Girls Involved in Real Life Sharing: Utilizing Technology to Support the Emotional Development of Teenaged Girls

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Abstract

This paper describes a new digital technology to support emotional self-awareness and empathy, called G.I.R.L.S (Girls Involved in Real Life Sharing). The system invited users to reflect actively upon and interact with a dialogue about how the story made them feel through the construction of pictorial narratives. In a pilot study with teenage girls, the system enabled the subjects to express themselves freely in a comfortable and meaningful way, and fostered an increase in emotional expressivity as compared to a control group. While the system has been tested with a small group of minority middle-school children, a web version of the system is in development that we believe will be useful for school counselors.

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According to Payton et al. (2000), In an effort to help young people to establish positive relationships, to adapt to the demands of growing up, to contribute to the community and to make responsible decisions, educators have adopted programs that target areas such as risky sexual behavior, violence, school drop out, and drug use. Often, maintaining these programs become too complex to coordinate and do not have the impact that they could. Social and emotional learning programs, geared toward recognizing and managing emotions, establishing pro-social goals, enhancing interpersonal skills, and developing other pertinent skills, are becoming a comprehensive, rather than piece-meal way, to address these target areas (Payton et al.). The purpose of this research was to explore how digital technology can be used to supplement social and emotional programs.

To date, there are only a handful of technologies with this goal in mind. For example, Granada Learning's *Just Like Series* is an educational system that attempts to compel learners to think about emotions related to an event. The system includes four videos that portray real-life stories of children who have faced adversity (Group, n.d.). Activities in these videos are designed to help children begin to develop empathy for others and gain a better understanding of themselves. Although this environment encourages reflection, the stories and emotions are limited to the ones chosen by the software designers. A more open-ended environment where children can construct their own narratives may be more beneficial. One example of this type of environment is the Digital Diary developed in the Today's Stories project. After collecting video from a

personal camera, students review their video collaboratively and annotate episodes with signs and symbols that make explicit the interpretations of what they see in their experiences including their emotions. This environment allows children to construct narratives and annotate some emotions; however, it was not created for the explicit purpose of exploring emotions.

G.I.R.L.S. is software geared toward supporting emotional self-awareness and empathy in teenage girls. With limited resources and recognizing that teenage girls and boys have different emotional styles and interests, we targeted just the girls in this version of the software. However, we expect that a slightly adapted version could be used with boys. The software was designed upon principles that are gender neutral – namely the constructionist theory of education (Papert, 1980) and narrative therapy (White & Epston, 1990). Constructionism asserts that people learn better when they are engaged in building personally meaningful artifacts that are reflected upon and shared with others in a community. Narrative therapy emphasizes the development of an individual's self- and shared- understanding by telling their stories or writing them. In G.I.R.LS., narrative serves as a vehicle for developing an understanding of an individual's emotion.

Overview of the Technology

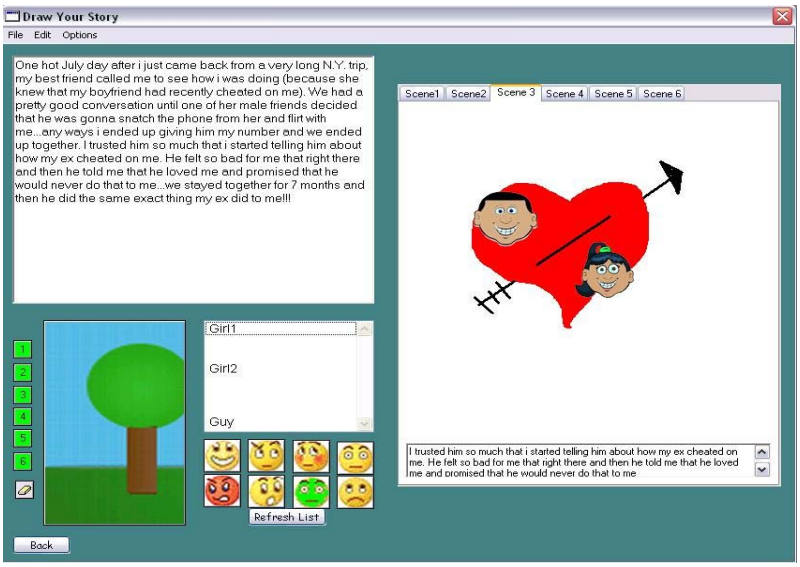
Girls Involved in Real Life Sharing is computer software geared toward allowing girls to think about the emotions related to their lives. The software guides girls through a series of windows – memory closet, character selection, pictorial narrative construction, suggestion, and emotional weighting – to produce a set of images, similar to a comic strip, about their story. The system begins with the "memory closet window,"

a safe space where they can write about events in their lives. The system is set up so that all drafts of a user's story are saved, much like a journal that can be reviewed later. In the next window, called the "character selection window", girls are placed in the director's seat and asked to select the characters that will star in their story. The system is designed with preset images of characters in order to emphasize the process of constructing the story rather than developing images of characters.

