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# An Interactivity-based Framework for Classifying Digital Games

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***ABSTRACT***

*The current categorization of digital games is not objective and is unable to assess the latest and more complex digital games. Digital games need to be systematically categorized so that similarities and differences can be identified and analyzed. The fundamental characteristic of digital games is interactivity. This paper addresses the current categorization gaps through the lens of interactivity. Through this lens, a conceptual framework consisting of primary and corresponding participants and controlling characters is developed. Future research topics are then presented based on this framework.*

***Keywords****: digital game classification, interactivity-as-product, interactivity-as-process*

## 1. INTRODUCTION

There is a need to categorize digital games, so that the similarities and differences between the types of games can be distinguished [1]. The Entertainment Software Association [2] currently classifies computer and video games based on game platform. These classifications, in turn, are broken down into thirteen genres such as strategy, role-playing, family entertainment, shooter, adventure, action, etc. Mode is another criterion classifying digital games. A particular game's mode may vary according to whether it is played at a multi- or single-player level. Several distinct established games exist: science fiction, fantasy, and horror being prominent [3]. Genre, in the context of games, enables the categorizing games [4]. In addition, the advancement of information technology (IT) such as hardware, software, and networks provides potential for expanding the types of digital games. Recently, the emerging genre of fusion game is one of cases showing the evolution of game genre.

However, the current categorization is biased and emerging and highly complex digital games are out of scope. The current genre is not mutually exclusive making analysis difficult since, for example, two or more genre could be included for the same digital game. The main cause of this problem is the missing of a basic characteristic.

Interactivity is the dominant defining feature of digital games [5]. Interactivity derives from 'interaction' and generally means 'exchange', 'interplay', and 'mutual influence'[6]. Interactivity and interaction are similar concepts with the exception for analyzing interaction itself in the communication research area [7]. While, in the real world face-to-face interaction is a basic communication style, in digital games, interaction between player and game is fundamental [8]. Recent advanced network technology provides game-mediated interaction among players. This study focuses on *interactivity* because it is the most fundamental game characteristic for categorizing both current and emerging digital games.

The conceptual framework captures the collaboration with game developers and the information exchange for game development. Further, the standard game framework identifies the most popular types of games by explaining why players continue to use them. In this paper, we introduce an interactivity-based framework for classifying digital games.

In the next section, we develop the **c**onceptual framework with interactivity-as-product and interactivity-as-process providing the theoretical underpinnings. Next, three elements (primary and corresponding participants, and controlling characters) illustrate the concepts of "block" and "combination". The final section discusses the theoretical contributions and presents avenues for future research.

## 2. THEORETICAL BACKGROUND

### 2.1 Interactivity-as-Product versus Interactivity-as-Process

The emergence of computer technologies provides opportunities for scholars to explore human-computer

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interaction. Recently, computer-mediated communication is one of the areas that shows the evolution of person-to-person interaction and provides opportunities to use various communication methods with both wired and wireless networks. It is common for users to interact with both computers as well as with other persons using computers.

Computer-based interaction is divided into two main types: person-to-system interactivity and person-to-person interactivity. Person-to-system interactivity is interacting with the medium itself (e.g., computer, system, etc.). Person-to-person interactivity, on the other hand, is using the medium as a tool for communication [9]. The defining characteristic of these two types of interactivity is *feedback* [10].

What distinguishes person-to-system from person-to-person interactivity is "who" or "what" causes the feedback. In person-to-system interactivity, the *system* itself has the agency for feedback, while in person-to-person interactivity, the *persons* communicating provide the feedback. Stromer-Gally [11] refers to "person-to-system" as "interactivity-as-product" and "person-to-person" as "interactivity-as-process"[1]. Interactivity-as-product stresses the programmed interaction procedure, whereas interactivity-as-process focuses on the process of interactive communication between persons.

*Interactivity-as-product* is interested in the interaction between the person and computer. This interactivity occurs when features allow users to interact with the interface or the system itself. "The machine makes judgments or decisions only on the basis of its program" [14]. This type of interactivity focuses on the reaction, mainly with respect to how effective the design transfers the developer's intentions to the users [7].

