

# Designing an Interactive Game to Encourage Cognitive Empathy as a Bullying Prevention Tool

Hanif Baharin<sup>1\*</sup>, ShukorSanimMohdFauzi<sup>2</sup>, Azlina Ahmad<sup>3</sup>, Fazillah Mohmad Kamal<sup>4</sup>

<sup>1,3</sup>Institute of Visual Informatics, Universiti Kebangsaan Malaysia, <sup>2</sup>Universiti Teknologi MARA

<sup>4</sup>Faculty of Quantitative Sciences, Universiti Utara Malaysia

\*Corresponding Author Email: [hbaharin@ukm.edu.my](mailto:hbaharin@ukm.edu.my)

## Abstract

Bullying can have detrimental consequences to the victims, hence there is a need for bullying prevention programs at school. In this paper, we describe a gameplay model which may be used to elicit cognitive empathy as a part of anti-bullying program among schoolchildren. We interviewed 79 schoolchildren from four schools in order to find out their understanding of bullying and their play behavior, and we observed their play behavior during recess. We found that most schoolchildren in our study instinctively know that bullying is wrong because it hurt others but attribute the consequences to self as imposed by authorities as the reason why hurting others is wrong. We argue that, this shows that they demonstrate affective empathy but would benefit from cognitive empathy training. From our findings we came out with design guidelines and produced a bullying morality conceptual model, which then informed our gameplay model. To validate the gameplay model, we designed and tested an indoor physical computing game prototype that encourages player to collectively exercise their cognitive empathy. The results from our game testing shows that the game mechanics proposed in our gameplay model do encourage players to exercise the empathy.

**Keywords:** Game design, bullying, schoolchildren, empathy.

## 1. Introduction

This paper describes a gameplay model which may be used as a part of anti-bullying program for primary schoolchildren. The gameplay model is based on our study that uses an ethnomethodologically-informed ethnographic approach to understand bullying awareness and game play behaviors among primary schoolchildren in Malaysia. Bullying cases among children and adolescents received a lot of media attention in Malaysia because the consequences for the victims were dire, such as permanent physical disabilities and even death. We approach bullying problem through the perspectives of Interaction Design, by asking the question of how technology intervention can be used as a part of bullying prevention tool at schools. Our early observation at schools shows that play may be used as an opportunity for anti-bullying training. Play, especially social and pretend play, is beneficial to the development of theory of mind skills in children (Burriss & Tsao, 2002). Theory of mind skills are related to empathy (Völlm et al., 2006), which correlates to bullying behaviors (van Noorden, Haselager, Cillessen, & Bukowski, 2014). Our findings also show that the participants morality on bullying may be linked to their affective and cognitive empathy. In fact, an anti-bullying game for primary school students has been used in a successful, nationwide anti-bullying program in Finland (Salmivalli, Kärnä, & Poskiparta, 2011). Hence, we argue that a game is suitable as a bullying prevention tool.

The scope of this research is to design a game as a technological intervention which may be used as a part of anti-bullying program. It does not address the design and testing of a comprehensive bullying prevention program. The main

contributions of this paper are the bullying morality conceptual model based on thick description of schoolchildren understanding of the meaning of bullying, design guidelines for designing games at school and a validated gameplay model for cognitive empathy training among schoolchildren. This research aims to answer the following questions:

1. How to design a game to be a part of bullying prevention program that fits into the playing behavior of primary children at school?
2. How to integrate cognitive empathy training in the game design?

## 2. Literature Review

Approaching the problem of bullying among schoolchildren from the perspectives of Interaction Design, we argue that games can be designed as a tool to be used as a part of bullying prevention training among primary schoolchildren. In fact, a successful nationwide antibullying program in Finland, called KiVA, already incorporated a digital game as a part of its program (Salmivalli et al., 2011). Bullying can be defined as repeated acts of individual or a group of people, over time, that causes physical or emotional harms to others who are powerless to defend themselves (Olweus, 1994). According to the statistics released by the Malaysian Ministry of Education, between 2012 to 2015 there were more than 14,000 bullying cases at Malaysian schools, and most bullying cases involved physical aggressions (Vijandren, 2017). This is in accordance with studies that shows that bullying among school students in Malaysia is rather a common phenomenon (Wan Ismail, Nik Jaafar, Sidi, Midin, & Shah, 2014; Yahaya, Ramli, Hashim, Ibrahim, & Rahman, 2009). However research on bullying in Southeast Asian countries is lacking despite research

of bullying from different Asian countries shows that cultural context influence characteristics of bullying (Sittichai & Smith, 2015). Instead of quantitatively measuring aspects of bullying based on constituents of bullying produced by research from Western countries, Sittichai & Smith (2015) recommend that more qualitative studies on bullying being undertaken in Southeast Asian countries.

A review on bullying prevention programs at school found that such programs are effective in reducing bullying with the average decreased of bullying by 20% to 23% and average reduction of victimization by 17% to 20% (Ttofi & Farrington, 2011). However, in Malaysia, there is no nationwide program undertaken at schools to prevent bullying. It is up to the management of the individual schools to take the initiatives to conduct such program. Bullying cases in Malaysian schools are handled using the same methods of punishing other disciplinary misconducts through warning, counselling, and physical punishments of canning (Salleh & Zainal, 2014).

The first nationwide bullying prevention program, Olweus Bullying Prevention Program (OBPP), was conducted in Norway, which was used as a part of an anti-bullying initiative known as First Bergen Project Against Bullying between 1983 and 1985 by the Norwegian Ministry of Education after three young boys committed suicide as a result from being bullied (Olweus & Limber, 2010). The program was designed based on research on mediation of problem behaviors, with the aim to create a sense of community at school, by creating a social environment among children and adults that decreases the chances for bullying behavior to take place (Olweus & Limber, 2010). There are four of OBPP components – school-level, classroom-level, individual-level and community level (Olweus & Limber, 2010). Since then, long term studies have been undertaken in Norway and the United States (Limber, 2011) to evaluate the effectiveness of the program. Overall results show that the program can considerably reduce bullying at schools (Olweus & Limber, 2010). The application of the program in Malaysia also shows positive results in reducing bullying, and it was shown that schools that gave more attention to classroom level components are more successful in reducing bullying (Yaakub et al., 2010). Deploying a nationwide and full scale anti-bullying program is outside the means and scope of this research, but we argue that games can be a valuable tool for such program.

Another major anti-bullying program implementation with state support is The KiVa program in Finland (Salmivalli et al., 2011). The program is based on the premise that bullying is a group phenomenon and actions of children who witness the act of bullying such as defending or consoling the victims, supporting or reporting the bully, play a role in sustaining or discouraging bullying behaviors (Salmivalli & Poskiparta, 2012). KiVa recognizes that there are six different roles in bullying situations, namely, a bully, a victim, the bully's assistant, the bully's reinforcer, a defender of the victim, and an outsider (Salmivalli & Voeten, 2004). The program is conducted at two levels of actions – universal actions, which includes student lesson, an anti-bullying game for primary school students, internet forum for secondary schools, guide for parents, and the usage of posters, and vest worn by teachers to make the program visible to everyone at school (Salmivalli et al., 2011). Meanwhile, indication actions includes intervention with bullies, victims and prosocial witness (Salmivalli et al., 2011).

Research shows that lack of empathy has been linked to involvement in bullying, and hence, there are bullying intervention programs which include empathy training (van Noorden et al., 2014). Empathy do not have a standard definition across the fields of knowledge, however, empathy can be generally defined as the ability for humans to understand each other's state of emotions either through thinking or feeling (Engelen & Röttger-Rössler, 2012). Research in empathy usually focus on either cognitive empathy - the ability to understand the other emotions through cognition, or on affective empathy, which

is experiencing the same emotions as the other (Dziobek et al., 2008). Some research argue that cognitive and affective empathy are interrelated. A thorough discussion of the concept of empathy is outside the scope of this paper. This research adopts the understanding of empathy from Perception-Action Model (PAM), which is (Preston & de Waal, 2002) p.4 :

“Attended perception of the state of the object's state automatically activates the subject's representations of the state, situation, and object, and that activation of these representation automatically primes or generates the associated autonomic and somatic responses, unless inhibited.”

In other words, empathy is the ability to automatically represent other people's state in one own's mind which becomes the catalyst for responses to that state. Humans with empathy have the tendency to eliminate the negative states such as stress of others because they themselves are experiencing the same state. We adopt PAM definition of empathy because it focuses on the biological process of how empathy arises which can explain a wide variety of phenomena in a variety of contexts that are supported by evidence from multiple disciplines.

