

Values-Based Transformative Games: From the Physical to the Digital

Khushbu Tilvawala¹, Michael Myers¹, Ton Spil² and David Sundaram¹

¹The Department of Information Systems and Operations Management, University of Auckland, Auckland, New Zealand

²Faculty of Behavioural, Management and Social Sciences, University of Twente, Enschede, The Netherlands

k.tilvawala@auckland.ac.nz

m.myers@auckland.ac.nz

a.a.m.spil@utwente.nl

d.sundaram@auckland.ac.nz

Abstract: In the context of game-based learning, learning is often limited to basic literacies such as math and reading, even though several educational institutions acknowledge the importance of Values education. In this paper we discuss how to bring values into a game. We discuss the design and implementation of a customisable version of the popular board game, Snakes and Ladders to teach values to the young (ages 0-8). Values refer to “a centrally held, enduring belief which guides actions and judgements across specific situations...”. This implies that there is an inherent element of choice or decision-making in demonstrating one’s values. We discuss the process of adapting the Snakes and Ladders board game to a physical artefact by applying a Values-based Transformative Games Design Model, and further digitizing the artefact to make it more accessible. A prototype of the digital artefact is presented to demonstrate the concept. The Insider Action Game Design Research methodology is applied to create a physical artefact given the researcher’s involvement in volunteer work on values-based education for the young. The findings of this research are of immediate benefit to those wishing to introduce a digitized version of a simple and popular board game to teach values to young children. The values-based questions used in the game are easy to adapt so the game has the potential to be extended to various other basic literacies, as well as different types of values such as sustainability and cultural values. The Values-based Transformative Games design model can also be adapted and improved with further research.

Keywords: Values, Transformative games, Young, Serious games, Sustainability, Game design

1. Educational Board Games

Educational board games are a popular and timeless means of teaching players whilst having fun. Human beings learn best from play and taking advantage of collective intelligence, the two qualities of most educational board games (Mackay, 2013). Educational board games are also available for all ages, making them versatile, highly accessible and collaborative.

Popular educational games are designed to train players in areas such as Maths, Reading, Science and Strategy. More recently, researchers recognise that educational board games have the potential to lead players into taking action in their communities in areas such as wellbeing and sustainability (Mulcahy, Zainuddin and Russell-Bennett, 2021; Pope, 2021) i.e., transformative. Boardgames represent a subset of ludic artefacts, defined as objects of play which require players to directly interact with them in order to produce their narrative effect (Bos, 2018). Van Delden (2019) concludes that the immersion in board games can be really high, an often used argument for applying new technologies. Board games simultaneously allow for social facilitation (cf. Marks (1998) remark about Risk that the computer-mediated game might actually hinder social facilitation). They argue for effect studies of possible immersion combined with the recent rise of cooperative against board games. In essence, normal board games can have an educational value but transformational board games can have much more value.

We acknowledge this power of educational board games and we propose that educating for action or transformation requires a focus on the *values* of a player (section 2). Spil and Bruinsma (2016) introduce the Value proposition game based on Osterwalder and Peigneur model (2005), a card game to determine the future value of a game idea. Determining value in an early stage of creating the serious game helps in reaching the goals later.

In this paper, we discuss the design and implementation of a values-based and customisable version of the popular board game, Snakes and Ladders. We demonstrate the application of a Values-based Transformative Games Design Model (section 3) to create both a physical artefact (section 4), as well as a digitized artefact (section 5) adapted from the Snakes and Ladders board game.

The findings of this research are of immediate benefit to those wishing to introduce a digitized version of a simple and popular board game to teach values to the young. The actual values-based questions used in the game are easy to adapt so the game has the potential to be extended to various other basic literacies, as well as different types of values such as sustainability and cultural values. Practitioners such as game designers can also apply the Values-based Transformative Games Design model for other types of games, both physical and digital. Last, but not least, researchers can further validate the Values-based Transformative Games Design model, as well as enhance it with other game design constructs not considered in this research.

