
Empathy Development in Young Children Using Interactive VR Games

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Abstract

The development of empathy in children age 5 to 8 helps them build social skills such as interpersonal, problem-solving abilities, and emotional regulation [3], [4]. Research in Virtual Reality (VR) and Game Development highlights that use of VR games can help promote empathy development. My dissertation aims to explore the use of educational VR games for empathy development. In particular, it aims to study both the engagement and usability of these systems by young children. I plan to conduct empirical studies of the roles character's emotions, characters' memory sharing, and player's perspective taking play in fostering empathy development. In addition, I am interested in how these features promote player engagement and interest in other's life experiences. As a basis for my research, I will be using an interactive VR Empathy game that I developed with a team of game designers in Spring 2017. In addition, I aim to contribute a set of design guidelines and suggestions for empathy game designers.

Author Keywords

Game Design; VR; Educational game; Empathy; Social Skills; Early Childhood Development; Engagement.

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces - User-centered design; K.3.1 [Computers and Education]: Computer Uses in Education - Computer-assisted instruction.

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Work Done

Fall 2015 – Spring 2017:

9 core and optional classes related to Human-Centered Computing, Early Childhood Development, Art Education, Children Literature, Digital Storytelling, and Affective Computing.

Spring 2016: Mobile

Empathy Game is created.

Fall 2016: Passed Qualifying

Exam, which includes writing a literature review of publications related to my dissertation topic.

Spring 2017: Deployment

of VR Empathy Game. Pilot study of VR Empathy Game: usability and engagement evaluation.

Introduction and Background

Empathy development in young children has been found to significantly improves children's social adaptation throughout their lives [3]. In the past, imaginary role play was a key factor in the development of empathy in young children ages 4 to 7 [7]. In recent years, role play has decreased significantly among young children [9]. Child psychologists link decreased role play to increasing use of technology among young children. On the other side, Game Design and Virtual Reality (VR) research suggests that interactive games might be very useful for developing empathy [7]. However, most education-related VR studies focus on the design and evaluation of technologies and activities for children from 12 to 18 years old. There are several studies focus on collaboration [1], social skill development as well as affect identification and feedback for children with autism spectrum disorders [6]. Moreover, the design, use, and research of interactive systems and games to support empathy development for children from 5 to 8 years old is a still unexplored research area [8]. This is also partially due to common concerns in the early childhood development field about the use of computer-based technologies by young children. Therefore, empathy development using modern technologies such as VR is still a new and open research area.

With the increasing availability of VR games and toys on market for children, there is a greater need to understand how to design VR learning experiences for young children. VR offers the potential to envision new ways to engage and scaffold young children's imaginary play.

My research question is "What roles do specific VR Empathy game features (i.e. empathy cues, memories,

perspective-taking) play in creating engaging learning empathy experience for young children?".

In order to address this question my team and I designed a VR Game, which includes the following features: virtual character emotional expression (e.g., face, body, ad voice), perspective-taking, and memory sharing. These features were created based on Empathy Development literature recommendations [4]. The game was designed to facilitate empirical study of these game characteristics/features through individual manipulation of each feature such as on/off toggles and intensity of expression (i.e. high/med/low).

Theoretical Framework

My research on promoting empathy for young children is built upon literature at the intersection of interactive game design, early childhood development, and virtual reality.

According to social constructivist learning theory [7] and early childhood development research [4], there are several highly beneficial activities that promote empathy in young children such as discussions, explanation of others' feelings and behavior, reflections on cause-effect relationships, role-taking, and collaboration. The broad range of Game Design and Virtual Reality (VR) research suggests that interactive games might be very useful for developing empathy [7]. Apostolellis [1] suggests immersive experiences created by VR technologies have great affordances for interactive educational games for children. They have the potential to enrich children's affective perception and involvement in learning situations [6] through emphasizing role-taking and collaborative [2], which are considered helpful for empathy development [4]. Game design research presents several ways of

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Next Stages

Summer 2017: Proposal writing and study plan (Data Collection and analysis) finalizing.

Fall 2017 and Spring 2018: Proposal defense. Running 3-4 studies focusing on different features of my games accordingly. Each study will include data collection, results analysis, and writing a paper about findings.

Summer and Fall 2018: Data analysis and generalization of results.

Spring and Summer 2019: Writing dissertation.

Fall 2019: Dissertation defense.

facilitating these experiences through interactive narrative and virtual avatars and characters.

