

# DIGITAL STORY EXPLICATION AS IT RELATES TO EMOTIONAL NEEDS AND LEARNING

by

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## Abstract

Too often, efforts toward re-thinking learning environments focus solely on the cognitive aspects of education. By expanding our view to consider other aspects of adolescent development involved in education, we can begin to address the needs of the whole child. This research aims to 1) gain a better understanding of the effects of immediate emotions in middle school academic contexts and 2) create a system geared toward addressing the emotional needs of teenage girls. To support emotional self-awareness and empathy, a proactive emotional health system was developed. This is a part of a long-term research plan for understanding the role that digital technology can play in helping address emotions and support learning for teenage girls. The system, G.I.R.L.S (Girls Involved in Real Life Sharing) Talk, allows users to reflect actively upon the emotions related to their situations through the construction of pictorial narratives. Users of this new system were able to gain new knowledge and understanding about themselves and others through the exploration of authentic and personal experiences. The system employs a new technology called common sense reasoning that enables it to infer affective content from the users' stories and support emotional reflection.

This system has been evaluated with seventeen subjects; one group used the G.I.R.L.S. Talk system with emotional reflection support, while the control group used the system without the support. Over three weeks, the group supported with common sense reasoning about emotion increased the variety of emotion words used in their writing; the control group showed no such increase. In both cases, the system enabled the subjects to express themselves freely in a comfortable and meaningful way.

Overall, this thesis makes three main contributions: 1) new insights into the effects of immediate emotions in academic situations for adolescents, 2) a new system for supporting teenage girls' emotional self-awareness and empathy, and 3) new insight into the value of utilizing constructionist technologies in proactive emotional health systems.

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# Table of Contents

ABSTRACT.....	3
THESIS COMMITTEE .....	5
ACKNOWLEDGEMENTS .....	6
LIST OF FIGURES .....	9
LIST OF TABLES .....	11
<b>CHAPTER 1 INTRODUCTION.....</b>	<b>12</b>
1.1 PURPOSE OF THE RESEARCH.....	13
1.2 THEORETICAL DEVELOPMENT OF CONSTRUCTS.....	14
1.2.1 <i>Emotions and Cognition</i> .....	14
1.2.2 <i>Emotional self-awareness</i> .....	15
1.2.3 <i>Empathy</i> .....	16
1.3 RESEARCH QUESTIONS .....	18
1.4 DEFINITION OF TERMS .....	19
1.5 ORGANIZATION OF THESIS.....	20
<b>CHAPTER 2 REVIEW OF LITERATURE .....</b>	<b>21</b>
2.1 INTRODUCTION .....	21
2.2 HISTORICAL UNDERPINNINGS OF SOCIAL AND EMOTIONAL LEARNING .....	22
2.3 CURRENT LITERATURE .....	25
2.3.1 <i>Emotional Learning</i> .....	26
2.3.2 <i>Current Technological Development</i> .....	27
<b>CHAPTER 3 DESIGN AND IMPLEMENTATION.....</b>	<b>30</b>
3.1 ORGANIZING THOUGHTS AROUND PERSONAL NARRATIVES.....	30
3.2 A STORY TO THINK WITH.....	32
3.3 CONCEPTNET: SETTING THE STAGE FOR PERSONAL REFLECTION .....	34
3.4 CONTINUING PERSONAL REFLECTION.....	37
<b>CHAPTER 4 PLANNED METHODOLOGY .....</b>	<b>39</b>
4.1 STUDY 1 OVERVIEW .....	39
4.1.1 <i>Hypotheses</i> .....	39
4.1.2 <i>Participants</i> .....	40
4.1.3 <i>Planned Procedure</i> .....	40
4.1.4 <i>Measures</i> .....	41
4.1.5 <i>Challenges to Planned Procedure Implementation</i> .....	42
4.2 STUDY 2 OVERVIEW .....	43
4.2.1 <i>Hypotheses</i> .....	43
4.2.2 <i>Participants</i> .....	43
4.2.3 <i>Procedure</i> .....	44
4.2.4 <i>Measures</i> .....	46
4.2.5 <i>Adapting the Procedure</i> .....	48
4.2.6 <i>Challenges to Planned Procedure Implementation</i> .....	50