2. Values Education for the Young

The concept of values has been suggested as a core concept across all the social sciences (Allport, Vernon and Lindzey, 1960; Rokeach, 1973; Schwartz, 2012), and is used in a variety of contexts – personal, family, organisational, and societal. In the personal context, we can define values as “central desires or beliefs regarding final states or desirable conducts that transcend specific situations, guide the choice and evaluation of our decisions and, therefore, of our conducts, becoming an integral part of our way of being and acting to the point of shaping our character” (Schwartz & Bilsky, 1987) in (Argandoña, 2003). This is a social psychology perspective on values. Similarly, Rokeach (1973) views a value as “a centrally held, enduring belief which guides actions and judgements across specific situations and beyond immediate goals to more ultimate end-states of existence”. This implies that values do not change too much over time. Researchers on values also explain that these beliefs guide us across our various life situations, and that they are different to other psychological constructs such as traits, norms, needs, preferences, worldviews and roles because there is an element of choice or decision-making in values (Marini et al., 2018; Schwartz, 2012).

In this research, “the young” refers to those between the ages of 0 to 8 years old. According to UNESCO, this may also be referred to as early childhood, a period when remarkable brain growth takes place, laying the foundation for subsequent learning and development (UNESCO, 2015). Researchers find that children begin to absorb values early on in life (Halstead and Taylor, 2000) and that we probably develop a moral sense within the first two years of life (Kagan and Lamb, 1987; Buzzelli, 1992). This is closely linked with emotional and social development (Dunn, 1988; Kuebli, 1994) in the young, which is a crucial factor in our long term well-being. Since play and learning are intertwined aspects in a young person’s life, most of this learning takes place during play. A lot of the literature on the young is therefore centred around play. In fact, research has found that play takes the shape of a “didactic device”, such that to an extent, our identity also depends on the games we played in our childhood, and on how much we played (Farné 2005).

This research acknowledges that the best medium to provide this education is through play, and that the prevalence of digital mediums for play present a good opportunity to provide values education to the young.

3. Values-Based Transformative Games Design

In this section we present a model to design values-based transformative games (Tilwala, Sundaram and Myers, 2019). The model outlines various levels of game design when the objective is to foster and sustain a value in a player. These levels are represented as parts of a model where one level leads on to the next. For example, if you want the player to learn the value of conserving energy, it is important to first *educate* the player on why conserving energy is important, then engaging them in a scenario to recognize how energy may be conserved. This engagement helps them appreciate this value and hence persuade them of its importance. Next, the player has the opportunity to reflect on their own practices in the real world and make decisions in the game, based on these practices i.e. subtle changes in a player’s decision-making process. The more a player *practices* and acknowledges the importance of the value, it becomes a habit. This leads to *transformation* in the player’s values. The goal is to take the player through these levels, and even iterating within each level to transform and *sustain* the values being learnt through the values-based digital game.

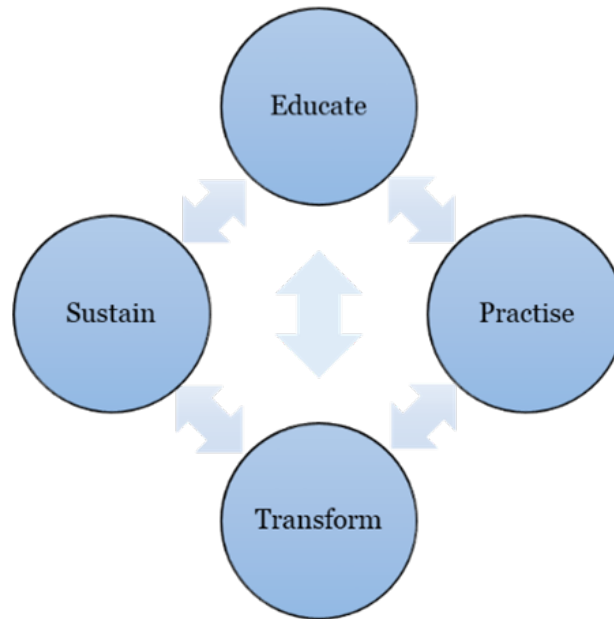


Figure 1: Values-Based Transformative Games Design (Tilwawala, Sundaram and Myers, 2019)

