

[Long Paper]

Play design and sense-making: players and games as digital interactive contexts for effects of sense

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Abstract. Exploring how meaningful experiences are addressed through digital interactive artefacts, this research investigates how design choices and techniques impact on emerging interactive experiences supporting *effect of sense*. *Effect of sense* is a semiotic phenomenon emerging between the perception of a designed product and the final receivers [1]. While it has been deeply explored for material product and tangible features [2], this paper investigates how the intangible dimension of digital interactive experiences mediates *effect of sense*. The focus is on digital interactive artifacts that enable meaningful play experiences [3], beyond traditional forms of entertainment and engagement that consider game void boxes without value and ideologies within. The paper advances this approach questioning in how many ways it is possible to enable *effects of sense* designing interactive processes, sensorial and perceptive features of games. This objective is driven by the emerging trend that shifts the attention towards digital representations and interactive contexts potentially carrying senses - and meanings - overcoming the conventional interpretation of meaningful play as prepackaged experiences decided by the designer *a priori*. The paper presents a selection of games as case study to enlighten the design dimensions and the techniques employed, in order to validate our hypothesis and set the basis for a design framework that moves from the wide concept of meaningful play to the design of interactive experiences based on sense-making processes.

Keywords: Play design, meaningful play, effect of sense, interaction design.

1 Introduction

The paper introduces a new perspective to the design of digital interactive artifacts that enable meaningful play experiences. Starting from Salen and Zimmerman [3] definition of meaningful play as the experience emerging from the relationship between players input and feedback received, prior researches [4][5][6][7] investigated the rhetorical value of play experience beyond the traditional pattern of engagement as defined by the entertainment industry. Indeed, an increasing number of games and experiments have been designed to investigate the expressive potential of

digital representation in transferring ideas and visions. The resulting digital games provide players novel interactive experiences that experiment at different degree with all the design dimension of a game. The games presented through the paper guided our exploration to identify the interactive techniques and the languages that contribute to the emergence of meaningful play. Although it is very common to use the words “meaningful play”, very few researches have tried to formalize the different techniques designers use as a “grammar” to design what they defined as meaningful. The objective of this research is to set the basis for the definition of a design framework that describes the relationship between interactive, perceptive and sensorial effects and the emerging sense making processes enabled through the play experiences. Through the paper, this approach requires to focus the attention from the concept of meaningful (play) to *effects of sense* (and sense making processes). To better frame the perspective of this paper, I refer to Krippendorff’s definitions of senses and meanings[8]. According to Krippendorff [8] “sense is the feeling of being in contact with the world without reflection, interpretation, or explanation. It involves all senses: seeing, hearing, touching, tasting, smelling, and even the kinesthetic sense.” Thus senses and sense making processes are the background of meaning that indeed “restores perceived differences between what is sensed and what seems to be happening.” Following this definition meanings - and meaningful experiences - emerge from the relationship between sense(-making processes) and the context of interaction, in my case.

Thus, this paper investigates how through the language of interaction, interactive dynamics and behaviors, formal attributes of digital games the designer can elicit interpretative processes in players, before to focus on specific meanings and messages.

Before to start the analysis of the games, the next paragraph reframes the definition of play experience in order to understand better the relationship between games, play, interactive experience and *effect of sense*.

2 Theoretical Foundation

2.1 Play: a perspective about digital representation, interactivity and effect of sense

For the purposes of the paper play is defined as an interactive process between the players and the elements of the game – rules, setting and representation [9]. Considering interactivity as the intrinsic characteristic of play underlines the perceptive and cognitive aspects of play and the dimension of signification [10] made by players on the base of the information and signs perceived. As stated by Ware in [11] indeed perception, interaction and cognition are three dimensions of a same complex process that drive our interpretative processes: “Seeing is all about attention, and when we interact with an information display, such as a map, diagram, chart, graph, or a poster on the wall, we are usually trying to solve some cognitive problem”[11]. This approach allows exploring the potentialities of digital interactive representations in games from the perspective of generation of sense by players through the interactive system of signs and perceptive dimensions that characterized

the games. According to some cognitive theories indeed every time we interact and perceive world representation (such as digital games) we are immerse in a process of coding/decoding of information received, trying to establish a connection with our previous knowledge or giving sense to the new information received [11][12]. For this reasons we agree with Manovich's [13] definition of interactivity as not only physical but also psychological: despite the type of artifact we are interacting with, we are always trying to recall previous information, reordering knowledge or filling in the missing one.

