

Serious Gamification: On the Redesign of a Popular Paradox

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Abstract

We challenge the idea of the paradoxical nature of the concept *serious games* and ask how researchers and designers need to conceive of serious games so that they at all appear paradoxical. To develop and answer this question, we draw on a theory–method that considers all forms of observation as paradoxical. We then use the tetralemma, a structure from traditional Indian logics, to resolve the paradox of serious games into this larger paradox of observation. Consequently, serious games may only be considered a paradox if we presume realities and define games as deviations therefrom. The increasing gamification of society, however, does not allow realities to be defined in contrast to games anymore. We therefore conclude that serious games do not represent particularly paradoxical forms of games, but rather next levels of reflexivity in communication design and in the self-definitions of next societies.

Keywords

serious games, communication design, paradox, oxymoron, tetralemma, form theory

Introduction

Although serious games are considered effective tools for learning (Bianconi, Saetta, & Tiacci, 2006; Charsky, 2010; Dormann, Whitson, & Neuvians, 2013;

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Geelen, Keyson, Boess, & Brezet, 2012) and persuasion (Bogost, 2011; Ferrara, 2013), useful prototyping environments (Bekebrede & Mayer, 2006; Johns & Shaw, 2006), an emerging market in the games industry (Alvarez & Michaud, 2008), and a growing field of interest in academia (Ritterfeld, Cody, & Vorderer, 2009) for quite some time yet, the concept still seems as elusive as it is popular. If we take serious games nonetheless seriously, then we soon find that their much vaunted effects are due to some “kind of a dialectical miracle” (Swertz, 2009, p. 7) and therefore hard to capture for researchers and game designers. And, indeed, there seems to be something special about this oxymoron serious game (Alexiou, Schippers, & Oshri, 2012; Boughzala, Bououd, & Michel, 2013; Djaouti, Alvarez, Jessel, & Rampnoux, 2011), which appears whenever we “submit to a paradox of intentionality—that is, when people engage deliberately in a fun, intrinsically motivating activity as a means to achieve a serious, extrinsically motivated work objective” (Statler, Heracleous, & Jacobs, 2011, p. 237). This paradox unfolds if games are kept in well-distinguished temporal or spatial distance to work (Krempf & Beyes, 2011), institutions (Wing, 2014), and further serious aspects of life. The problem, however, is in the fact that serious games seem to work particularly well if this well-defined distinction collides (Andersen, 2001, 2011). Yet, this very distinction between the fun in games and the seriousness of all additional purposes remains in the core of both definitions of and controversies on the nature of serious games. And it is against the background of this “paradox of serious games” (Rockwell & Kee, 2011) that authors such as Marc Prensky (2001) and Michael Zyda (2005) declare that entertainment should come first in serious games, thus challenging one of the most canonical definitions according to which “a serious game is a game in which education (in its various forms) is the primary goal, rather than entertainment” (Michael & Chen, 2006, p. 287; cf. also Abt, 1987).

The present article, however, does not take for granted the oscillating, oxymoronic, or paradoxical nature of serious games, which is the underlying assumption of even the most enthusiastic approaches to serious plays and games (Bjerg, 2011; Statler, Roos, & Victor, 2009; Roos, Victor, & Statler, 2004). Rather, our aim is to find out how we need to observe serious games so that they at all appear as paradoxes. Starting from the observation that any form of observation is an inherently paradox operation, we will ask what it takes to make the observation of serious games appear particularly paradoxical.

In the following section of this article, we will introduce basic concepts of form theory, that is, a theory–method based on the observation of the paradoxical nature of all forms of observation. We will then present the paradox of serious games as a special case of the general observation paradox and ask how we need to conceive of serious games so that they can at all appear a research and design paradox. In focusing on this question, we followed the advice that the “creation of solutions to a paradoxical design situation often requires the development and creative redefinition of that situation” (Dorst, 2006, p. 14). We hence use the tetralemma, an ancient structure from traditional Indian logics that has been used many times to redefine

problems, to redesign the paradox of serious games. Eventually, we will find that the paradoxical observation of *serious games* points at prevailing implicit predefinitions of both the form *game* and the different media games are played in.

