Ontology of Video Game Virtual World

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Abstract

This article is devoted to the research of the virtual world in video games. The purpose of the article is to create the ontology of video game virtual world to identify its fundamental basis, describe its entities and essential links between them. On the grounds of the literature review we have systematized scientific knowledge about genres of video games and formulated a general faceted classification of video games according to their content, number of players, publishing criteria, distribution type, platform, graphics, gameplay, rhythm, atmosphere, and ending type. The analysis showed that the existing classifications of video games do not cover the variety of video games, and sometimes do not allow to clearly identify the genre. They do not take into account interests and needs of gamers and developers. We have developed the ontology of video game virtual world based on the interaction between the Architect and the Beholder.

Keywords: classification, video game genre, ontology, video game structure, virtual world of video game, game studies, simulacrum, virtual world Architect, Beholder, flow, game-related phenomena

Introduction

Video games are widely presented today. According to Entertainment Software Association statistics, in the United States, a leading country in the industry, almost half of all people play video games. The age of an average player is around 35. Many people prefer to spend their leisure time by playing more video games than to read books or watch movies (Entertainment Software Assotiation 2016).

The number of people playing video games is growing every year. The Spil Games estimates that the number of players around the world in 2016 will reach 1.55 billion people (Johnston 2013). The gaming market now exceeds $ 90 billion. It is growing rapidly, and in many countries exceeds the amount of film distribution market. Moreover, video games and game technologies penetrate into other areas: education (Da Rocha Seixas et al. 2016; Galanina et al. 2015), business (Korn & Schmidt 2015), marketing (Lucassen & Jansen 2014), management (Robson et al. 2016), science (Bowser et al. 2013), medicine (Cudney et al. 2015), social media (Love et al. 2016), etc. Gamification based on the transfer of game elements and mechanics to non-gaming processes is quite popular today (McCall et al. 2013; Deterding et al. 2013; Ašeriškis & Damaševičius 2014; Pedreira et al. 2015; Robson et al. 2015).

Video games have a great impact on modern culture. They construct various types of virtual worlds, elements of which, on one hand, penetrate reality and continue to exist as «game-related phenomena» (role playing game, cosplay, fun fiction), on the other hand, virtual images – simulacra – get their existential form, design the real without being created as real in the first place. Virtual worlds of video games constitute the simulacra space which causes social interaction and involve users into a new type of economic relations (virtual economy) (Castronova 2003) changing modern social economic landscape. Thus, video games and virtual worlds they create are significant cultural and social phenomena that require enhanced studying.

A huge number and variety of video games along with their popularity leads to the need of systematizing the existing knowledge about the types and genres of video games, their elements and structures. We need to describe the nature of the video game virtual world. Thus, the virtual world of

video game is the subject of our research. The purpose of this research is to create the ontology of video game virtual world to identify its fundamental basis, describe its entities and essential links between them.

Video Games Classification

Classification and conceptualization of video games is crucial when studying them as a cultural and social phenomenon. Researching their typology and genres allows creating a common ground for communication between video game developers, gamers, scholars, and video game publishers. This helps create the conceptual framework of the constantly changing field of video games, to classify this area and make it easier to understand.

Presently, quite a large number of studies is devoted to the classification of video games by genre (Clearwater 2011; Clarke et al. 2015; Apperley 2006; Arsenault 2009). Most classifications are based on either interactivity, or on the understanding of the complex nature of video games consisting of interactive, narrative, thematic and social aspects. However, as Clarke et al (Clarke et al. 2015) correctly noted "Current conceptions and definitions of video game genres fail because they do not offer concrete set identification, offer poor collocation and retrieval, inhibit creative development, and monopolize and/or skew sales".

In this article we systematize the existing scientific knowledge about video games. Basing on the literature review we have compiled a generic faceted classification of video games (GameIsArt 2016; Wikipedia 2016; Hafner & Lensky 2005; Tvtrophes 2016; Mobygames 2016; Gunn et al. 2009; Room 2011; Stahl 2005; Arsenault 2009; The escapist staff 2010; Grace 2005; /v/'s 2012; Dobrowolski et al. 2015; Shariff 2014; Makar 2003; Lee et al. 2014; Apperley 2006; Khenissi et al. 2016; Ludoscience 2016).