Based on a review of 40 studies that look at the connection between bullying and empathy, van Noorden et.al (2014) concluded that there are four types of involvement in bullying, namely, bullying, victimization, defending and bystanders, and proposed emphatic training to match the different types of involvement. Van Noorden et. Al (2014) findings can be summarized as follows:

- The lack of affective empathy is linked to bullying, which means that bullies tend to not experience what others feel.
- Victimization is generally negatively associated with cognitive empathy; thus, this shows that victims have problems with understanding what other people feel but they can experience the feelings of others.
- Children who defend and console victims of bully have high level of both cognitive and affective empathy.
- Findings for bystander are inconclusive because in there are only two studies that reported on bystanders and the findings are contradictory.

Thus, we argue that training in empathy through games would be beneficial as a part of bullying prevention programs at school. This is because, as shown above, high level of affective and cognitive empathy among schoolchildren may reduce bullying, victimization and increase the probability for them to side with victims and not bullies. Bullies should be trained on affective empathy, victims on cognitive empathy and increasing empathy in general will encourage more children to stand up to bullies (van Noorden et al., 2014).

Affective and cognitive empathies are factors that contribute to defending bullying victims due to the need to reduce the perceived stress which is affecting own's state, therefore empathy provide a positive prediction that one will conduct altruistic behavior (Batson & et al, 1981; Lockwood, Seara-Cardoso, & Viding, 2014). According to Ttofi & Farrington (2011) some bully prevention programs at school level already include empathy training (Alsaker & Valkanover, n.d.; Heydenberk, Heydenberk, & Tzenova, 2006; Hunt, 2007; Jensen & Dieterich, 2007; Rahey & Craig, 2002; Smith, Pepler, & Rigby, 2004). Empathy training has been also implemented in a variety of context such as education, nursing, medicine and human services (Lam, Kolomitro, & Alamparambil, 2011) among different types of people including ranging from children to adults, including university students, health professionals and patients (van Berkhout & Malouff, 2016).

A review of literature on empathy training, show that the training can be classified into the following types: experiential training, didactic and experiential learning, skill training, didactic and skill training, writing training and video stimulus training (Lam et al., 2011), which are described as follows: in experiential training, the trainees are put through experience, designed by the facilitator,

which may let them exercise their empathy. Meanwhile, didactic and experiential learning combines lectures on theories and concepts with experience training. Skill training provides trainees with specific skills which can be demonstrated to be useful in situations in need of empathy, and didactic and skill training combine lectures with skill training. Writing training requires the trainees to write from the perspectives of other people. In video stimulus training, trainees watch videos of empathic behaviors of self or others in mock situations and then responds and discuss about the video with the facilitators. A review of the literature of shows that, overall, empathy trainings are effective (van Berkhouit & Malouff, 2016).

Digital games, social media, online communities, and immersive virtual reality have been used as technological intervention for eliciting empathy (Ibrahim & Chan, 2018). According to Ibrahim & Chan (2018) technological intervention used in this context make use of 'perspective taking' – in other words, using technology to support the ability of putting oneself in other people's shoes, for example, a game called 'Peacemaker' is developed to reflect views of both Israeli and Palestinians in the Israeli-Palestinians conflict (Gonzalez & Czlonka, 2010). Players can chose to play the role of either Palestinian or Israeli Prime Minister in making decisions, and scores are given if they can increase the satisfactions of different parties involved in the conflict (Gonzalez & Czlonka, 2010). Based on literature review, (Belman & Flanagan, 2009) came out with design principles for games to foster empathy. One of the principles is very much related to this research, which is to make the players explicitly aware of their similarity with the people to empathize with (Belman & Flanagan, 2009). In this research the simulation used in our game depict mainly children in different situations. There are also digital games developed as a way to address the issue of bullying among children. One of which is a serious game, which uses 3D graphics to simulate a child interacting with adults and peers at school (Cláudio et al., 2016). The core game mechanic of the game is the player playing the child have to interact with others in ways which will avoid bullying occurrence (Cláudio et al., 2016). A similar work which uses simulation of a player interaction with others is FearNot!, but unlike serious games, FearNot! focuses on emergent storytelling as a way to teach children about bullying (Figueiredo et al., 2006). This work differs from previous work in that it focuses on designing a game which fit the context of schooling in Malaysia and also the schoolchildren's play behavior. It is also worthwhile mentioning that the scope of the research is to validate a gameplay model to elicit empathy which mechanics are based on schoolchildren bullying morality model.

### 3. Methodology

This research takes an ethnomethodologically inspired approach to ethnography, in order to understand, from the perspectives of schoolchildren, what they know that all the other schoolchildren know, about bullying. In other words, the aim of this research is to understand the shared meanings of bullying among them. The research also aims to understand how the process of play takes place among schoolchildren at school. Ethnography is an effort to produce thick description, meaning that in the process of writing about direct observations of people's actions, ethnographers also analyze the actions to produce "a stratified hierarchy of meaningful structure" (Geertz, 1973, p. 7). Meanwhile, ethnomethodological investigations aim to unearth the rationalization people make of actions displayed by others or the implicit meaning that actors in the social world share in order to make sense of each other (Garfinkel, 1991). Ethnomethodologically (EM)-informed ethnography was first used as an analytical framework to ethnographic data by producing thick narratives that discover how people accomplish

work by embodied actions embedded in work settings, in contrast to abstract descriptions of work (Crabtree et al., 2000).

Interviews and observations are the methods used to achieve our research aims. Although it would be beneficial to do in-context, in-depth interviews with the schoolchildren in order to get rich description on their understanding and experience of bullying, it was not feasible due to limited access to them during school hours. It was not possible for the same students to be interviewed many times during school hours because that would interrupt their schooling. We also found through our initial interviews that schoolchildren get bored and distracted rather easily and were not willing to talk about the same topic for a long period of time. Hence, we take the approach of interviewing many students, each taking a small period of time, instead of interviewing a small group of students repeatedly.

79 students from four schools were interviewed at their school during school hours. Access and consent to do research in the schools were granted by the State Education Department which acts as a gatekeeper. All schools are government funded, mixed gender and race public schools, which use Malay language as the medium of teaching. School A is in a rural area, while School B, School C, and School D are in urban areas. The schools are secular but as with all public schools in Malaysia, Islamic religion is a subject taught to Muslims students while non-Muslims students take moral subject. The students for interviews were randomly selected based on the access given to us by the school's administration. Our research was conducted during school hours to enable in-context interviews and observation, therefore school administrations had to make sure the schoolchildren's lessons were not interrupted.

16 students were interviewed individually, and the rest were interviewed in groups of two, three or four. The reason for doing this was because during the individual interviews some students were quite reluctant to talk, they showed signs of being uncomfortable or perhaps scared even though the researcher had met and taught them in class for another project. Thus, the students were teamed up to increase their confidence to talk. 74 students are in standard five (eleven years old). Four students interviewed are in Standard 4 (ten years old) and one in Standard 6 (twelve years old). These students outside Standard 5 came from the same school. They saw their classmates being interviewed and they volunteered to join. They were interviewed in a group of six and a group of two. Individual interviews lasted around ten to fifteen minutes while some group interview lasted more than fifteen minutes.

The interviews conducted were semi-structured open-ended interviews in Malay language and touched on two main topics, the games the children play at home and school, and bullying. The Malay term for bullying, 'buli' was used in the interviews. At the start of each interview, the schoolchildren were explained about the aim of the research. It was made clear to them that the interview was not an oral exam, so there were no right or wrong answers, and the researcher was not there to evaluate them. The researcher explained to them that we were planning to design and develop a game for schoolchildren and needed their help to design it. The researcher also explained that the interview was conducted to know about bullying. To get the children's confidence and to make them comfortable talking to the researcher, the researcher asked them to talk about themselves and their family first. The interview then proceeded to the topic of games played at home and at school. The interview ends with questions and discussion on bullying.

The interviews were recorded using a voice recorder, and then transcribed using a transcription software called Transana. The transcriptions were then analyzed to produce themes which were used to write rich description on shared meanings of bullying among schoolchildren and their play activities at school.

In terms of observation of play behavior at school, the four schools were visited twice during the period of study, and during every visit the researcher would walk around the school

compound during recess to observe schoolchildren's activities. We chose recess time because it was the time when the schoolchildren have free time to do the activities of their choosing. Recess is also the time when play activities are concentrated because children from different classes mingled together and they can move freely outside class. Observations made during recess, and interesting incidents were recorded in the researcher's design journals. Photographs were taken to remind the researcher of interesting observations. These are used to complement the themes that emerge from the interviews.