4.3	PROTECTION OF PARTICIPANTS .....	53
<b>CHAPTER 5</b>	<b>RESULTS.....</b>	<b>54</b>
5.1	STUDY 1 RESULTS .....	54
5.2	STUDY 2 RESULTS .....	58
5.2.1	<i>Hypothesis 1</i> .....	58
5.2.2	<i>Hypothesis 2</i> .....	59
<b>CHAPTER 6</b>	<b>DISCUSSION AND CONCLUSION.....</b>	<b>65</b>
6.1	STUDY 1 DISCUSSION .....	65
6.2	STUDY 2 DISCUSSION .....	66
6.2.1	<i>Empathetic Suggestions</i> .....	66
6.2.2	<i>Developing Empathy</i> .....	67
6.2.3	<i>Greater Emotional Self-awareness</i> .....	67
6.2.4	<i>Interview Themes Surfacing</i> .....	69
6.2.5	<i>Learning Stories</i> .....	69
6.3	THESIS SUMMARY .....	73
6.4	FUTURE WORK .....	75
6.5	REFLECTING AND REEVALUATING.....	76
<b>REFERENCES.....</b>		<b>78</b>
<b>APPENDIX A</b>	<b>ABBREVIATED LIST OF RESEARCHED TEEN SITES.....</b>	<b>82</b>
<b>APPENDIX B</b>	<b>RECRUITMENT FLYER.....</b>	<b>83</b>
<b>APPENDIX C</b>	<b>COUHES CONSENT FORM STUDY I.....</b>	<b>84</b>
<b>APPENDIX D</b>	<b>COUHES ASSENT STUDY II.....</b>	<b>87</b>
<b>APPENDIX F</b>	<b>SCHOOL PROPOSAL .....</b>	<b>94</b>
<b>APPENDIX H</b>	<b>COUHES ASSENT FORM STUDY II.....</b>	<b>100</b>
<b>APPENDIX I</b>	<b>FREQUENTLY ASKED QUESTION SHEETS .....</b>	<b>101</b>
<b>APPENDIX J</b>	<b>SAMPLE GROUP SCHEDULE.....</b>	<b>103</b>
<b>APPENDIX K</b>	<b>MID-WORKSHOP QUESTIONNAIRE .....</b>	<b>104</b>
<b>APPENDIX L</b>	<b>PARENT LETTER .....</b>	<b>105</b>
<b>APPENDIX M</b>	<b>TEACHER CORRESPONDENCE.....</b>	<b>106</b>
<b>APPENDIX O</b>	<b>EXIT INTERVIEW EPN GROUP .....</b>	<b>109</b>
<b>APPENDIX P</b>	<b>EXIT INTERVIEW PN GROUP.....</b>	<b>111</b>
<b>APPENDIX R</b>	<b>CODED EMOTION WORDS .....</b>	<b>113</b>

## List of Figures

FIGURE 2-1: TIMELINE OF HISTORICAL EVENTS INFLUENCING THE DEVELOPMENT OF SOCIAL AND EMOTIONAL LEARNING THEORIES; BLUE REPRESENTS SOCIETAL CHANGES, RED REPRESENTS EDUCATIONAL FORCES, GREEN REPRESENTS MENTAL HEALTH INFLUENCES.	25
FIGURE 3-1: MEMORY CLOSET. A SAFE SPACE WHERE GIRLS CAN EXPRESS THEMSELVES.	31
FIGURE 3-2: CHARACTER SELECTION WINDOW. HERE GIRLS CAN CAST THE CHARACTERS FOR THEIR STORY.	32
FIGURE 3-3: BACKGROUNDS THAT CAN BE SELECTED FROM SCENE DESIGN WINDOW.	33
FIGURE 3-4: MAIN NARRATIVE CONSTRUCTION INTERFACE.	33
FIGURE 3-5: EMOTION BANK WINDOW. HERE GIRLS CAN THINK ABOUT THE GENERAL SPACE OF THEIR EMOTIONAL REACTIONS.	37
FIGURE 5-1: MEANS OF SELF-REPORTED SADNESS AND ANGER ON THE EMOTION MANIPULATION CHECK USED AFTER WATCHING FILM CLIPS.	55
FIGURE 5-2: MEAN SELF-REPORTED SADNESS AND ANGER. EXCLUDES THE TERM “BLUE” FOR SADNESS CONDITION.	55
FIGURE 5-3: RESULTS OF FIRST PROBLEM SOLVED BY PARTICIPANTS IN FIRST STUDY. ERROR BARS INDICATED HOW GRAPH WOULD LOOK WITH EACH OF THE THREE CODING SCHEMES.	57
FIGURE 5-4: RESULTS OF SECOND PROBLEM SOLVED BY PARTICIPANTS.	57
FIGURE 5-5: RESULTS OF THIRD PROBLEM SOLVED BY PARTICIPANTS.	57
FIGURE 5-6: PRE-TEST AND POST-TEST RESULTS FOR PERCEIVING EMOTIONS BRANCH OF MSCEIT:YV™.	58
FIGURE 5-7 MEAN PRE-TEST AND POST-TEST SCORES FOR THE PERCEIVING EMOTIONS BRANCH OF THE MSCEIT:YV™.	59
FIGURE 5-8: PARTICIPANT PRE- AND POST-TEST SCORES ON FULL MSCEIT:YV™	60
FIGURE 5-9: MEAN SCORES FOR MSCEIT:YV™ PRE-TEST AND POST-TEST SCORES.	60

