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Affecting Children's Ability to Understand Other's Feelings through an Online Cyber-wellness Programme

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Abstract: The purpose of this paper is to investigate the effectiveness of using an interactive cyber-wellness programme to teach primary school students life skills on cyberwellness as well as values like positive self perception and knowing the feelings of others. 95 male and 112 female Primary 4 Singaporean students participated in this research. Measures of self-perception and understanding of other's feelings were conducted for both control and experimental groups as a pre-test and post-test measure. The experimental group (N=46) interacted with the iZ HERO RESPECT programme, an online cyberwellness teaching programe, daily for 14 days, while the control group (N=107) did not experience the intervention. Questions measuring self perception and ability to know the feelings of others were taken from (Rosenberg, 1965)'s Self Esteem Scale, (Choo et al., 2010)'s psychological variables and (Liau, Tan, Li, & Khoo, 2012)'s Personal Strengths Inventory. Results showed significant increases in ability to know the feelings of others in the experimental group compared to the control group. There was no significant change to measures of self-perception in both groups. A knowledge quiz showed improvements in knowledge gained on cyberwellness for the female students in the experimental group but not for the male students. Overall, the iZ HERO RESPECT programme is demonstrated to be able to teach students to understand other's feelings, lending support for the use of technology to teach values. An area of application is that schools can free up curriculum time by allowing students to engage in such programmes at their own time outside of school. Further work will help analyze the elements of the programme that have helped or not helped in the participants' learning.

Keywords: Self-perception, ability to understand feelings, online cyber-wellness programme, iZ HERO RESPECT programme

1. Introduction

The increased use of Internet and social media in the world brings about safety concerns especially for younger users. Increasingly, countries are getting more well connected and access to the Internet is readily available. For instance, 96% of Australian children between 9-14 years (Australian Bureau of Statistics, 2012) and 97% of households with school going children in Singapore (IDASingapore, 2013) have access to internet from home through various devices such as their smartphones or computers. With the pervasiveness of social media and online communication, an important area of concern is what happens when bullying occurs online. Cyberbullying can be broadly defined as willful and deliberate use of the Internet as a technological medium to intentionally and repeatedly threaten, harm, embarrass, or socially exclude a specific person or group of persons (Patchin & Hinduja, 2010). Such instances can also be classified as online aggression and are not uncommon. The prevalence of school students who have reported to being cyberbullied in the past year can vary greatly, ranging from 15%-75% (Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Li, 2006; Tanrikulu & Campbell, 2015). Cyberbullying can have long lasting and damaging effects to both offender and victim (Kowalski & Limber, 2013) and has to be managed with the right intervention.

1.1 Importance of Self-Esteem and Empathy

The current literature has commonly associated a lack of empathy as well as moral disengagement, with cyberbullying behavior (Barkoukis, Lazuras, Ourda, & Tsorbatzoudis, 2016). In a sample of 396 students aged 12-18 years in Singapore, those who had low affective empathy and low cognitive

empathy were reported to engage in the highest levels of cyberbullying (Ang & Goh, 2010). This inability to understand and experience the emotions of others is typically associated with more aggressive and callous behaviour, and has also been linked to traditional bullying. Increased anonymity and the lack of other physical or auditory cues in the cyber world can also reduce the amount of room for empathy online (Sourander et al., 2010).

Relatedly, moral disengagement mechanisms kick in less for high empathy individuals (Paciello, Fida, Cerniglia, Tramontano, & Cole, 2013). Some mechanisms of moral disengagement include dehumanization, attribution of blame to victim, diffusion of responsibility or moral justifications (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). Higher levels of cyberbullying was associated with a greater tendency to disengage morally in students even if knowledge of cyberbullying moral standards were controlled and especially if they had higher confidence in their cyberbullying capabilities (Bussey, Fitzpatrick, & Raman, 2015). One who disengages morally tends to engage in less prosocial behavior and less self-censorship and experience heightened thoughts and emotions that are linked to interpersonal aggression (Bandura, et al., 1996). When put together, the lack of empathy and increased moral disengagement can result in more aggressive and self-centered behaviours that occur in cyberbullying.

