The Development of Measurement of Empathy in Digital Games

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Digital games are often used in an educational environment. They are considered an effective learning tool, especially for keeping learners motivated. Gamification is used to make learning like a game by using elements of games, such as badges or scores. However, from a digital game studies perspective, gamification alone is not enough. Players are not attracted to games only by badges and scores. There are many efforts in design to keep players attracted. One of them is to make players empathize with games. This study focuses on empathy in digital games. It is believed that empathy not only attracts players but also affects players' behavior. As technology evolves, it becomes easier for players to empathize with the game. From both educational media and digital game studies perspectives, it is important to look at empathy in digital games. Especially it is important to look at game effects and learning effectiveness regarding empathy. An instrument to measure empathy in digital games is urgently needed. In this study, an initial phase of development of a measurement of empathy in digital games is introduced.

Keywords: Digital games, Empathy, Measurement

Introduction

Digital games are popular and attract more and more people as technology advances. Many studies focus on why people are involved in digital games in the hope finding a way to keep people motivated in different situations. For example, gamification elements and flow are widely studied to clarify why people are engaged in games.

This study takes a different perspective to the motivation for playing games. This study looks at empathy as one factor that motivates players to continue playing. Because the digital game is an interactive medium, players may develop a social relationship, similar to that between people, with characters in games. One thing that keeps players in the game is taking control of their characters and enjoying events in the game with their favorite characters. Empathy not only attracts players, but also affects players' behavior in games.

Empathy is also important in educational environments. Empathy towards teaching agents is necessary for the development of an effective relationship between teachers and students and to help students develop empathy.

In educational media, the importance of empathy cannot be overemphasized. Human-robot interaction studies use empathy to improve human-robot relationships (Pereira, Leite, Mascarenhas, Martinho, & Paiva, 2010). When educational media are used in the classroom, digital games and characters in them may play the role of teaching agents. It seems necessary to study empathy in digital games not only to motivate players' behaviors in games, but also to improve their relationship with agents and to cultivate empathy through game experience. This paper attempts to define empathy in the digital game context and to develop a measurement of empathy in digital games.

Definition of Empathy in Digital Games

The study first attempts to define empathy in digital games with reference to Tobari's (2003) definition of empathy in real life. Tobari defines empathy as "a matching or a corresponding emotional response in a person when observing another person going through an emotional experience (Tobari, 2003, p. 136)." Applying this to digital games, this study defines empathy in digital games as a corresponding emotional response in a player when observing the experiences of characters in digital games.

The original definition includes the emotional experience of the observed person, who corresponds to the characters in digital games. However, this emotional aspect was excluded in the adapted definition because what game characters are experiencing is not emotional. The characters do not have emotions, although they may seem

emotional because of the way they are depicted. For similar reasons, the definition does not state that the players have to respond with an emotion matching that of the characters.

Research Design and Methods

The measurement adopted questions from Tobari's Multidimensional Empathy Questionnaire (2003). The questionnaire has four dimensions: empathic concern, personal distress, fantasy, and imagining other's feeling. Fantasy looks at how much a person identifies with fictional characters in novels and movies. Because the digital game is an interactive medium, it is possible that players may not only identify with their own characters, but also develop empathic concerns for other characters as the relationship with them matures. From an evolutionary psychology perspective, empathy is considered a mind mechanism to drive prosocial behavior when needed. Unlike other media where the audience usually has to remain passive, in digital games, players are literally players who can take an action. It can be assumed that empathy in digital games will work more like empathy in the real world than in novels and movies. Therefore, in this study, empathy measurement was adopted and the wording was revised to fit digital game situations. Also, questions on fantasy remained to see if players identify with game characters in a similar way to fictional characters in other media.

In addition, two questions from the friendship questionnaire (Pereira et al., 2010, p. 6) were adopted. The questionnaire identifies empathy in human-robot relationships. The two questions adopted, which came from the intimacy dimension of the questionnaire, ask about sharing feelings with a robot, which is relevant to empathy in digital games. Therefore, the questions were adapted to digital game situations and included in the measurement. The questions were translated by the author and checked by a graduate student who is a native Japanese speaker.

After the items were collected, the most relevant items were selected according to their factor loadings as described in Tobari's paper. Some questions were reversed in the process. In addition, because there is a difference between the relationships players have with their own characters, and relationships between players and other characters, the measurement was made to consist of two parts. Twenty-four items were chosen for the two-part Measurement of Empathy in Digital Games: 14 questions about the player's character and 10 questions about other characters. The measurement was reviewed by two graduate students with extensive digital game experience.

To test the validity and reliability of the measurement, and to see its factor structure, a survey was conducted. Because the measurement is to be applied across a range of digital game genres and platforms, the survey did not limit the game title. The participants were asked to think of a digital game of which their memory was the clearest and easiest to recall. The participants were to recall their interactions with characters in the game and answer the questions.