1. *Classified by content*

   a. By genre

i. Games of information

1. Action role-playing games (ARPG)
2. Open role-playing games (open RPG)
3. Role-playing games (RPG)
4. Multi-user dungeon (MUD)
5. Massively multiplayer online role-playing game (MMORPG)
6. Puzzle
7. Quest
8. Point-and-click
9. Browser role-playing games (Browser RPG)
10. Adventure
11. Education
12. Test (Quiz)
13. Contact (Dating sim)
14. Visual novel
15. Hero
16. Toure (Environmental narrative games)
17. Full motion video (Interactive movie)
18. Roguelike

ii. Games of action

1. Open action
2. Action
3. Slasher

4. Battle-racing
5. Platformer
6. Stealth-action
7. Fighting
8. Racing
9. Arcade
10. Horror
11. Survival horror
12. Shooter
13. Sport
14. Simulator
15. Rhythm
16. Metroidvania
17. Beat ‘em up
18. Shoot ‘em up
19. Light gun games
20. Vehicular combat
21. Breaking out
22. Mad marble maze
23. Maze games

iii. Games of control and planning

1. Real-time strategy (RTS)
2. Multiplayer online battle arena (MOBA)
3. Global strategy
4. Turn-based strategy (TBS)
5. Sim strategy
6. Global wargames
7. Economical
8. Tower defense
9. Wargames
10. Card games
11. Logic
12. Tactic (+jRPG)
13. Microcontrol
14. Building
15. Life sim

b. By setting

i. According to the site of action

1. Real worlds
2. Asian
3. Casino
4. Castle
5. Game show
6. Hospital
7. Nature
8. Ocean
9. Rural
10. School
11. Space
12. Spaceship
13. Tundra
14. Urban
15. Parallel worlds
16. Alternative worlds
17. Fantasy
18. Heroic mythology

19. Christian mythology
20. Modern mythology

c. According to the time of action

1. Origin of life
2. Cyberpunk
3. Futuristic
4. Gothic
5. Historic
6. Medieval
7. Modern
8. Renaissance
9. Steampunk
10. Prehistoric times
11. Dawn of civilizations
12. Middle Ages
13. Colonization Ages
14. Industrialization Ages
15. Overpast wars
16. Modern times
17. Information era
18. Outer space exploration
19. Evolution

d. According to the purpose of action

1. Playthrough games
2. Education games
3. Entertainment games
4. Casual games
5. Sandbox games
6. Competitive games
7. Hardcore games
8. Exergaming
9. Party
10. Social
11. Meditation

e. According to the narrative

1. Adult (Sex)
2. Art & Design
3. Business
4. Children
5. Concept
6. End of the world
7. Food
8. Holydays
9. Drama
10. Law
11. Medicine
12. Nature
13. Politics
14. Religion
15. Science
16. Sport
17. Supernatural
18. Travel and Transportation
19. Comedy
20. Crime
21. Horror

22. Romance
23. Spy, espionage
24. Survival
25. Mystery
26. Thriller
27. War, Fighting
28. Western
29. Cyberpunk, Dark Sci-Fi
30. Space
31. Post-apocalyptic games
32. Steampunk
33. Fantasy
34. Historic
35. Sci-fi, Futuristic

2. Classified by the number of players

1. Singleplayer (SP)
2. Multiplayer (MP)
3. Hotseat, Splitscreen
4. Play by Electronic Mail (PBEM)
5. Massively multiplayer online game (MMOG)

3. Classified by the publishing criteria

a. According to the budget development

1. AAA
2. B
3. Indie
4. Amateur

b. According to publishing format

1. Original
2. Sequel, prequel, remake
3. Add-on, expansion
4. Episodic
5. Downloadable content (DLC)

4. Classified by spread type

a. Chargeable

1. Physical copy
2. Digital copy
3. Subscription

b. Free

1. Shareware
2. Free to play (F2P)
3. Trial
4. Freeware

5. Classified by the platform

1. Personal computer
2. Gaming console
3. Mobile devices
4. Arcade machines
5. Browser (Web)

6. Classified by graphic image

a. According to the position of the game camera

1. First person view
2. Third person view
3. 2D side-view
4. 3D side-view
5. 2D top-down
6. 3D top-down

7. ¾ view
8. Vertical scrolling
9. Side scrolling
10. Perspective manipulation

b. According to the technology of graphic representation

1. Pseudographics
2. 2D
3. 3D
4. 3D stereo
5. Augmented reality
6. Virtual reality (VR)

c. According to the visual style

1. Comics
2. Cartoon
3. Anime, mange
4. Realistic
5. Abstract
6. Handicraft
7. Watercolor
8. Cel-shaded
9. Wireframe

7. Classified by gameplay

a. Goal-oriented
b. Process-oriented
c. According to the basic rules of gameplay

1. Avoid
2. Match
3. Destroy
4. Create
5. Manage
6. Move
7. Random
8. Select
9. Shoot
10. Write

8. Classified by a rhythm

a. Meditative ("Zen")
b. Stable
c. In real time
d. Step by step
e. Games with the ability to manipulate time
f. Calendar-based game clock
g. Timed action

9. Classified by the atmosphere

1. Adventurous
2. Aggressive
3. Cute
4. Dark
5. Humourous
6. Ispirational
7. Intense
8. Light-hearted
9. Mysterious
10. Peaceful
11. Sarcastic
12. Sensual

13. Solitary
14. Quirky

10. Classified by the type of ending

1. Branching
2. Circuitous
3. Finite
4. Infinite
5. Post-Game(Lee et al. 2014)

Analysis of this classification has shown that, firstly, the existing classifications of video games do not cover their variety. Secondly, the boundaries between different genres are blurred and sometimes it is impossible to identify a particular game (for example, "GTA V" can be attributed to the genre of third or first-person action, and to the racing genre with elements of RPG and MMO, sandbox). Thirdly, classifications of video games do not take into account interests and needs of video game players and developers.