Once students have chosen the stars of their stories, they are taken to the "pictorial narrative construction window" shown in figure 1, where they build scene-by-scene images with captions representing specific incidents in the story.

Figure 1.

The pictorial narrative construction window.



They can choose from a small selection of backgrounds, but they also have the option to use a small paint program to create their own scenes. Additionally, the names of the characters chosen in the character selection window appear in a list box. By selecting a name from the list and then selecting an emotion face, girls can choose the expressions

for main characters in the story (excluding the character representing themselves). The goal of this feature is to encourage students to think about the emotions of the other characters in their stories and to use that reflection to select an expression. To be able to choose an expression for the character representing them, students must submit the caption to a natural-language-processing toolkit, called ConceptNet, which supports affective textual reasoning over documents (Liu & Singh, 2004). The system will then try to empathetically suggest emotions that relate to this event in the "suggestion window". For example if the caption reads,

> *… she was beating me and as she was beating she hit my mirror and broke it and said see what you made me do and beat me more harder. Then the next day I went to school with bruises on me and my friends were asking me what happened and I said nothing. That whole day I was walking around telling people not to touch me because it hurts (from a participant)*

The system would display, "Sounds like that may have made you feel fearful or maybe angry?" At this juncture, the student can select from four buttons in the suggestion window, which read, "Yeah that's how I felt," "No, I didn't feel that way," "Maybe a little of both," or "I don't know."

To further support this first reflection on her emotions, the student is then taken to an "emotional weighting" window. In this window the student can choose from nine emotions as well as have the option to type in her own emotion. The weighting can range from "not at all" to "a lot", and is ideally based on how much the student felt she experienced the emotion. This reflection is important because this weighting determines how the main character (representing the student) will appear in the pictorial narrative

construction window once the user is finished. For example, if the girl weights happy as “a lot”, the character will appear with a big smile. Each emotion and weighting is associated with a particular expressive appearance.

Methods

The research questions developed for this study were: 1) Does the labeling of emotions within the context of stories enhance emotional self-awareness? and 2) Can identifying the emotions of other actors in the story help the user to develop empathy for others? The main hypotheses derived from these questions were:

- Building a pictorial narrative, including labeling the emotions of other actors, will help users better identify the feelings of others.
- Building a pictorial narrative and exploring the emotional space supported by common sense reasoning technology will support greater emotional self-awareness than only building the pictorial narrative.

Participant Sample

Participants, all attending a New Haven, Connecticut public school, were 17 girls ages 11- 14 in the sixth, seventh, or eighth grade (one participant was lost due to a school suspension). The mean of the ages was 12.35 with a standard deviation of 1.23. Participant’s ethnicity ranged from black, to black and Puerto Rican, black and white, and Puerto Rican. Participants were recruited through the principal and counselors from a middle school (grade 6-8) in the New Haven area. Girls participating were chosen somewhat on the basis of accessibility (i.e., having teachers and parents willing to let their students participate). Each participant was randomly assigned to a group, described below, once her consent form was signed. Participants were not involved in

other outside activities directly related to emotional development such as intervention programs. The fact that other activities (sports, clubs, etc.) can contribute indirectly to emotional development has not been overlooked, but was not directly controlled for.