Giving the above assumption, play design is a design action on senses emerging through the interactive experience of play. In semiotic *effect of sense* is a phenomenon enabled by the designer through a *product of sense* (the interactive artifact in our case) [1], and tied for definition to the knowledge build on the perceptual level [14]. Sense making, for example, is that cognitive process that allows us to recognize the form of an animal in a cloud. How are effects of sense elicited through the design of play experiences? The paper will reframe the concept of meaningful play investigating the different ways an interactive process could support the process of making-sense acting on cognitive and perceptual levels through formal attributes of interactions. In more detail the perspective we are adopting is that one of interpreting the players as a reader and the designer as a writer. As the *second level reader* defined by Eco [15], the main idea beside our interpretation of meaningful play, is that the designer is like a writer providing the "interactive" text through which the reader can establish, connection and interpretation. However since the designer can't actually foresee how every player will interpret the game, by defining the interactive system and the dimension of the game, she/he is providing the context for the experience to emerge.

In next paragraphs I will analyze a selection of video games explaining how meaningful play has been afforded by game designers.

3 From play to meaningful play

When games and play started to be considered for their expressive potentialities granted by interactivity and the idea that "doing means also understanding" [4], a number of researches from digital humanities and game studies have started to focus their attention to meaningful play and the use of games beyond traditional forms of entertainment. Describing games as digital and interactive representation means to not only focus on games as a conventional system of rules for engaging players, but more as an interactive context containing instructions and that requires players to establish a connection between the information received beyond pure engagement and entertainment purposes, thus play becomes meaningful play. In our collection of case study we focused on some specific type of games, mostly experimental and/or designed by independent game designers. This choice is guided by the fact that it is in this type of games that experimental play has been mostly explored instead of responding to the traditional objectives of the entertainment industry. The preliminary framework outlined at the end of the paper tries to formalize and derive some best practices from an ongoing process of experimentation, to understand in a broad sense

how we can design interactive artifacts that elicit effects of sense and are meaningful, while defining formal and aesthetics attributes of interactive experience.

To develop this preliminary framework I analyzed five different games – *The Marriage*, *Passage*, *Proteus*, *Portal*, *Luxuria Superbia* - that provide meaningful play experiences acting on different formal dimensions of the game.

3.1 The Marriage

The Marriage by Rod Humble (<http://www.rodvik.com/rodgames/marriage.html>) is an experimental prototype in which game designer's feel about the marriage is translated into an interactive system: every interaction with and among the game elements is designed to digitally "retrace" the interplay between two partner, their reciprocal needs and behaviors in respect to each other and the external world. The two "characters" of the game are two colored square (pink and blue) representing the two sides of the marriage and moving slowly within a fixed area (Fig.1). External "forces" to the relationship are represented by grey and black circle. The objective of the player is to interact with the graphic avoiding or allowing certain interaction to happen between the two squares and the circles, in order to preserve the life of the two squares, in fact, the existence of the marriage. Following the instruction given by the game designer, here it is how the game uses the interactive process to retrace how the marriage works for the designer: *"You have two controls. 1) When you mouse over the blue or pink square the blue square reduces in size and both squares move towards each other. 2) When you mouse over a circle it disappears and the pink square gets smaller. When the edge of the blue square collides (or "kisses") with the edge of the pink square (but not when they overlap): the blue square shrinks slightly and becomes more transparent. The pink square grows slightly and becomes less transparent. When the blue square touches any coloured circle but black then the blue square becomes less transparent and grows in size to a significant degree. When the pink square touches any coloured circle but black then the pink square grows in size slightly. When the pink or blue square touch a black circle they shrink significantly. As time passes the pink square becomes more transparent. When squares collide with things then a white bar at the bottom of the screen increases in size. When either the pink square or blue square shrink to nothing or become totally transparent then the game is over. The general game flow will be balancing the need to have the pink & blue squares "kiss" to insure the pink square does not fade from the marriage versus the blue square needing to touch the circles to insure it does not fade."*

Despite the player can share or not the view proposed by the designer, this is an example of how designing a system in which the effects of the decisions of player are evident should support interpretative processes. Indeed, the author affirmed that: "The game was created to be played, to be enjoyed by each person exploring the rules and how it related to their own life" (<http://www.rodvik.com/rodgames/marriage.html>).