The Paradox of Observation

In this theory statement, we are rejecting the categorical separation of theory and method, consider it a mistake (Elias, 1978), and rather assume that a theory actually acts as a methodology whenever the theory applies its own distinctions not only to its objects of observation but also to the theory itself. Because of this self-application, the theory not only observes but also indicates how its observations come about and may be replicated.

The quality of such a theory–method is not in its robustness against falsification or the richness of the data it is grounded on, that is, not in the number of problems that have been solved by or for the theory, but rather in the scale and scope of scientific problems this theory allows to generate (Merton, 1959). As paradoxes themselves are notorious for the scale and scope of problems they generate, the scientific observation of the paradox calls for a theory–method that is able to generate problems big enough in which to resolve the observation of the paradox. For this reason, we are referring to form theory (Spencer Brown, 1979), because form theory starts from the fundamental paradox inherent to every form of observation. From a form theoretical perspective, nothing is special about paradoxes, which is why in using form theory we are able to treat the observation of the paradoxical nature of serious games as just a special case of a general observation paradox.

The basic idea of Spencer Brown's (1979, p. 1) form theory is that the observation of something is based on the distinction of this something from something else: "We take as given the idea of distinction and the idea of indication, and that we cannot make an indication without drawing a distinction. We take, therefore, the form of distinction for the form." Observing something hence means concurrently drawing a distinction *and* pointing at one side of the distinction. Such observation is an inherently paradox operation: A duality is both unfolded and indicated as a unit. The starting point of form theory is already a movement: Everything that appears is appearing only because of a distinction and indication that carries the inherent paradox that indication is only possible based on a distinction of distinction and indication (Kauffman, 1987, p. 58). If we now recall that distinctions are drawn to indicate one (and not the other) side of the distinction and therefore have to be distinguished from the distinguished, then we realize that this paradoxical reentry of the distinction of distinction and indication is present in all forms of observation (Spencer Brown, 1979, p. xxix-xxx). The observation paradox therefore does not stop at the observation of the paradox.

In looking at the specific observation paradox of the observation of the paradox, we are confronted with the paradox that "the operation of observing (. . .) includes the exclusion of the unobservable, including, moreover, the unobservable par

excellence, observation itself, the observer-in-operation” (Luhmann, 1995, p. 44). The form of the form obviously is a paradox (Luhmann, 2001, p. 247). In this sense, the paradox may be defined as a self-contained form containing no sign of potential external Archimedes points from which it could be observed and with observation as the prime example of a paradox. Consequently, the paradox is in the observation, in every form of observation, every time and everywhere. In other words, a paradox is observed whenever an observation points at the observation itself.

The Paradox of Serious Games

Once we have accepted the surely not too shocking insight that every form of observation is paradoxical, we find that every paradox can be solved (only) by a new form of observation. In other words, we can resolve paradoxes by moving from one paradox to another, which also means that the appeal of a scientific observation of the paradoxes is not in their resolution but rather in the question why a given observer is fascinated by a given paradox.

In order to be and keep on being fascinated by the oxymoron or “paradox of serious games” (Rockwell & Kee, 2011) rather than the tautology of serious games, an observation must observe the form serious games as robust to a considerable number of classical de-paradoxing strategies (Luhmann, 2001, p. 249). Normally, observed paradoxes can be resolved:

1. by instructions (observe this, not that),
2. by the sequencing of observations (e.g., in the form of observational programs, “First observe this, then that”),
3. by the distinction of different observers (he is observing this, whereas she is observing that), including the two temporally different observers we are when we try to observe our own observations.