Procedures

The participants were divided randomly into two groups. The first group (n = 8) – hereafter referred to as the Supported Pictorial Narrative (SPN) group – was asked to use the G.I.R.L.S. software described above. The second group (n=8) – the Pictorial Narrative (PN) Group – used an adapted version of the software where they never encountered the emotional suggestion or the emotional weighting window. Thus, both conditions involved new technology to reduce the effects of novelty on any outcome. This study consisted of six meetings over the course of three weeks, each lasting one hour. In each meeting, girls were scheduled to come with their groups (SPN and PN). During each of the visits, a group of participants came to the computer room together, but interacted with the G.I.R.L.S software individually. At each meeting, a general story theme was discussed each time a new story began. Participants had the flexibility to decide what story they would write within that theme, or decide to go with an entirely different subject. Themes discussed included boyfriend issues and conflict with friends or family members, issues most felt they could write about. Some felt they did not have much to say about the subject matter and chose their own. During the last session, participants were asked to fill out a short questionnaire and then allowed to wrap up their last story. Each participant was spoken to individually for five to ten minutes each about her responses.

The study took place in a computer room of a New Haven public school. We note that the participant's knowledge that an experiment was taking place could have some effect on the outcome; however, it was believed that an unfamiliar setting (e.g., a research laboratory) would have further confounded these effects.

Measures

For both hypotheses, we used a comparison group (SPN and PN) experimental design. Additionally, semi-structured interviews and an analysis of narratives were used as measures. The semi-structured interviews consisted of binary, Likert-scale, and open-ended questions. These questions included topics related to a participant's name, age, the type of stories she told with the software, her experiences with the software, her likes and dislikes of the software, her desire to use the software further and changes she would make to the software. For the SPN group, additional questions related to the student's opinion of the empathetic emotion suggestions were included. Because of the small number of participants, a descriptive analysis comparing the means of the Likert-scale responses was conducted. Each open-ended question of the interview was hand-coded by the researcher to identify and describe themes that surfaced.

As a second measure, an analysis of each student's narratives was conducted. This included a comparison of the mean amount of stories written by the groups as well as a descriptive analysis of the mean percent of emotional words used in the first and last stories written a) including repeat words, b) not including repeated words.

Results & Discussion

Hypothesis 1

As described earlier, the pictorial narrative window prompted the students in both groups to select a character and then use the emotion faces to determine what the expression of that character would be. This hypothesis stated that doing so would help users better identify the feelings of others. During the interview, participants were asked how they chose the expressions of others in the story. The majority of participants in both groups said they decided what the people would look like by thinking about how the character felt during the story. Responses included: *"By the emotions that they were feeling,"* and *"Because however they were in my story, like mad or scared, that's what I did."* These responses provide evidence that participants had to place themselves in the minds of others to decide what they may have been feeling – a key element in empathy and a support of this hypothesis.

At the same time it is unclear that all participants had this direct reflection on the feelings of others. Two participants from the PN Group had a different way of selecting the expressions of the characters. For example, an interview with a sixth grade participant named Michelle progressed as follows:

Written response: "By what they said and how it sounds in my mind"

Researcher: "What do you mean by how it sounds in my mind?"

Michelle: "I just tried to think on when it happened and see what that person looked like during that time."

Researcher: "Okay, so how did you pick it in the program?"

Michelle: "Once I remembered how they looked I found a face I thought matched it."

It seems that, rather than doing a direct reflection or thinking about how the person may have been feeling, this student may have just matched facial expressions. She and other participants may not have made the connection between facial expressions and emotions.

Hypothesis 2

This hypothesis asserted that building a pictorial narrative and exploring the emotional space supported by ConceptNet would support greater emotional self-awareness than only building the pictorial narrative. Over the course of the five sessions, students produced anywhere from one to six stories, totaling 28 stories for the groups. The SPN Group created an average of 1.75 stories (total of 14), while the PN Group produced 2.33 stories (total of 14). It is not possible to tell how long each group spent on the stories. Future development of the software for research purposes could involve a log of the time spent working on each story. Two different analyses – Coding Scheme A and Coding Scheme B – were performed on each narrative in order to quantify the number of emotion words used in the story. These schemes were only used on the first and last stories for each participant to make sure the stories were created within the same time period. Additionally, since multiple drafts of the same story were written, the last draft of each story was used for analysis.

In Coding Scheme A, the total number of emotion words used in the final story was counted. In Coding Scheme B, the total number of distinct emotion words used was counted with repeated words only counted once. For instance, in Coding Scheme A, if “sad” was used three times it was counted three times, however, it was only counted

once in Coding Scheme B. In both schemes, the total number of words in the story normalized the number of emotion words used.

According to the analysis, the SPN group increased in both the mean percentage of repeated and non-repeated emotion words used (see figure 2). Figure 3, shows the PN group also increased in mean percentage of repeated words, their mean percentage of non-repeated emotion words, or variety of emotion words, did not increase.

