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December 2006

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Jack Brzezinski
DePaul University

Xiao Fang
DePaul University

Susy Chan
DePaul University

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Recommended Citation
Brzezinski, Jack; Fang, Xiao; and Chan, Susy, "Instrument Development for Measuring Computer Game Play Enjoyment" (2006). *AMCIS 2006 Proceedings*. 77.
http://aisel.aisnet.org/amcis2006/77

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Instrument Development for Measuring Computer Game Play Enjoyment

Jack Brzezinski
DePaul University
JBrzezinski@cti.depaul.edu

Xiaowen Fang
DePaul University
XFang@cti.depaul.edu

Susy Chan
DePaul University
SChan@cti.depaul.edu

ABSTRACT

Despite enormous technological progress in the field of computer games, game design is still an area that is largely a guessing game. Game designers try to estimate user preferences when it comes to the story, structure, playability and other factors that constitute a game. No formal methods are applied so far to support the game design. As the first step towards addressing these issues, this project attempts to develop a self-reporting instrument for measuring the enjoyment of computer game play. The paper presents the review of relevant theories and describes the development process of this instrument.

Keywords

Computer game play model, computer game enjoyment

INTRODUCTION

Ever since the first computer game SpaceWar! was invented by Stephen Russell at MIT in 1962, computer games have demonstrated the ability to generate an experience that both immerses and absorbs their participants. The game industry has become a multi-billion dollar business in a relatively short period. However, there have been few empirical studies on game play. Game developers and publishers, pressured by competition and commercial challenges, have been designing games primarily through experience. Given the potential impact of computer games on users and society, IS researchers need to acquire a better understanding of how various aspects of games affect their users.

Prior research on computer games in behavioral science has focused mainly on the negative effects of playing video games, e.g., addiction and violence (Anderson, 2004; Anderson & Bushman, 2001; Anderson & Dill, 2000; Uhlmann & Swanson, 2004). Few IS studies have investigated factors affecting user acceptance of computer games. Hsu and Lu (2004) incorporated technology adoption model (TAM) proposed by Davis (1989) with social influence and flow experience when studying user acceptance of online games. They have found that social norms, attitude, and flow experience explain about 80% of game playing. Choi and Kim (2004) suggest that people continue to play online games if they have optimal experiences while playing the games. However, a comprehensive framework for examining the interaction between player characteristics and game content is needed for a better understanding of the game play process and its impacts on users. Extant measurements of enjoyment tend to be too simple with a few items. Construct validity and reliability haven't been empirically validated. Also, extant measurements do not take into consideration constructs contributing to enjoyment. This makes it difficult to accurately measure enjoyment.

This paper discusses research in progress that focuses on developing an instrument for modeling game play enjoyment. This research is a part of a larger project that aims at the development of a model of computer game play, in which game enjoyment is one of the components. Currently, there is no theoretical framework that captures the reasons for a tremendous attraction of people to computer games. The development and validation of a measurement of game play enjoyment presents the critical first step towards developing the model of game play.

COMPUTER GAME PLAY AND ENJOYMENT

There is very little research on enjoyment of computer game play. In order to establish a theoretical foundation of enjoyment of computer game play, the authors reviewed literature in the following relevant areas: video game usage, modeling of complex entertainment experiences, media enjoyment modeling, transportation, disposition and flow theories.

In several comprehensive studies, Sherry and his colleagues (Sherry, Desouza, Greenberg, & Lachlan, 2003) have enumerated a set of video game uses and gratifications based on focus group research and surveys of over 1,000 participants ranging in age from 10 to 24 years old. These factors include: (1) Competition ─ to prove to other people who has the best skills and who can react or think the fastest; (2) Challenge ─ to solve the puzzles to achieve goals such as reaching the next level or beating the game; (3) Social Interaction ─ to use video games to interact with friends and learn about the personalities of others; (4) Diversion ─ the use of games to avoid stress or responsibilities and to fill time, relax, escape from stress, and/or because there is nothing else to do; (5) Fantasy ─ to do things they normally would not be able to do, such as driving race cars, playing professional football, or flying; and arousal-the stimulation of emotions resulting from fast actions and high quality graphics. Grodal (2000) explains that much of the fascination with video games can be attributed to the ability of players to control the game in terms of outcomes (i.e., deciding how the "plot" will unfold), the speed at which the game progresses, and mastery of the game or mastery over other players. Vorderer, Hartmann, and Klimmt (2003) have provided support for the idea that game play is more enjoyable when there are a variety of ways to solve a challenge offered in a video game. Agarwal and Karahanna (2000) propose a model of deep involvement with software. They analyze user intentions to use IT technology and emphasize the cognitive determinants. This research's scope is wider than the cognitive absorption construct proposed by Agarwal and Karahanna. Hoffman and Novak (1996) present a model of flow in computer – mediated environments. The flow model involves "positive affect", "exploratory behaviors" and "challenge/arousal", which could be considered elements of enjoyment.

