Analysis of Empathic Experiences in Video Games with Microblogging

Ossy Dwi Endah Wulansari[1,2(✉)], Johanna Pirker[2], Christian Guetl[2]
[1]Computer Sciences Department, University of Lampung, Lampung, Indonesia
[2]ISDS Graz University of Technology, Graz, Austria
ossy_dew@yahoo.co.id

Abstract—Empathy refers to what people experience and feel. Experts believed that empathy is an emotional intelligence skill that can be trained and taught. Therefore, it is very important to explore ways to experience and teach emotional empathy. Empathy experiences can be stimulated by reading fiction and other narratives, storytelling, watching movies, but also playing computer games. In this work, our objective is to investigate the effect of video gaming on empathy using a microblogging tool designed to collect user experiences related to empathy. The aim of this research is to contribute by providing a tool to teach, experience, and measure empathy. This research applies quantitative and qualitative methods. We conducted two studies: (1) investigating the correlation between empathic experiences and video games, and (2) a laboratory experiment to evaluate microblogs as a tool for interviews and media to express feeling or opinion related to empathy. Quantitative data were obtained from the IRI questionnaire. We developed and implemented a microblogging tool. Study 1 involved 100 participants, and study 2 involved 43 participants. As a result, we find that during the interventions, mean scores increase more for male than for female participants. The impact of playing the video game toward empathy is to raise players' fantasy. The game's story or narrative has the most important role to affect players' feelings. We also explore the potential of a microblogging tool for acquiring qualitative data related to empathy experiences and the effect of playing games.

Keywords—empathy, microblogging, user experience, tool, self-assessment

1 Introduction

Empathy is necessary to build good relationships between individuals. It provides a sense what other people are feeling and experiencing. The absence of empathy in social interaction can lead to destructive behaviors such as bullying, violent crime, abusive parenting, narcissism, or spouse abuse.

Empathy is the capability to sense emotions of others, coupled with the ability to imagine what someone else might be thinking or feeling.

Bird argues that empathy depends on two sources of input obtained from computationally intensive processes being the 'affective clue classification system' and 'situation understanding system' [1].

Information technologies can foster global understanding and thus impact empathy. For example, excessive 'screen time' or 'time spent online' might have negative impact to individual which can lead to dependency or addiction on digital media content [2]. On the other side, Carrier finds that online activities in general do not reduce peoples' capability to empathize in the real-world [3]. Time spent online increases the prospect of face-to-face encounters, which can have a positive impact on empathy. Some developers are venturing into technology that could have a positive impact on emotional state and also encourage kids to become kinder and more caring in their social lives. However, research in this regard is still limited, and further research is needed that utilizes ICT innovations to teach and train empathy skills. Exploring ways to experience and teach emotional empathy to others is becoming increasingly important.

The ability to empathize is not only inborn to each individual but can also be learned continuously. Experts believe that empathy is an emotional intelligence skill that can be trained and taught. Empathy experiences can be stimulated by watching movies, reading fiction, storytelling, playing computer games, or experiencing simulations. Although several games related to empathy that have been developed and released, there is still a lack of evidence that they are a sufficient tool for teaching and experiencing empathy and linking it to real-life situations. In this regard, Manney states that most games did not generate empathy because the games' stories do not have deep psychological implication on the characterization [4].

Cognitive science experts believe that age-appropriate video games involving many players can help children develop the ability to see through the eyes of others. When properly designed, they also have the potential to foster players' meta-cognitive regulation and engage them in active cognitive thinking. Genres of interactive games that address real-world problems in all their complexity include also "serious games" and "educational games". Educational games can be utilized to foster a kind attitude and improve cognitive knowledge of the subject [5]. Also, Papoutsi has also found in their research that games can have positive effects on social interactions [6].

Nowadays there is the phenomenon of empathy deficit or decreased empathy. According to Kaliouby, younger generations might be losing the capability to empathize because they are growing up with digital era [7]. One of the main dimensions of human beings is emotion, which in many cases is missing in the digital realm. Therefore, there is an opportunity to develop online tools that can stimulate empathic experiences or improve empathy skills to overcome the problem of empathy deficit.