## 4. Results

The results report the participants' understanding of bullying, and their play behavior. This section will describe the participants' experience of bullying, their understanding of the definition of bullying and why they think bullying is wrong. Play behavior is described according to the types of games play – indoor and outdoor games.

### 4.1. Bullying and Being Bullied

Majority of the students interviewed said they were aware of people being bullied at school, either witnessing bullying themselves or heard about it through their friends and teachers. In one case, a teacher went from class to class to investigate about a student who was bullied. Some students said they learnt about bullying from the media, such as television and newspapers, "Yes, I've seen people being bullied, it was just a story on TV." "I saw it on the news about people fighting and extorting money. But I didn't finish watching the news.

When asked about the forms of bullying the schoolchildren witness or experience at school, some of the most prominent answers given were name-calling, physical aggressions such as punching, kicking or tripping others, and extortion of money from other children:

It was when I was in Standard 1, my friend liked to ask me for money, so I gave it to her. She was in Form 1. But then my mom scolded her and talked to her mother.

He just like to do [punch me.] He is very rough, I've been hurt by him. He has no other things to do. Like when he hurt you, he is angry, and he will punch you. For example, he told me to buy him a drink, I said no, then he hit my head.

Physical aggression can start as a form of pranking but resulted or could result in physical harms. As reported by two students:

A student at the back [of the class] called me. I walked towards him but then a student stuck out his foot and tripped me. I fell. It was painful, and I was bruised. Then the student at the back said he had nothing to say to me. It was all a trap.

He told me to touch the main electrical switch, but I didn't want to. I told the teacher and the teacher scolded him.

My friend like to push my head. I know she was just joking but sometimes it hurts, and I was angry and told her not to push me.

Forms of name-calling include making fun of people's name or their father's name, "They called my father, Burger. I don't know why," or by calling people by the words that sounded like their or their fathers' names, "If your name is Adam, they will call you pemadam (eraser)." One student reported that the schoolchildren also made fun of other people's fathers' jobs, "His father has a barbershop and they are making fun [of his father's job.]" Other forms of name-calling include making fun of people because of their race, skin color or physical appearance, "They made fun of me. Called me ugly. Sometimes they made fun of me, [my] dark [skin color], they called me black." A tall student was called a giraffe. One student reported that a student of Indian ethnicity was being teased. When asked if he was being teased because he was Indian, the student said, "Maybe." Being perceived as belonging to a minority group also can be a factor for being teased:

I'm not really sure, but I have seen, there is this Indian boy. One of my classmates bullied him. The father of the boy who was bullied was very angry. The bullied boy then moved to another school.

They called me Chinese because I went to a Chinese school before. They think I'm Chinese, so they called me Chinese.

Sometimes, verbal abuse can turn into physical violence:

Yes [people have fought because of name-calling.] It is like a norm. It's their habit to insult others. Or maybe sometimes they were just kidding but then it became a big problem. Yes! They want to joke but then it became a problem.

In some cases, the bully was recognized by many children who were interviewed and the same story about the same bully was related many times to the researcher. In School D, there is one student who is well known as a bully and the student was also reported as having many disciplinary problems, such as smoking and bringing a knife to school. The participants reported that this bully likes to extort money from other students.

A few participants from School A reported about a well-known bully known as Daniel (all names used are not real names) who targets the same vulnerable children, one who is known as Sarah, who is a shy person raised by an older single father, and, another student who has to wear diapers to school due to some illness he has. The researcher also witnessed how bullying can be very traumatizing. One case in particular was Sarah, whose friend, Aliya told us that Sarah was constantly being bullied by Daniel. Aliya thought this was because Sarah's mother had passed away and she was currently raised by a single father. According to Aliya, Daniel used to force Sarah to give him money that she didn't have any to buy food during recess, so Aliya had to lend money to Sarah, who always paid her back. Daniel was then transferred to another school for disciplinary problems. During interview Sarah said she was relieved that Daniel was no longer at the school. It was difficult for Sarah to talk about her experience. She cried, and the interview had to be ended.

### 4.2. The Definition of Bullying from Schoolchildren's Perspectives

When asked about what does bullying mean, almost all of the participants, gave answers by describing specific actions of bullying. Mostly they talked about physically hurting other people or acting aggressively, "Bullying is an act of roughing up other people. It is a rough act like extortion. Or asking people for money. Forcing, to force." Other definitions of bullying given by the participants that stand out in the transcriptions are money extortion, taunting and name calling. Forcing other people to do things they do not want to do is also defined as bullying by the participants. They gave examples of forcing others to do one's homework, to buy food, or "forcing people to become coolies". A participant mentioned the disparity between bullies and victims when giving the definition, "Like when big boys bully smaller boys. Even small boys bully me. Example of bullying is physical and online," and another stated the intention of the bully: "Hit people without any reasons, punch people, ask for money because they're pressured and feel they're great, [they want to] teach people."

Only two students gave abstract answers (bold in the quotes below) to supplement their description of specific actions of bullying. The answers they gave are more abstract, "The meaning of bullying, it is like we ask people's money through extortion. And doing something which is not good to someone."<sup>4</sup> "We make others have hard feelings toward us, or we hurt them physically." Three participants said they did not know the definition of bullying, but one student gave a textbook definition of bullying which she learnt from English class. There is a topic on bullying in Standard 5 English textbook, "There are two types of bullying, physical and mental. Example of physical, hitting

someone, mental, mocking others...I learnt from the internet and at school.”

### 4.3. Why Bullying is wrong

The participants were asked about why bullying is wrong, and to give reasons to their answer. There are participants who did not know why bullying is wrong, but they stressed that it was wrong to bully others, “Bullying is wrong because it is something that we should not do,” and there are those who did not give any answers at all to the question of why bullying is wrong, “We can’t bully people...I don’t know why.” “I don’t know...but it is not good.”

Factors related to religion, like sins and the threat of hellfire were given by some participants when asked about why some actions are wrong. One participant talked about a bully taking her bag and threw it at her neck. She said it was painful, but she did not retaliate because she knew causing harm to other people is a sin. There are also who said that taunting people is bad because it is a sin. Other answers which invoke religious reasons are: “It is a sin [to taunt people]. [We] will be sent to hell fire.” “[We can’t taunt people] because it is a sin.”

The participants mentioned that bullying is wrong because it will hurt other people, physically and emotionally, “[I think bullying is wrong] because people will get hurt.” “Bullying is not good because it has claimed lives.” The participants also described bullying as an action of disturbing other people, which is wrong. When asked why it is wrong to hurt other people, the participants stated that hurting other people will have consequences, other than sins and hell fire, there are also school rules, laws and enforcement from the teachers, parents or police. Some participants also talked about the consequences from bullying can affect victim’s future:

“We [can’t bully other people] because if people get hurt it will burden the teachers. [Bullying is wrong because we have] laws, school rules. It is a sin.”

“Because [you’re] hitting people. It will be a police case. My mom won’t let me [hit people].”

“[Bullying is not good] because it involves the future, like if causing someone to break their leg.”

“[Bullying is wrong because] it will make people skip school because they’re scared of the bully. So, they can’t study and will not get a job. Difficult.”

### 4.4. Play Behavior at School

This study also aims to understand schoolchildren play behavior at school in order to design a game which can be used as part of anti-bullying programs. As mentioned in the methodology, schoolchildren were observed at four primary schools, especially during recess when many of them were at play. Interviews with the schoolchildren also touched on topics of play and games at school. This section will present the results from the observation and interview. The types of games the schoolchildren play can be broadly categorized into indoor games and outdoor games. Indoor games are typically played indoor due to the fact that there is no need for a large space for physical activities. Meanwhile outdoor games require a lot of space to enable physical movements required by the games. However, the schoolchildren sometimes play indoor games outside, and outdoor games inside.

### 4.5. Indoor Games

Students play many types of indoor games at school. The most prominent game played in all school, and perhaps is en vogue during the time of the interview is Batu Seremban (will be describe shortly). Types of indoor games played include Monopoly and its variations, like local versions of Monopoly called Saidina and Jutaria, Scrabbles, congkak (a Southeast Asian version on Mancala), pickup sticks, Jenga, chess, checkers, Snakes and Ladders, and card games, like Snaps, Uno, Pokémon

Cards, Boboiboy (a popular cartoon character in Malaysia) Cards. The children played any time they can play, mostly during recess. They reported that they play before class starts, after having their meal during recess and also in the classroom when teachers are absent. Sometimes teachers used games in classrooms. Some teachers used Scrabbles in their teaching, so the students play during English class. The students also sometimes play board games during physical education class or during extra-curricular activity time. They also play after school, while waiting to be picked up from school by their parents or waiting for their bus. In regard to digital games, majority of the schoolchildren interviewed reported that they play a variety of digital games on many different devices and at various places. Some who do not have devices at home play computer games in the lab or resource center at school. They can ask permission from teachers to access the lab to play computer games during recess, or they played during lab time.