Programmed reactions occur in digital games stemming from specific actions such as clicking a mouse or entering commands, These interactions, in turn, are related to the characteristics of interfaces. Clicking a mouse or entering commands to get the designer's intended system reactions are examples of interactivity-as-product. Interactivity-as-product stresses the objective of the interactivity itself [15]. This reaction is similar to the method of human-computer interaction (HCI) and regards interactivity as a trait of the medium or the product of the interface design [11].

On the other hand, *interactivity-as-process* focuses on interpersonal interaction. Generally, human-to-human interaction occurs among two or more people. Later messages in any sequence take into account not just the messages that preceded them, but also the manner in which previous messages were reactive [7]. Interaction between people has a level of unpredictability not experienced through interacting with communication technology. The response of a prior message might be uncertain because "the human has potential for transcending his or her programming, on the basis either of reason or of emotion" [14].

Interactivity is not simply reaction, but rather reciprocity, wherein participants in the exchange can freely take turns and reverse roles: "It is a process-related construct about communication" [7]. Interactivity is not a characteristic of a medium [7]. Participants perform the continuous interactivities through activities receiving messages and reacting to them. It is a process-related construct about communication. It is the extent to which messages in a sequence relate to each other, and especially the extent to which later messages recount the relatedness of earlier messages [7]. Interactivity-as-process comports with a computer-mediated communication (CMC) approach and constructs "interactivity" as a communication process [11].

### 2.2 Interactivity in Digital Games

Interactivity is required in digital games [8]. In the context of digital games, interactivity is defined as the way in which the game is played rather than watched and is regarded as the dominant feature of the game [5]. In the past, digital games focused on the interactivity between player and game. With the advancement of information technology, interest has expanded into game-mediated interaction among players. Digital games basically need a useful interface with ease of use to operate games. In the case that many players participate in competing or collaborating games, digital games have to provide players game-mediated communication, that is, interactivity-as-process. Players enjoy the game itself through interactivity-as-product as well as through communicating with other players mediating the game. Digital games play both 'object' and 'medium' simultaneously.

If the digital game is the media, what is the core element of the media role? It is obvious that digital games play the role of mediating the interactivity among players. Characters which gamers control are more than just tools. The gamer controls a character and interacts with other gamers through it. In the process, the gamer recognizes the character as something special which has attained all of the game experience within. In addition, through the continuous activities in developing characters, the boundary between player and character could be blurred, so that the player puts the character into the same class. Hence, a character plays a reliable role as a medium bridging players with each other.

Traditionally, the number of characters controlled is one. However, with the advancement of game development technologies, it is possible to control multiple characters simultaneously or sequentially (e.g., World of Warcraft). Emerging game technologies evolve new types of interactivity capabilities. In online games, each character which is controlled by players plays the role of medium. If using multiple characters, digital games have multiple and not the traditional single channel.

## 3. INTERACTIVITY-BASED FRAMEWORK CLASSIFYING DIGITAL GAMES

### 3.1 Main Elements

The case of the role of sender and receiver is not fixed. All senders and receivers are called participants, which imply that the roles of sender and receiver are interchangeable [16]. Game

[1] Previous literature has made similar dual classifications using other terminologies such as user-to-system and user-to-user interactivity [12], human-to-media and human-to-human interactivity [10], and content and interpersonal interactivity [13].

framework based on interactivity consists of game participants and the controlling character. There are two types of participants: primary participants ($P^p$) and corresponding participants ($P^c$). Primary participants ($P^p$) represent the view of the user and corresponding participants ($P^c$) representing the opposing side of the primary participant. Primary participants should take part in a digital game, but corresponding participants may not. This is because corresponding participants do not need to join the game in the case that primary participants directly interact with the game. Therefore, the number of primary participants could be considered '1' ($P^p_{(1)}$) and 'n,' ($P^p_{(n)}$) that represents two or more participants; the number of corresponding participants could be '0,' ($P^c_{(0)}$) '1,' ($P^c_{(1)}$) and 'n' ($P^c_{(n)}$).