Virtual World of Video Game

A video game is a complex and multifaceted subject of study. It exists on many levels of our perception. A video game "is a particular piece of software created and run on particular computer hardware at a particular moment in time" (Bogost 2009). Among other, a video game is code, a platform, as well as a narrative, digital media, a new form of art, etc.

In fact, video game goes beyond its borders and it is no longer just a game, it constructs a kind of virtual world, which continues to exist outside the game. Plunging into the virtual world of a video game the consciousness of a player usually gets into the mental state of flow (Csikszentmihalyi 2008) in which one is completely fascinated by the video game, which erases the boundaries between the real and the fictional "here and now". A video game is always something more than it is originally meant to be. By forming virtual worlds with their own rules and laws, objects and characters, values, beliefs, and codes of conduct video games significantly influence mass consciousness and modern culture.

We believe that virtual world can be understood not only as computerized space that simulates the real world where users presented by avatars are able to interact simultaneously (Messinger et al. 2009; Bell 2008; Koster 2004; Hughes 2012; Eisenbeiss et al. 2012). In a broader and more philosophical sense virtual world is holistic space of simulacra which becomes relevant in the process of interaction between the Architect and the Beholder of the virtual world. We put forward the following idea – virtual world of a video game is the simulacra universum constructed by the Architect (game designer, developers) and actualized in the process of interaction between: a) the Beholder (gamer) and the Architect in singleplayer games; b) the Beholders (gamers) between each other and the Architect – in multiplayer games via computer-based environment. Thus, the reality of video game virtual world is constructed by the consciousness of the Beholder since he actualizes this space in accordance with personal needs, interests and features, as well as with the gaming context.

Ontology of Video Game Virtual World

The virtual world of a video game has not been the subject of a separate research. We are implementing the construction of the video game virtual world ontology as the ontology of form (Bogost 2009). It is based on previously compiled classification of video games, as well as on the research of the elements and structure of a video game, and the Beholder's needs.