In a previous study, we examined the relationship between video games and empathy [7]. We also seek to investigate how video games stimulate empathic experiences. For this purpose, we examined video games using various game elements such as story or narrative, character identification, the game world, objective or goal settings, action choice, and role-playing.

This research is expected to provide deeper insight and findings, especially about the analysis of empathic experiences using microblogging tools in combination with a video game. The goal of this study is to contribute by providing a tool for teaching, experiencing, and measuring empathy. The focus is on computer games and social media.

The results of this experiment are excepted, to support moral character education, especially the development of empathy in students.

The remainder of this paper is organized as follows: Section 2 summarizes related works. Section 3 explains the methods used in this study. In Section 4, we analyze and discuss the results, and finally, Section 5 presents conclusions and future work.

2　Related work

2.1　Empathy

In the psychology community, there are different arguments, ideas, and viewpoints on the concept of empathy [8]. Since the term "*Einfühlung*" or "empathy" was first introduced nearly a century ago, the meaning of this term "has an intrinsic ambiguity that appeals to the kind of definitional debates that have continued". In a recent literature review, Cherry defines empathy as: "the ability to emotionally understand what other people feel, see things from their point of view, and imagine yourself in their place" [8]. The author further infers two main factors that contribute to the ability to experience empathy: genetics and socialization. It is also emphasized that empathy is a skill that can be learned and strengthened.

2.2　Empathy research

Research on empathy has shown that the concept of empathy has evolved and changed in many ways over the past century. A vast body of research has been produced in the past decades on how empathy relates to such things as moral development, aggression, altruistic motivation, similar experiences, and interpersonal relationships. Empathy is a prominent topic in several research areas, including neuroscience, psychology, education, and sociology.

For example, Cooper noted that there is a significant increase in research on emotional processes in learning and achievement [10]. Educators should not only focus on learning content, but also be able to engage students' emotions to optimize learning. Educational experts should provide analytical learning measurements by collecting and logging interactions of the user to create statistical evaluations [11].

There is also increasing interest in the research and development of digital games for learning and educational purposes. Research on the learning and educational benefits of video games has made significant progress in recent years.

Granic reviewed the literature exploring the educational and social benefits of video games and concluded that video games can provide immersive and compelling cognitive, social, and emotional experiences [12]. In addition, video games provide cognitive benefits that can be transferred to real-world contexts.

Although game design and research address several issues, research on digital games for teaching moral development is still limited. More work is needed to better understand the potential of digital games to support specific learning outcomes. Because video games are often vilified in the media narrative for being associated with addiction, violence, and antisocial behavior [13]. Lim conduct research to examine empathy as

a factor that motivates players to continue playing [14]. Players can establish a social relationship similar to that between people and with characters in games. He believes that empathy not only attracts players but also affects player behavior in games.

Only limited research exists tackling the topic of communication on social media involving emotions or "empathy online". A study by Vossen reports that social media use is associated with an increase in cognitive and affective empathy over time [15]. Specifically, social media use improved the ability to understand and share the feelings of peers.

On the other hand, Collins examines the correlation between empathy and Facebook, using "The Facebook Intensity Scale", which measures Facebook use, its integration into the user's daily activities, and emotional attachment to the site [16]. He reveals the positive correlation between empathy and Facebook use, time on Facebook, and the ability to chat.

In our first study, we found that pro-social video games have the potential to stimulate empathy. The findings of this study suggest that strong stories in video games can have a positive impact on player empathy [8].

2.3   How to measure empathy

Neumann stated that researchers have used different approaches to measure empathy [17]. Empathy can be measured from three different perspectives: self-rating (first-person assessment), patient-rating (second-person assessment), and observer rating (third-person assessment). Self-report measures of empathy include the Empathy Quotient (EQ), the Interpersonal Reactivity Index (IRI), Base Empathy Scale (BES), and the Balanced Emotional Empathy Scale (BEES), Griffith Empathy Measure (GEM), Toronto Empathy Questionnaire (TEQ), Accurate Empathy Scales (AES), Adolescent Measure of Empathy and Sympathy (AMES). Table 1 show detail of self-report empathy questionnaires [23].