The final criterion which classifies the types of digital games is the number of controlling characters (C) which players can control during the game. There are two types of characters which play the role of channel: single-character ($C_{(1)}$) and multi-character ($C_{(n)}$).

The interactivity-based framework for classifying digital games is provided in **Fig. 1**.

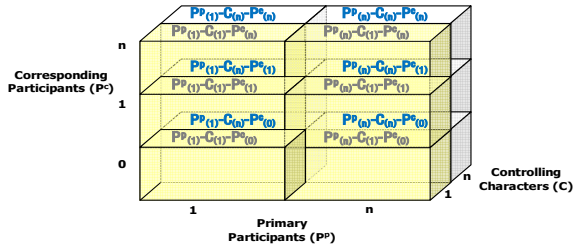


Fig. 1. Interactivity-based Framework Classifying Digital Game

The framework provides the opportunity for applying this taxonomy to all digital games for classification. First, in the case that only one primary participant takes part in a game regardless of the number of controlling characters, the participant should interact with the game directly ($P^p_{(1)}$-$C_{(1)}$-$P^c_{(0)}$ and $P^p_{(1)}$-$C_{(n)}$-$P^c_{(0)}$)[2]. This type of interactivity illustrates the characteristics of interactivity-as-product. The other cases, with the exception of these two, have the characteristic of interactivity-as-process.

However, all of interactivity-as-process cases do not display the same traits. For example, there is the case of two or more primary participants in a game without corresponding participants ($P^p_{(n)}$-$C_{(1)}$-$P^c_{(0)}$ and $P^p_{(n)}$-$C_{(n)}$-$P^c_{(0)}$), to achieve the same mission. The main goal of these types of interactivity is to achieve the specific objective including collaboration. Other cases which contain corresponding participants have the characteristic of a competitive game.

Of the twelve types which the framework provides, there are two types of cases. Some games such as Tetris are mapped onto only one type during the game, the others like World of Warcraft are changed dynamically across a few of interactivity types. The framework consists of primary participants, corresponding participants, and controlling characters. Therefore each type represents cube and reflects the characteristic of the three factors. Each cube is called the interactivity 'block' in this paper. By combining cubes, the framework gives us various game types.

There are three characteristics of the *interactivity block*. First, only one type of interactivity is represented at a time. Second, by combining the interactivity blocks, a broad range of digital games can be studied. Finally, after analyzing digital games, we can understand the patterns of interactivity blocks.

The interactivity blocks could be fixed or variable depending on digital games. For the offline Tetris game, a player cannot choose the interactivity type. For the Tekken game, after choosing the type of interactivity before the game, the player cannot change the type. In Starcraft, players can change the interactivity types continuously throughout the game.

The changeability of interactivity during the game can be categorized into three types:

1) Players have no choice of interactivity type.
2) Players can choose one of interactivity types before play begins, but they cannot change it after the game starts.
3) Players can change the types of interactivity freely during the game.

## 4. CONCLUSION AND FUTURE RESEARCH

The goal of this paper was to identify salient determinants of digital games and to develop the conceptual framework for classifying them. Toward that goal, we suggested that interactivity should be critical to understanding digital games and it should be grouped into two types of product and process interactivity. We developed the interactivity-based game framework using three key factors: primary and corresponding participants, and controlling characters.

This study contributes to theory by providing objective criteria able to analyze the emerging genre of complex digital games. The framework could cover all of interactivity patterns of digital games. Each interactivity block can be regarded as mutually exclusive and be combined with other interactivity blocks.

Future research should consider the following challenges:

- Classifying digital games through both cross-sectional and longitudinal empirical research using the framework.
- Observing the trend of digital games focusing on the interrelations between the richness of interactivity and the emergence of new information technology.
- Developing software for monitoring gamers' interactive behaviors within the game.
- Specifying the characteristics of each interactivity block of the framework.

[2] The number within the parenthesis is the number of primary participants, the number of controlling characters, and the number of corresponding participants.

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