Thus, if we want to keep on observing serious games as paradoxical forms, then we need to assume that neither of these strategies may be satisfactorily applied to serious games. Exactly this is the case in the discourse on serious games. Both instruction and sequencing strategies may be observed, for example, in the case of the *game (first) focus* of Prensky (2001) or Zyda (2005) versus the *seriousness (first) focus* as proposed by Abt (1987) or Michael and Chen (2006); and both strategies are eventually personalized as viewpoints of different authors, as it has just been the case in the present lines. Although “all playing is being played” (Butler, Olaison, Sliwa, Sorensen, & Spoelstra, 2011, p. 330; Gadamer, 1975, p. 106), the paradox is sometimes also sourced out of the serious game and into individual players of the game, whose seriousness is then seriously up for debate. In this sense, playful states have recently been observed as failed states (Andersen, 2011, p. 429).

Neither of these strategies, however, proves helpful to redesign the paradox of serious games insofar as any of these de-paradoxing strategies may rightly be

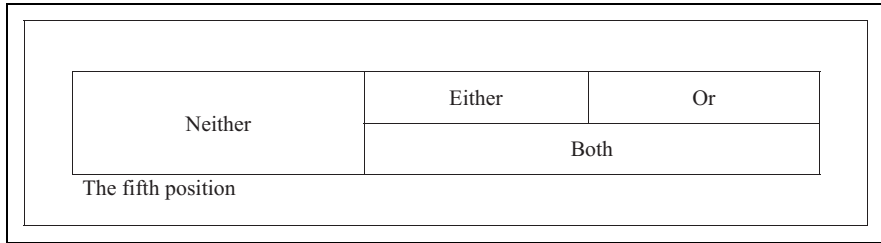


Figure 1. The tetralemma (own figure).

countered with another de-paradoxing strategy. If we, however, recall that paradoxes cannot be disposed of once and for all, but only resolved in larger paradoxes, then we find that the major tool against issues related to the paradox of serious games is in a hyperparadoxing strategy such as the tetralemma (Jayatilleke, 1967).

Originally, this structure from traditional Indian logics has been used many times to define attitudes and viewpoints a judge in court can have toward two conflicting parties (cf. Figure 1).

From the perspective of the tetralemma, the judge has not only the dilemma of finding in favor of *either* the one party *or* the other but also may consider the option that *both* or *neither* of the parties is right. The fifth position represents the idea that both the concrete and the general tetralemma themselves are contingent forms of problem descriptions; in this context, the judge may find that either his observation of the case or the use of the tetralemma is not right.

In our present case, we may use the tetralemma as a game that shows that games provide an alternative way of pursuing communication even when one form of communication or another is confronted with its blocking paradoxes (Luhmann, 1999), that is, the definitely functional veils of ignorance that cover the irreducibly paradoxical nature of any form of communicative. Thus gamifying serious games, we find that serious games can not only be considered *either* (predominantly) serious *or* (predominantly) gamy but also *both* serious and gamy and *neither* serious nor game (but rather, e.g., a form of a “corruption of games,” Caillois, 2001, p. 43). The real moral of the story of the tetralemma, however, is in the observation of the fifth position, just because this position forces the observation of any given tetralemma to move outside its own box and seek for both the difference it makes and the medium it is drawn in.

The Re-form of Serious Games

In approaching the relationship of form and medium from a form theoretical point of view, we are immediately confronted with the paradox that every form is a form in a medium, the latter of which can only be addressed in the form of another form (drawn in another medium). The complexity yet involved in the observation of this

definition is already a good reason for why forms are commonly coded as forms of two sides. In this sense, the observation of a code refers to the observation of a form without its medium, whereas the observation of a medium refers to the observation of a form without its code.

These nuances are important if it comes to the distinction of paradoxes and related concepts such as dualities, dilemmas, and dialectics. In this context, we find that dualities as the coded forms of paradoxes are not to mixed up neither with paradoxes nor with dilemmas, the latter concept of which refers to dualities recoded not in the medium of the general paradox, but in the medium of a specific paradox called decision. Dialectics finally indicate decisions as (contradictory) forms and relate them to (integrative) media, the latter of which are turning into forms themselves as soon as they are indicated and therefore, in the end, may be challenged by contradicting forms themselves.