FIGURE 5-10: DIFFERENCE BETWEEN PRE- AND POST-TEST SCORE.	60
FIGURE 5-11: MEAN RESPONSES TO LIKERT SCALE QUESTIONS ON EXIT INTERVIEW.	61
FIGURE 5-12: MEAN PERCENT OF REPEATED EMOTION WORDS USED IN THE STORY. CALCULATED BY COUNTING EACH OCCURRENCE OF EMOTION WORDS AND DIVIDING BY TOTAL AMOUNT OF WORDS IN STORY. ERROR BARS INDICATE THE STANDARD DEVIATION OF THE COUNT.	64
FIGURE 5-13: MEAN PERCENT OF NON-REPEATED EMOTION WORDS USED IN THE STORY. CALCULATED BY COUNTING EACH OCCURRENCE OF EMOTION WORDS ONCE AND DIVIDING BY TOTAL AMOUNT OF WORDS IN STORY. ERROR BARS INDICATE THE STANDARD DEVIATION OF THE COUNT.	64
FIGURE 6-1: FIRST STORY CREATED BY RUTH (EPN GROUP). HERE SHE USES A MORE LIST-LIKE NARRATIVE.	70
FIGURE 6-2: FOURTH STORY WRITTEN BY RUTH (EPN GROUP). IN THIS STORY SHE HAS SHIFTED FROM A LIST-LIKE NARRATIVE TO A MORE EMOTIONALLY EXPRESSIVE FORM OF WRITING.	71
FIGURE 6-3 FIRST STORY WRITTEN BY SHEILA (PN GROUP). THIS STORY LEAD OTHERS TO CREATE BODIES FOR THEIR STORIES, AND FIND OTHER WAYS TO RE-APPROPRIATE THE SOFTWARE.	73

## List of Tables

TABLE 3-1: SENSITIVITIES AND WORD ADDITIONS MADE TO CONCEPTNET TO MAKE IT MORE AMENABLE TO TEENAGE STORIES. WORDS IN GRAY WERE ADDED FOR THIS THESIS.	35
TABLE 4-1: DAILY AGENDA USED DURING STUDY	45
TABLE 4-2: MID-WORKSHOP QUESTIONNAIRE RESPONSES. THE NON-SHADED AREAS ARE FROM THE EPN GROUP, WHILE THE GREY SHADED ANSWERS ARE FROM THE PN GROUP (GRAMMAR AND SPELLING ERRORS AS IN ORIGINAL)	48
TABLE 5-1: CODING SCHEME USED FOR FIRST PROBLEM ENCOUNTERED BY PARTICIPANTS	56

## Chapter 1 Introduction

*“Full many a flower is born to blush unseen, / And waste its sweetness on the desert air”*  
-Thomas Gray, “Elegy in a Country Churchyard”