In addition, use of different modalities (i.e., visual, audial, and tactile) helps children age 5 to 8 learn better and increases engagement and attention span [6]. Likewise, non-linear game storylines will help to provides opportunities for players to interact with the world in unscripted ways, to allow players to have autonomy as well as increase their engagement and exploratory interest in their game play experience.

Basis for Research: Interactive Empathy Game

I designed and implemented an interactive VR empathy game for children age 5 to 8 as an experimental basis for my dissertation research. I used a participatory design and iterative development approaches to design my game “Why did Baba Yaga take my brother?”. This game creates a 3D VR game environment that provides opportunities for children to see and experience another person’s perspective and explores the roles a character’s personal history plays in shaping their perception of situations and current behavior. My goal is to use the immersive experience provided by VR to help children engage in and reflect on the underlying reasons behind another person’s actions. The game is based on the Russian fairy tale “the Magic Swan Geese”. In search of the child’s brother in the game, the player encounters four different emotion-based characters (e.g., happy, sad, fearful, and angry) and needs to communicate and interact with each character to find out who has stolen the brother and why. Baba Yaga represents anger, who over time became a part of her personality. However, for a child to rescue the brother the child must discover the reasons behind Baba Yaga’s behavior, by looking through her glasses

to see her perspective, exploring her memories to see how she became the person she is today, and engaging directly with her through different types of prosocial behaviors. Each empathy character offers the player the opportunity to engage in dialog with the character, experience the behaviors related to each emotion, and their perspective and personal memories.

Methodology

My research question is “What roles do specific VR Empathy game features play in creating engaging learning empathy experience for young children?”.

I plan to conduct several studies using the configurable back-end of my VR empathy game to isolate individual features in order to answer the following questions.

RQa. What role do empathy cues (face, body, voice) play in creating engaging learning empathy experience for young children, how and why?

RQb. What role do character’s memories play in creating engaging learning empathy experience for young children?

RQc. What role does character’s perspective-taking play in creating engaging learning empathy experience for young children?

Data Collection and Analysis

For each study I plan to collect the following data: participant observation, video recording of player's behavior and emotional reactions towards a game, game logs including in-game choices and actions of a player focusing each time accordingly to particular feature. In addition to self-report and behavioral data evidence, in order to specify a level of empathetic and emotional experience of a player during gameplay I

plan also to collect player's visual focus in a game VR world, body language and facial expressions [5].

For each of these studies I plan to measure: learning outcomes of the game using engagement scale, usability scale, empathy assessment tool (KEDS Kids Empathic Development Scale and Bryant Empathy Scale), and in-game actions including choices and results, which will be collected in log files in the back-end of the game.

Expected Outcomes and Contributions

I aim to contribute a set of empirical studies about the specific roles interactive game mediated empathy developing in young children, and a set of design guidelines and suggestions for empathy game designers.

References

1. Panagiotis Apostolellis, and Thanasis Daradoumis. 2010. Exploring the value of audience collaboration and game design in immersive virtual learning environments. In *Proceedings of the 9th International Conference on Interaction Design and Children (IDC'09)*, 326-330.
2. Daniel Churchill, Jie Lu, Thomas KF Chiu, and Bob Fox. 2016. *Mobile Learning Design*. Springer.
3. Jonathan Cohen. 2001. *Social and Emotional Education*. Social Emotional Learning. Teachers College Press. New York, NY.
4. Kathleen Cotton. 1992. *Developing empathy in children and youth*. Northwest Regional Educational Laboratory.
5. Nancy Eisenberg, and Richard A. Fabes. 1990. Empathy: Conceptualization, measurement, and relation to prosocial behavior. *Motivation and Emotion* 14, no. 2: 131-149.
6. Marientina Gotsis, Judith Piggot, Diana Hughes, and Wendy Stone. 2010. "SMART-games: a video game intervention for children with Autism Spectrum Disorders." *9th IDC*, pp. 194-197.
7. Marcia L. Nell, Walter F. Drew, and Deborah E. Bush. 2013. *From play to practice*. National Association for the Education of Young Children.
8. W-H. Wu, H-C. Hsiao, P-L. Wu, C-H. Lin, and S-H. Huang. 2012. Investigating the learning-theory foundations of game-based learning. *Computer Assisted Learning* 28, no. 3: 265-279
9. G. Veiga, C. Neto, and C. Rieffe. 2016. Preschoolers' free play-connections with emotional and social functioning. *International Journal of Emotional Education* 8, 1: 48.