Vorderer, Klimmt and Ritterfeld (2004) investigated complex entertainment experience and suggest that an integrated view of media entertainment is capable of covering more of the dimensional complexity and dynamics of entertainment experiences than existing theories could. Based on a description of what is meant by complexity and dynamics, they outline a conceptual model of entertaining experience as depicted in Figure 1. This model centers on enjoyment as the core of entertainment and addresses prerequisites of enjoyment, which have to be met by the individual user and by the given media product.

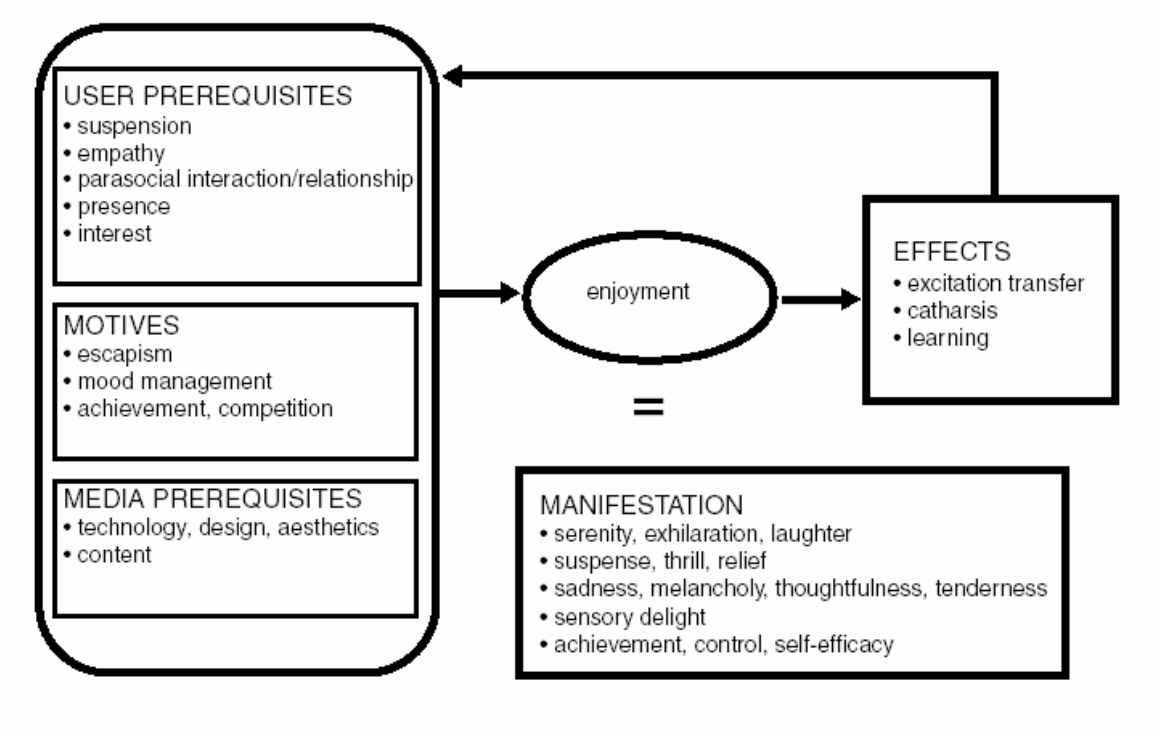

Figure 1. A model of complex entertainment experience (Vorderer, Klimmt, & Ritterfeld, 2004)