The survey was done both online and on paper. Participants of the paper survey were 238 university students from undergraduate classes at universities located in Kanto Area. Participants of online survey were 55 game players. The description of participants is in Table 1.

Table 1
Description of Participants

Gender	Ages 15-20	Ages 21-25	Ages 26-30	Not answered	Total
Male	72	37	6	0	115
Female	140	35	0	1	176
Not answered	0	0	0	2	2
Total	212	72	6	3	293

On average, it took about ten minutes to complete the survey both on paper and online. The items on the paper survey and online survey were identical. The questions asked how often participants experienced each feeling. Possible responses were on a five-point Likert scale: never, not often, neutral, often and always. The online survey was created using the online survey tool Creative Survey (http://creativesurvey.com).

Results

Among 293 participants, 16 responded that they had never played a digital game before. Out of the 16 participants with no game experience, 15 were female.

First, item difficulty was checked for each item in the measurement. Responses were divided into three groups—high, middle, and low—according to their total scores. The average scores of the low and high groups were compared for each item. The average scores for the high groups were significantly higher than the scores of low groups for all items in the questionnaire (p<.01). Items with difference less than 1 were eliminated. In addition, items on which more than 40% of respondents answered "never" or "always" were eliminated. Overall, five items were eliminated.

Next, factor analysis was conducted on 19 items to identify the underlying factors. Promax rotation was used because all the items were expected to be correlated, since they are all related to empathy. The four-factor solution was preferred because the eigenvalue dropped below 1 after four factors. Further, based on the original questionnaire, the measurement was inferred to consist of four dimensions.

During several steps, four items were eliminated because they did not have primary factor loadings of .4 or above and communalities over .3. The factor analysis of the remaining 15 items using Promax rotation was conducted. The factor loading matrix is in Table 2. Factors were labeled in accordance with the original measurement of empathy.

Table 2
Factor loadings and communalities for 15 items of Measurement of Empathy in Digital games

	Empathic Concern and Perspective Taking	Fantasy	Indifference to Character Emotion	Personal Distress	Communality
When other characters are having a happy experience, I become happy	.842	.070	.091	-.131	.654
When other characters are having a depressing experience, I want to encourage them	.838	.056	-.009	-.005	.758
When other characters are having a sad experience, I feel pain	.816	.079	.100	-.014	.718
When my character is having a sad experience, I become sad	.811	-.247	-.085	.101	.581
I imagine how other characters are feeling	.671	.206	.035	-.004	.624
When my character is having a happy experience, I become happy	.638	-.006	-.025	.104	.544
When my character is having a depressing experience, I want to encourage him/her/it	.636	-.099	-.139	.226	.626
When I play a game, I get into the character I am controlling	-.133	.733	-.019	.173	.389
I imagine how I would feel if what is happening in the game happened to me	.072	.628	-.042	.016	.447
I play while I think about the main character's emotions while I play	.372	.557	-.032	-.120	.591
I am not sensitive to my character's emotions	.062	-.064	.785	-.078	.451
I am not sensitive to other characters' emotions	.089	-.005	.743	.060	.375
I don't want to help other characters even when they are in trouble	-.216	-.011	.526	.132	.326
I don't know what to do when my character is in trouble	.061	.020	.064	.843	.508
I want to stop playing when my character seems to be in pain	.004	.122	.017	.712	.475
% of variance	43.901	10.835	8.604	7.122	

Correlations between factors	Empathic Concern and Perspective Taking	Fantasy	Indifference to Character Emotion	Personal Distress
Empathic Concern and Perspective Taking	1.000			
Fantasy	.648	1.000		
Indifference to Character Emotion	-.426	-.374	1.000	
Personal Distress	.478	.278	-.251	1.000

The reliability of the measurement was tested, and the value of Cronbach's alpha was .901.

To test the validity of the measurement, the scores of the measurement and the scores of Psychological Involvement–Empathy, the subscale of the Social Presence Gaming Questionnaire (De Kort, Y. A. W., Ijsselsteijn, W. A., & Poels, K., 2007) were compared. The correlation of the average scores of both measurements was high: Pearson's r was .816 (p<.01).

Discussion

The results are similar to those of empathy in real life. Tobari (2003) also got a four-factor solution for her measurement. The four dimensions of her measurement are Empathic Concern, Personal Distress, Fantasy, and Perspective Taking. The Measurement of Empathy in Digital games also includes all four dimensions of empathy in real life, with the addition of Indifference to Character Emotion. Indifference to Character Emotion is likely to happen in digital games because some players only consider the rules of the game and the other features (narratives, visual, etc.) are meaningless to them.

The empathy players feel towards characters in the game is one key to explaining player behavior in digital games. Their feelings towards characters not only make players behave in a certain way in games, but also move people in real life, as can be seen by considering what is happening with Pokémon Go worldwide. With empathy, digital games can be used not only to tell something to players but to change players' behavior. With the Measurement of Empathy in Digital Games, more research on empathy in digital games along with its effect on the player can be conducted.

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