From designer's perspective the statement is clear: he designed the interactive system planning exactly how the player should play and which are the consequences – and the implicit meanings - of every player's decisions. It is a prepackaged play experience that we can define meaningful as it is aimed at delivering a specific message to players.

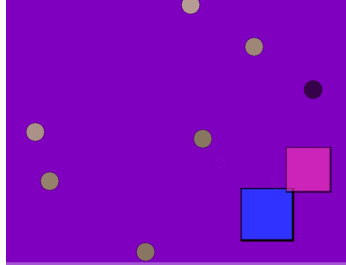


Fig. 1. *The Marriage*, interface: the two squares represent metaphorically the two side of the relationship, while the grey and the black circles the external forces

The game is valuable for the purposes of this paper because it explores different design dimensions of the game: 1) expressiveness of the interactive process (later explain in this paper as *procedural rhetoric* [6]); 2) metaphors; 3) absence of sounds and music.

With the expressive power of interactive process, we are referring to the use of game mechanics to reproduce and explain a situation, a context or a system during the play experience. The designer expresses his point of view or a vision about a situation and a system by digitally translating it. Through the play experience players experience situations, controversies and life issues.

As a matter of the fact, procedural rhetoric has his foundation in mechanics and rules considered as a peculiar dimension of games. Their consumption process differs from other type of media and this makes them more effective in persuade or deliver a message. Procedural rhetoric was defined by Bogost [6] as the possibility to explain how a system works and deliver information through game mechanics and modeling the system of rule assembled together in order to evocate a real system: “[...] an argument made by means of a computer model. A procedural rhetoric makes a claim about how something works by modeling its processes in the process-native environment of the computer rather than using description (writing) or depiction (images).”[16]

Thus according to *proceduralist*, meaningful play emerges through the correspondence between the interactions made possible in the game, the interactive process which is build over time, and the adherence to directly or metaphorically evoke the real life or the context the designer want to suggest or criticize.

The marriage is a fully exploration of this approach indeed the decision to use the metaphors of two squares is justified by the conviction that rules and mechanics are strong enough in tracing a system. The use of a graphical metaphor actually could be ambiguous: even if it could be intriguing and it elicits the sense-making process of players, on the other side it could be that the players don’t get designer’s statement.

In the end a final consideration has to be done for the absence of sound and music. As we will see in other examples, the presence of sounds could be useful in the construction of the play experience, here their absence is aimed at driving the attention to mechanics and their implicit meaning as defined by the designer.

3.2 Passage

Passage is an experimental video game by Jason Rohrer (<http://hcssoftware.sourceforge.net/passage/>). In this video game the player experiences a male character lifetime as a linear process: the player can only move the character from left to right, or up down to explore the space constrained in a small rectangular portion of the screen (Fig. 2). While the character is moving in the space, he can collect treasures until he finally meets a female character. If you decide to touch her, the two characters start their journey moving together within the game space, even if the relationship makes the collection of treasures tougher. Meanwhile, time passes and both the characters get older, until at the end of the game they both die.

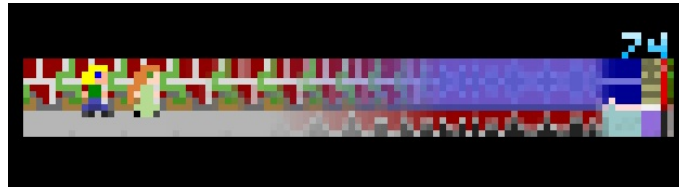


Fig. 2. *Passage*, interface: the linear frame and the two characters moving together

Passage expresses and investigates metaphorically the human condition. Effect of sense here is tied to the following dimensions: 1) interaction possibilities; 2) storytelling and metaphors; 3) time dimension;

Interaction possibilities refers to the actions made possible to the players within the game world. In *Passage* they are limited (in respect for example to *The marriage*) but enough to describe metaphorically the lifetime condition. Together with the metaphor of the linear journey where you can encounter treasures and people, the limited interaction is designed to evoke what actually is our “passage” in our life: a moment framed between a start and an end, through which different things may happen, but we can experience only a small part of them. Indeed, it is possible to play the game different times deciding if play alone or with the female character making experience of two totally different life. Another dimension that contributes to storytelling is time: while you move the character in its limited pixel world time passes, you get older and you can’t escape from your destiny, death.

