participants in the show. If actors were to go off script they could be playing a game with one another but when interacting with the audience, the audience members have generally not adopted a surrogate role and while the outcome may be unknown not everyone is in on the game. Improvisational acting is frequently made up of “improv games” and even an entirely improvisational show could be described as playing house with an audience. The unknown that audiences experience at the theater is a facade, especially considering that some of them may have seen the play before. Therefore, the game only exists when participants encounter uncertainty in their surrogate roles.

**Exploring the definition**

Stenros (2017) offers ten questions regarding any definition of games based on their literature review definitions of games. The questions serve to question the components of a definition of games as well as investigating the need for further definition. We provide answers to these questions based on our new definition in Figure 1.

**Figure 1. Answers to Stenros’ Questions Regarding a Definition of Games.**

<table>
<thead>
<tr>
<th>Question (Stenros, 2017, p. 515)</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are rules?</td>
<td>A rules set defines limits to behavior as acceptable or unacceptable within the context of the game.</td>
</tr>
<tr>
<td>Do games have a function?</td>
<td>Games do not require a specific function to be defined as a game.</td>
</tr>
<tr>
<td>Are games an artifact or an activity or a muddle of the two?</td>
<td>The word “game” is used to refer to an activity that meets the definition of a game, it also can exist as an artifact used for the playing of a game. Monopoly exists as a game both when it is played as well as while it is sitting on the shelf.</td>
</tr>
<tr>
<td>How games exist in relation to the quotidian?</td>
<td>The acceptance of surrogate roles and a rules set outside of the quotidian are necessary for an activity to be considered a game.</td>
</tr>
<tr>
<td>What are players?</td>
<td>Participants as actors in the game, both human and artificial, who take actions to affect the game state. At least one sentient participant is necessary.</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>What do games produce?</td>
<td>There is no requirement or restriction for production from a game however there should be a perceivable outcome. This outcome does not necessarily need to be defined as a goal or result.</td>
</tr>
<tr>
<td>What is the role of competition?</td>
<td>Competition is common in games but not necessary. Competition is but one way to produce an unknown outcome.</td>
</tr>
<tr>
<td>What about goals?</td>
<td>Goals are common but ultimately unnecessary to define a game. Many games have existed with no defined goals.</td>
</tr>
<tr>
<td>What sorts of phenomena are relevant for games?</td>
<td>A voluntary human participant, an unknown outcome, rules, and the adoption of a surrogate role.</td>
</tr>
<tr>
<td>What purpose do definitions serve?</td>
<td>This definition exists to define the core elements of games in such a way that includes serious games within the larger context of games while excluding traditional academic activities. It further offers specific contextual points for the altering of traditional learning activities into games.</td>
</tr>
</tbody>
</table>

**Discussion**

Seeking to build on Schaffer’s (2007) definition of a game, this article covered the necessary addition of surrogate roles, uncertain outcomes, and the term ‘participants’ to his definition. While not discussed in depth here, rules are agreed upon as a vital part of games across disciplines. This new definition allows game designers, theorists, and evaluators to have a meaningful structure by which to analyze the necessary components of a game to examine its use of these components to create meaning. This definition also allows for serious games to meet the definition of actually being games. One notable component that this definition leaves out is the existence of fun, upon which volumes have been written. It turns out that fun does not require a game, and games do not require fun. However, fun is generally a necessary component of good games (Csikszentmihalyi, 1975, 1990; Prensky, 2001; Koster 2005). If researchers are to continue to examine what makes games great, they must further examine the relationship between participants, uncertain outcomes, rules, and surrogate roles.

**References**