It is also suggested that cyberbullying can occur as a result of need for self enhancement (Menesini, Nocentini, & Camodeca, 2013). Although low self-esteem is commonly associated with victims of cyberbullying, cyberbullies are also found to have lower self-esteem compared to those who do not engage in cyberbullying (Kowalski & Limber, 2013; Patchin & Hinduja, 2010). In addition, a meta-analysis by (Kowalski, et al., 2014), found that perpetrators of cyberbullying reported low levels of life satisfaction and low self-esteem. As a result, empathy training and activities targeted to boost self-esteem have been recommended to be incorporated as part of cyberbullying intervention to help decrease the prevalence of cyberbullying in schools (Ang & Goh, 2010; Barkoukis, et al., 2016; Patchin & Hinduja, 2010). Prevention attempts for cyberbullying should focus on factors that take place not only at school but also at home (Tanrikulu & Campbell, 2015). With these values in mind, we have designed an interactive web-based computer programme, the iZ HERO RESPECT programme, to encourage positive interactions in the cyber world for primary school students.

1.2 Using Technology to Teach Values

iZ HERO RESPECT programme is a web based cyberwellness learning programme that aims to help children 6-10 years develop responsible digital use. The programme focuses on inculcating positive values of self-esteem and empathy through a gamified platform to encourage self directed and experiential learning. Using a unique story telling approach, students get to take on the role of an 'iZ HERO RESPECT' whose task is to restore the 7 pillars of safe cyberspace which have been destroyed by the enemies known as Infollmons. Restoring each pillar would come with a set of missions where students would learn about different cyberwellness themes and values (see Table 1). Every mission consists of a combination of a teaching lesson through video or a comic strip, a game or quiz to reinforce learning and sticker activity to allow students to express their learning in a creative way. Completion of a mission would help the player earn points and accumulate experience points until the entire pillar is successfully restored. At the same time, coins are also awarded which allows the player to 'purchase' e-comics about cyberwellness so that they can read them online. As part of their learning to inculcate empathy and charity, each pillar would also contain missions educating students about various charity causes and students are encouraged to donate their coins to any of the mentioned charities. While the charity does not get actual cash money, it is part of an experiential learning of giving that the programme hopes to inculcate.

Table 1. Values and themes addressed in each iZ HERO RESPECT Pillar

Pillar	Values	Themes	Topics covered
Radar	Smartness, discernment	Being aware of cyber dangers	Cyberbullying, identity theft, protecting personal information
Eyes	Gratefulness, appreciation	Recognizing the good in others and ourselves	Cyberbullying
Shout	Courage, assertiveness	Standing up against	Cyberbullying

		cyberbullies	
Protect	Astuteness, vigilance	Online safety and security	Personal privacy, data and identity theft, spam and scam
Ears	Empathy, compassion	Connecting with compassion	Cyberbullying
Control	Self discipline	Maintaining self control in terms of what you play and when	Computer or game addiction, pornography,
Teleport	Vigilance, assertiveness, honour	Knowing when to seek help or to make an exit.	Online grooming, online strangers

There are a few major elements of the iZ HERO RESPECT programme that are based on gamification to promote the learning of positive values. First of all, as an interactive web-based platform, the iZ HERO RESPECT programme promotes exploration and discovery within the programme which can captivate and sustain the learner's attention as it makes learning interesting. Technology has been credited in helping to promote greater engagement in the subject and enhancing learning (Yilmaz & Keser, 2016). Furthermore, the interface of the programme includes game mechanics such as a leader board, progress bars, virtual currency, point systems and avatars (Figure 1). These elements can help to reflect performance and the status of player's progress in the programme. Such feedback can keep users motivated to stay on in the programme (Dicheva, Dichev, Agre, & Angelova, 2015).