Table 1. Empathy questionnaires

Questionnaires	Elements	Scales	Characteristic
EQ	60	4	Tend to focus more on measuring empathy process then construct
BES	40	5	There is a scarcity of literature that provides ability coefficients
GEM	23	9	Cognitive component tent to stable and doesn't show highly internal consistency
TEQ	16	5	Loads on single factor example of broadest, common construct of empathy
BEES	30	9	Limited in focus on emotional empathy
IRI	28	4	Require the criterion or predictive validity
AES	20	8	Small part of recorded interviews can be reliably rated
AMES	16	5	Devote for measure empathy and sympathy in adolescents

3 Study design

This research consists of two studies and was conducted using quantitative and qualitative methods. We focused on evaluating empathic experiences in the context of a game and the potential of microblogging tools for interviews, discussions, and media to express opinions that engage users to become aware of empathy issues. Therefore, this study investigates whether the video game Path-Out in combination with microblogging can improve the players' empathic experiences [18]. We focus on the following main research questions:

RQ1: What is the impact of playing "Path-Out" on empathy?
RQ2: Can be microblogging used as a tool to analyze user experiences related to empathy?

To address the research questions, we conduct two studies in which we investigate the correlation between empathic experiences and video games. In the first study, we conduct an experiment with a game called "Path Out" based on a true story about the Syrian civil war.

The second study is a laboratory experiment to evaluate microblogs as a tool to obtain qualitative data on emphatic aspects. A Twitter-like microblogging tool was developed for this purpose.

3.1 Study 1

The first study is designed as a correlational study between video games and empathic experiences. For this purpose, we choose a video game Path-Out as a medium to generate empathic experiences. This study uses quantitative and qualitative methods. The quantitative data were obtained through a questionnaire using a non-probability sampling method. The qualitative data were obtained from empathy microblog postings and the logs of the empathy progress testimony reports.

Instruments.
- Interpersonal Reactivity Index

The Interpersonal Reactivity Index is a measure of empathy that aims to measure empathy for individuals [17]. The measuring instruments consist of 4 aspects; each aspect has 7 different items; the answers use a Likert scale consisting of 5 points. These aspects or sub-dimension of empathy are:

1. **Perspective taking** is seen as the behavior of individuals who take over spontaneously from another's point of view.
2. **Fantasy** is the behavior of changing self-patterns imaginative into thoughts, feelings, and actions.
3. **Empathic concern** addresses feelings of sympathy and concern for others, especially in sharing experiences of indirectly and directly feeling the suffering of others.
4. **Personal distress** refers to controlling personal reactions to the suffering of others, which includes feelings of surprise, fear, anxiety, concern, and helplessness.

- The "Path-Out" Game

The game "Path-Out" is an autobiography game and uses narrative elements to make players understand the protagonist's story. It uses game elements to enable players to experience someone's life story [18]. Path-out is an example of an adventure game inspired by the autobiography of a young Syrian artist who escaped from the civil war in his country.

Participants. Participants are recruited from the Computer Science Department University of Lampung, and Senior High School students in Lampung Province, Indonesia. They were invited to take part in this study including rewards of course credits. About 124 students were invited to take a part. 100 students completed the study. The outcome of this experiment is to support moral character education especially "empathy" development skill for students.

Procedure. Due to the situation of the pandemic, this experiment was conducted in an online mode. The experiment consists of three sessions. In each session, participants are asked to play the game "Path Out", then complete the IRIQ as a post-questionnaire and write or make a posting (microblog) about what they were thinking or feeling after playing the game. They were also asked to rate six elements of games that affect player empathy: story, action-choice, role-playing, games-world, character-identification, and games-goal. In the last part of the session, they were asked about the progress of their understanding of others' situations, perspectives, and feelings. Additionally, the first session included a pre-questionnaire and participants were asked to fill out the IRIQ before playing the game. Overall, all sessions lasted 1–2 hours.

3.2 Study 2

In the second study, we evaluate the potential of a microblogging tool to collect qualitative data related to empathy experiences and the impact of playing the game Path Out. We use quantitative data to evaluate the user experience of the empathy microblog.

Instruments.
- **User Experience Questionnaire (UEQ).**

The User Experience Questionnaire (UEQ) is a method used for measuring "user experience" using a questionnaire as a medium in collecting feedback from users when using a tool. There are 6 scales with a total of 26 items categorized by measurement scales contained in the UEQ [22].