*Keralyn is a vibrant nine-year-old girl who is deeply involved in her school choir and junior cheerleading team. She lives with her mother and three siblings because her father left town once he found out her mother was pregnant. He comes around every once and a while, but is usually so turned out on drugs that Keralyn’s mother won’t let him near their daughter. Her mother tries hard, but trying to manage four children and a boyfriend is not easy. Keralyn is not fond of her mother’s boyfriend, Jim, because he talks down to her and her younger siblings. She stands up to him as much as she can, but he frightens her. One day, while her mother is away, Jim starts screaming at Keralyn’s little brother and threatens to punish him with a belt. As usual, she comes to her sibling’s rescue, but this time Jim is so angry that he attacks her with the belt and beats her so badly she has bruises up and down her legs. Keralyn wears pants to school the next day to hide her bruises, but isn’t able to hide them at cheerleading practice. No one notices at school that she’s upset and no one has the time because of an already packed schedule. Only the other children ask at practice, but she tells them she fell. Keralyn has to take a test in school later that week, but she isn’t able to focus on what she is doing.*

This is not an uncommon story. It is presented to paint a vivid and real-life picture of what many children have to deal with on a daily basis. Even when circumstances are not this extreme, day after day, children are asked to perform to the best of their abilities in the midst of great difficulties in their lives outside of school, while their basic emotional needs are sometimes overlooked or ignored. Very often, efforts toward re-thinking learning environments focus solely on the cognitive aspects of education (Comer 2004). By expanding our view to consider other aspects of development involved in education, we can begin to address the needs of the whole child.

### **1.1 Purpose of the research**

This research aims to 1) gain a better understanding of the effects of immediate emotions in middle school academic contexts and 2) develop a system geared toward addressing the emotional needs of teenage girls. A proactive emotional health system has been developed to support emotional self-awareness and empathy. This is a part of a long-term research plan for understanding the role that digital technology can play in helping address emotions and support learning for teenage girls.

Why focus on girls, especially when girls already show some abilities that are better than boys when it comes to certain skills such as recognizing emotions? The focus on girls stems from both a personal interest as well as evidence that girls often lag behind boys in math and science, especially during adolescence. Therefore addressing the emotional needs of girls becomes important in light of the long-term vision of supporting learning.

The system I developed for this purpose, G.I.R.L.S. (Girls Involved in Real Life Sharing) Talk, was geared toward allowing users to reflect actively upon the emotions related to their situations through the construction of pictorial narratives. The idea was to help users gain new

knowledge and understanding about themselves and others through the exploration of authentic and personal experiences.

The system employed new common sense reasoning technology, which enabled it to infer affective content from the users' stories to try and support emotional reflection. It was expected that such reflection would facilitate development of new perspectives on dealing with life's events.

## **1.2 *Theoretical Development of Constructs***

### **1.2.1 Emotions and Cognition**

Very little is known about how affect influences cognitive processing in specific academic tasks; however, there are social psychological theories linking affect and cognition. How affect influences the storage and retrieval of information from long-term memory, and how affect influences the processing of information and the way one approaches a situation are two major lines of research (Linnenbrink & Pintrich 2004) Bower (1981) proposed an associative network theory suggesting that mood is associated with information stored in long-term memory. For instance, if a person is in a negative mood, she is more likely to retrieve negatively valenced information. Additionally, he proposed that a match between mood during encoding and retrieval facilitates recall.

Two models – the resource allocation model as well as affect-as-information model – have been proposed to relate moods to differences in how information is attended to and processed. The resource allocation model suggests that being in a positive or negative mood makes it more difficult to attend to a current task because of task-irrelevant processing that clutters working memory. Schwarz's affect-as-information theory, states that a negative mood state signals that there is a problem that needs to be addressed, which in turn leads to a focus on

details, whereas a positive mood indicates everything is fine and results in heuristic processing of information. By eliciting sad and happy emotions through the recall of a life event, Schwarz showed that sadness may support analytical problem solving (Linnenbrink & Pintrich 2004).

The previous models have focused more on the role of negative affect. Isen and colleagues have demonstrated that positive affect can influence the way cognitive material is organized and have shown that this influences creativity (Isen et al. 1987). Using a variety of different techniques such as gifts, comical movies, or refreshments, positive affect state was elicited in the study participants. The emotional state had direct affect on performance on tests such as Duncker's candle task, the Remote Associates Test, and medical decision-making with hypothetical patients (Isen et al. 1987; Isen et al. 1991; Isen 2001). Subjects also better integrated the material presented to them and exhibited an ability to better organize their protocols as compared to a control group.