4. Physical Artefact

The objective of this research is well suited to be first explored using a physical artefact, followed by the creation of the intended digital artefact. The intention is to leverage the experience, feedback and observations of designing and implementing the physical artefact to guide the design and implementation of the digital artefact.

The value of having physical artefacts prior to digital artefact design are multi-fold. In this research context, the foremost role of the physical artefact is to validate the artefact with the target users, in this case, the young.

We apply an Insider Action Game Design Research (Figure 2) methodology (adapted from Jrad, Ahmed and Sundaram, 2014), a combination of Action research, Design Science and System Development (Nunamaker, Chen and Titus Purdin, 1991; Avison *et al.*, 1999; Hevner *et al.*, 2004; Sein *et al.*, 2011). This methodology is of particular relevance given the researcher's involvement in volunteer work in values-based education for the young.

Design input may be gathered via observation. The physical artefact also acts as an iteration of design science research as per the guideline of viewing design as a search process (Hevner *et al.*, 2004). Another objective of this research is for the digital artefacts to influence players' values in the real world. The physical artefact helps assess this objective with a more tangible artefact, and the ability to view players' reactions and progress in the game in person. Further, the learning from the process of creating the physical game artefact also contributes to the process for creating the digital game artefact. Nuances in the game content, mechanics and logic are easier to observe across a larger target user group for rich, collective feedback in a physical setting. In essence, the physical artefact is another perspective of the game, to aid in a more robust game design (Schell, 2014).

Next, we discuss the four phases of creating the physical artefact – observation, theory building, game development and evaluation.

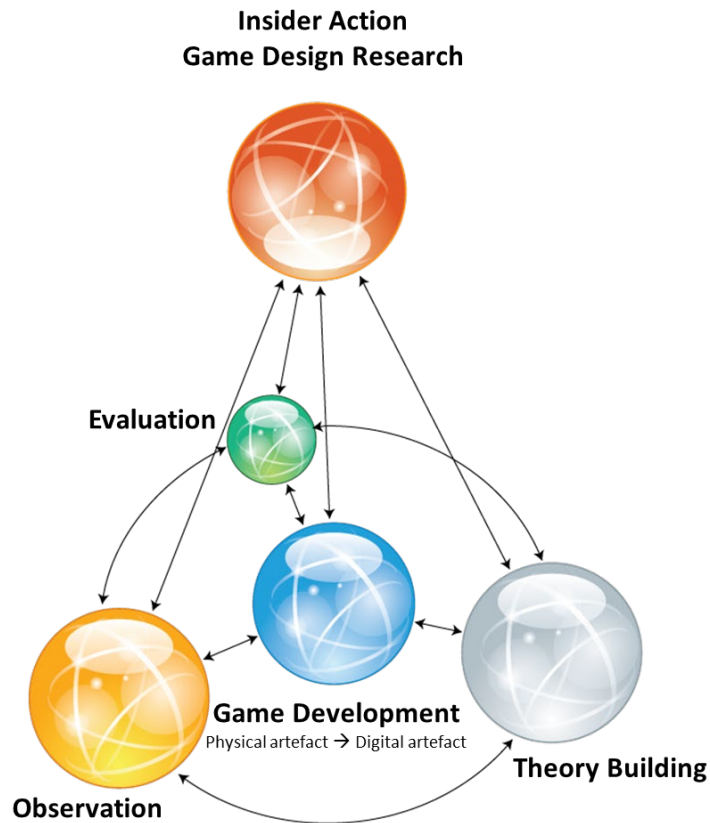


Figure 2: Insider Action Game Design Research: From the physical to the Digital (Adapted from Jrad et al., 2014)

4.1 Observation

The objective of observation is to gain a general understanding of the research area, to understand the factors driving the research decisions (Nunamaker, Chen and Titus Purdin, 1991).