- **Empathy Microblogging Tool.**

To test whether an empathy video game intervention would improve empathic experiences and connectivity, we developed a microblogging tool for the user's empathic experiences expression, which we name "empathy microblog". It is also available online under www.mblogempathy.com. Figure 1 shows the empathy microblog homepage.
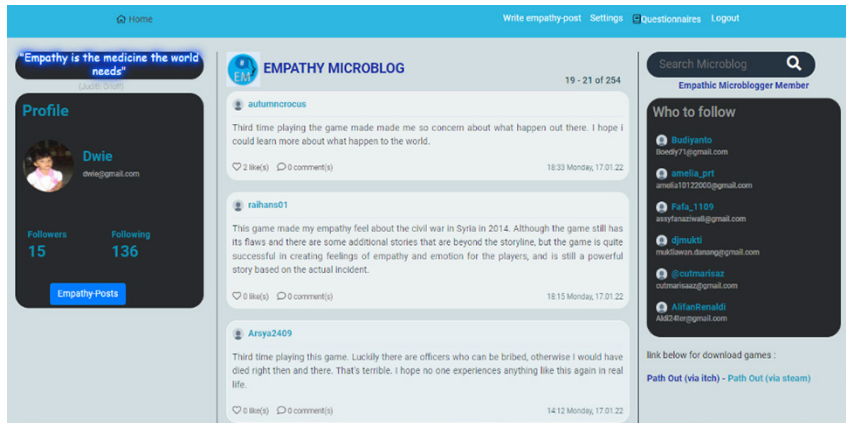
Fig. 1. Empathy microblog tool homepage

Participants. Participants were undergraduate students and senior high school students in Lampung Province, Indonesia. 43 students took part in this study.

Procedure. First, participants were asked to access and explore all menus provided in the empathy microblog. In the next step, they were asked to complete the User Experience Questionnaire (UEQ). To obtain feedback from the participants, after completing the UEQ, they were asked to write comments or suggestions about empathy microblogging tools. Participants spent an average of about 5–10 minutes.

4   Result and discussion

Study 1 was conducted from October to December 2021. Study 2 was conducted from January to March 2022. Study 1 involved 100 high school and college students from the Computer Science Department at Lampung University (Indonesia), and Study 2 involved 43 high school and college students in Lampung (Indonesia). Table 1 shows the demographic information of the participants.

Moore report on the importance of quantitative gender differences in the basic networks associated with cognitive and affective forms of empathy [20]. For this reason, it was important for us to have a gender balance of participants. Therefore, we involved 50 male students and 50 female students in Study 1.

To examine the effects of playing the game "Path Out" on empathy, we first compared IRIQ scores of the pre-test, the first post-test, the second post-test, and the third post-test as illustrated in Table 3. From Table 3, it can be seen that the total score of female participants is higher than male participants. However, during the interventions, male participants have on average more outstanding increasing scores than female participants. Whereas the sub-scales of the IRI (fantasy, perspective taking, personal distress, and empathic concern) were reviewed separately for the purpose to find the games' impact on the cognitive and affective aspects of empathy (see Table 3).

Table 2. Demogrphic informations

	Study 1		Study 2	
	Amount	**Percentages (%)**	**Amount**	**Percentages (%)**
Gender				
Male	50	50	16	37
Female	50	50	27	63
Age				
15–17	7	7	3	7
18–20	57	57	12	28
21–23	31	31	28	65
More than 24	3	3	–	–
Education				
Senior High School	15	15	3	7
Bachelor	82	82	40	93
Master	3	3	–	–

Table 3. IRIQ Score comparison

IRIQ Result	PostTest1		PostTest2		PostTest3	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
Mean of increasing score	10.76	9.44	9.92	8.55	15.65	10.26
Standard Deviation	8.98	9.67	8.87	8.50	10.97	13.55
Total score	4753	4863	4831	5011	4877	5152
Increase amount	23	17	25	27	22	29
Increase amount total	40		52		51	