3.3 Proteus

Proteus (<http://www.visitproteus.com/>) by Ed Key and David Kanaga is a “game of audio-visual exploration and discovery” in an open world in which the interactivity consist only in exploring and adventuring from a first person perspective a unique world, a dream-like island drawn in pixel art that change every time it is played (the game world is procedurally generated). The game starts with you opening eyes (Fig.3a) finding yourself in the middle of the sea. On the horizon you see an island from which some sounds and music seem to come. When you decide to approach the island, you discover a colored world to explore (Fig. 3b), without any specific instruction. There is no interactivity with game elements, as for example animals you

can casually encounter run away. The sounds change according to player's position, it is silent at the top of an hill, or richer of effects within the hill. There are no instruction on how to move or proceed, unless when during the night, as time has passed, some flashing lights detach player's attention. Moving within the lights the player passes to the next "season". Each island differs from the previous one, changing slightly as it happens in real world from spring to summer, from summer to autumn, from autumn to winter. The changes regard sounds, as well also graphical mood. The end of the game is different every time, and in the end you finally close your eyes.

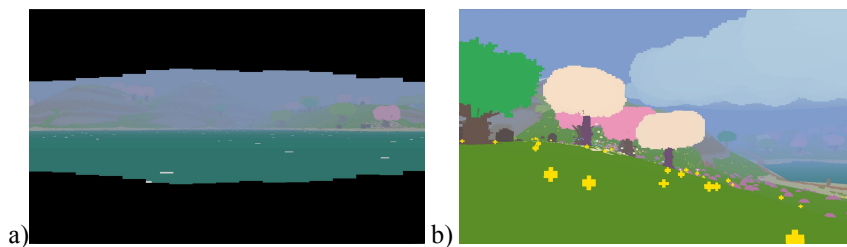


Fig. 3. *Proteus*: a) opening scene; b) landscape of one islands

Like in *Passage*, effect of sense here is tied to few interaction possibilities (the primary means of interaction is simply your presence in the world) even if this time there is no any constraints in terms of objective or time: the player can only walk and move in the landscape, or sit down, like taking a rest, and look around without any specific goal, in a meaningless way, because there aren't game elements to interact with. In this example every player is free to interpret the play experience. We can compare the minimal interactive techniques to the art of "hesitation" of some literary works, defined by Eco [15] as the decision to stop the narration and introduce description paragraph or leave something incomplete in order to elicit readers' curiosity or open the possibility of imagination and interpretation of future actions. The perception is that you are playing a game that is saying: "So what to do?"

I think this is what happens in *Proteus*: instead that having a clear message or a statement reflected in a strict system or rules, the designer is providing an interactive context, an experience of exploration that has its sense in its apparently nonsense and un-interactivity. Exploring this dimension of no-interactivity, the effect of sense is left to the player.

For its definition as audio-visual exploration game graphical and sound style play a key role in providing an intriguing aesthetic experience. The surrounding landscape and its inhabitants creates the sounds and the music that change accordingly to the season you are exploring, becoming even slower and silent in autumn and winter. A second dimension affecting the play experience is the variable of time. While exploring the island time passes from day to night, and from a season to another one, contributing to the perception of a story to be discovered and interpreted.

The examples analyzed until now are at two opposite sides: from one side there is the exploitation of well defined mechanics and procedures and clear designer's statement, on the other one, the reduction of interactivity at its minimum without a clear

meaning. In the next paragraphs, we will see two other types of games that explore effect of sense focusing more on perceptive experience.

3.4 Portal

Portal (<http://www.valvesoftware.com/games/portal.html>) by Valve software, is an hybrid between a first person shooter and a brain teasers: players must solve physical puzzle, opening portals, moving objects through the portal in ways that are usually impossible and that subvert common gravity rules (Fig.4).