The researcher's role as a volunteer at a values-based school was observed to be in synergy with the efforts to create conceptual and system artefacts to guide the design and implementation of values-based games. The idea to design a physical values-based game for the children to play and engage with came about as part of the general activities at the values-based school. The researcher played a more active role in this process after this objective was outlined. First, the options for the game were brainstormed. The group was assigned approximately 30 minutes to play the game, there was also a readily available checkered playground floor, and the age group assigned for this activity were 5 to 6 year-old children.

Given these considerations, the consensus amongst teachers planning the activity was to design a life-sized board game for play. Several popular board games were shortlisted, including Ludo, Tic Tac Toe, Snakes and Ladders as well as memory games like Go Fish. Snakes and Ladders was eventually the unanimous game of choice given its familiarity and easy to follow rules.

One of the criteria when selecting the game was for the rules to be straightforward and easy to understand for a 5 to 6 year-old child. The purpose of the game was to reinforce some everyday universal values that the children were familiar with while having fun, so they do not spend too much time understanding the rules of the game, but instead, stop and think about the consequences of decisions (values-based).

Research about the history of the game further convinced the team of teachers working on the live sized game of its suitability. Snakes and ladders is an ancient Indian board game with roots in morality where the player's progression up the board represented our complex life journey made of virtues (ladders) and vices (snakes) (Augustyn, 2004). It is also commonly used to teach basic literacy to children e.g. counting, basic addition, sequence and patterns of numbers (Newmonic, 2016). For the life-sized game, the goal was to leverage Snakes and Ladders to reinforce positive values by demonstrating the consequences of practising these values via the day-to-day decisions we make. The idea was to go beyond basic literacy, and these goals somewhat aligned

with the roots of the game where ladders depict the positive and snakes depict the lack of positive. The next section discusses how Snakes and Ladders is designed for the purpose of this research.

4.2 Theory Building

At a macro level, the objective of theory building is to develop new ideas and concepts, including conceptual models or frameworks (Nunamaker, Chen and Titus Purdin, 1991). The purpose of these “theories” is to guide the design of the system as well as to guide the observations. In this research, the application of the Values-based Transformative Games Design model (Figure 1) is assessed. The model has four parts – Educate, Practise, Transform and Sustain. The physical game aims to “educate” the players, in this case, 5 to 6 year-old children about some universal values. In this instance, it is assumed that the children are already familiar with these values and the game will help reinforce these further.

The execution of this game and observations of the physical game being played help guide the design and implementation of the digital artefacts, much like an iteration in design science research (Hevner *et al.*, 2004). Further, the physical artefact itself contributes as another medium for children to learn about values, a complementary artefact to the digital artefacts envisioned in this research.

In essence, the purpose, vision, and rules of the physical game are the same as a potential digital game, but its execution, scalability, portability, and experience change with a digital medium. To exemplify this theory, the physical game of Snakes and Ladders is designed into a live sized values-based game for children. The teachers chose to include some universal values for this game (Schwartz and Bilsky, 1987; Schwartz, 1992). The objective was to exemplify the universal values via scenarios for “Snakes” and “Ladders” in the game, where “Snakes” represented scenarios where a value was lacking and “Ladders” where a value was present. The presence of these values would mean progressing faster through the game, and the lack of the value would slow one’s progress. The scenarios for the “Snakes” and “Ladders” were carefully worded and reviewed a few times and adapted these to ensure they were neutral to all cultures and not introducing an undesired or negative value through the game.

The next section discusses the implementation and execution of the physical artefact.