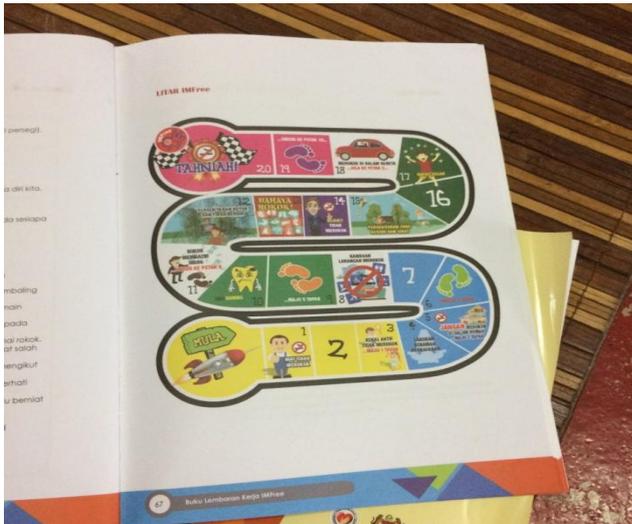
Batu (literally means stones) Seremban is a game played by a two or more players. Players sit on the floor in a circle facing each other. Depending on the type of game played, the game either uses five or seven stones. To start the game, a player throws all the stones on the floor. Using one hand, she takes a stone and toss it vertically up in the air, and before it hit the ground, she has to pick up a combination of the stones left on the floor and catch the tossed stone. She is not allowed to move any other stones on the floor, other than the one being picked up. The series of combinations of stones to be picked up on the floor depends on the versions of the game played. In a game that uses five stones, the players have to pick up a series of combination without making mistakes, such as failing to catch the tossed stone, picking up the wrong combination, stones falling from the hand after being picked up, or moving or the stones on the floor. A player will lose her turn if she made a mistake, and the next player will continue. In this game the player that advances through the series the most is the winner. In a version that uses seven stones, the players have to pick up one stone, followed by two and lastly three. The players then have to do a ‘timbang,’ which consist of holding all seven stones in one hand, toss them, and then catch them using the back of the hand. The stones that landed on the back of the hand are then tossed again and the players have to catch them back using the palm of the hand. The number of stones caught in the palm are counted and kept track during the play. If a player made any mistake he will lose his turn. The next player then takes his turn. The player who got the most ‘timbang’ count is the winner.

Students bring their own board games to school or buy them at the school’s bookstores. School provides games such as chess, Scrabble and congkak to students. These games are stored in the school’s sports equipment storeroom and are used by teachers in their lessons. The students can request the games by asking permission from the teachers if they want to play during recess. In one school, congkak is available in the library and the students can go and play during recess. Chess and checkers were also used to be available in one school library and resource center room, but the games were lost. Participants in School D reported that congkak board is available in the prayer room, while School A provides congkak board and marbles in the library (Fig).



Fig. 1: Congkak in the library at School A

School Chas a counselling room with two counsellors. There are many games in the counselling room such as scrabble, congkak and pickup sticks, Jenga, Uno and games designed by the Ministry of Health to raise awareness about the dangers of smoking (Fig).



**Fig. 2:** A game by the Ministry of Health used as a teaching tool about the dangers of smoking

The students can go to the counselling room and play during recess if the counsellors were there, or they can ask permission from a prefect manning the room. Participants from all schools reported about playing Batu Seremban using tiny sandbags made of cloth, instead of stones that are readily available on the schoolground. The cloth Batu Seremban were either made at home, or bought, and some schoolchildren sell them at school:

“Student 1: We used the stones taken from downstairs. We took them, played in the classroom. Then we came back.”

Researcher: Don't you use the [ones made from] cloth?

Student 1: Yes, they sold them for RM3.00, they made them themselves. The girls, they made them, they sold. They put gravel [in them]. The girls bought them, but the boys don't. The boys only used stones.

Student 2 (who is a male): I bought them too.”

A student showed plastic pieces he bought which are also used to play Batu Seremban (Fig). Another student said they used erasures to play, “[I play tossing erasures] like playing Batu Seremban. Take and toss.”



**Fig. 3:** Plastic pieces used to play Batu Seremban

Students play mostly during recess. During the one of researcher's visits at the school during the end of school term after examination and before school holidays, students were seen gathering in small groups playing Batu Seremban (Fig) and cards

(Fig). During this time, classes are over, so the students are allowed to bring games from home to play school. Some schools allow the schoolchildren to bring games as long as they do not play during class and some prohibited them from bringing their own games.



**Fig. 4:** A group of schoolchildren at School A playing Batu Seremban in the classroom



**Fig. 5:** A group of schoolchildren at School D playing Pokémon cards in an open-air hall

The students also reported that some of them were making slimes in the classroom during the researcher's visit. They brought the ingredients from home, such as, glue and soap, while some they bought from friends, like Borax.

The schoolchildren were observed to play the most during recess after having their meal. Play and games during this time can be spontaneous or preplanned. The students who brought their own games to school or bought their games at the school bookstore obviously have a plan in mind about playing the game during school hour. However, while some of them make previous plans with a set of friends beforehand to play, others just pick up any available friends to play. Games played are impromptu and develop organically with what is available at hand.

#### 4.6. Outdoor Games

Outdoor games are mostly played during recess, or during physical education class. During a visit at recess time a group of boys were observed playing futsal. The ball was made by crunched up papers wrapped in cellophane tape (Fig).



**Fig. 6:** A ball made of paper and cellophane tape used by the schoolchildren to play futsal during recess

When asked about how they decided who belongs in each team they said that they did not collectively made a decision, but individuals just joined a team they preferred at any time during the play. After meal they saw a group was playing so they just joined in. There was no teacher monitoring the game, the game was regulated by all the players in the game.

The participants reported that they play a variety of physical games during recess. One of the most prominent games is a game of tag and its variations. Schoolchildren were observed running around at schools during recess and they also talked about playing tag during the interviews:

“Researcher: Ok can you please tell me what you did during recess? Let’s say from the start of recess when the bell ring until the end recess bell rings?”

Student 3: We ate and the we gathered by the tree.

Researcher: Gathered by the tree? [How about] you?

Student 3 and 4: The same.

Researcher: Why did you gather at the tree.

Student 3: To play.

Researcher: What did you play?

Student 3: Tag.”

At School A, female students interviewed said they do not include male students in playing tag, they only play among girls. One student said she did not like to play with boys because they boys like to kick them. A variation of tag mentioned repeatedly by schoolchildren from all school is called Iced Water. In the game, one student will become it. He will chase the others. The one he manages to catch will become ice and cannot move. If she moves she will be it. When there is only one remaining player who has not becomes ice, she can give water to the players so that they can run again. If the it can turn all the players into ice, the last player turned into ice will become it. At School D, the players do not have to wait until all players, but one to become ice to rescue the frozen players. Players can free other frozen players at any time. A student mentioned that Iced Water is fun because they can run, but it is not so fun because the players like to push each other. Another variation of tag is Police and Thief. Schoolchildren at School B play Police and Thief after eating during recess, and they played it all over the schoolground since the school is rather small. The teams for the Police and Thief emerges spontaneously as each student will chose which side he or she will be on. The schoolchildren interviewed also mentioned a game called Running Man, the name of which is based on a Korean TV series. Running Man at School D made use of stickers in the game. Each player put a sticker on their back. The other player must try to take as many stickers as possible from other players’ back. The one with the most stickers win. The students bought the stickers at the school’s bookstore. Meanwhile at School C, the stickers used are just

imaginary. At the beginning of the game all players have an imaginary sticker on their backs, and the others have to try to touch the backs of other players to take the stickers. The player whose back is touched is out of the game. Essentially, this is just a variation of game of tag, with every player becoming it and at the same time has to avoid every other player.

Many of the schoolchildren interviewed reported that they played the game of hide and seek. Some played during recess while others played after school before going home. One student reported playing hide and seek in the classroom, “[We] only played hide and seek in the classroom. Hiding behind the doors.” The schoolchildren made up their own rule regarding the area which the players are allowed to hide. Some of them used the whole school for hiding while others set the limit, “[We played] in the area between the prayer room and the lab.” Hide and seek played at School A is modified because the time the player have is limited, which is about 15 to 20 minutes. Instead of having to find all the hidens, the it should only seek one hiding player, and the player found then becomes it.