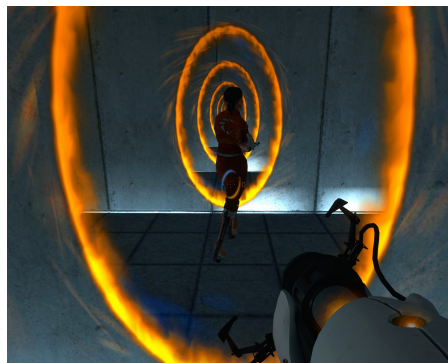


Fig. 4. *Portal*, an example of controversial situation through the opening of the portal

In this case the interestingness of the game is granted by the experimental gameplay based on solving perceptual puzzle requiring the player a cognitive effort to make “sense out of noise”. The controversial and surreal way the objects and the player move towards the portals supports that natural activity of our brain to find sense where everything seems senseless and controversial in respect to our previous mental models [17] [18]. In *Portal* there is no a message or a statement expression by the designer, however it enlightens a gameplay technique that is interesting for the player for itself and for the pleasure of solving a puzzle picture like it happens for optical illusions. Our brain is constantly pushed between two or more possible but incoherent visual solutions, and this is considered more alluring for our brain, that a one-way explicit solutions [17]. *Portal* explores the dimension of visual perception introducing unexpected cause-effect reactions that contrast with previous players’ knowledge. Exploring this dimension grants effect of sense tied to the constant tendency to find coherence in an interactive representation while applying our previous experience of the world.

3.5 Luxuria Superbia

Luxuria Superbia (<http://luxuria-superbia.com/>) by Tale of Tales is defined by its authors as a “simple game of touch, pleasure and joy made for fingers on touchscreens and joysticks on computers. *Luxuria Superbia* is a musical journey from

the sensuous to the spiritual. Exciting designs explode from your gestures as you glide through tunnels, beautiful as flowers. It's all about the experience and the interaction.” *Luxuria Superbia* is an artistic and emotional game: it is based on the metaphor of a garden, where you play with 12 different flowers-like tunnels. The game clearly evokes its sensual nature. The player has to color every flowers by “caressing” the “petals” while in same time satisfy the request of the flower, paying attention to the feedback received by the flower itself: colour intensity changes, increasing soundtracks, descant hums and sigh, or the text occasionally appearing on the screen (“touch me”, “keep going”) (Fig.5).

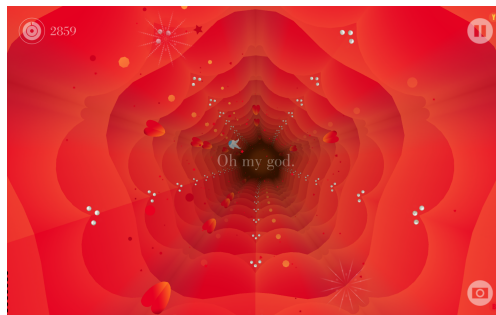


Fig. 5. *Luxuria Superbia*, one of the flower to color and the feedback text

The effect of sense here derives from the way you interact with the screen. The modality of interaction – the metaphorical act of caressing the flowers – contributes clearly to the effect of sense because there is continually a dialogue between player’s way to caress the flower (fast, slow etc) and the feedback received. More the player is able to interpret the feedback received and to adjust his actions, more the result will be higher and the flowers will be satisfied.

The effect of sense would probably not be the same in other ways, and this is the reason why it works very well on touchscreen devices. In this case the design of interactions modality, plus coherent sounds and visual effects was effective in creating a play context that becomes meaningful as it glues to previous players experience and knowledge. Here the sense effect is supported by the capability to recall through interaction something already known by players, while creating the digital interactive context to play with this knowledge.

Portal and *Luxuria Superbia* are designed to produce effect of sense exploring different design dimensions and also two different ways to produce effect of sense. While in *Portal* the interactive system is designed to be controversial in respect to previous mental model, introducing and requiring the acceptance of new knowledge, in *Luxuria Superbia* the effect of sense is driven by the capability to recall previous information and make player experience it through the digital representation.

4 Results and Discussion

4.1 Describing meaningful play

This analysis allows deriving some design guidelines and reflections to better frame the relationship between formal dimensions of the play experiences and the “effects of sense” produced. Considering the limited number of case study presented, this is a preliminary contribution to be further expanded in future researches.