Second, iZ HERO RESPECT programme aims to structure its content as clearly and as concretely as possible. It presents the curriculum as multiple 10-15 minute missions, each with different learning points. In this way, the material is broken down as achievable learning stages and scaffolds the learning process for the user. Certain key messages might be featured in more than one mission in order to reinforce its importance as well as demonstrate its use in different contexts. In this way, the programme provides the learner with different experiences and areas where the learning can be applied. This helps to bridge the gap in which there is no one size fits all format and is helpful as it acknowledges that different kids learn the same materials in different ways (Keengwe, Onchwari, & Wachira, 2008). Each mission is accompanied by actionable learning tasks such as a sticker creation (Figure 2), quiz or game (Figure 3). These elements facilitate the use of reflection and supports learning with the use of immediate feedback. Missions can be repeated and such multiple attempts allow users with the 'freedom to fail' so that learning can be exploratory and at one's own pace.

Figure 1. Interface of the iZ HERO RESPECT Programme

Thirdly, iZ HERO RESPECT programme strives to allow meaningful learning through activities that are authentic and provides opportunities for users to develop their own personal narratives and takeaways. Videos and comics depicting common and relatable dilemmas or scenarios are used as teaching points so that the users can immediately identify with. Users get to put themselves in the shoes of the other character and are asked about feelings and thoughts about the character's actions. Such elements help to facilitate knowledge transfer to real world problems (Koh, 2013). When students are given the chance to develop personal meaning from their learning, the programme can be effective (Merrill, 2002). There is also the platform for donation of their virtual currency to various Voluntary Welfare Organisations (VWOs). While they are not donating actual money, this symbolic act of using

their virtual money to help support a good cause instead of trading it for the online comics can help to users to experience the feeling of giving.

Figure 2. A student's sticker creation

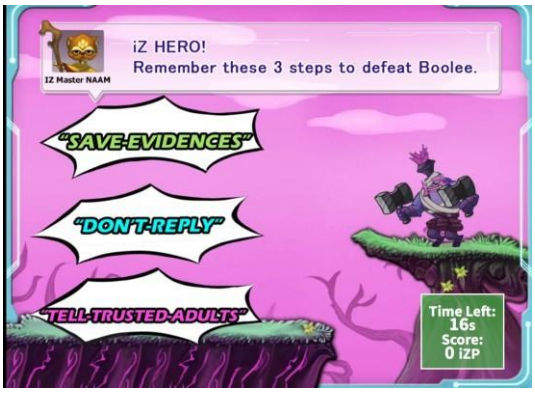

Figure 3. Game to reinforce learning

While the above discusses how the interface, content and experiential elements of programme might contribute to learning, the question still remains as to whether something that is tied more emotionally rather than cognitively such as values and morals can be taught effectively with a computer programme. (Roodt & Wanjogu, 2015) argue that this is possible. They state that values such as empathy are not something one possesses or not but in fact, each one possesses them in varying degrees that can be enhanced. By breaking down values into several learnable component skills, they have documented positive results in using technology to enhance the experiential learning element to increase empathy learning in medical students (Roodt & Wanjogu, 2015). Similarly, the iZ HERO RESPECT Programme utilizes several experiential elements to affect user's empathy and self esteem. Specifically, this study looks at its effects on ability to know what other people are feeling as well as on one's self-perception.

Other studies hoping to influence one's values through technology have also demonstrated positive results. For instance playing pro-social video games have been found to increase pro-social behavior through enhancing interpersonal empathy in university students (Greitemeyer, Osswald, & Brauer, 2010). Text messages to remind young adults to be empathic helped increase empathic feelings and motivations in young adults (Konrath et al., 2015). Acts of practicing compassion over a week period can help to improve self esteem and happiness (Mongrain, Chin, & Shapira, 2010). Our hypothesis is that the engagement in the iZ HERO RESPECT programme activities over 14 days can be effective in increasing children's ability to know other's feelings and also influence them to have positive perceptions of themselves.