4.3 Games Development

The objective of the game development phase is to test the feasibility of the conceptual artefacts proposed earlier via the design and implement a physical values-based game (Hartmanis, 1993). The artefact that results from system development then functions as a bridge between the technological research (concept stage) and the social research (impact stage) (Nunamaker, Chen and Titus Purdin, 1991).

The Snakes and Ladders game in this research is created as a design iteration for a digital values-based adaptation of the popular game Snakes and Ladders. The activity encourages positive values in 5 to 6 year-olds by taking them up the ladder for eliciting a positive value, and down a snake for a negative value, or lack of a positive value. The activity was planned such that children played on a live sized snakes and ladders board, which was hand-drawn based on a typical Snakes and Ladders game board (Figure 3). The list of values-based scenarios brainstormed in the theorising phase were prepared into chits to be handed out to the players every time they landed on a Snake or Ladder. The rules and mechanism of the game remained the same, with the added layer of the chits to reinforce the values by providing a reason for either going up the ladder or coming down a snake.



Figure 3: Live Sized Snakes and Ladders Board Designed for Values-Based Play

4.4 Evaluation

This section evaluates the appropriateness of the methodology applied for creating the physical artefact, the relevance of the physical game design elements, and the overall effectiveness of the game. This is in line with Hevner et al.'s (2004) design science research guidelines to include a rigorous evaluation of the artefact designed to determine its usability, quality and effectiveness; and that a design artifact is considered 'complete and effective' when it satisfies the requirements and constraints of the problem it was meant to solve. Our objective in this phase of the research, however, is not to create a complete and effective artefact, but one that serves as an iteration to guide the next iteration of artefact design and implementation. This is more closely aligned with principle 5 in Sein et al's (2011) stages and principles proposed for the ADR methodology. Given the multi-methodological approach to Insider Action Design Research, we adapt Hevner et al.'s (2004) Design Science evaluation guidelines to evaluate the physical artefact.

The physical artefact design, in this case, the live sized, values-based Snakes and Ladders game is underpinned by several conceptual, procedural artefacts and system artefacts. These are included in the evaluation. All the categories of Hevner et al.'s Design Evaluation Methods are applied to this research and adapted to fit the context (Hevner et al., 2004).

Conceptual artefacts refer to the concepts, models and theories driving the game design. Here we first evaluate the appropriateness of the IAGDR methodology used. In this context, this is done via Observational, Experimental and Descriptive Methods (Hevner et al., 2004). The adaptation of the methodology was appropriate for this context, with the pre-existing relationship between the researcher and the teachers involved in designing the values-based game. The methodology is seen as fit for the purpose of this research because it not only addresses a research problem outlined for design science, but also fulfils an organization's objective of creating an effective, engaging, and enjoyable values-based game for their 5 to 6 year-old students (Informed Argument). Then we evaluate the Values-based Transformative Games Design model via Observational, Experimental and Descriptive methods. We also evaluate the values (Schwartz and Bilsky, 1987) used in the artefact and the theory underpinning the choice of values (Bandura, 2001) via Observational, Analytical, Experimental and Descriptive evaluation methods.

Next, we evaluate the procedural artefacts i.e. the artefacts associated with the process of playing the game, as well as the post-game debrief process. The evaluation of this artefact is primarily via the Observational and Descriptive methods to assess the short term goal of reinforcing positive values in an engaging and enjoyable way, including post-game observations and feedback from teachers and players.

Finally we evaluate the actual artefact/system artefact, the live sized Snakes and Ladders board. This is evaluated via all five categories of the design evaluation methods – Observational, Analytical, Experimental, Testing and Descriptive (Hevner et al., 2004). A team of 4 teachers, including the researcher designed the game, with 7 players. The game was evaluated, both via observing its implementation, and having in-depth discussions about the game from conception to post-implementation. This included an analysis of the usability, effectiveness, and appropriateness of the artefact for the intended outcome of reinforcing selected universal values in the players. Overall, the feedback on the physical game was positive – from the teachers that designed and observed. Table 1 summarises the design evaluation methods applied to evaluate the physical values-based game of Snakes and Ladders.