Based on a review of various terms for capturing the concept of media enjoyment, Nabi and Krcmar (2004) introduce a tripartite model of media enjoyment ─ affective, cognitive, and behavioral dimensions of enjoyment (Figure 2). In this model, the underlying affective dimension focuses largely on empathy; positive and negative moods and specific affective states (e.g., horror, sadness, and suspense) could also be considered to feed this component. The cognitive component focuses primarily on judgments of game characters' actions, though other judgments, like general enjoyment as attitudes toward story assessments (e.g., perceived realism, story coherence, message quality) or more personal evaluations (e.g., relevance, similarity) could also be included in this category. Finally, the behavioral component is logically connected to selective exposure in terms of the player's viewing intent as well as behaviors during viewing, including the act of viewing itself.

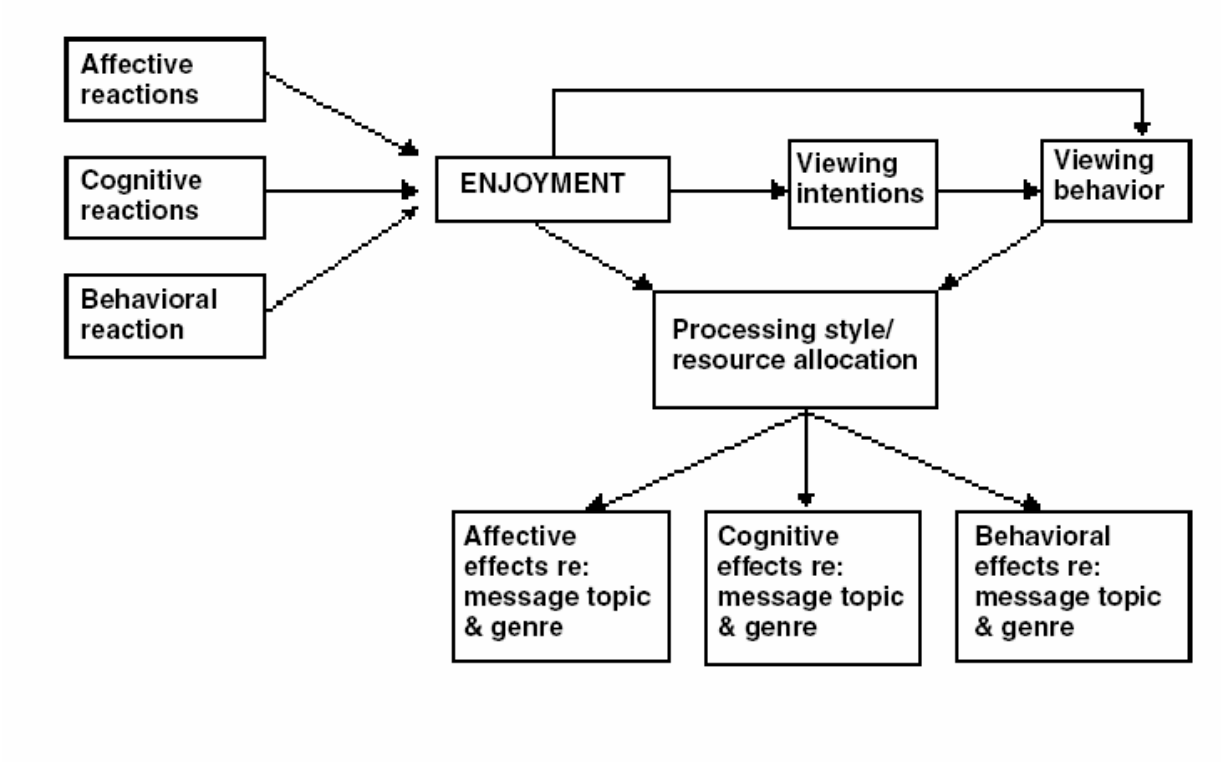

Figure 2. A tripartite model of media enjoyment (Nabi & Krcmar, 2004)

The transportation theory suggests that media enjoyment can benefit from the player's experience of being immersed in a narrative world as well as from the consequences of that immersion (Green, Brock, & Kaufman, 2004). Based on the transportation theory, enjoyment may be gained in six ways: (1) enjoyment from traveling to the dark side of the frightening or cheerless story world; (2) enjoyment from gaining benefits; (3) enjoyment from escaping the self; (4) enjoyment from transformation via the opportunity for identity play and exploring and experimenting with other possible selves; (5) enjoyment from close connections between the transported individuals with media characters; and (6) Enjoyment from mood management in which selective exposure to different kinds of media fare can help individuals manage their moods, often with the goal of increasing or maintaining positive states or lessening negative affect.

