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# User Validation of an Empathic Virtual Buddy against Cyberbullying

Janneke M. VAN DER ZWAAN<sup>a,1</sup>, Elke GERAERTS<sup>b</sup>, Virginia DIGNUM<sup>a</sup> and Catholijn M. JONKER<sup>a</sup>

<sup>a</sup>*Delft University of Technology*

<sup>b</sup>*Erasmus University Rotterdam*

**Abstract.** People are able to comfort others by talking about their problems. In our research, we are exploring whether computers can provide social support in a similar manner. Recently, we proposed a design for an empathic virtual buddy that supports victims of cyberbullying. To validate our approach in providing social support and to gather feedback from potential users, we performed an experiment (N = 30) to compare interaction with the buddy to reading a text. Both the buddy and the text received high scores; scores for the buddy were consistently higher. The difference was significant for the extent to which feelings were taken into account. These results indicate that participants liked to interact with the buddy and that they recognized the emotional cues emitted by the buddy, thus validating our approach in comforting users.

**Keywords.** Social support, embodied conversational agents, cyberbullying

## Introduction

Today, children and adolescents spend a lot of time on the Internet. One of the risks they run online is to become a victim of cyberbullying. Cyberbullying refers to bullying through electronic communication devices. It is a complex problem that has a high impact on victims [1]. To help victims deal with their negative emotions, specialized helplines, such as Cybermentors<sup>2</sup> and Pestweb<sup>3</sup> enable them to talk to online counselors and/or peers trained to give social support. Social support or comforting can be defined as communicative attempts, both verbal and nonverbal, to alleviate the emotional distress of another person [2].

Since one-on-one online counseling is very labor intensive, automating this kind of support could help to reach more victims. In our research, we are exploring whether Embodied Conversational Agents (ECAs) can provide social support in the same way as humans do. An ECA is a user interface consisting of a virtual character that interacts with users based on the principles of face-to-face communication. Recently, we proposed a design for a virtual empathic buddy that tries to comfort victims of cyberbullying [3]. The buddy ‘lives’ on the computer screen of potential victims of cyberbullying. When a child feels uncomfortable because of a cyberbullying incident, it

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<sup>1</sup> Corresponding Author: Janneke van der Zwaan, Jaffalaan 5, 2628 BX Delft, The Netherlands; E-mail: j.m.vanderzwaan@tudelft.nl.

<sup>2</sup> [www.cybermentors.org.uk](http://www.cybermentors.org.uk)

<sup>3</sup> [www.pestweb.nl](http://www.pestweb.nl)

can turn to the buddy for emotional support and practical advice on how to deal with the situation. To validate our approach and explore how users experience interaction with the buddy, we performed an experiment with the target audience.

This paper is organized as follows. In section 1, we present the virtual empathic buddy. Section 2 describes our methodology. In section 3 the results are discussed. Finally, in section 4, we present our conclusions.

## 1. Empathic Virtual Buddy

The virtual empathic buddy is a virtual agent that acts as a supportive friend to victims of cyberbullying. For this experiment we implemented a prototype of the buddy. Figure 1 shows a screenshot of the interface. In the top left of the interface, a virtual character is displayed for non-verbal communication. Verbal communication between the user and the buddy is facilitated through the chat window. The prototype is a Wizard of Oz (WOZ) system; this means a human experimenter controls the actions of the buddy (i.e. the text sent to the chat window and the emotional expressions displayed by the virtual character).



Figure 1. Screenshot of the virtual empathic buddy.

The structure and contents of conversation between the user and the buddy are based on the validated anti-bullying and social competence training named ‘Fun at school’ [4]. ‘Fun at School’ is a two-day summer course aimed at children aged 11-13 suffering from social anxiety, social-behavioral problems, or classroom bullying. During the training, participants learn they cannot change events, but they can change the way they deal with the thoughts and feelings that stem from these events. To remind our participants of the interaction between thoughts and behavior, the diagram visualizing this interaction is depicted on the right side of the chat window (see figure 1).

After saying hello to the user, the buddy asks him what happened. This allows the user to give his account of the events. Next, the buddy asks the user what he thinks about the event and how he feels. Then the buddy explains the interaction between events, thoughts, feelings, behavior and consequences. After explaining the theory, the buddy asks the user to come up with a helping thought about his situation. If the user comes up with an unhelpful thought instead of a helpful one, the buddy implicitly corrects the user by saying: *I also thought of an example*: and includes a relevant helpful thought. Finally, the buddy gives some practical tips the user can try to (temporarily) stop cyberbullying. During the conversation, the buddy responds sympathetically to input from the user, gives compliments, and mirrors the user's emotion.

## 2. Method

A between subjects design was used to gather user perceptions of the virtual empathic buddy. Participants were randomly assigned to either the experimental group or the control group. Participants in the experimental group interacted with the buddy and participants in the control group read an informative text containing the same information as the conversation with the buddy. Thirty children aged 14-16 took part in the experiment (mean age = 14.9, SD = 0.7). Sixty-three percent of the participants were male and all of them were experienced Internet users. Prior to the experiment, written permission from the participants' parents was obtained. The experiment was conducted at a high school in the Netherlands during class hours.