Table 1: Physical Values-Based Snakes and Ladders Game Design Evaluation

		Evaluation Method								
		Observational	Analytical		Experimental		Testing		Descriptive	
Evaluation Artefact		Field study	Static Analysis	Dynamic Analysis	Controlled environment	Simulation	Black box testing	White box testing	Informed Argument	Scenarios
Conceptual	Insider Action Game Design Research Methodology	x			x				x	

		Evaluation Method								
		Observational		Analytical		Experimental		Testing		Descriptive
	Transformative Game Design Model	x			x	x			x	
	Universal values	x			x				x	x
	Social cognitive theory of games (Bandura, 2001) [Concept of the game]	x	x		x	x			x	
Procedural Artefacts	Game process: Habit formation process	x							x	
	Post-game debrief process	x							x	
System Artefacts	Live sized Snakes and Ladders game	x	x	x	x	x	x	x	x	x

5. Digitized artefact

In this section we discuss the design and implementation of a digitized artefact based on the experience of designing and implementing the physical artefact. This is discussed in terms of what we observed, theory building, the development of the digitized game, and its evaluation.

5.1 Observation

First, we reflect on the physical Snakes and Ladders values-based game compared to other physical values-based games for the young, and literature on values-based games for the young. We find that there are only a handful of games that are specifically values-based, and for children. The values-based version of the Snakes and Ladders game is not novel, yet not used commonly for this context today. Several articles surprisingly point to its roots for values education in ancient India, a fact none of the teachers were aware of prior to conceptualising this game. The live sized board was noted to be a novel and fun approach compared to the board game.

Other research projects studying values in games also included a physical/tangible game iteration prior to designing or suggesting a framework for digital values-based game design (Belman *et al.*, 2011; Flanagan and Nissenbaum, 2014; Spil and Bruinsma, 2016; Kheirandish and Rauterberg, 2018). Common modalities for physical values-based games are board games, including cards, or memory card games. When studied through the social cognitive theory lens and the Values-based Transformative Games Design Model, all these games are mostly focused on the “Educate” part of the model, and “Practice” where the game is played repeatedly, with the players gaining familiarity with the value scenarios in the game.

5.2 Theory Building

Following the evaluation of the game, two possible variations of the game are considered (applicable both to the physical artefact, or a digital version of the game). Firstly, the option to flip the game mechanism to include decision-making by the player. I.e., some boxes on the Snakes and Ladders board are marked to indicate a decision-making scenario. Based on the decision made by the player, either a Snake or a Ladder appears to demonstrate consequences of the different decisions. The player wins by getting through the board first but this time, it is not just a matter of chance i.e., landing on a Snake or Ladder, but rather, their decisions help them get through the board faster.

Another alternative is to have the scenarios on some of the boxes on the Snakes and Ladders board. The player is then required to guess whether the scenario calls for a Snake or a Ladder, and the selected option then appears. The player scores points for guessing this correctly, so the winner is not the player that gets through the board first, but the player that scores the maximum number of points.

These alternative mechanisms may be a more indicative way to demonstrate the impact and effectiveness of the game, as well as evaluate other aspects of the Values-based Transformative Games Design Model.

5.3 Game Design

The variations of the game also provide the potential to build a repository of values' scenarios to pick from. For instance, we picked Universal Values to demonstrate the implementation of the physical artefact in this section, but in a digital context, a player or game facilitator may choose values related to sustainability.

The other benefits of a digital version are to help reach more players globally. Having a digital version also provides the opportunity to include a link to the real world. Our digital and physical worlds are closely intertwined, helping us tap into the potential of digital games to transform in the real world.

An instantiation of a potential digital version of the values-based Snakes and Ladders game is as shown in Figure 4. The specific values in the game are good health and wellbeing in the young through healthy habits. This is a universally recognised value as part of the 17 UN sustainable development goals – sustainable goal 3.