In looking at the serious games, we find that the only medium in which the form serious games may be drawn is a double form of four sides, with one of these sides being the form serious games. In other words, to end up with a form called serious games, we need to distinguish serious from unserious and game from nongame. In combining these two distinctions, serious games then appear as one perfectly well-defined category among the alternatives serious nongames, nonserious games, and nonserious nongames. Though it remains hard to answer the question which question such a double form of two sides might be an answer to, we find it easier now to illustrate that the form serious games does not appear particularly paradoxical. In fact, it becomes apparent that serious games may be observed as contradictory only if games are considered inherently unserious and the serious inherently ungamey. Although the fact that such a peculiar constellation—in which the insides of two codes (serious, game) are mutually defined by each other's outside (unserious, nongame)—results in the observation of rather contingent definitions rather than in the observation of paradoxes, it is quite popular in the discourses on serious games in general and their paradoxical nature in particular. The lure in this case of—intersect—circular reasoning is in its hidden background assumptions, read: in the medium in which this specific convergence of two actually independent distinctions takes place. If we follow Johan Huizinga (1970, p. 8), then playing is not serious insofar as it represents a form of “stepping out of ‘real’ life into a temporary sphere of activity with a disposition all of its own,” however. This argument, however, satisfies us only if we accept the idea of a real life out there, and only if we assume that this serious real life is the standard from which play just deviates. A similar issue arises if we assume that a game is characterized by the observation of two or more players who agree that “(t)hese actions, in which we now engage, do not denote what would be denoted by those actions which these actions denote” (Bateson, 1972, p. 185–186), where, again, the definition is developed against the background of a supposedly real meaning or interpretation of the denoted actions. Even more recent approaches to games as “hard fun” (Papert, 1998), or indeed the career of the concept of serious games itself (Djaouti et al., 2011), seem to start from the assumption that

games have to be either defended against or linked back to a real life made of serious goals, purposes, and intentions. If necessary, sometimes even at the cost of a reinforced paradox: Is it not that “play itself contains its own, even sacred, seriousness” (Gadamer, 1975, p. 102)?

If we recall the fifth position of the tetralemma, however, then we may consider games simply gentle reminders of the contingent nature of socialness (Baecker, 1999, p. 103). In fact, play has been observed as “a communicative socialness characterized by its doubling of this socialness so that the social reality becomes visible in play” (Andersen, 2011, p. 425). Developing this idea further, we find that the point about plays and games is less in their supposedly unserious nature, but rather in their capacity of generating *alternative* social realities (Sørensen & Spoelstra, 2012) and, thus, in the exit options they bring about. If we actually do without the assumption that some social realities are more real than others, then it appears that playing is by no means just a matter of a few specialized actors, childhood years, or evening hours. Rather, games may be considered interactions observed in the light of alternatives. We might recall that our ability of changing interactions and playing different roles has increased ever since the dawn of the medieval (Roth, 2013) and that it keeps on growing as the present multimedia revolution accelerates (Roth, 2014a). Different accounts and avatars indeed allow for even more alternatives personalities and inter-/actions.¹ Consequently, it is, of all things, the increasing *virtualization* that makes the increasing multiplication of entry-and-exit options and, hence, the increasing ludification or gamification of society (Bogost, 2011; Deterding, Dixon, Khaled, & Nacke, 2011b; Deterding, Khaled, Nacke, & Dixon, 2011a; Raessens, 2006; Roth & Schneckenberg, 2012; Young et al., 2012) more *tangible*. In an increasingly ludified or gamified society, however, games are ubiquitous, with the result being that games must be taken for serious, just because if games are considered omnipresent, then present realities can hardly be defined in opposition to games anymore. In this sense, the introduction chapters of works on the supposed paradoxical nature serious games, most of which share the idea of an *increasing* gamification, give the best evidence of the fact that serious games are not more of a paradox than any other form of observation.