2. Method

2.1 Participants

A total of 95 male and 112 female students from Primary 4 cohort of a primary school in Singapore took part in this study with consent from their parents. Through convenience sampling, 2 classes were assigned the experimental condition and 4 classes were assigned the control condition. Both conditions consisted of students from higher ability classes and lower ability classes so as to even out differences in language and learning abilities.

Preliminary findings showed that 38 students have gone through the iZ HERO RESPECT programme prior to the study. As such, these students were excluded as they might have already gained knowledge from their earlier exposure to the programme. In addition, participants who had given consent but were absent on either of the survey dates were also excluded from the study. In total, there were 153 participants in which 107 were in the control group and 46 in the experimental group.

2.2 Materials

2.2.1 Self Perception

Ten items were chosen after deliberation between the investigators of this project and a panel of experts from the Self-esteem scale (Rosenberg, 1965) and certain psychological variables used by (Choo, et al., 2010) in their study of pathological gaming in Singaporean youth. Participants had to rate each item on a 5-point scale ranging from 1 which indicates "Strongly Disagree" to 5 which indicates "Strongly Agree".

2.2.2 Ability to Know What Others Feel

The ability to know what another is feeling is determined using 2 questions from the empathy subscale of Liau et al.'s (2012) Personal Strengths Inventory. Each item was also scored on a 5-point scale that ranged from 1 which indicates "Strongly Disagree" to 5 which indicates "Strongly Agree".

2.2.3 Knowledge Quiz

A 13-question multiple choice quiz on the various topics of the content taught was also given to the students to determine their understanding of what has been taught. The topics include educating students about the Internet, cyber security measures, bullying and how to respond to various dangers online. The participant is required to indicate their answer to each question from a choice of 4 different responses.

2.3 Design

The study is set up as a quasi-experiment with an experimental group and a control group. It utilises a mixed factors design as both between and within subjects are compared. Students in each condition are required to complete a pre and post test approximately 2 months apart. The changes in the pre and post scores are first noted within each condition and then compared between condition to determine the impact the programme has on the gain in knowledge.

2.4 Procedure

Students in the experimental group took part in a pre test in a classroom setting. They were then required to go through the iZ HERO RESPECT programme on their own at home with structured guides to tell them which mission to go to each day for 14 days. The missions are sorted into different themes to enhance each day's learning objective. Thereafter, they had to sit for a post test in the classroom. The duration between the administration of the pre test and post test is approximately one month. The control group took the same pre-test and post-test in the same time frame. Changes in their ability to know other's feelings, self-perception and quiz scores were then examined.

3. Results

Prior to the main analysis, an independent-samples t-test was conducted to verify that there were no significant differences between the 2 groups prior to intervention on all the items. Paired samples t-test was then used to analyse the data. Visual examination of the histograms showed no violation in the assumption of normal distribution in the difference scores. The results are presented in Table 1. Items that are reverse coded to maintain the same directionality of change are also indicated in the table.

3.1 Quiz Score

We compared the pre- and post- quiz scores in experimental and control groups to determine knowledge gains. As shown in Table 2, both experimental and control groups improved from pre- to post- quiz, but the differences have not reached a significant level. The analysis was then repeated across gender to test

for possible gender differences. Results showed that female students in the experimental condition showed an overall positive significant change, $t(23)= 2.16$, $p<.05$ improving their scores by .88 (SD=1.99), 95% CI [-1.71, -.04] during the post test. As for improvement of individual quiz questions, male students in experimental group improved on Q1 ($t = 2.16$, $p < .05$), Q5 ($t=2.628$, $p <.05$) and Q13 ($t=2.309$, $p<.05$) and female students in experimental group improved on Q6 ($t=4.053$, $p<.001$) and Q7 ($t=2.290$, $p<.0.05$). The same improvements did not appear in male and female students in the control group.