To make sure all participants received the same treatment, the interaction with the buddy (or reading the text) was based on a fictive scenario. The scenario tells the story of René, a fourteen-year-old boy who is verbally abused on msn by a classmate. Participants were explicitly told to take the perspective of René when interacting with the buddy or reading the text. During the experiment, participants received a paper version of the scenario and were asked to empathize with the main character. The scenario was available to the participants for the duration of the experiment.

After reading the scenario, participants in the control group received a text on paper with information on how to deal with cyberbullying. This text was presented as information found on the Internet by the main character in the scenario. Participants in the experimental group interacted with the WOZ buddy, that was presented to them as 'a computer program that offers assistance to children who are victims of online bullying' the main character found on the Internet. The conversation with the buddy took place on a laptop with a keyboard and mouse attached. This laptop was connected to the laptop of the experimenter who controlled the buddy. During the experiment, the experimenter behind the laptop was hidden from view.

After interacting with the buddy or reading the text, participants were asked to rate their agreement to seven statements on a 5-point scale (items: relevance, trustworthiness, and understandability of the information; the extent to which the advice would be followed, the information was geared towards the situation, and feelings were taken into account; and perceived support; with 1=completely disagree and 5=completely agree). In order to gather subjective feedback, the questionnaire also contained two open questions: *How useful do you think the buddy is?* and *How can the buddy be improved?*

### 3. Results

#### 3.1. Statements

Table 1 shows the scores for each of the seven statements. Both the text and buddy were evaluated positively on all statements; average scores range between 3.64 and 4.75. Scores for the buddy were consistently higher than scores for the text. The difference was significant for the feelings statement ( $t(28)=2.05$ ,  $p=0.03$ ). This indicates that the target audience recognizes the emotional cues emitted by the buddy.

**Table 1.** Average scores and standard deviations for the seven statements (1=completely disagree and 5=completely agree).

Statement	Control		Experiment		<i>p</i>
	M	SD	M	SD	
Relevance	4.50	1.05	4.75	0.56	0.43
Trustworthiness	4.21	1.08	4.44	0.70	0.60
Understandability	4.14	1.30	4.69	0.58	0.16
Follow advice	4.36	1.04	4.40	0.71	0.90
Geared towards situation	4.00	0.85	4.13	0.99	0.72
Feelings	3.64	1.17	4.44	0.61	0.03
Perceived support	4.07	0.80	4.44	0.70	0.21

#### 3.2. Usefulness

Answers to the open questions also demonstrated the participants' positive attitude towards the buddy and the text. Ten out of 14 participants in the control group and 8 of 16 in the experimental group used the argument that information and tips were given to substantiate the usefulness of the buddy or text. Three participants in the control group stated that they think a text alone will not help to stop cyberbullying. Two participants in the experimental group liked the fact that users can tell their story to the buddy. One participant was impressed by the buddy's social skills:

*He gives good advice. He really wants to know how you feel, what you think about it. And he has clear answers and asks follow up questions. (P21)*

However, the user experience clearly varies, as another participant said the buddy should empathize better with the victim's situation.

A participant in the experimental group saw the fact that nobody could read along with the conversation as an advantage. Some concerns were also expressed: two participants refer to the lack of context when discussing upsetting events:

*You don't know what other things some one may have experienced (P5)*

Only one participant was explicitly negative about the buddy, he suggested victims of cyberbullying should talk to a person instead of a computer program.

#### 3.3. Improvements

Two participants in the control group and one in the experimental group mentioned the language used by the buddy or in the text was too difficult. Simplifying the language is

therefore an obvious improvement of the buddy or text. Other suggested improvements concerned the amount of information or tips (three participants wanted more information or tips) and one participant suggested to include an explanation why bullies bully. Also spreading the word about the buddy and educating people in schools were mentioned as improvements.

#### 4. Conclusion

Interaction with the buddy was rated at least as high as reading an informative text with the same information content. Also the subjective feedback gathered from open questions was generally positive for both the buddy and the text. Based on these results we conclude that the target audience generally has a positive attitude towards the idea of a virtual empathic buddy against cyberbullying. The significant difference between the buddy and the text on the feelings statement indicates that the emotional cues emitted by the buddy are recognized, thus validating our approach. This result also provides evidence for our hypothesis that ECAs are able to provide social support.

The high scores and positive feedback for both the buddy and the text might also indicate the participants' appreciation for the information on cyberbullying (regardless of how this information was presented). Possibly, schools do not educate students on cyberbullying, even though there is a need for more knowledge. Some answers to the open questions pointed in this direction; for example, a participant in the control group suggested that schools should provide education on cyberbullying. This is consistent with findings from Sharples et al. on e-safety education in the UK; only 11% of the teachers interviewed by the researchers said they frequently taught students about online safety issues [5]. More research is needed to investigate this issue.

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