Reflecting on Current State and Future Research of Empathy Assessment and Development within the Game-Based Learning Community

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Abstract: There are decades of growing interest in social-emotional learning (Muravevskaia, 2023; Hoffman, 2009). According to the founders of the SEL concept, Cherniss, Goleman, et al. (2006), SEL is "the process of acquiring a set of social and emotional skills—self-awareness, self-management, social awareness, relationship skills, and responsible decision-making within the context of a safe, supportive environment." One of the most popular SEL frameworks is CASEL (2003), which includes five aspects: self-awareness, social awareness, self-management, decision-making skills, and relationship skills. The social awareness aspect includes competencies related to empathy: (taking others' perspectives, demonstrating empathy, and showing concern for the feelings of others). Empathy is widely used and mentioned in SEL and other literature across the research fields of game-based learning, design research, social psychology, neuroscience, affective computing, artificial intelligence, educational technologies, and others. Design thinking methodology and user experience research claim empathy is the first step in user research and developing multiple tools and measures (Dorst, 2011; Wright, 2008). Virtual reality is suggested as an "empathy machine" and promoted as a good tool for empathy development (Ventura, 2020). Affective computing works on modeling and measuring empathy in artificial agents to create systems that would scaffold the learning experience using SEL components (Gebhard, 2021). Empathy games are emerging as a new separate sub-domain (Muravevskaia,2023). Such situation multiplies many different definitions, methodologies, and measures for empathy. Such an active and divided interest in empathy across different domains can cause potential research confusion and challenges for educational technology and game-based research communities. We invite the GBL Research community to gather together as an interdisciplinary community to be able to discuss what empathy means for our community, how we define it and which methods use, which role it plays in the GBL, and which emerging future research in this area we envision together.

Keywords: Empathy, Social-emotional Learning, Empathy Development, Empathy Games, Affective Computing

1. Introduction and Background

Psychology research describes empathy as social and emotional competence, which "measures the ability to understand, process, manage, and express social and emotional aspects of our lives" (Cohen; 2001, p. 220) and "may be considered as a basic human characteristic related to social adaptation" (Borke, 1973, p. 102). Cotton, during his study in 1992, suggests that empathy mainly comprises affective and cognitive components, whereas Reid (2013) defines three aspects of empathy: affective, cognitive, and behavioral (Reid; 2013). There are two major lines of definitions:

1. Some researchers (De Waal, Reid, Bayne) suggest that empathy is a general term (or even an umbrella of terms) that identifies the ability of one to identify and understand others' feelings and emotions and includes several aspects (i.e., affective, cognitive, and behavioral).
2. Other researchers (Bloom, Preckel) identify empathy as a state or a feeling of what another person feels. They highlight that this state might not be helpful and that a person who experiences empathy towards another person cannot even act prosocially sometimes due to personal distress. In contrast, they identify compassion as a solution when a person can stay distantly emotional and act prosocially according to the situation. The first group of researchers talks about these two concepts as aspects of empathy and names them affective empathy and cognitive empathy accordingly.

Besides these two big general chains of thought, there are many others that can also be identified. In particular, Cuff (2014) identified 43 more or less distinct definitions of empathy. The way empathy has been defined affects: 1) how the relationships between empathy and other similar concepts (compassion, sympathy, theory of mind, etc.) can be identified; 2) how it can be measured; and 3) which methods to use for its development.

Empathy games are still new research area, which is in its infancy. Scherier (2021) conducted a systematic review of "empathy" and "games," which aimed to establish a common foundation for the new research area of empathy games. She found that the word empathy is now used or defined very loosely across the papers, which focused on the empathy games domain. Interest in empathy games is increasing nowadays, in particular, in game-based learning field of research. For example, only in 2024 year there 61 papers published that mentioned the words "game-based learning" and "empathy" at least once (Google Scholar). This interest is timely and

reasonable as it has a potential to address several current issues with decline of empathy and social skills among young people. Early childhood development research supports role-play activities as very important practices for social-emotional learning, and in particular, for empathy development (Cotton, 1991; Vygotsky, 1978). Moreover, modern technologies (e.g., VR, AR, AI) bring opportunities for the systematic development of educational empathy games, such as: 1) opportunity to collect and analyse behavioural and biometrics data, 2) real-time scaffolding of player's educational and emotional needs during the game flow, and 3) providing feedback and conducting assessment as a result of the player's activity. However, It is still underexplored how to systematically approach these opportunities in order to design educational empathy games.