Serious Gamification and Other Conclusions

In the present article, we challenged the idea of the dialectic, oxymoronic, or paradoxical nature of the concept serious games. We referred to the tetralemma, a form of traditional Indian logics, to resolve the supposed paradox of serious games into the larger paradox of observation. As a result, we found that the concept of serious games may be considered a paradox or oxymoron only if we presume the existence of a real life and define games as deviations therefrom (e.g., if we “believe that games can achieve great things in the real world,” cf. Ferrara, 2013, p. 290). The larger paradox involved in the paradoxical observation of serious games is therefore in the fact that the observation of an increasing gamification of society leads to a

situation in which so-called real lives cannot be defined in contrast to games, but only in consideration of the omnipresence of games in real life. As parts of these realities, games cannot be defined as unserious escapes from serious realities, anymore. If games are parts, if not integral parts, of all social realities, then this has major implications for all attempts of communication design, which, in the future, may be focused on the design of paradoxes rather than on their resolution.

Against this background, the major benefit of the form serious game seems to be that the serious part of the game form eventually points at the medium in which the game makes a difference. In this sense, researchers in serious games are well advised to leave the wonder about this initially oscillating form to developers and distributors, who may still use the wrong first impression to better sell both their particularly serious and particularly unserious games. Instead of going on with penetrating into the nature of a supposed paradox, however, researchers could explore the impact the observation of games has on and in the most different media. This media analysis would not have to stop at the distinction of different forms of dissemination media but could also focus on the roles games play in different symbolic media (Chernilo, 2002) such as money, power, or truth as well as in the corresponding function systems of society (Roth, 2014b). In doing so, we may then find that “the freedom of play is thus opposed to the servitude of work” (Krempf & Beyes, 2011, p. 467) only if we observe games in the medium of politics and, thus, fade out that games can also be games of money (Bjerg, 2011), illegal or—even for supporters of sports teams—simply beautiful (Kretchmar, 1989). Such an extended media analysis may not only allow for the detection or defense of alternatives to capitalist *games of empires* (Dyer-Witthof & De Peuter, 2009) but also support the idea that the observation of games is more accepted in some function systems (e.g., sport and art) than in others (e.g., law and religion). As the observation of games has indeed much to do with the essentially modern observation of alternatives that can be played off against each other, the observation of different paces of gamification in the different media would also indicate different levels of engagement in the observation of alternatives and, hence, different decisional margins of the individual function systems. Although it remains impossible for a function system to step outside their own binary code (Luhmann, 1992), serious games may come into play if these sidesteps need to be at least simulated to manage the system’s own blocking paradoxes (Luhmann, 1999). If the emerging sciences of games (Bjerg, 2011; Zyda, 2007) take the observation of the recent gamification of society seriously, then it appears that the blocking paradox of the concept *game* is no longer to be found in canonical distinctions of fun and seriousness, which may have worked well in the context of labor societies. Rather, ambitions to pinpoint games may be well advised to remain gamy themselves at least as long as it takes to divine the first clearer contours of the next society.