Unfortunately, the previous theories, and other theories in the social psychology literature, have not used tasks that are used in traditional academic contexts. Additionally, the relationship between affect and cognition in school situations is usually limited to anxiety (Linnenbrink & Pintrich 2004). Linnenbrink and Pintrich have begun to explore the relationship between emotions and learning mathematics. Their preliminary results have shown that positive affect enhances engagement in terms of effort and higher order use strategy in mathematics problem solving.

### **1.2.2 Emotional self-awareness**

Emotional self-awareness is the ability to recognize one's own internal states. It is also referred to as meta-mood, the affective analogue of metacognition (Mayer & Stevens 1994), mindfulness (Langer 1989; Kabat-Zinn 1994), or meta-affect (DeBellis & Goldin 1997). The

awareness of emotions enables one to know strengths and limits as well as appropriate times for asking for help. Psychologist John Mayer of the University of New Hampshire finds that people attend to their emotions in three distinct ways: they are accepting, engulfed, or self-aware. He claims that an accepting person tends to be aware of her feelings but does not try to impact them. She is passive in the sense that recognition does not necessarily call for action. On the other hand, a person who tends to be overwhelmed by her emotions is referred to as engulfed. She usually avoids her emotions, and is paralyzed by them if she attempts to act. Mayer asserts that a person who is self-aware is said to be in the ideal state. She is at a healthy balance between overwhelmed and unaffected by her emotions. She is able to actively reflect and act according to her perceptions.

Not many measures of emotional self-awareness have been developed. Those that have rely either on observation, self-report, or tests of ability. The Emotional Competence Inventory (ECI) is a rating scale based on observations and self-report measures. Self-awareness is viewed as accurate self-assessment and self-confidence (Mayer et al. n.d.). Alternatively, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT™) relies more on measures of ability rather than self-reporting. The subject must be able to define complex emotional blends and understand emotional transitions.

### **1.2.3 Empathy**

The word “empathy” was invented by Titchener as a translation of the German word “Einführung,” meaning to project yourself into what you observe (Titchener 1909). Empathy, therefore, is built upon self-awareness, in that the more one is open to her own emotions, the more skilled she will be in reading feelings of others (Goleman 1995).

Based on different definitions of the empathetic process, the study of empathy has followed different paths: the cognitive approach and the affective approach. In the affective approach, four different approaches, which are not mutually exclusive, exist. In the first, the observer's feelings are "appropriate" to the person's emotional state (Stotland 1969). In the second, the "appropriate" feeling is seen as one that matches the person's emotional state (Hoffman 1984; Eisenberg & Miller 1987; Hoffman 2000). In another view, the feeling in the observer is *any* emotional response to another's emotion (Stotland et al. 1971). The most recent viewpoint in this affective approach is that the observer's feeling must be of concern or compassion to another's distress (Batson 1991). In the cognitive approach, empathy involves *understanding* the other's feelings. Most recently, this inference of another's emotional state has been called "mind-reading," "understanding other minds," or "theory of mind" (Baron-Cohen 2001).

Measures of empathy may address either the affective or cognitive approaches. The Chapin Social Insight Test presents hypothetical scenarios to subjects and prompts them to choose one of four responses. Another, created by Stotland (1969), relies on self-report and physiological indicators; however, many inconsistencies were found in the data. The Questionnaire Measure of Emotional Empathy (QMEE) was specifically designed to assess an individual's tendency to react strongly to another's experience (Mehrabian & Epstein 1972). More recently, Mayor-Salovey-Caruso Emotional Intelligence Test was developed to measure emotional perception, emotional facilitation, emotional understanding and emotional management. This measure of empathy relies upon a more cognitive approach such identifying emotions in faces of others and pictorial designs.

### **1.3 Research questions**

In this study, I have sought to lay the foundation for answering a much larger research question of the role that digital technology can play in helping address emotions and support learning in the long-term for teenage girls. Although a full answer to that question is beyond the scope of the current work, two studies contributing towards this larger work are presented in this thesis.

The first study, which stems from research showing that emotions influence cognition, seeks to examine how emotions influence students directly in academic learning situations. Do negative emotional states harmfully influence performance on cognitive reasoning tasks? The hypothesis derived from this question was:

- An angry emotional state will weaken performance on a reasoning problem, while a sad emotional state will facilitate execution. A neutral emotional state will neither inhibit nor enhance performance.