Figure 2.

A Comparison of the number of repeated emotion words for both groups from their first stories to their last stories.

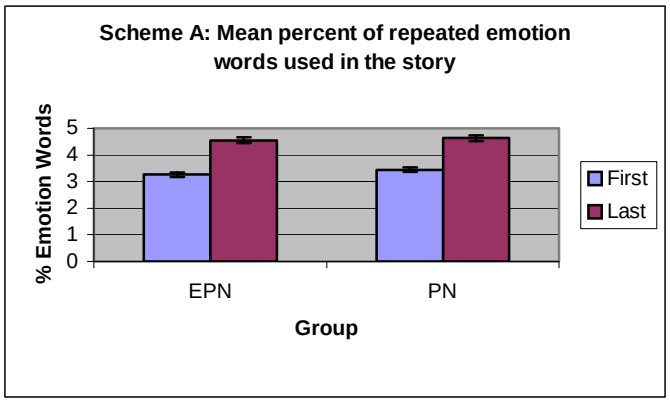


Figure 3.

A Comparison of the variety of emotion words used by both groups.

This increase in emotional expressivity of the SPN group can be an indication of greater emotional self-awareness which is in line with this hypothesis.

The argument could be made that increased emotional expressivity is due to the thematic content of the stories rather than interaction with the system. Looking at the content of the stories, we can see that this probably was not the case. Out of the first stories written, 93%, as compared to 71% of the last stories told by the groups, dealt with (the usually) emotionally laden subjects of the death of a family member, a fight with a family member or boyfriend, or a very special gift from a family member or boyfriend. It would be expected, therefore, that the emotional descriptions decrease as the emotional intensity in the story decreases. However, it was found that the inverse occurs after interacting with the software.

Other Results

The measures used in this study also revealed important information directly related to the software. For both groups, the questionnaire consisted of Likert scale (0: I totally hated it, 7: I totally loved it) and open-ended questions. The results are summarized in **Table 1**. Based on their responses, girls in the SPN group enjoyed “choosing the expressions for different actors in their stories” (x= 6.25, SD = .886) and “interacting with the software overall” (x = 6.75, SD = .462) more than the PN group (x = 5.83, SD = 1.60;x = 6, SD = 1.55). At the same time, the both groups indicated neutrality regarding how much they learned about themselves during the workshop (PN: x = 4.67, SD = 1.211; SPN: x = 4.375, SD = 2.06).

Participants in the SPN group were asked in the exit interview about their feelings towards the empathetic emotion responses. (Recall that these questions were

not included for the PN group since they had no interaction with the emotional weighting window system feature). Based on their responses to the question “How much did you like the program suggesting emotions to you?” students liked the program (x = 5.5, SD = .92) doing this. Although students felt the suggestions were only correct a little more than half of the time (Question: How often do you think the suggestions were correct? x= 5, SD = 1.06), they were usually not completely annoyed (x = 5.125, SD = 2.6) as shown by their response to “When suggestions were wrong I felt:” (0: Completely annoyed; 7: not annoyed at all). One student who did feel annoyed by the suggestion stated, “I know my feelings,” while another felt that there were no correct answers. One student’s Likert scale rating of 3 indicated that she was very annoyed, but her answer to the question “Why did the suggestions annoy you?” explained that the suggestions did not annoy her because she “always wants to listen to what people have to say.”

Table 1

Results of questionnaire given to both groups at the end of the study

Question (Scale 1 to 7)	**PN**		**SPN**	
	Mean	**SD**	**Mean**	**SD**
How would you rate the G.I.R.L.S. Talk program overall?	6	1.55	6.75	.462
How did you feel about being able to choose the expression of the people in your story?	5.83	1.60	6.25	.886
I learned something about myself when I wrote these stories.	4.67	1.21	4.375	2.06
How much did you like the program suggesting emotions to you?	N/A	N/A	5.5	.92
How often did you think the suggestions were correct?	N/A	N/A	5	1.06
When it was incorrect I felt:	N/A	N/A	5.125	2.6

Other students (n = 6) who reported not being annoyed said they thought the suggestions were “neat” and they liked them. In one case, the student said that when the suggestion was wrong, she wondered if she in fact felt that way. This is interesting because it seems as if, as desired, the emotion suggestion initiated a thought process. In the emotional weighting window she was then able to think more about these emotions.