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Note

1. The corresponding expansion of behavioral margins is observed to increase the individual creativity (Lau, 2012).

References

- Abt, C. C. (1987). *Serious games*. Boston, MA: University Press of America.
- Alexiou, A., Schippers, M., & Oshri, I. (2012). Positive psychology and digital games: The role of emotions and psychological flow in serious games development. *Psychology, 3*, 1243–1247.
- Alvarez, J., & Michaud, L. (2008). *Serious games. Advergaming, edugaming, training and more*. Montpellier, France: IDATE.
- Andersen, N. Å. (2001). *Power at play. The relationships between play, work and governance*. Basingstoke, England: Palgrave Macmillan.
- Andersen, N. Å. (2011). Who is Yum-Yum? A cartoon state in the making. *Ephemera. Theory and Politics in Organization, 11*, 406–432.
- Baecker, D. (1999). The form game. In D Baecker (Ed.), *Problems of form* (pp. 99–106). Stanford, CA: Stanford University Press.
- Bateson, G. (1972). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution, and epistemology*. Chicago, IL: University of Chicago Press.
- Bekebrede, G., & Mayer, I. (2006). Build your seaport in a game and learn about complex systems. *Journal of Design Research, 5*, 273–298.
- Bianconi, F., Saetta, S. A., & Tiacci, L. (2006). A web-based simulation game as a learning tool for the design process of complex systems. *Journal of Design Research, 5*, 253–272.
- Bjerg, O. (2011). Poker phases: Draw, Stud and Hold'Em as play-forms of capitalism. *Ephemera: Theory & Politics in Organization, 11*, 450–465.
- Bogost, I. (2011). *Persuasive games: Exploitationware*. Retrieved from http://www.gamasutra.com/view/feature/6366/persuasive_games_exploitationware.php/
- Boughzala, I., Bououd, I., & Michel, H. (2013). *Characterization and evaluation of serious games: A perspective of their use in higher education*. System Sciences (HICSS), 2013 46th Hawaii International Conference on IEEE, 844–852.
- Butler, N., Olaison, L., Sliwa, M., Sorensen, B. M., & Spoelstra, S. (2011). Work, play and boredom. *Ephemera: Theory & Politics in Organization, 11*, 329–335.
- Caillois, R. (2001). *Man, play, and games*. Chicago: University of Illinois Press.
- Charsky, D. (2010). From edutainment to serious games: A change in the use of game characteristics. *Games and Culture, 5*, 177–198.
- Chernilo, D. (2002). The theorization of social co-ordinations in differentiated societies: The theory of generalized symbolic media in Parsons, Luhmann and Habermas. *The British Journal of Sociology, 53*, 431–449.

- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011a). From game design elements to gamefulness: Defining gamification. In A. Lugmayr, H. Franssila, C. Safran, & I. Hammouda (Eds.), *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9–15). New York, NY: ACM.
- Deterding, S., Khaled, R., Nacke, L. E., & Dixon, D. (2011b). Gamification: Toward a definition. *CHI 2011 Gamification Workshop Proceedings*. Vancouver, BC: Canada.
- Djaouti, D., Alvarez, J., Jessel, J.-P., & Rampnoux, O. (2011). Origins of serious games. In M. Ma, A. Oikonomou, & L. Jain (Eds.), *Serious games and edutainment applications* (pp. 25–43). London, England: Springer.
- Dormann, C., Whitson, J. R., & Neuvians, M. (2013). Once more with feeling: Game design patterns for learning in the affective domain. *Games and Culture*, 8, 215–237.
- Dorst, K. (2006). Design problems and design paradoxes. *Design Issues*, 22, 4–17.
- Dyer-Witheford, N., & De Peuter, G. (2009). *Games of empire: Global capitalism and video games*. Minneapolis: University of Minnesota Press.
- Elias, N. (1978). *What is sociology?* London, England: Hutchinson.
- Ferrara, J. (2013). Games for persuasion: Argumentation, procedurality, and the lie of gamification. *Games and Culture*, 8, 289–304.
- Gadamer, H.-G. (1975). *Truth and method*. London, England: Continuum International Publishing Group.
- Geelen, D., Keyson, D., Boess, S., & Brezet, H. (2012). Exploring the use of a game to stimulate energy saving in households. *Journal of Design Research*, 10, 102–120.
- Huizinga, J. (1970). *Homo ludens: A study of the play element in culture*. London, England: Paladin.
- Jayatillicke, K. (1967). The logic of four alternatives. *Philosophy East and West*, 17, 69–83.
- Johns, R., & Shaw, J. (2006). Real-time immersive design collaboration: Conceptualising, prototyping and experiencing design ideas. *Journal of Design Research*, 5, 172–187.
- Kauffman, L. H. (1987). Self-reference and recursive forms. *Journal of Social and Biological Structures*, 10, 53–72.
- Krempf, S.-T., & Beyes, T. (2011). Work = work ≠ work: In defence of play. *Ephemera: Theory & Politics in Organization*, 11, 466–481.
- Kretchmar, R. S. (1989). On beautiful games. *Journal of the Philosophy of Sport*, 16, 34–43.
- Lau, K. W. (2012). A study of students' learning experiences in creativity training in design education: An empirical research in virtual reality. *Journal of Design Research*, 10, 170–188.
- Luhmann, N. (1992). The coding of the legal system. In G. Teubner & A. Febbraio (Eds.), *State, law, and economy as autopoietic systems: Regulation and autonomy in a new perspective* (pp. 145–185). Milano, Italy: Giuffrè.
- Luhmann, N. (1995). The paradox of observing systems. *Cultural Critique*, 31, 37–55.
- Luhmann, N. (1999). Sign as form. In D. Baecker (Ed.), *Problems of form* (pp. 46–63). Stanford, CA: Stanford University Press.