Once the first study was completed, the next step was to build a system to explore the role that digital technology can play in emotional learning. The system the participants interacted with enabled them to develop stories in cartoon form and used common sense reasoning technology to analyze their text to provide empathetic emotion suggestions. These suggestions were used as a catalyst to help the girls think about the emotions related to the events they were writing about. Once the suggestions were given, the next window contained an emotional space where girls could think about how different emotions blended together and shaped their reactions. This system is discussed in further detail later in the thesis.

The second study, used to evaluate the system that was designed, consists of two main questions. Does the labeling of emotions within the context of stories enhance emotional self-

awareness? 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.

#### **1.4 Definition of Terms**

ConceptNet is a common sense knowledgebase consisting of spatial, physical, temporal, and social aspects of everyday life. It consists of a natural-language-processing toolkit supporting textual reasoning tasks over documents (Liu & Singh 2004). An adapted version is used in this thesis to sense affect in texts for the purpose of supporting emotional reflection.

Digital story explication is a part of the system that allows users to focus on the most important people, places, and things in their lives, and construct a pictorial narrative around them.

Emotional Self-Awareness is knowing one's internal states, preferences, resources and intuitions. It encompasses both the ability to recognize one's own inner signals, and the ability to notice to what degree decisions and values match.

Empathy is the ability to imagine oneself in the place of another and understand the other's feelings, desires, ideas, and actions. It is predicated on imagination, self-awareness, and other-awareness.

## **1.5 Organization of Thesis**

Chapter 1 discusses the purpose of this thesis and presents the research questions that guided the methodology used in the study designed to evaluate the G.I.R.L.S. Talk system. Chapter 2 presents some of the historical underpinnings of social and emotional learning as well as some recent technological developments related to this area. Chapter 3 describes the design and implementation of the system. The methodologies used in both studies are included in Chapter 4. The data collection procedures, instruments, and data analyses are also described. Chapter 5 presents the results of the data analysis. Chapter 6 contains a discussion of the analysis, a summary of the findings of the thesis, and future directions of this work. A list of references and the appendices follow the final chapter.

# Chapter 2 Review of Literature

## 2.1 Introduction

Mental health itself is a strong motivator to address emotional needs. Teens with good emotional health may be more in control of their thoughts, feelings and behaviors. They tend to feel more positive about themselves and have good relationships. While drugs, alcohol, promiscuity, and depression are sometimes symptoms of normal teen experimentation, they may also be an indication of teens with poor emotional health (Payton et al. 2000). An extreme case of unmet emotional needs is the development of Borderline Personality Disorder that stems from the consistent invalidation of emotional experience (Linehan 1993). Other reasons for addressing emotional health include the impact of emotional health on both physical health and academic achievement.

Dr. Candace Pert impresses upon her readers the extent to which emotions can affect one's physical life. She explains that when an emotion is being experienced, neuropeptides are released allowing the brain to know what is occurring. While there are centers in the brain that are overall processors of emotions, there are cells in the immune system (blood, bones, etc.) that contain receptors for emotional signals. Consequently, the entire body experiences emotions, and holds memories of emotions in the same cells. Therefore *long-term* negative emotions may

harmfully affect the immune system (Pert 1999). As discussed in the previous chapter, emotions can also influence how a person approaches a problem-solving activity. Isen has shown that positive affect has an influence on creative-problem solving, while Schwarz has shown that negative affect may support analytical problem solving (Isen 2001; Schwarz 2002). Emotional needs can affect social, intellectual, physical, and other aspects of one's life. The importance for studying ways to help meet these needs becomes immediately apparent. This chapter describes some of the historical background of social and emotional learning. Following, is a review of selected current literature representing the findings in social and emotional learning programs that are relevant to this thesis as well as technological developments applicable to this area.

## ***2.2 Historical Underpinnings of Social and Emotional Learning***

Emotional learning<sup>1</sup> is most often discussed in the broader context of social and emotional learning. Societal changes in the United States during the late 1800s helped to shape social and emotional learning theory and practice. Problems arising from the depression of 1873, a large influx of immigrants, industrialization, unemployment, and poverty gave rise to increasing family disorganization, delinquency, and prostitution. Generally reform was, in part, aimed at responding to these crises, and school became a focus as a possible platform for change. This reform began a child guidance movement, with a special focus on social and emotional skills believed necessary to succeed in life (Cohen 2003).