The preliminary results enlighten a novel conception to the design of meaningful play making a step back and framing the problem around the sense making process activated in players and on the effects of sense carried by the way we interact with the game and its formal dimensions. Indeed, different interactive languages are employed reflecting different approaches towards the formal dimensions of games and their meaningful use, while also reflecting different ways game designers interpret their roles towards players’ experience. Interpreting the design action as the process to create products that are not only material and formal dimensions but also senses and meanings [14] [21], designing games means to design interactive spaces, contexts, and play experiences that carry information used and interpreted by final players.

Through the paper five main design aspects of games were outlined:

Procedural rhetoric: the use of rules and mechanics to retrace and explain a system and deliver a message, a perspective, a point of view on specific topic and real issues. The interactive process is designed to evoke a specific context and interactive dynamic, and creating new knowledge connection in players.

Metaphors: graphical language or interactive processes retrace abstract and intangible concepts for “understanding and experiencing one kind of thing in terms of another.” [19] For our purposes metaphors are useful as the translation of concepts between two different fields contribute at eliciting effect of sense every time players try to establish a meaningful connection between their preexisting knowledge and the metaphorical contents experienced through the game.

Interaction possibilities and Interaction modalities: the interactions made possible through the game affect the number of ways players can interact with the game world and thus receiving more or less information by interacting with it. In some games, especially in the case of procedural rhetoric interactive possibilities are more complex and aimed at the construction of sense by the players through the system of interaction. In other game, like *Proteus* indeed, interaction possibilities are reduced at their minimum, and the effect of sense arise from the absence of a clear sense behind the minimum possible actions, as well as other dimensions of the game (like sensorial effects, time and storytelling). Together with interaction possibilities, interaction modalities define the formal aspect of interactions, the “how” [20] you interact with game elements. In *Luxuria Superbia* for example, the way you interact with the flowers contributes to the effect of sense in significant way, as it directly evokes a specific context and situation. The type of action itself carries the meaning.

Sensorial and perceptive effects: exploiting the multisensory features of digital games, play with sensorial and/or perceptive effects can act as reinforcement to the interactive experience. In *Proteus* or *Luxuria Superbia* we have seen how sounds and music aren't only "cosmetic features" but reinforce the sense of some actions made by player, as they change accordingly to players input and movement within the game. In *Portal* conventional perceptive experience is subverted requiring players to interpret and adapt to the novel reference system.

Perception of Time and Storytelling: the final dimension is time. In some games, like *Passage* or *Proteus*, the dimension of time is fundamental as it contributes to the perception of a narration within the game and thus the possibility for the player to look for a sense in the interactive process in respect to the time that passes.

Finally, the different uses of these strategies allows also to map the games in a matrix according two main axis:

- A. Meanings/Senses: how much the play experience is constrained to specific meanings (rhetoric) or sense-making (dialectic): if from one side there are games designed to deliver a specific experiences (through for example procedural rhetoric – *The marriage*, *Passage*), from the other one there are games that activate a dialectic relationship with the player, leaving a higher degree of freedom in the process of interpretation (*Proteus*).
- B. Recalling knowledge/Subverting knowledge: the paper identified how different interactive techniques in a game could glue to previous players' knowledge in different ways. From a cognitive perspective, the effect of sense plays with our previous experience: recalling previous information, subverting previous knowledge and introducing new knowledge connections.

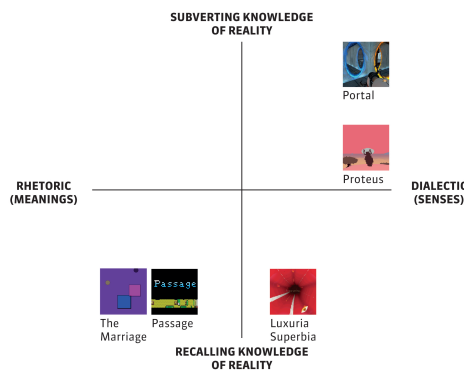


Fig. 6. Map of the games analyzed

5 Conclusion and future research

In conclusion the contribution of the paper is to approach meaningful play not only as the possibility to convey clear messages to players, but more as the design of interactive experiences for "effect of sense". This change of paradigms has two main

consequences. First of all the process of interpretation of players is the focus of the play experience. This means that if from one side the designers can not foresee exactly how the experience will be perceived, from the other side it is their responsibility to investigate and become aware of the potential meanings and sense making processes activated by the interactive languages of digital product through the intangible dimensions of play. In second instance the contribution of meaningful play as activator of effect of sense is useful to open a discussion around an emerging field of interaction design in which interactive experiences mediated by digital technology based artefacts have started to be considered as something more than void box for entertaining or solving needs.