Three of the lesser mentioned games, but worthwhile reporting here, because, like game of tag and hide and seek, they are also games which does not use any special equipment other than what are readily available to the schoolchildren. The games are Cup Tiang (claim a pole), Galah Panjang (long pole) and Ice Cream Soda. Cup Tiang requires four poles and five players. The schoolchildren use poles that supported corridor’s roof or at the gazebos. The four players each stand next to a pole and holding it, and they have to change pole with another player. The fifth player without a pole will try to steal one from the players. Galah Panjang requires two team of players. Depending on the number of players, lines were drawn on the ground. One team plays the guards. Each team members guard along the line and the other team has to cross the lines without being touched by the guards. To play Ice Cream Soda, players stand in a circle and sang Ice Cream Soda song to pick a player to become it. When the song finishes the it will try to step on another player’s foot. The player whose foot is stepped on is out. The players then sing the song again to pick another it. The game continues until one player is left.

School’s attitude towards schoolchildren playing physical outdoor games during recess differs from school to school. From the interviews, it is gathered that School C is the strictest in not allowing the schoolchildren to run around during recess. Students mention that they are not allowed to go into the classroom during recess, to prevent theft, but some boys played in the classroom during that time. According to a prefect, it is because the staircasewas not guarded by a prefect, so the students returned to their classroom during recess. According to a student from School C, they are only allowed to play in the school assembly area, but not the carpark, or the field, “[The field] is slippery. It’s wet. Slippery. The teachers don’t allow us to play in the field.” In School C, very few schoolchildren were seen running around during recess, compared to the three other school where the schoolchildren are free to play during recess. Some Standard 5 schoolchildren, mostly female, said they don’t play physical games anymore because, “We have grown up now,” or they stated that they used to play more when they were in the lower standards.

## 5. Analysis

Our results show that all of the schoolchildren interviewed are aware of bullying. They either have experienced being bullied, witnessed people being bullied at school, or themselves, bullies. Some students are also aware of bullying through the media. Bullying awareness is also taught at school through English lesson for Standard 5. Teachers also have highlighted bullying cases which took place at school, thus the schoolchildren are aware if

any students are being disciplined for bullying or if teachers are investigating bullying cases at school.

The most frequent type of bullying the schoolchildren reported in the interviews is name-calling. This is in accordance with other bullying research in Southeast Asia which shows that the most prevalent form of bullying is verbal bullying (Sittichai & Smith, 2015). Students made fun of each other's appearance or made fun of people's names and their father's names. Name-calling can also have a racist connotation. Other most reported type of bullying reported by the schoolchildren is extortion of money. Teasing, or verbal bullying can escalate to become physical aggressions.

Some participants said that physical bullying can start from something harmless, like a joke or a prank, which then have undesired consequences, such as causing physical harms. However, there are cases of physical bullying which did not start as a practical joke, but the perpetrator intentionally hurt others through kicking, punching, pinching, or tripping others. Participants also mentioned that bullies wanted to show others that they were great and strong. There is a pattern from the interviews that there is a set of students who can be labelled as 'school bullies' known by many students. These students usually have other disciplinary problems at school. One bully from School A had been expelled, and the trauma he caused to one student in particular is clearly visible when the bullied student was interviewed. When the schoolchildren were asked if they have been bullied, some said yes and talked about the instances of being bullied, but none talked about the persistency of being bullied. Only participants in School A reported that the same bully targeted the same two students time and again.

Only one participant gave a textbook definition bullying. However, the student did not mention the persistency of the act from the bully towards the same victims. Most of the participants gave definitions of bullying using examples of concrete actions which they classified as bullying, such as, physical aggression of punching or kicking and verbal abuse such as name-calling. Two participants gave their definition in abstract terms of "doing something not good to someone" and "make others have hard feelings towards us." These students talked about the other, and about the effects of one's actions to others. This leads to the next point of this analysis, which is the reasons why the participants think bullying is wrong.

The participants' answers to the questions of why bullying is wrong can be classified into three types. First, no knowledge of the reasons. Second, answers that cite negative repercussions to future self, due to enforcements by authoritative figures. These answers include bullying is wrong because it is a sin, it can evoke gods' wrath and the bully will be sent to hell, and also the actions which the authorities such as the police or teachers can take to reprimand the bully, through rules and laws. Third, and the majority of the answers the participants gave to the question of why bullying is wrong is bullying action can hurt other people, or the negative consequences of bullying on others. Most participants gave this answer almost automatically and without the hesitation characterized by the act of reflections. However, when asked why it is wrong to hurt others, many participants took some time to reflect, and talked about the consequences they will receive from authorities, imaginary or real. They gave answers which were available to them, perhaps from knowledge they gained from adults, such as citing religious reasons or talking about the need to obey rules and authoritative figures. This shows that the participants knew instinctively not to hurt, and we argue that this is the first step towards empathy because they know how others might have felt if they were hurt. Examples of responses from the participants about bullying is wrong because it hurts others are:

"Because bullying other people or hurting people. Because punching people, disturbing people, it is a bad behavior."

"People will get hurt. I don't know why bullying is wrong."

"[Bullying is not good because] we caused pain to others. If we let them bully for a long time, they will always bully, and many people will be bullied."

Only two participants reflected on the state of emotions of others when in discussing about why bullying is wrong. We argue that this shows that they were expressing their cognitive empathy, meaning that they think about the emotional states that may rise in others due to certain acts:

"[Bullying is wrong because] it hurts other people's feeling and causes injuries."

"[Bullying is wrong] because it is not a good behavior. It is not good to be rough to other people. And it will make people feel unsatisfied and angry."

"[Bullying] hurts other people's feelings, make them sad. Make people hold grudges."

In a nutshell, although some students do not know why bullying is wrong, most of them said that bullying is wrong because it will hurt other people, either physically or emotionally. And they are aware that there are consequences of being physically or emotionally hurt, such as, it will affect victims' studies, and future (for example not getting a job due to disrupted studies due to being bullied). But when asked why it was wrong to hurt people, they spoke of negative consequences to self, such as it is a sin, it will make god angry, and they will be sent to hell. The repercussion to self, brought about by the laws and schoolrules were also mentioned by the schoolchildren, who reflected about possible future consequences of bullying, such as they will end up in prison if it becomes a police case.

We argue that participants responses that stated hurting others is wrong may have its origin from empathy. Our analysis shows that affective empathy may have played a role for the schoolchildren to feel that hurting others is a wrong thing to do. They seemed to instinctively know it is wrong to hurt other people. Based on PAM model (Preston & de Waal, 2002), our data shows that the schoolchildren interviewed have the ability to automatically activate in their minds the emotional states of the perceived others. But when asked why it is wrong to hurt others, most students are baffled or took a long time to answer, finally giving answers which shows concerns about negatives consequences to self as enforced by external factors such as the authorities. We argue that this shows the lack of cognitive empathy, in other words, the ability to explain another's state of mind. They just knew that it was wrong to hurt others, because they are demonstrating their affective empathy, to feel what the others are feeling. However, some schoolchildren interviewed showed the lack of ability to formulate into words how others might have felt or what negative consequences the victims would face if they were bullied. The schoolchildren gave their justifications for their judgements on right or wrong behaviors based on what they have previously learned, hence, the answers that cites sins and breaking of the laws as the motivation for not hurting others. However, schoolchildren may face new situations in their social interactions at school in which they have to rely on their affective and cognitive empathy in order to take the right actions, such as defending bullying victims, not encouraging or siding with bullies, and reporting bullying to the school.

To reiterate, our analysis shows that the schoolchildren are aware of bullying at school but unable to give abstract descriptions of the concept. They are unaware that one main characteristic of bullying is persistency of bullying on the victims, however, they are aware of the social power difference between bullies and victims, and the inability of victims to defend themselves. Most of the schoolchildren interviewed show a lack of cognitive empathy due to the fact that they could not easily explained negative state of mind of victims caused by bullying. They seemed to instinctively know they are not supposed to hurt others, but they do not really know the reasons other than the fear of repercussions to the self as enforced by authorities. Only some schoolchildren talked about repercussion of bullying to the emotional states of others.