Table 2: Comparison of Pre-/Post Quiz Scores in Experimental and Control Group

	Experimental (N=46)	Control (N=107)	Male Experimental (N = 22)	Female Experimental (N=24)	Male Control (N=42)	Female Control (N=65)
Post-Pre quiz scores	.39 (2.30)	.22 (2.04)	-.14 (2.53)	.88 (1.99)*	.29 (1.72)	.17 (2.24)
Q1 Diff	-.09 (.41)	.04 (.50)	-.18 (.40)*	.00 (.42)	.07 (.41)	.02 (.55)
Q5 Diff	.11 (.48)	.06 (.45)	.32 (.57)*	-.08 (.28)	.10 (.43)	.03 (.47)
Q6 Diff	.24 (.52)**	-.06 (.43)	.05 (.49)	.42 (.50)***	-.02 (.35)	-.08 (.48)
Q7 Diff	.15 (.60)	-.06 (.47)	.00 (.54)	.30 (.62)*	-.17 (.44)*	.02 (.48)
Q11 Diff	.11 (.32)*	.05 (.46)	.09 (.30)	.13 (.34)	.02 (.52)	.06 (.43)
Q12 Diff	-.11 (.67)	.02 (.53)	-.32 (.65)*	.08 (.65)	.07 (.46)	-.02 (.57)

*$p<.05$, **$p<.01$, ***$p<.001$

3.2 Measures of Self Perception and Empathy

The difference in pre and post test scores of the experimental group is displayed in figure 4. Items (1-10) that were related to self-perception saw no significant change in both conditions. Items related to empathy (11-12) saw positive significant changes on the dimension of being able to know what people feel online. The experimental condition saw a positive change of M=-.63, SD=1.65, $t(23)=-2.59$, 95% CI [-1.12, -.14].

In addition, some variables of interest about the participants' attitudes online are also displayed in Figure 4. Participants in both conditions rated showing respect online as important to them. Effect size of the change in the experimental condition is medium (Cohen's d=.5) while that of the control condition is small (Cohen's d=.2). Participants in the experimental condition also reported an increase in sharing with their parents about the people whom they talk to online (M=-.54, SD=1.71, t(45)=-2.16, 95% CI [-1.05, .04]. They also rated more negatively to the statement "playing games instead of doing homework is ok" (M=.33, SD.95, $t(45)=2.35$, 95% CI [.05, .62]) in the post test. The effect size for these 2 items is small (Cohen's d=.4). This result is consistent with what is demonstrated in a previous evaluation of an earlier version of the iZ HERO RESPECT programme which saw significant improvements in participants' knowledge of prioritising homework before gaming and importance of respecting others online (Liau et al., 2015).