Future researches will expand this initial framework by analyzing other type of games and refining the definition of the different interactive techniques found until now.

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References

1. Zingale, S.: *Gioco, dialogo, design. Una ricerca semiotica*, Milano, ATi Editore, pp. 9-10 (2009)
2. Gatti, E., Bordegoni, M., Spence, C.: Investigating the influence of colour, weight, and fragrance intensity on the perception of liquid bath soap: An experimental study. *Food Quality and Preference*, Vol. 31, pp. 56-64, Elsevier (2014)
3. Salen, K., Zimmerman, E.: *Rules of Play: Game Design Fundamentals*. Cambridge MA, The MIT Press (2004)
4. Frasca G.: *Play The Message, Play, Game and Videogame Rhetoric*. PhD Dissertation, IT University of Copenhagen, Denmark (2007)
5. Rusch D.: *Mechanisms of the Soul: Tackling the Human Condition in Videogames*. In *Proceedings from DiGRA* (2009)
6. Bogost I.: *The Rhetoric of Video Games*. In K. Salen, edited by, *The Ecology of Games: Connecting Youth, Games, and Learning*. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, pp. 117–140. doi: 10.1162/dmal.9780262693646.117 (2008)
7. Gualeni S.: *Augmented Ontologies or How to Philosophize with a Digital Hammer*, *Philosophy and Technology*, Vol. 26 (2) Springer Science+Business Media Dordrecht, DOI 10.1007/s13347-013-0123-x (2013)
8. Kipperndorff, K.: *The Semantic turn: a new foundation for design*, CRC Press Taylor and Francis Group (2006)
9. Pichlmair, M.: *Designing for Emotions – arguments for an emphasis on affect in design*. PhD dissertation, Technischen Universität Wien (2004)
10. Laurel B.: *Computers as theatre*. Reading, MA.: Addison Wesley (1991)
11. Ware C.: *Visual Thinking for Design*. Morgan Kaufmann (2008)
12. Dewey J.: *Logic: The Theory of Inquiry*. H. Holt & Company, New York (1938)
13. Manovich L.: *The Language of New Media*. Cambridge, MA: The MIT Press (2001)
14. Bianchi, C., Montanari, F., Zingale, S. (edited by): *La Semiotica e il Progetto 2. Spazi, oggetti, interface*. Franco Angeli, Milano (2010)
15. Eco, U.: *Sei passeggiate nei boschi narrativi*. Harvard University, Norton Lectures 1992-1993. Tascabili Bompiani, Milano (2003)

16. Bogost, I.: Persuasive games: The proceduralist style. Retrieved online on 8th February 2015 http://www.gamasutra.com/view/feature/132302/persuasive_games_the_.php (2009)
17. Zeki, S.: La vision dall'interno, Arte e cervello. Bollati Boringhieri, Torino (2003)
18. Ramachandran, V. S., Hirstein, W.: The science of art: A neurological theory of aesthetic experience. *Journal of Consciousness Studies*, 6.6-7: 6-7 (1999)
19. Lakoff, G., Johnson, M.: *Metaphors we live by*. University of Chicago press (2008)
20. Lenz, E., Diefenbach, S., & Hassenzahl, M.: Exploring relationships between interaction attributes and experience. In *Proceedings of the 6th International Conference on Designing Pleasurable Products and Interfaces* (pp. 126-135), ACM (2013)
21. Kazmierczak, Elzbieta T.: Design as meaning making: from making things to the design of thinking. *Design Issues* 19(2) (2003): 45-59.

Game References

The Marriage, Rod Humble (<http://www.rodvik.com/rodgames/marriage.html>)
Passage, Jason Rohrer (<http://hcsoftware.sourceforge.net/passage/>)
Proteus, Ed Key and David Kanaga (www.visitproteus.com)
Portal, Valve Software (<http://www.valvesoftware.com/games/portal.html>)
Luxuria Superbia, Tale of Tales (www.luxuria-superbia.com)