## 6. Bullying Morality Conceptual Model

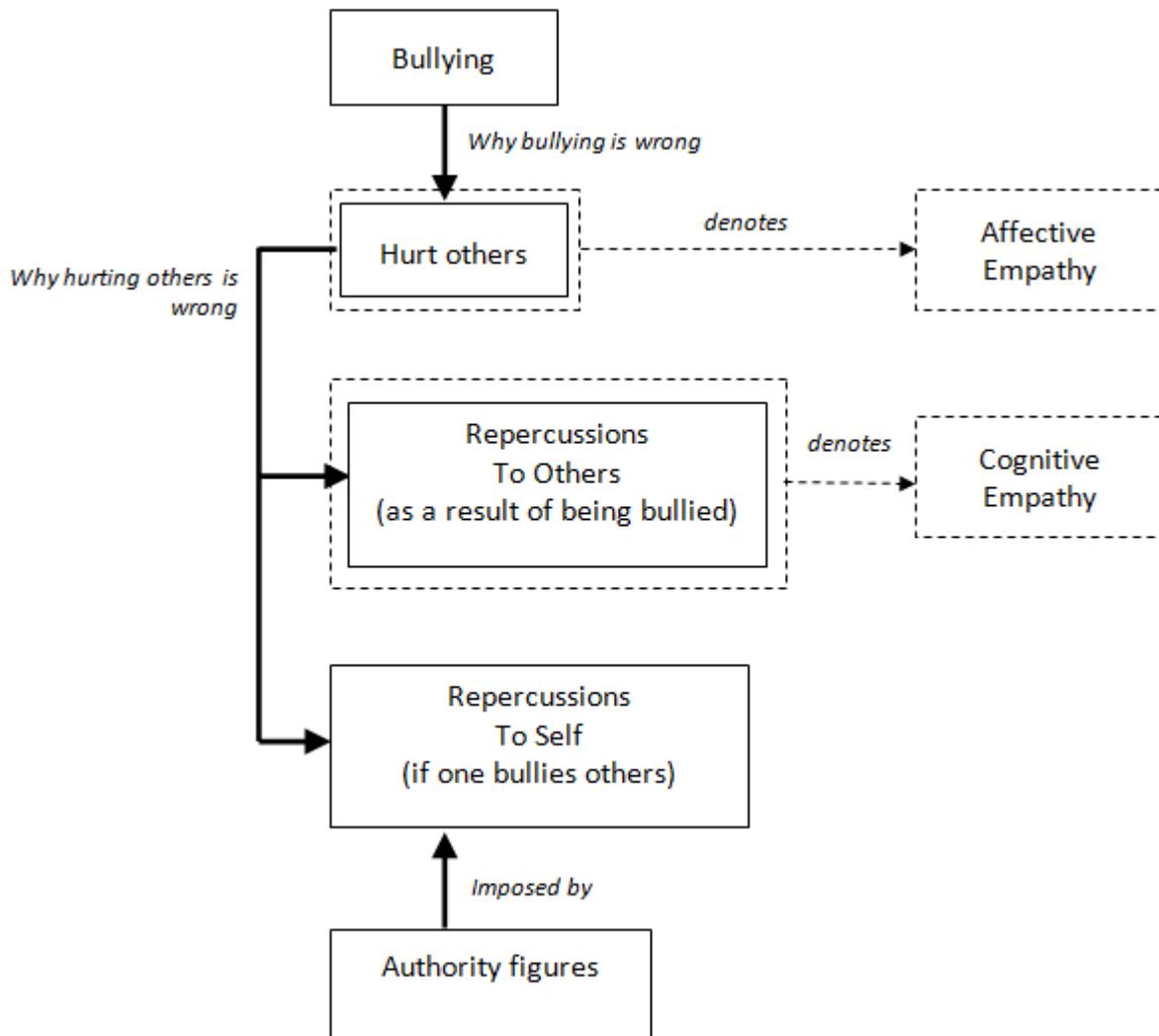


Fig. 7: Bullying Morality Conceptual Model

Fig shows the conceptual model of the participants' morality of bullying. The model shows that most participants instinctively know that bullying is wrong because it hurt others. Some answers to the questions of why hurting others is wrong depicts the repercussion to self, which may be brought about by authority figures if one bullies other people. Meanwhile, some answers to the question reflects on the repercussions to others as a result of being bullied. We argue that the spontaneous answers given by the participants that bullying others is wrong because it can hurt others denotes their affective empathy (Fig), or the ability to feel the emotions as experienced by others. On the other hand, the participants ability to describe the mental experience of bully victims denotes their cognitive empathy (Fig).

## 7. Design Implications and Game Play Design Model

The main objective of this research is to design a game as a tool for anti-bullying programs. In this section we will discuss implications for games design from the analysis of our interviews and observations of schoolchildren on their play behavior and awareness on bullying. In terms of play behavior, games that are designed as intervention in Malaysian school may be designed to be played during the 15 to 20 minutes time the schoolchildren

have to play after their meal during recess, or during their physical education class when their teachers allows free activity. However, recess time is ideal because the children are allowed to roam the school compound (within some limit) and are free to spontaneously play games of their choosing in any areas of the school.

Games at school may be designed to be readily available to play during recess time. Schoolchildren will most likely play whenever they have the chance and are allowed to play by using what is available at hand. Hence, the most popular games are those that do not require any equipment. Most of the schoolchildren reported playing games variations of tag and hide and seek. Another popular game, Batu Seremban, requires the use of pebbles, but they are readily available on school compound. The schoolchildren also improvised by using erasers to play the game. They can also use small clothed sandbag or plastic pieces which they bought from each other. The availability of games influences their play. Some schools make games readily available in the library or resource center rooms. Some access to games are restricted in the sense that the schoolchildren have to ask permission from teachers or school prefects to get the game equipment. This is understandable since the school may lose the equipment. However, we argue that the game designed should be readily available without any restrictions. Any need to curb the loss of the game equipment such the game board, pieces or dice,

should be address by design, or designers should take into account that schoolchildren improvised when they want to play - they made a ball out of paper and cellophane tape to play futsal or use erasures to play Batu Seremban. The game design should allow for these improvisations. Game equipment that are more likely to be lost can also be sold at the school bookstore at a very cheap price so that the schoolchildren can play when they want to. Games may be designed as variations to the previously known and popular games among schoolchildren. Our analysis shows that the schoolchildren play variations of the same game, and game play of the same game also differs between schools. In one school, the schoolchildren play Running Man, a variation of tag, using stickers they bought from the school bookstore, while in other school, these stickers are only imaginary. Thus, a game designed as an intervention to foster cognitive empathic skills among schoolchildren can be based on an already known game. The justification to design a game as a variation of an already known game is that the schoolchildren do not have much time to play

during recess. Introducing new games as an intervention for bullying that have new and complex rules may slow down the uptake of the games, especially among the younger schoolchildren. Our analysis shows that although the schoolchildren seems to instinctively know it is wrong to hurt others, they find it difficult to describe the state of mind of bullying victims and attribute fear of authority as justifications for right and wrong behaviors. We argue that although schoolchildren were taught what is right and wrong according to the school rules and their religious morals, they encounter many new situations in their daily social interactions with their schoolmates. Hence, they need to be able to exercise their cognitive empathy to relate to the emotions of others, in differentiating prosocial or antisocial behaviors. Therefore, based on the conceptual model of the participants' morality of bullying, we came out with a gameplay model (Fig) for games which may be used to elicit cognitive empathy among schoolchildren.