Sherry (2004) theorizes media enjoyment by synthesizing empirical literature from uses and gratifications with Csikszentmihalyi's (1988) flow theory. Sherry argues that a media user achieves enjoyment of media stemming from a flow experience when media message content balances with individual ability to interpret that message.

RESEARCH METHOD

Method selection

In this study, we adopted the instrument development method suggested by Moore and Benbasat (1991) which consists of three stages. The first stage is item creation; the purpose is to create pools of items for different constructs. The next stage is

scale development. The basic procedure is to have panels of judges sort the items from the first stage into separate categories based on the similarities and differences among items. In the final instrument testing stage, the instrument is tested through a few rounds of surveys.

In the following sections, we will discuss the four stages involved in the instrument development for computer game play enjoyment: initial development, expert consultation, scale development, and instrument testing. The first two stages resemble the "item creation" stage in the Moore and Benbasat (1991) approach.

Initial development

In the first stage, an initial version of the questionnaire was developed based on the tripartite model of media enjoyment (Nabi & Krcmar, 2004). The tripartite model suggests three constructs of enjoyment: affective, cognitive, and behavioral reactions. Brainstorming sessions of a research team were held to create items for cognitive and behavioral reactions constructs. The research team consists of faculty members and doctoral students with diverse background. All of them conduct IS research and some of them are frequent game players. Based on prior research (Compeau, Higgins & Huff 1999), 21 items were created for cognitive reactions construct, 12 items were developed for behavioral reactions construct, and 33. items were identified to measure affective reactions.

Expert consultation

In the second stage, twenty professional game designers and developers have been contacted by email. These designers and developers work for leading firms such as Electronic Arts, Sony Entertainment, Midway Games, Media Options, Microsoft XBOX, High Voltage and Namco. The experts were asked to provide feedback on all the appropriate items from the first version of the questionnaire. Out of twenty contacted experts six responses containing detailed comments were received. The feedback includes recommendations to keep or delete items from the instrument and suggestions to rephrase or add specific items. Several items were added to the instrument as a result of the received feedback and a few questions were re-phrased. Generally, the feedback was positive and no items were removed. The experts mainly agreed with the content of the instrument and recommended a number of wording changes and in a few instances proposed additions of items covering narrowly defined aspects of enjoyment. For example, a suggestion was made to add items that investigate specific behavioral aspects, i.e. whether players talk during the game using voice over Internet Protocol (IP) as opposed to talking to a person sitting in the same room. After reviewing the expert responses six items measuring behavioral aspects have been added. These items focus on issues related to how player perceive the difficulty level of the game. The result of this stage is the second version of the instrument.

Scale development

The goals of this stage are twofold: to assess the construct validity of the scales being developed and to identify any particular items that may still be ambiguous. In this stage, which is currently under way, thirty experienced game players will be recruited to perform the card sorting procedure by organizing items from the second version of the questionnaire. Three rounds of card sorting procedure will be performed. Each round consists of two sessions. Five game players will participate in each session. Each item is printed on one index card. The cards will then be shuffled into random order for presentation to participants. Each participant sorts the cards into categories and labels them independently from other participants. At the end of each card sorting session, a focus group discussion session will be held. The focus group session is intended to gather more feedback about the instrument. The transcript of each focus group session will be reviewed. The analysis method suggested in the Moore and Benbasat (1991) study will be used to analyze the results of this stage. This process is intended to result in a shorter version of the instrument.

Instrument testing

In the fourth stage, three rounds of surveys will be conducted to validate the instrument developed from the third stage. This stage will start with a small-scale pilot test and continues with a full-scale pilot test. The last step is a final test. In the final test, physiological measurements will be used to validate the validity and accuracy of the instrument.

NEXT STEP

This research is currently in progress. The authors are conducting focus group studies. The results of focus group studies and card sorting will be presented at the conference.

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