Table 4. IRIQ sub-scales

Sub Dimension	PreTest	PostTest1	PostTest2	PostTest3
Perspective Taking				
Total Male score	1223	1214	1220	1270
Total Female score	1225	1193	1228	1285
Total score	2448	2407	2448	2555
Fantasy				
Total Male score	1117	1160	1189	1201
Total Female score	1186	1201	1249	1272
Total score	2303	2361	2438	2473
Empathic Concern				
Total Male score	1306	1273	1267	1285
Total Female score	1312	1314	1337	1369
Total score	2618	2587	2604	2654
Personal Distress				
Total Male score	1144	1106	1155	1121
Total Female score	1219	1155	1197	1226
Total score	2363	2261	2352	2347

The effects of gender differences in empathy sub-scales were also taken into consideration. Table 3 shows the change on scores in the empathy sub-scale for male and female participants. It can be seen that there is an increasing score for the fantasy sub-scale among males, while for females the scores for "empathic concern" and "fantasy" increase. The highest sub-scale score is "empathic concern". As can be seen from the line graph in Figure 2, shown only the Fantasy sub-scale increased during three times interventions. Thus, we can observe a positive correlation between fantasy sub-scale scores and the number of interventions. This suggests that the impact of playing the game Path Out on empathy is to boost players' fantasy.
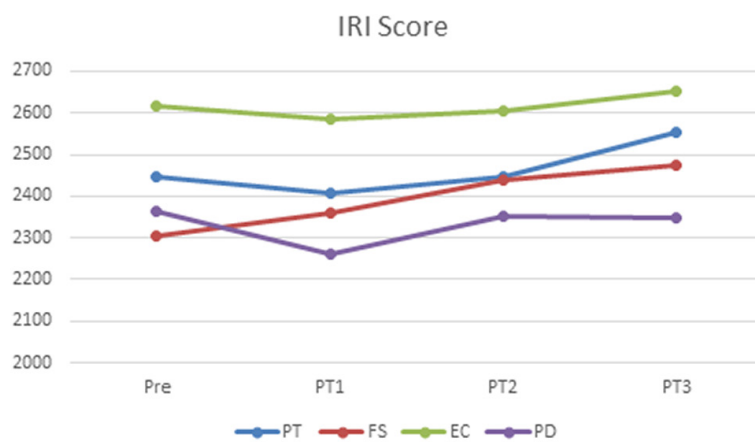

Fig. 2. Sub-scale comparison

This study also investigated how games affect empathy. We seek to find game elements or aspects that influence empathy or trigger empathic experiences. In addition to writing microblogs, participants were asked to rate six aspects of games or game elements that influence their emotions and help players to put their-self in the main character position. These were story or narrative, action choice, role-playing, games-goal, games-world, and character identification.

The results show that "story or narrative" plays the most important role in influencing players' feelings, followed by "character identification", "game worlds", "role playing", "objective", and finally "action choice". This finding is in-line with a study by Belman that argues that empathetic players intentionally try to size up the feelings and thoughts of people or groups portrayed in the game (cognitive empathy), and adjust to an emotional response [21].

In obtain qualitative data, we provided an online interview feature via microblogging tools. Data were collected through a structured online interview that explored participants' experiences. An open-ended question was asked about self-assessment of progress in understanding the feelings or conditions of others. We randomly present some of their answers in the empathy progress testimony log.

Table 5. Testimony logs

Testimony	Report
T1	"After playing the game, my empathy had increased".
T2	"This game increased my awareness".
T3	"It is really nerve-wrecking when you need to disguise yourself for your own safety".
T1	"I feel more empathetic towards other people than before".
T2	"I feel empathy for them, I also understand how the main character feels at that time".
T3	"How lucky I am that I can still live a peaceful life here. If I were in the position of the main character, I'm not sure I could handle it".
T1 T2 T3	"After playing this game I realized and felt more open about the things that were happening out there. Many unexpected things often happen without us realizing it, this game makes me more sensitive and raises the spirit of empathy for the conditions around us".
T1	"I think I can quite understand other people's feelings just by imagining if I was in his situation. But now, I don't think that's enough, I should understand more about that person before trying to imagine the situation he's in".
T2	"I feel sad that the situation in the game has no human value, the situation seems to always be depressed".
T3	"I think when playing the game is the difficulty of the main character in the game to get the freedom to cross the road to reach the destination because of the tight guard from the Syrian army. And it made the human soul in me feel annoyed with the Syrian army".