Figure 4: Digitized Values-Based Game of Snakes and Ladders

5.4 Evaluation

The digitized artefact was evaluated informally via observation of players navigating through the game. Some initial feedback included having a bigger snakes and ladders board, having the ability to customise player icons and colours, the possibility of having levels so players can advance from basic to more complex questions about the values involved, making the value being communicated more visible and explicit, and lastly, to have a dynamic question bank so players don't get bored with the same questions across the board.

6. Conclusion

This research discusses how games can be designed to go beyond being educational to transforming behaviour. This can be done via the design and implantation of values-based games because it is the fostering and changing of one's values that leads to transformation.

The aim of this research was to demonstrate the design and implementation of a values-based and customisable version of the popular board game, Snakes and Ladders via a Values-based Transformative Games Design Model. We created both a physical artefact, as well as a digitized artefact adapted from the Snakes and Ladders board game to demonstrate this.

We focused on values for related to good health and wellbeing in the young through healthy habits, a universally recognised value as part of the 17 UN sustainable development goals.

The Insider Action Game Design Research (adapted from Jrad, Ahmed and Sundaram, 2014) methodology was applied to create a physical artefact given the researcher's involvement in volunteer work in values-based education for the young. The experience, feedback and observations of designing and implementing the physical artefact was then used to guide the design and implementation of the digital artefact.

The key contributions from this research are the conceptual artefacts proposed such as the Values-based Transformative Games Design model and process of creating a physical artefact followed by a digital artefact, and the evaluation process. The findings of the research are of immediate benefit to those wishing to introduce a digitized version of a simple and popular board game to teach values to the young. The actual values-based questions used in the game are easy to adapt so the game has the potential to be extended to various other basic literacies, as well as different types of values such as sustainability and cultural values. Practitioners such as game designers can also apply the Values-based Transformative Games Design model for other types of games, both physical and digital. Last, but not least, researchers can further validate the conceptual artefacts, as well as enhance them through future research.