Up to date, there were several studies which tap on some of these opportunities. For example, there were several projects addressed SEL and included assessing emotions. For example, "InsideOut" (Kralicek, 2018) environment aimed to support SEL by visualization of emotions for a teacher and students in the classroom. There were multiple data collected (i.e., brain waves, heart rate, and skin resistance noninvasive sensors) and presented as emotion avatars based on five basic emotions: joy, anger, sadness, fear, disgust. "EmotoTent" (Antle, 2019) also used noninvasive sensors to measure brain and heart activity to generate and visualize children's emotions and projected them as a 3D holographic image on the top of the tent. Antle (2019) suggested that such visualization can lead to a discussion of how to express prosocial actions, contributing to the development of empathy. Antle (2019) also suggested emotions guessing games using such holographic images as a tool to support emotional recognition skills. Both papers contribute new tools for emotions' representation and suggested activities on how to use it for developing emotion recognition and perspective-taking skills. However, none of them provided further specific recommendations for game activities. Another research by López-Faican (2021) proposed a circular iterative empathy development model for analyzing gamification strategies. This model is proposed to be useful for the design of interactive systems for the development of empathy. This model uses pedagogical strategies in which users are exposed to affective, cognitive, reflective, and social experiences that encourage the expression of behaviors of a prosocial nature. The model presented by Lopez-Faican (2021) is based on Davis's empathy research and aligns with PAM empathy model from psychology field (Preston, 2007), that suggest developing affective empathy proceeds to cognitive empathy and that behavioral empathy is built on affective and cognitive empathy (Reid, 2013). The further work by Lopez-Faican builds on this model and explores ways to develop empathy via AR games, however, does not provide clarity on whether such games can build empathy in the educational contexts. It opens a number of further research avenues.

2. Current Opportunities

We suggest the following opportunities be explored so that the GBL community can consistently move empathy research forward: 1) establishing the vocabulary for the new empathy games field; 2) interdisciplinary collaboration.

2.1 Establishing the Vocabulary

While researchers in human-centred computing, game design, and educational technologies refer to some of the psychology or medicine literature in order to be able to ground their empathy research, a lack of training in this area might lead to confusion about which definition and from which psychology research school they shall build their research. This is illustrated by the initial systematic survey by Karen Scherier on empathy and games (Scherier, 2021), which lists 18 different definitions and aspects of empathy used in different research papers from different fields of study related to empathy games studies. Scherier highlights that many papers use the definitions very loosely and/or create their own variations of empathy aspects/sub-aspects, which leads to adding new definitions that are potentially not well grounded in psychology research. Such a situation might lead to more confusion if, for example, other researchers refer to newly generated definitions without deep exploration of the topic. Such dynamics might undermine the quality and consistency of the further empathy research in GBL. Therefore, we need to make sure we have a common ground and unified terminology for every concept we use (i.e., empathy, compassion, sympathy).

2.2 Interdisciplinary Collaboration

GBL is a very interdisciplinary community, which includes researchers and practitioners from education, computer science, HCI, games, psychology, and others. Confusion with empathy definitions might make interdisciplinary projects challenging because different definitions might represent different learning traditions

(e.g., social constructivism, cognitivism, etc.) as well as utilize different methodologies. Therefore, it is a need for more collaborative interdisciplinary projects among these domains.

3. Future Research Opportunities

This sub-section lists potential interdisciplinary research avenues on empathy research that might interest the GBL community.

1. A systematic literature review on how game-based learning can address empathy assessment and development. We consider it a first step, which would establish a systematic foundation of definitions, learning theories, and methods to be used in this area (Schrier, 2017).
2. Research on how tools and methods from affective computing and mixed reality fields can be used to incorporate biofeedback and immersive environments into learning games in order to scaffold the learning process as well as create empathic experiences for the players (Muravevskaia, 2023).
3. Research on further establishing game design frameworks for empathy games, which would create empathic experiences in players and provide learners with an opportunity to explore, interpret, and address the emotions of others (Muravevskaia, 2023).
4. Research incorporating artificial intelligence into games to explore ways to design game characters that model the player's empathic behavior as well as address their emotional changes.

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