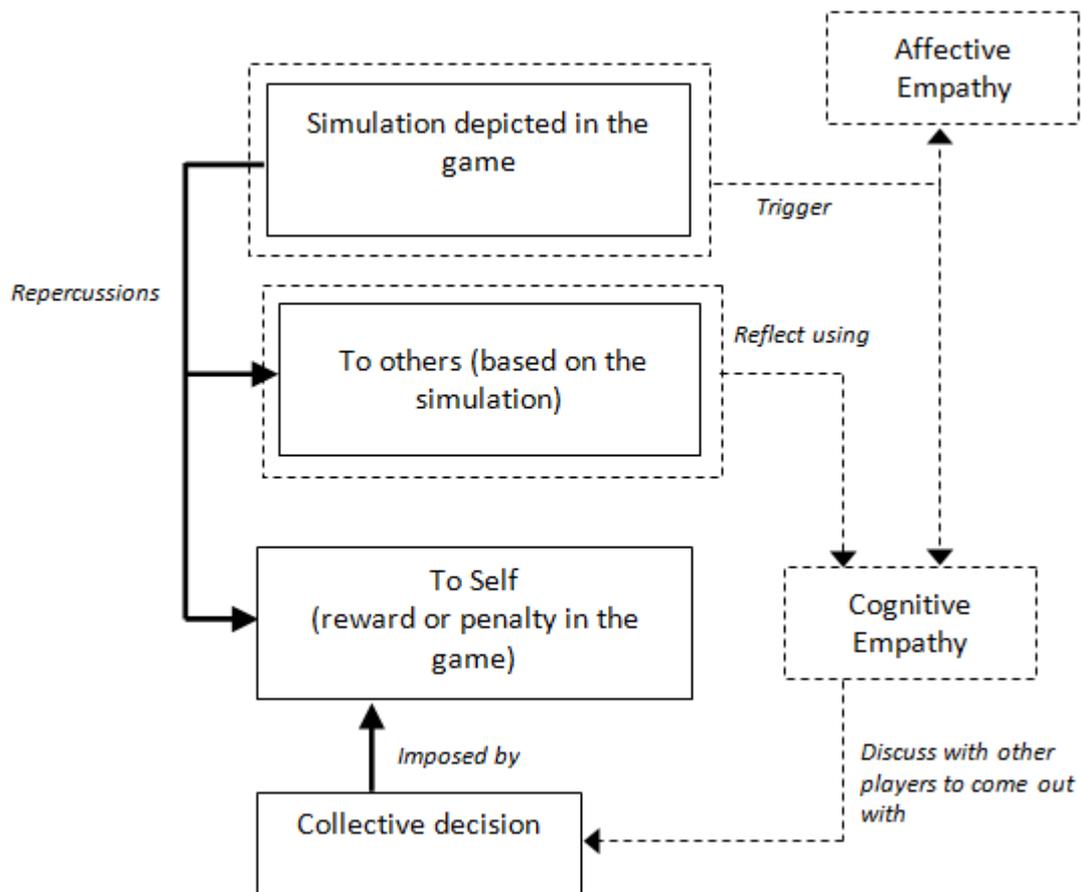


Fig. 8: Gameplay Model

'Authority figure' in the conceptual model shown in Fig. is replaced with 'collective decision' in the gameplay model as shown in Fig. Since many of our participants give examples of concrete actions as definitions of bullying, we argue for the use of simulations which can trigger affective and cognitive empathy among players. Thus, gameplay design makes use of simulation which can trigger empathy. As shown in Fig shows, the core mechanic of the model is that the players have to come out with collective decisions to reward or penalise each player in the game. We argue that if the simulation depicted in the game make the players reflect on the state of mind of people depicted in the simulations in order to come to a consensus whether to give reward of penalize a player, then the game has managed to make the players exercise their cognitive empathy.

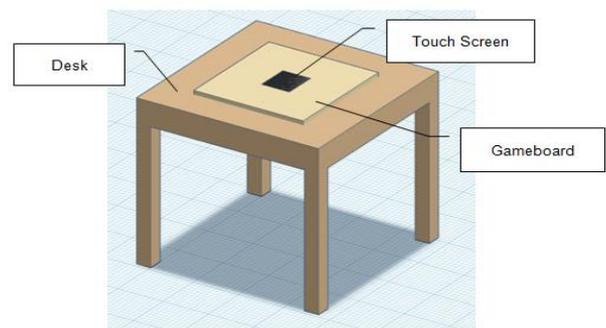


Fig. 9: Game Prototype Design

Based on design implications described above and the gameplay model (Fig) we proposed a design for an indoor physical

computing game which as shown in Figure 9. Inspired by how congkak is placed in the library or resource center at schools, we design the game as a furniture, which can be placed in the library or resource center to make the game readily available to schoolchildren during recess time. The game will be designed as a variation of a previously known and popular game among the schoolchildren. Therefore, we have decided to design it as a board game. The gameboard will be integrated into the surface of a desk. This will prevent loss of the game but allow easy access. At the center of the board there is a touch screen to display simulation to trigger empathy and also provide digital dice (Fig). The school can supply tokens or game pieces just like they supply marbles for congkak, or let the schoolchildren buy them for a cheap price at the school's bookstore. Based on our findings, we predict that the schoolchildren will improvise to create their own game pieces, perhaps by using bottle caps, pebbles, or paper if they want to play. Before we build this proposed indoor physical computing game, we need to test if the gameplay model is validated and which gameboard is suitable based on the design implications stated.

### 8. Game Paper Prototype Testing and Game Design Model Validation

The purpose of doing this paper prototype testing is twofold. Firstly, to validate the design model and secondly to test which

gameboard design fulfills the design implications. We tested two gameboard design, the first is based on the game of Snakes and Ladders and the second is based on Ludo. The prototypes were used to validate whether the simulations depicted in the game will elicit empathy and encourages played to practice their cognitive empathy, and to put themselves in other people's shoes, when coming up with a consensus to reward or penalize a player.

#### 8.1. Game Paper Prototype Design

The first design is a variation of Snakes and Ladders. Instead of having snakes and ladders to determine if a player goes up or down the board, some boxes in this board game contain simulations, which are short sentences describing a scenario (Fig). The game is played using two dice. If a player falls into the box containing the scenario ('simulation' in the gameplay model in Fig), he or she has to read it aloud. Then all the players have to decide if the action describe in the scenario is the right or wrong thing to do ('collective decision' in the gameplay model in Fig). If it is right, the player will go up the board according to the number in parentheses in the box, and if it is wrong, he or she has to go down ('reward or penalty' in the gameplay model in Fig). The game was designed to be played during recess time and also can be used in English classes, since English teachers at school already used games as part of their teaching.

41	42 We use the washing machine to wash our clothes ourselves. (5)	43 	44	45 Instead of sharing the cake with his sister, he ate it all by himself. (7)	46 	47	48 	49 She toasts her bread herself for breakfast before going to school. (6)	50
40	39 	38 The children made the entire meal by themselves (2)	37 	36	35 She did not do her homework herself, she asked her friend to do it. (9)	34 	33	32	31
21	22	23	24 He folds all the clean clothes himself. (2)	25 	26	27 They injured themselves by playing with knives (12)	28 	29	30
20	19	18 	17 She did not pick up the dirty clothes on the bedroom floor herself. (7)	16	15 	14 I taught myself how to use the washing machine. (2)	13	12	11 
1 	2	3 He throws himself in the muddy puddle. Now his clothes are dirty. (2)	4 	5	6 She put all her dirty clothes in the laundry basket herself. (5)	7 	8	9	10 They did not do the laundry themselves. They forced their little brother to do it. (6)

Fig. 10: Right or Wrong Board Game (only half of the board is shown)

Fig shows half the board for the game Right or Wrong. The scenarios used are not necessarily about bullying incidents per se. For example, in box 24 in Fig the scenario reads, "He folds all the clean clothes himself." This scenario is about being independent at home, to help around the house and ease the housework done by adults. The players have to think about others when deciding whether the action described is right or wrong. Meanwhile, box 10 in Fig describes a scenario closely related to bullying, "They did not do the laundry themselves. They forced their little brother to do it."

Fig shows the gameboard designed as a variation of Ludo. Instead of having 4 pieces per player, each player in this game only has one piece. This game is played using one die. Like Ludo, the aim

of this game to get the piece around the board and into the 'Home' of each player, which is denoted using the color similar to the player's piece. Unlike Ludo, some circles on the board have a card icon in it with a number in parentheses. When a piece lands on the circle with a card, the player has to pick a card which shows photos or written descriptions of people doing things ('simulation' in the gameplay model in Fig). He or she has to show that card to all the other players. Then they have to come to a consensus if the scenario depicted in the photo is the right thing or the wrong thing to do ('collective decision' in the gameplay model in Fig). If it was the right thing to do, the player will go up the steps according to the number in the parentheses and if it was the wrong thing to do he or she will have to go down ('reward or penalty' in the

gameplay model in Fig). If a player come upon a circle containing the piece of another player, the player can jump over to the next circle. There are 60 cards used in this game which contained 26 'right' cards, 26 'wrong' cards and 8 ambiguous cards. Ambiguous cards contain photos of children using knives without adults' supervision, children playing in muds and puddles and also

a photo of two adults, one using a mobile phone and the other looking at him. Examples of 'wrong' cards are photos of children fighting, children mocking other children and robbery scene. 'Right' cards include, among others, photos of children doing household chores, helping adults and hugging each other. 'Right' and 'wrong' cards also include some written scenarios.