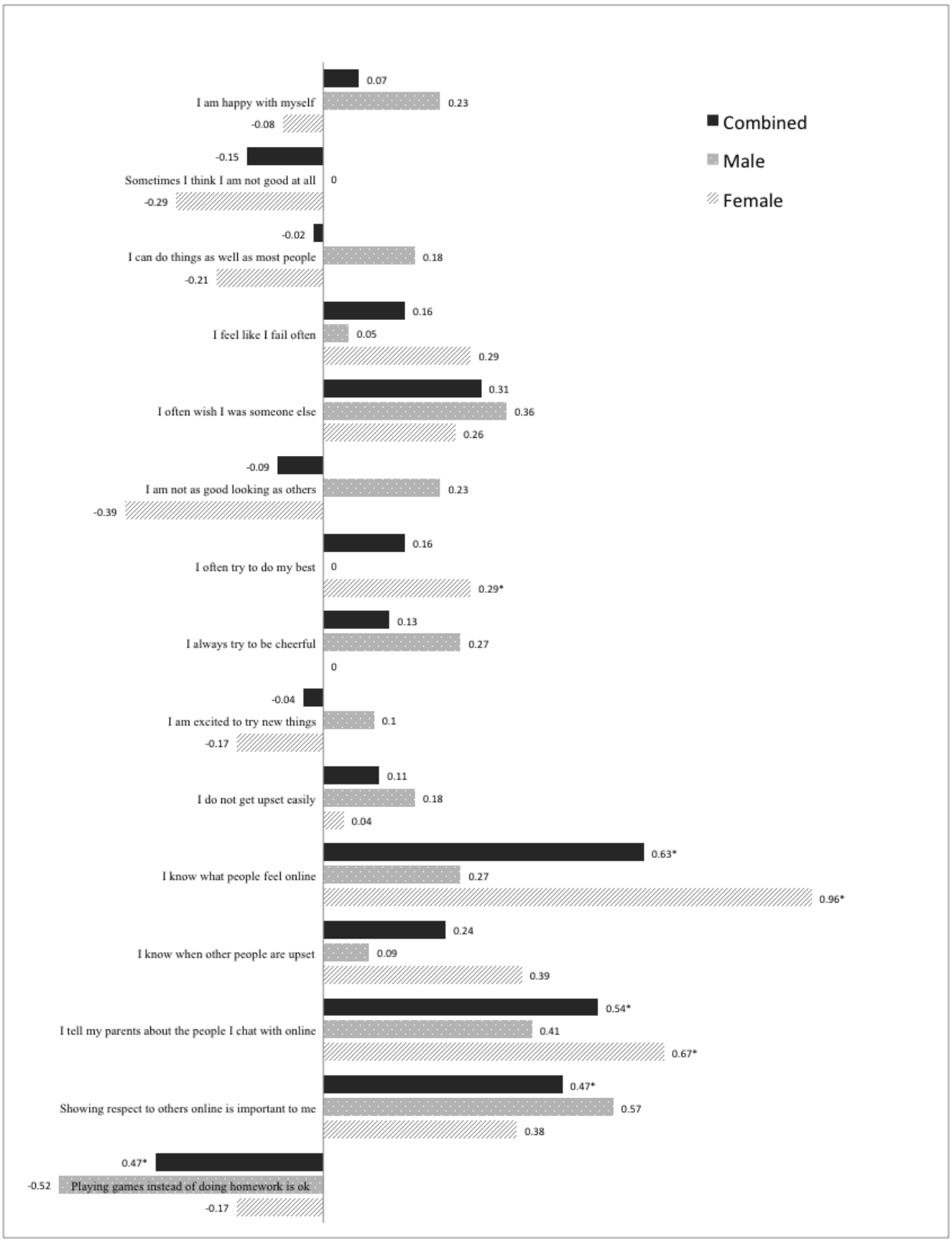

Figure 4. Difference in pre and post test scores in the experimental group, *p<.05

4. Discussion

The aim of this paper is to explore the possibility of effecting change in participants' self-perception and ability to know other's feelings through an online cyber-wellness programme. Empathy is commonly understood as a form of interpersonal connection through the expression of one's insight and understanding of others (Sharp & Morris, 2014). In our study, we used a similar operationalization and

examined participant's ability to understand other's feelings in an online context. Results showed that the experimental group improved in their ability to know the feelings of others when compared to the control condition. In particular, participants in the experimental group demonstrated more agreement to the statement "I know what other people are feeling online" compared to the control group. This result is consistent with the current literature that indicates that traits like empathy are indeed teachable through an online platform (Roodt & Wanjogu, 2015). The improvement in ability to understand the feelings of others is seen as a first step to effecting positive change in cyberbullying behavior (Ang & Goh, 2010). Being able to teach values such as this in students through an online programme can help free up more school curriculum time for other activities. Schools teachers are generally overloaded with their usual teaching subjects and extra-curricular activities and it is the hope that this programme will be able to lighten their and to allow students to be able to learn lifeskills independently and outside of the school context.

In addition, we also compared their knowledge gain about the cyber-world and its dangers from participants' quiz scores. The results show non-significant changes in both control and experimental conditions. However, gender differences were noted where the females in the experimental group were found to have improved significantly in terms of knowledge compared to the males in the experimental group. This finding might suggest that females are more receptive to the programme that males. However this could also be due to the difference in levels of engagement in the programme. While all students participated in the programme, 67.4% reported to have completed all the missions in the programme. When examining gender differences, 55% of the boys compared to 79% of the girls completed all the activities. As such, the results of knowledge gain could be a reflection of the participant's completion of the programme rather than of the ability of the programme to impart knowledge.