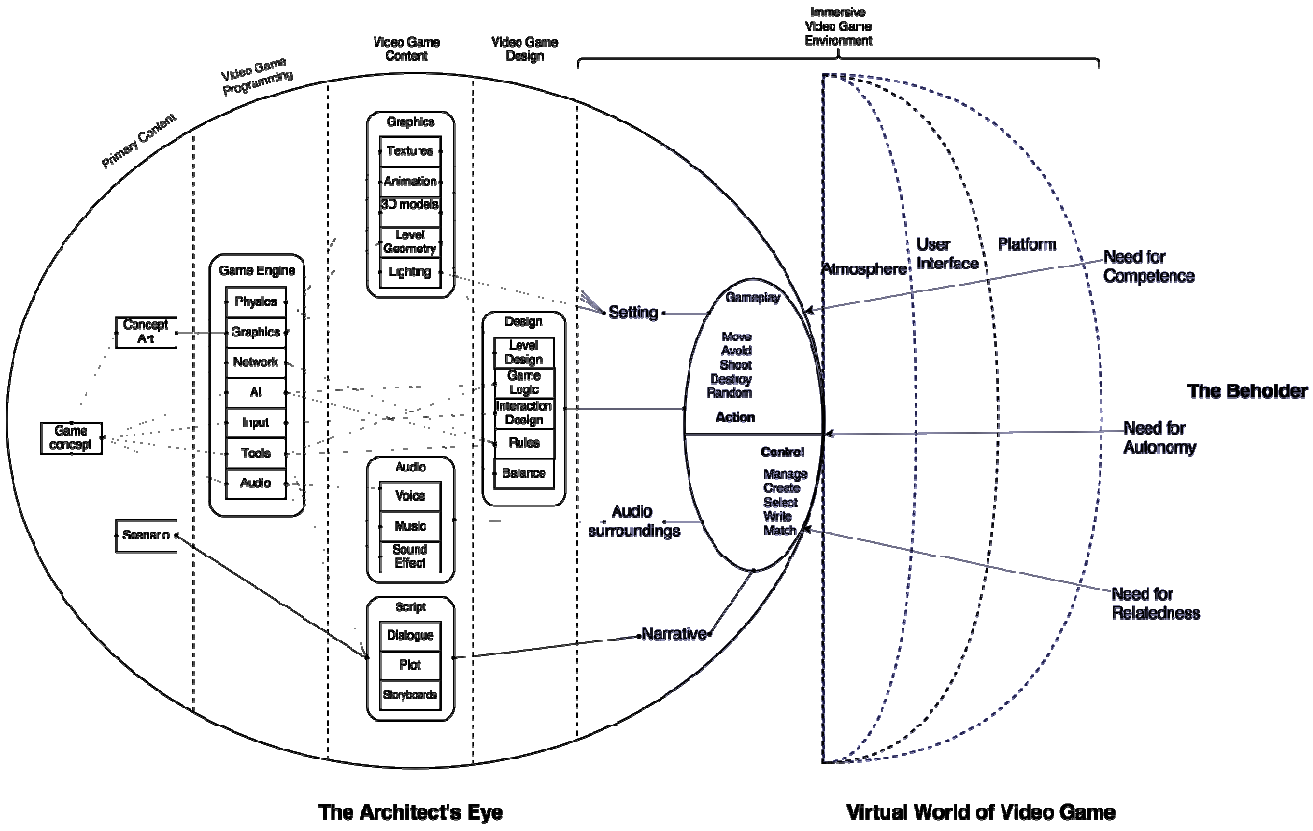

Figure 1. Ontology of Video Game Virtual World

The left side of the figure presents the area that describes the actions of the Architect creating and developing a video game:

1) primary content includes the idea, the concept of a video game including concept art and scenario;
2) video game programming – the process of turning the concept into the game content;
3) video game content consists of three main blocks: graphics, audio, and the script.

As a result of the Architect activity immersive video game environment has emerged. We consider this environment as the space a players are immersed into interacting directly through setting, narrative, gameplay, audio surroundings, user interface, platform and atmosphere:

- setting – video game environment where the action takes place including time and place where the events unfold;
- narrative – substantial component of a video game, narration, exposition of interrelated events presented to the player as a set of words and images;
- gameplay – set of all possible elementary actions that can be committed by a player in the game environment. it is the game process from the player's point of view;
- audio surroundings – audio component of a video game;
- user interface – set of commands and menus to communicate with the program;
- platform – hardware/software configuration which provides video game functioning;
- atmosphere – the tone of a video game which provokes certain psycho-emotional state.

The right part of the figure illustrates the interaction between the Beholder and a video game along with the process of immersion into the video game environment. The player has basic needs: need for competence, need for autonomy, need for relatedness (Gee et al. 2012). Video games of different

genres satisfy these basic needs to a different extent. For example, if the need for competence prevails, action games (e.g. action, slashers, platformers, racing shooter, sport, etc.) are more likely to satisfy it.

In order to satisfy the need for autonomy games of control and planning are best suited (e.g. strategy, card games, logic, sandbox, etc.). In order to satisfy the need for relatedness video games in which social interaction plays the key role are more suitable (e.g. multiplayer online games, cooperative games, role playing games, etc.). Generally, the Beholder's needs satisfaction occurs when interacting with gameplay, setting, narrative, audio surroundings through the prism of graphic interface on certain platforms. All these provide special atmosphere of a video game.

The virtual world of a video game in Figure 1 is indicated by the color. The virtual world of a video game is the simulacra universum constructed by the Architect and actualized by the consciousness of the Beholder. The virtual world of a video game is constructed only during the process of interaction between the Architect and the Beholder.

The ontology we present will allow classifying video games more clearly distinguishing between different genres. Consider a similar classification of video games on an example of a video game "Braid" (see table 1.).

Table 1. Ontology Application ("Braid")

Ontology layer	**Description**
Platform	Xbox 360, PC, PlayStation 3
User Interface	Keyboard, gamepad, main menu, jigsaw puzzle pieces indicator, minimalistic user interface
Atmosphere	Mysterious, bright, melancholic, picturesque hand-drawn, fairytale
Gameplay	Move, avoid, destroy (platformer); interact, time manipulate, match (puzzle)
Setting	House, parallel worlds
Narrative	Multi-faced and metaphor narrative: supernatural abilities, ethics and philosophical questions, relationship issues, moral responsibility of scientist
Prior Gamer's Need	Need for competence

The developed ontology of the video game virtual world allows to look at this phenomenon as at something holistic, to see some links between video game elements, between the Architect and the Beholder.

Conclusion

Video games are not just present-day entertainment. They construct virtual worlds plunging into which a person gets an opportunity to learn more about oneself because video games meet specific needs of players. Various genres did not appear by themselves, but as a result of the Architect's work embodied in the development of video games that satisfy those needs.

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