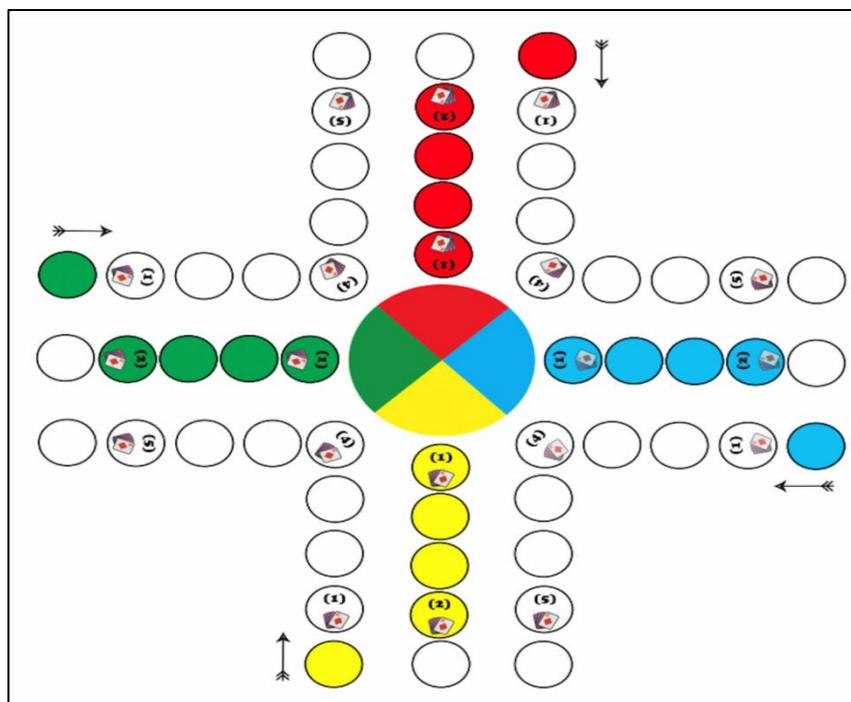


Fig. 11: Right or Wrong Game based on Ludo

## 8.2. Game Paper Prototype Testing Method

Both games were tested at School B among three groups of schoolchildren aged 10, with four players in each group, in two separate sessions. The first session tested the gameboard based on Snakes and Ladders and the second session tested the gameboard based on Ludo. Before the participants played, they were explained about how to play the game. In the first session, the participants were told that the game is very similar to Snakes and Ladders and were explained about the difference between the game and Snakes and Ladders. In the second session, they were told that the game is very similar to Ludo and the rules of the game was explained.

In order to verify the gameplay model (Fig) the participants were observed during play and the researcher took notes about their gameplay behavior focusing especially if the simulations used, and having to come to a consensus about rewarding or penalizing a player make the participants put themselves in other people's shoes.

## 8.3. Game Paper Prototype Testing Results

For the design based on Snakes and Ladders, on average it took about 15 to 20 minutes for the first player to reach the 100<sup>th</sup> box. Due to the limitation of time during the testing, when one player reached the 100<sup>th</sup> box, the game was ended. Some player who hadn't finished wished all of them could play until they reached the end box. The game is a bit slow due to many boxes containing scenarios in the first part of the game and could be demotivating for the players if they landed on too many scenario boxes during the beginning of the play. One player who played in the first session complained, "When are we going to finish? When will we reach the hundredth?" after she had to go down multiple times at the beginning of the game. However, the second group played for

20 minutes but they did not think the game was slow because they did not face many obstacles in the beginning. Some players made a mistake of going backward instead of forward because they did not really give attention to the numbering of the boxes. Since many players entered boxes that have the same scenarios, it was observed that the players did not assess the scenarios again, since they had already decided if the scenario shows the right or the wrong thing to do. Some players made a mistake of going backward instead of forward because they did not really give attention to the numbering of the boxes. However, those players who made mistake in moving their pieces were always corrected by other players.

The participants decided that the scenario, "The cat's fur is dirty. It licks itself to clean its fur," shows the right thing to do because, "The cat did it itself." Meanwhile, some scenarios depict behaviors which are more ambiguous than others, hence were interpreted differently from group to group. For example, the scenario, "The children made the entire meal by themselves," were interpreted as the right thing to do by the first group because the children are being independent and helping adults, but a player asked if children cooking by themselves were dangerous. The second group decided it was the right thing to do too. However, the third group took some time to come to a consensus if children cooking by themselves was right or wrong, until one dominant student decided it was wrong. It was again observed that when the value of a simulation has been decided, the players did not take time again to evaluate the scenario depicted.

For the game based on Ludo, the first player took approximately 10 minutes to reach 'Home.' It was observed that when a player got a card, he or she tended to take and look at it without showing it to others. Hence, the other players protested. The game has less obstacles compared to the gameboard based on Snakes and Ladders, hence more fast-paced and there were no complaints from the players about the game being slow. Similar to previous results, players who made the wrong moves were corrected by

other players. For all three groups tested, the schoolchildren could not make a decision on two cards, both are cartoon drawings with one showing a child eating a meal consisting of a piece of chicken, peas and mashed potatoes and the other is a drawing of a child scribbling on the wall with his mother frowning at him. The schoolchildren said they did not understand what the two pictures were supposed to convey. Similar to the results from the first session of testing, some students said that the photo of a child using a knife was good, because, "He is helping his mother." (Although the mother is not in the card), while some said it was the wrong thing to do because it was dangerous. A card that shows children playing in a puddle was considered bad because it will cause inconvenience to their parents to clean their muddied clothes.

#### 8.4. Analysis of Game Design and Game Design Model Validation

This section will first analyze the design of the gameboard, and then interpret the results based on the gameplay model (Fig) in order to validate it. The results show that the advantage of designing a game as a variation of a known game is that it was easy for the schoolchildren to understand how to play the game. Our testing also shows that the participants regulate play among themselves, but the design of the gameboard could be made better to reduce the chances of players making mistakes. The game based on Ludo is more suitable to be played during recess because the game is fast paced, and it took around 15 to 20 minutes for all four players to reach 'Home'. Using cards to depict simulations is better than writing them on the gameboard, but photos used on cards should show concrete actions that schoolchildren can understand. The results show that schoolchildren have difficulties in interpreting the meaning of 'non-actions' such as two adults standing together, therefore cannot make any judgment on whether the cards show the right or wrong things to do. Both photos and words used on card to depict scenarios are suitable, however using photos requires the schoolchildren to interpret the context and the emotional states of the people in the photos which we think is more suitable simulation for empathy training. On repeated play, using 60 cards to play the game are not enough because once the players already decided on the wrong or right value of a card, they tend not to exercise their collective judgments and come a consensus on the same card. To use an infinite number of printed cards is not feasible, therefore we argue that a paradigm that combines the physical with the digital as shown in Fig is very suitable as a technological solution to display a bigger number of cards.

The game testing results shows that the game design model (Fig) is validated, i.e. by removing 'authority figure' in the bullying morality conceptual model (Fig) and replacing it with 'collective decision', simulations can induce cognitive empathy when 'collective decision' must be used to imposed reward or penalty. This is evidenced in the statements by the participants that things are good or bad because they have effects on other people. For example, playing in the mud was not good because it will cause inconvenience to parents, and actions that shows independence are good because they will reduce burden of other people. In some ambiguous simulations group of participants came out with different consensus but they showed the used of cognitive empathy by thinking about the other. Children using a knife is an independent behavior thus would help others, but it could also be dangerous to self. It is interesting to note that in playing this game, in order to come out with a collective decision that will affect another, or the self, they think about the other and even about the imagined other who is not present in the simulation. However, the results show that some simulations are better to elicit cognitive empathy than others. Action oriented simulations that reveal more context about a situation compared to actions without concrete context are more easily interpreted by the participants and

accordingly apply their cognitive thinking in making collective decisions.

## 9. Conclusion and Future Work

In this paper, we have demonstrated how to design a game which can be used part of anti-bullying program at schools that fits into schoolchildren play behavior. Based on the thick description produced from our ethnomethodologically-inform ethnographic study, we produced bullying morality conceptual model which acts as a guide for us to come out with a gameplay model to encourage cognitive empathy among the players. We argue that design implications from our research may be generalized throughout schools in Malaysia, however, further contextual studies should be conducted if our findings were to be applied elsewhere. Design implications for designing game that fits into play behavior at schools are:

- Games may be designed as variations to the previously known and popular games among schoolchildren.
- Games may be designed to be played during the 15 to 20 minutes time the schoolchildren have to play after their meal during recess.
- Games at school may be designed to be readily available to play without any restrictions
- Prevention of game equipment loss should be incorporated in the game design
- Game design should allow the use of improvised game equipment or do not use any equipment at all.

From these implications we proposed a design for an indoor physical computing game. Before the actual development of the game, we tested two gameboard design to test the validity of our gameplay model. The results show that the gameplay model is successful in encouraging players to think about the state of mind of others thus practicing their cognitive empathy. In our research, we proposed an indoor physical computing game using a touchscreen to display the simulation to fit into the play behavior at Malaysian schools. However, we argue that the gameplay model can be applied in any digital technology such as virtual reality, augmented reality or 3D gaming. In the future we will develop our proposed indoor physical computing game and deploy it at schools. As a continuation from this work, we will also design and develop an outdoor physical computing game which can strengthen empathy based on schoolchildren's play behavior.

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