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Literature Review

Player–video game interaction: A systematic review of current concepts

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ABSTRACT

Video game design requires a user-centered approach to ensure that the experience enjoyed by players is as good as possible. However, the nature of player–video game interactions has not as yet been clearly defined in the scientific literature. The purpose of the present study was to provide a systematic review of empirical evidences of the current concepts of player–video game interactions in entertainment situations. A total of 72 articles published in scientific journals that deal with human–computer interaction met the criteria for inclusion in the present review. Major findings of these articles were presented in a narrative synthesis. Results showed that player–video game interactions could be defined with multiple concepts that are closely linked and intertwined. These concepts concern player aspects of player–video game interactions, namely engagement and enjoyment, and video game aspects, namely information input/output techniques, game contents and multiplayer games. Global approaches, such as playability, also exist to qualify player–video game interactions. Limitations of these findings are discussed to help researchers to plan future advances of the field and provide supplementary effort to better know the role of less-studied aspects. Practical implications are also discussed to help game designers to optimize the design of player–video game interactions.

Contents

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1. Introduction

Video games now constitute one of the world's premier cultural industries with a global market of 80 billion dollars in 2011 (Interactive Software Federation of Europe, 2011). Since the initial commercial success of the game "Pong" in 1972, video games have been experienced by many different categories of players on a wide range of different platforms. 48% of European adults aged 16 or more and 58% of Americans said that they had played video games in 2012, 55% of these being men and 45% women (Entertainment Software Association, 2013; Interactive Software Federation of Europe, 2012). 68% of American players played on game consoles, 63% on computers, 43% on smartphones, 37% on dedicated handled systems and 30% on wireless devices (Entertainment Software Association, 2013).

The increasingly widespread popularity of video games has prompted the emergence of numerous scientific publications dealing with player–video game interactions and their implications for practical application. However, most of these publications continue to focus on the impact of games on the external behavior of players. In particular, some studies have examined the negative influence of violent video games on behavior (e.g., Anderson et al., 2010). Other researchers has emphasized the positive effects of cognitive training following interaction with action games (e.g., Bavelier, Green, Pouget, & Schrater, 2012).

More recently, another community of researchers has published results not on the effect of video games on their players but on the nature of the player–game interaction itself, based on an examination of the players' motivations (e.g., search for pleasure, entertainment, challenges, emotions) (Barr, Noble, & Biddle, 2007). Such studies help minimize disruptions to the interaction between the player and the game and thus ensure that the experience enjoyed by players is as good as it possibly can be. Player-centered studies of player–video games interactions are therefore of vital importance, in particular because they enable designers to create video games that can adapt to the expectations and capabilities of the users (Pagulayan et al., 2012).

The study of player–video game interactions remains difficult because they are hard to define (Pagulayan et al., 2012). The one characteristic common to all video games is the ability of the player to interact with a virtual environment, generally with the help of an artifact (e.g., joystick, movement detection sensor, touchscreen control). The main interface of this environment is presented in audio–visual form via a terminal, which is either specific (e.g., portable games console) or not specific to video games (e.g. television, smartphone, tactile tablet). This environment reacts to the orders received from the player and then sends new information via the interface. Unlike other media that convey audio–visual information, such as the cinema for example, video games enable users to interact with this information. This player–video game interaction is clearly the key point that differentiates games from other types of cultural media.

The purpose of the present article was to provide a systematic review of empirical evidence of the current concepts of player–video game interactions as described in scientific journals. The aim was to show that, in terms of human–computer interactions, video games should be considered above all as complex IT systems, with which individuals wish to interact within the framework of a goal-directed activity.

The goals of video game players when using video games are very diverse. Although nowadays, video games can be used, for example, in education (e.g., Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012; Egenfeldt-Nielsen, 2006), or work activities (e.g., Boyle, Kennedy, Traynor, & Hill, 2011), the original aim of video games was to entertain the player. So, to be as generally applicable as possible, the purpose of the present article was to provide a systematic review of empirical evidences of the current concepts of player–video game interactions in entertainment situations only.

2. Method

2.1. Search database

This literature search method was configured to target empirical evidence focused only on the intrinsic concepts of the player–video game interaction in entertainment situations. This excluded studies about serious games, educational games, game culture, the nature of the games, the nature of players, and the effects of using a game on human behavior or the use of games as research tool or for other activities than entertainment. To reach this goal as precisely as possible, only main scientific journals that deal with human–computer interaction (HCI) were used in the search database. These journals were those that were indexed in the journal list of *HCI Bibliography*[1] database (hosted by ACM SIGCHI) in 2013. This list was supplemented by journals indexed in the *Science Citation Index Expanded* and the *Social Sciences Citation Index* (Thomson Reuters) categorized in the "Computer Science, Cybernetics"[2] or "Ergonomics"[3] subject categories in 2013. The journals included in the search database are listed in Appendix A.

2.2. Selection criteria for inclusion of papers in the current review

To avoid missing articles that would use different terms than video games to qualify them (e.g., computer games, digital games),

[1] http://www.hcibib.org/show.cgi?file=journal, retrieved October 22nd, 2013.
[2] http://science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=D&SC=ER, retrieved October 22nd, 2013.
[3] http://science.thomsonreuters.com/cgi-bin/jrnlst/jlresults.cgi?PC=SS&SC=JI, retrieved October 22nd, 2013.