Contrary to our hypothesis, our study did not show any significant changes to participants' self-perception after the use of the programme. This also runs contrary to some of the literature reviewed. For instance, (Vatankhah, Daryabari, Ghadami, & KhanjanShoeibi, 2014) showed that teaching life skills to students such as anger management, can positively impact their self esteem especially for female students. The iZ HERO RESPECT programme comprises of various topics of life skills such as managing one's emotions, self discipline and assertiveness. As such, we had expected to see positive influences on participants' self perception as well. There could be a few reasons for this lack of significance.

Firstly, as mentioned above, student's level of participation might have an impact on completion of the programme. Because participants were expected to complete the programme on their own at home, the depth of their engagement with the programme also cannot be judged. It is possible for children to complete the programme without understanding or digesting its content fully. As this was an extra aspect of the school curriculum and the study was conducted close to their exams period, engaging deeply in the programme might have been a lower priority for the students and could have resulted in hasty completion.

Secondly, the lack of change might be due to a ceiling effect as the average baseline scores of items of self esteem and empathy are relatively high to begin with so might not have a clear effect. In our study we did not restrict our programme to only those identified with low empathy or self esteem scores as our programme was targeted at the general level. However, it might also lead to a dilution of the effects as seen from the high average baseline scores. This ceiling effect might also be the result of participants wanting to present positive answers to appear more socially desirable.

Thirdly, the duration of engagement of the programme might be too short to produce much change. Programmes that have documented success in this area had generally longer participation rates. (Schultze-Krumbholz, Schultze, Zagorscak, Wölfer, & Scheithauer, 2016)'s study showed success in improving affective empathy in participants through ten 90-minute sessions over 10 weeks. In contrast, the iZ HERO RESPECT programme is implemented in fourteen 30-minute sessions. The total run-time of the sessions are less than half of (Schultze-Krumbholz, et al., 2016)'s programme. However this was done with the limitation of the amount of content and activities in the current iZ HERO RESPECT programme. The iZ HERO RESPECT programme is currently undergoing some re-development and increasing its content might be one improvement that can be explored.

4.1 Limitations

One major limitation of the study is the inability to track how the participants interacted with the programme such as how much time they spent on each mission's activities as well as their depth of engagement and how they are able to apply it to their own experiences. While self reports of engagement have been largely positive – more than 90% of the participants 'agreed' or 'strongly agreed' that the programme was helpful and made learning interesting and 80.4% found engaging in the programme worthwhile – they do not provide additional information on how the programme was used. While the design of the programme encourages self-directed learning, the participant also has to expand effort in meaning making and reflection of the content in order to maximize the benefit of the programme. Hence it is useful to understand how much of the lack of significance in results might be due to a lack of effort of students to engage in the programme. Knowing this could help identify elements of the programme that have helped or not helped in enriching the participant's learning.

Another limitation of the study is that it uses measurements that are individual questions rather than a full scale. Hence, it is unable to make the conclusion with regards to self esteem and empathy. Examining individual questions also provide limited sensitivity for change. The measures are also all reliant on the self-report of the students where inherent biases of social desirability might be present.

The sample for this study is taken from one school and might be affected by the demographics, learning abilities and socio-economic factors that might be particular to students of that school. While care was taken care to ensure that they are matched according to ability and results also indicated no difference in baseline scores, there might be limited generalizability to the entire population. More data from other schools can also be used to supplement this study.

5. Conclusion and Future Directions

While not all without its limitations, this study suggests some success in the iZ HERO RESPECT programme to teach students to understand other's feelings. This contributes to the growing field of using technology to influence learning. Importantly it also lends partial support to other studies which have achieved similar successes. Future studies can improve on the study's limitations and be replicated in other schools to ensure generalisability. Future versions of the iZ HERO RESPECT programme might need to take into account improvements in its addition of content and quality.

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