- Luhmann, N. (2001). Die paradoxie der form. In O. Jahraus (Ed.), *Niklas luhmann: Aufsätze und reden* (pp. 243–261). Stuttgart, Germany: Philipp Reclam jun.
- Merton, R. K. (1959). Notes on problem-finding in sociology. In R. K. Merton, L. Broom, & L. S. Cottrell, Jr (Eds.), *Sociology today: Problems and perspectives* (pp. 9–34). New York, NY: Basic Books.
- Michael, D. R., & Chen, S. (2006). *Serious games: Games that educate, train, and inform*. Boston, MA: Thomson Course Technology.
- Papert, S. (1998). Does easy do it? Children, games, and learning. *Game developer (June 1998)*, p. 88.
- Prensky, M. (2001). Fun, play and games: What makes games engaging. In M. Prensky (Ed.), *Digital game-based learning* (pp. 1–31). New York, NY: McGraw-Hill.
- Raessens, J. (2006). Playful identities, or the ludification of culture. *Games and Culture*, 1, 52–57.
- Ritterfeld, U., Cody, M. J., & Vorderer, P. (2009). *Serious games: Mechanisms and effects*. New York, NY: Routledge.
- Rockwell, G. M., & Kee, K. (2011). The leisure of serious games: A dialogue. *The International Journal of Computer Game Research*, 11. Online source available at http://gamestudies.org/1102/articles/geoffrey_rockwell_kevin_kee
- Roos, J., Victor, B., & Statler, M. (2004). Playing seriously with strategy. *Long Range Planning*, 37, 549–568.
- Roth, S. (2013). Dying is only human: The case death makes for the immortality of the person. *Tamara Journal for Critical Organization Inquiry*, 11(2), 37–41.
- Roth, S. (2014a). Fashionable functions: A Google ngram view of trends in functional differentiation (1800-2000). *International Journal of Technology and Human Interaction*, 10(2), 34–58.
- Roth, S. (2014b). Coining societies: An inter-functional comparative analysis of the Euro. *Innovation: The European Journal of Social Sciences*, 27(4), 99–118.
- Roth, S., & Schneckenberg, D. (2012). The gamification of innovation. *Creativity and Innovation Management*, 21, 460–461.
- Sørensen, B. M., & Spoelstra, S. (2012). Play at work: continuation, intervention and usurpation. *Organization*, 19, 81–97.
- Spencer Brown, G. (1979). *Laws of form*. New York, NY: E. P. Dutton.
- Statler, M., Heracleous, L., & Jacobs, C. D. (2011). Serious play as a practice of paradox. *The Journal of Applied Behavioral Science*, 47, 236–256.
- Statler, M., Roos, J., & Victor, B. (2009). Ain't misbehavin': Taking play seriously in organizations. *Journal of Change Management*, 9, 87–107.
- Swertz, C. (2009). Serious games taken seriously. *Eludamos. Journal for Computer Game Culture*, 3, 7–8.
- Wing, C. (2014). Hitting walls (v. XXVIII): Captured play. *Games and Culture*, 9, 442–453.
- Young, M. F., Slota, S., Cutter, A. B., Jalette, G., Mullin, G., Lai, B., . . . Yukhymenko, M. (2012). Our princess is in another castle: A review of trends in serious gaming for education. *Review of Educational Research*, 82, 61–89.
- Zyda, M. (2005). From visual simulation to virtual reality to games. *Computer*, 38, 25–32.
- Zyda, M. (2007). Creating a science of games. *Communications of the ACM*, 50, 26.

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