References

- Allport, G. W., Vernon, P. E. and Lindzey, G. (1960) 'Study of values.'
- Augustyn, F. J. (2004) *Snakes and Ladders, Dictionary of toys and games in American popular culture*. Haworth Press.
Available at: https://en.wikipedia.org/wiki/Snakes_and_ladders.
- Avison, D. E. et al. (1999) 'Action research', *Communications of the ACM*, 42(1), pp. 94–97.
- Bandura, A. (2001) 'Social Cognitive Theory: An Agentic Perspective', *Annual Review of Psychology*, 52(1), pp. 1–26. doi: 10.1146/annurev.psych.52.1.1.
- Belman, J. et al. (2011) 'Grow-A-Game : A Tool for Values Conscious Design and Analysis of Digital Games', in *Think Design Play*.
- Bos, D. (2018) 'Answering the Call of Duty: Everyday encounters with the popular geopolitics of military-themed videogames', *Political Geography*, 63, pp. 54–64.
- Buzzelli (1992) 'Young children's moral understanding: learning about right and wrong', *Young Children*, 47(6), pp. 47–53.
- van Delden, R. et al. (2019) 'How Serious is Serious Game Design?-Exploring Entertainment-Oriented and Goal-Oriented Gaming', in *European Conference on Games Based Learning*. Academic Conferences International Limited, pp. 767–XXIII.
- Dunn, J. (1988) *The Development of Social Understanding*. Cambridge, MA: Cambridge University Press.
- Farné, R. (2005) 'Pedagogy of Play', *Topoi*, 24(2), pp. 169–181. doi: 10.1007/s11245-005-5053-5.
- Flanagan, M. and Nissenbaum, H. (2014) *Values at Play in Digital Games*. The MIT Press.
- Halstead, J. M. and Taylor, M. J. (2000) 'Learning and Teaching about Values: A review of recent research', *Cambridge Journal of Education*, 30(2), pp. 169–202. doi: 10.1080/713657146.
- Hartmanis, J. (1993) 'Some observations about the nature of computer science', in *International Conference on Foundations of Software Technology and Theoretical Computer Science*. Springer, pp. 1–12.
- Hevner, A. et al. (2004) 'Design Science in Information Systems Research', *MIS Quarterly*, 28(1), pp. 75–105.
- Jrad, R. B. N., Ahmed, M. D. and Sundaram, D. (2014) 'Insider Action Design Research a multi-methodological Information Systems research approach', in *2014 IEEE Eighth International Conference on Research Challenges in Information Science (RCIS)*, pp. 1–12. doi: 10.1109/RCIS.2014.6861053.
- Kagan, J. and Lamb, S. (1987) *The Emergence of Morality in Young Children*. London: University of Chicago Press.
- Kheirandish, S. and Rauterberg, M. (2018) 'Human value based game design', in *2018 2nd National and 1st International Digital Games Research Conference: Trends, Technologies, and Applications (DGRC)*. IEEE, pp. 6–16.
- Kuebli, J. (1994) 'Young children's understanding of everyday emotions', *Young Children*, 49(3), pp. 36–47.
- Mackay, R. F. (2013) 'Playing to learn: Panelists at Stanford discussion say using games as an educational tool provides opportunities for deeper learning', *Retrieved November, 23*, p. 2015.
- Marks, M. P. (1998) 'Using the Game of " Risk" to Teach International Relations', *International Studies Notes*, pp. 11–18.
- Mulcahy, R. F., Zainuddin, N. and Russell-Bennett, R. (2021) 'Transformative value and the role of involvement in gamification and serious games for well-being', *Journal of Service Management*, 32(2), pp. 218–245.
- Newmonic, D. (2016) *Educational value of Snakes and Ladders, Newmonic Language Resources*. Available at: <http://www.speechlanguage-resources.com/simple-board-games.html> (Accessed: 26 November 2021).
- Nunamaker, J. F., Chen, M. and Titus Purdin (1991) 'JMIS systems development in IS research Nunamaker.pdf', *Journal of Management Information Systems*, 7(3), pp. 89–106.
- Osterwalder, A. et al. (2005) 'Business model generation', *Business Model*.
- Pope, L. (2021) 'Board games as educational tools'.
- Rokeach, M. (1973) *The nature of human values*. Free press New York.
- Schwartz, S. H. (1992) 'Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries', in Zanna, M. P. B. T.-A. in E. S. P. (ed.). Academic Press, pp. 1–65. doi: [https://doi.org/10.1016/S0065-2601\(08\)60281-6](https://doi.org/10.1016/S0065-2601(08)60281-6).
- Schwartz, S. H. (2012) 'An overview of the Schwartz theory of basic values', *Online readings in Psychology and Culture*, 2(1), pp. 919–2307.

- Schwartz, S. H. and Bilsky, W. (1987) 'Toward a universal psychological structure of human values.', *Journal of Personality and Social Psychology*, 53(3), pp. 550–562. doi: 10.1037/0022-3514.53.3.550.
- Sein, M. K. et al. (2011) 'Action Design Research', *MIS Quarterly*, 35(1), pp. 37–56. doi: 10.2307/23043488.
- Spil, T. A. M. and Bruinsma, G. (2016) 'Designing serious games with the game of games', in *Proceedings of the European Conference on Games-based Learning*, pp. 634–643. Available at: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84996605368&partnerID=40&md5=e8c41f6318e16b3b0026436981eb4249>.
- Tilwala, K., Sundaram, D. and Myers, M. D. (2019) 'Serious games for sustainable development: a decision-driven transformative approach'.
- UNESCO (2015) *Early childhood care and education*. Available at: <http://www.unesco.org/new/en/education/themes/strengthening-education-systems/early-childhood/>.