Most participants testify that during interventions, they had the progress in understanding others' feelings, perspectives, and situations.

- **User Experience Questionnaire Analysis**

We used the UEQ Data Analysis Tool created by Martin Scherpp [22]. This tool makes the analysis of UEQ data easier and calculates all statistics necessary to interpret the results. Figure 3 shows the benchmark of the empathy microblog.
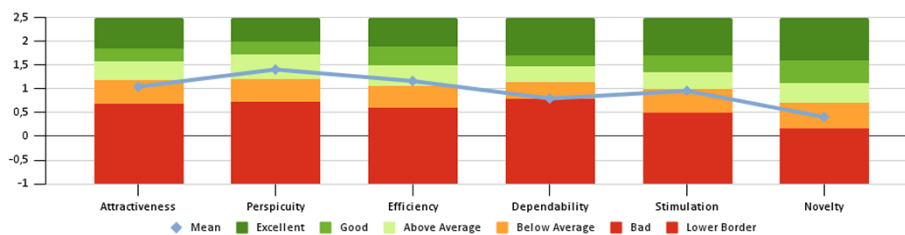
Fig. 3. Benchmark analysis result

The benchmark scale is important to evaluate the quality of a tool compared to similar tools. As shown in Figure 3, perspicuity (understandable and learnable) aspect is on a "good" range. Aspects such as attractiveness, efficiency, stimulation, novelty and dependability are on "above average" range. Another scale highlighted is the "evaluation" of 6 aspects scale. Overall, the results of the evaluation are on "positive"

assessment. We also collected user comments or suggestions toward the empathy microblogging tools from online interviews. This included suggestions such as adding forget password and search features to empathy microblogging tool. We take users' suggestions into account for the next improvement.

5 Conclusion and future work

The results of Study 1 indicate that during the interventions, mean scores increase more for male participants than for participants identifying as female. The highest score on the empathy subscales is "Empathic Concern." There is an increase in the "fantasy" scores among males. Female participants the score for "empathic concern" increased the most. This suggest that during interventions, male participants experienced more cognitive empathy, whereas females experienced more affective empathy. This indicates a positive correlation between fantasy scores and amounts of interventions, so the impact of playing the game Path Out toward empathy is to increase the players' fantasy. We find that the story of the game plays the most important role in influencing players' emotions. Short-term effects related to the use of the game Path-Out support the possibility that empathy is enhanced by the fantasy sub-scale. Results of second study demonstrate the potential of a microblogging tool for collecting qualitative data related to empathy experiences and impact of playing games.

However, future research efforts are needed to determine possible long-term changes in empathy training. We also hope that these results can provide an indication that microblogs are a useful tool to assess and deliver empathy training.

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7 Authors

Ossy Dwi Endah Wulansari is member of the Cognitive and Digital Science (CoDiS) Lab, Inffeldgasse 16c, 1080 Graz, Austria. She works as lecturer at Computer Science Department University of Lampung. Her research interest is interactive and social-media, e-learning media, video games, virtual and augmented reality technology (email: ossy_dew@yahoo.co.id).

Johanna Pirker is a computer science professor at the Ludwig Maximilian University of Munich for Media Informatics, assistant professor at Graz University of Technology for Games Engineering and leads the research lab Game Lab Graz. She researches games with a focus on AI, HCI, data analysis, and VR technologies.

Christian Guetl is affiliated at the Institute of Interactive Systems and Data Science at Graz University of Technology in Austria where he leads the Cognitive and Digital Science (CoDiS) Lab. Christian is involved in e-learning and e-assessment for more than 20 years and he has authored and coauthored in more than 220 peer-reviewed book chapters, journals, and conference proceedings publications. He is involved in numerous organizational and editorial boards as well as program committees. He is founding member of the Global Immersive Learning Research Network (iLRN), chair of the technical committee of immersive learning (ILE-TC) of IEEE Education Society, managing editor of J.UCS, coeditor of the International Journal of Knowledge and Learning (IJKL). His research interests include information search and retrieval, e-education, e-assessment, adaptive media technologies, and virtual and augmented reality for learning and knowledge transfer.