A theme of both personal and personalized expression came out often during the interviews, but was not hypothesized. Participants seemed to feel that they could say what they wanted, no matter how personal, since it was all entered into the computer. Stories of abuse as well as family conflict (both humorous and violent) were told. One participant, when asked if she had participated in anything like this, replied,

> Well, I’ve been in counseling, but I couldn’t share like I wanted because of others that were there. I figured I would just wait until I could get the counselor by herself… I felt like on the computer I could say anything – I mean it’s not going to tell anybody, it’s a computer… I felt like, rather than taking everything out on my parents, I could get it out on the screen. I could get my emotions out rather than bottling them up.” – SPN Group

As far as personalized expression, when participants were asked about one thing that they liked about interacting with the software, a major theme around personalized expression that arose was the fact that they could choose and write their *own* stories. Responses about this feature of the interaction included: *“I just liked that I got to write my story however I wanted and then create scenes around it”* and, *“I got to write what I wanted… all of it was true so I knew all the parts and everything that happened in the*

story." This theme meshed well with the constructionist ideal of personally meaningful projects.

Practical Implications and Limitations

G.I.R.L.S. offered a safe and supportive environment for girls to write and create around events happening in their lives. Students were able to explore a variety of emotions related to themes ranging from relationships to conflict to death. The promise shown by this software has lead to the development of a second version that will be freely available online at http://affect.media.mit.edu/projectpages/girls. This additional effort to make the software more widely available was inspired by the girls who tried to find the "product" later on their own, and only then realized that it was not available except as an MIT research project. By making it freely available over the web, we hope to enable anyone who is interested to interact with the technology.

One limitation of the software is the affect reasoning done by ConceptNet. The participants responded that the software seemed to incorrectly suggest possible emotions related to the event about half of the time. The number of abbreviations, misspellings, grammatical mistakes, or slang used probably hampered the system's ability to produce correct responses. A positive aspect of this limitation is that there was often still a reflection process that the students went through as a result (i.e. disagreeing with the system and thinking about how they actually felt). Future work could involve preprocessing the submitted text for grammatical corrections as well as entering teenage-specific common sense, since older users have entered most data in the knowledge base. Additionally, the system could be modified to apologize for not providing correct suggestions, and further, to explain that it is only a computer, and has

a lot to learn about emotions. Teens could also help “teach” the system about their emotions.

Another limitation of the application in this context is the lack of a human to further support the exploration beyond the technological limitations. By bringing school counselors in the loop, however, it is possible to circumvent this limitation. At the same time, because the software is self-contained it would not be expected to add additional work onto a counselor’s workload. Practically, school counselors would probably want to make sure there was a space where a student or a group of students could come and work with the software. One may choose to work with the school technology coordinator to use a computer resource center or with administrators to get a computer with Internet access. Alternatively, if resources are limited, girls could work from anywhere including an Internet café, networked library computer, or other computer facility, and optionally give access to a group of “experts” or counselors who could even remain anonymous or reside in another town.

Finally, counselors would want to develop their own definition and measures of development for students interacting with the software. Although, not covered in this paper, an emotional development test was also used to determine whether students moved towards better emotional awareness or empathy for others. Because of the length (e.g. 45 minutes) and multiple-choice design (e.g. 120 questions), the girls often chose any answer to make it through the test. The girls told the researchers of this problem; consequently, this measure was not used in the results. If a better emotional development test is found, this or interviews and evaluations could be used to measure whether students had the desired results.

Conclusion

For this study, we hypothesized 1) that building a pictorial narrative while labeling the emotions of other actors, would help users better identify the feelings of others and 2) that building a pictorial narrative and exploring the emotional space supported by common sense reasoning technology would support greater emotional self-awareness than only building the pictorial narrative. Interview data suggests that girls directly reflected on the emotions of others in the pictorial narrative construction window. Additionally, the increased emotional expressivity of the SPN group seemed to indicate that the increased support given through the suggestion window and emotional weighting window supports development of emotional self-awareness.

Allowing students to reflect within the context of constructing personally meaningful stories has shown promise for helping teenage girls grow in aspects of their emotional development. As the use of technology becomes more ubiquitous outside and inside of schools, it is important to recognize its value outside of instructional purposes. The technology presented in this paper could offer school counselors a new web-based tool to use with their students that is easy, but yet, exciting to use.

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