Beginning in the late 1950s, the civil rights movement underscored the belief that all children are entitled to education, believed to be the pathway to becoming an effective member of the community. The skills, knowledge, and beliefs required to be an effective citizen are directly reflected in the structure of social emotional learning programs. As with the civil rights

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<sup>1</sup> Throughout the rest of this document, the terms emotional skill needs (i.e. empathy, emotional self-awareness, connection) and emotional learning will be used interchangeably.

movement, the women's movement helped to influence the current practices in emotional learning in its emphasis on the importance of relationships and emotional and social experience as the foundation for human life (Cohen 2003).

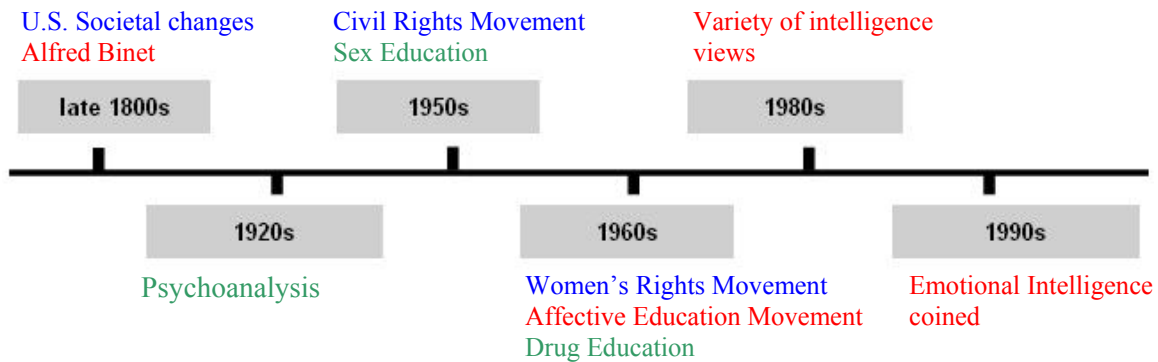
Developing in parallel with these societal forces were educational influences. In the late 1800s, Dr. Alfred Binet, of France, was hired to develop a test to determine if students were severely mentally retarded; the measure he developed focused on children's linguistic, mathematical, visual-spatial, and attentional abilities. Many years later Professor Lewis M. Terman and colleagues from Stanford University translated the test into English and called it the Stanford-Binet test of intelligence. This test contributed to schools emphasizing skills, knowledge and beliefs that enhanced performance on this measure of intelligence (Becker 2003). Many psychologists at the time supported the idea that there was one thing called intelligence, which meant some possessed more of it than others, while others did not possess it at all. This notion of intelligence was carried through much of the 1900s until other researchers started exploring other views of intelligence.

Robert Sternberg's theory of intelligence claims that a healthy balance amongst analytical, creative, and practical abilities contributes to a "successful intelligence." He also notes that conventional notions of intelligence and associated tests miss important kinds of intellectual talent (Sternberg 1985). Howard Gardner developed a conceptual framework for multiple intelligences in the early 1980s (Gardner 1983). Gardner suggested that there are seven modes of intelligence: linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist (added later). A person's intelligence, he said, may be a blend of these modes of intelligence, rather than just one. This notion again reinforced the notion that there is not one kind of intelligence that a test can measure. Gardner's ideas of intra-

and inter- personal intelligences are subsumed into the idea of “emotional intelligence” (discussed later). Twenty years prior to emotional skills being seen as intelligence, there was a large affective education movement

In the 1960s, the notion that emotional abilities can be cultivated in the classroom gained popular attention as part of the affective education movement, which underscored how children feel about what they are learning, about themselves, and their relationships with others. The movement promoted experiential approaches for building student self-knowledge and feeling recognition and focused specifically on self-esteem and self-image (Wood 1996). Unfortunately, affective education as a movement faded from the educational forefront in the late seventies and early eighties due to a lack of empirical research studying helpful and unhelpful efforts that constituted educational practices during this time as well as political controversy that surrounded the efforts. With the new consideration of emotional skills as intelligence in the early 1990s, this affective education movement was revived in the form of emotional learning.

Psychoanalysis has, in large part, shaped the mental health roots of social and emotional learning. In the 1920s Anna Freud, building off the work of her father, helped show that people’s conscious and unrecognized emotional life shapes behavior and that discovering what we feel and think is powerful. Anna Freud promoted children’s self-reflective capacities and the process of understanding. These and other traditions in psychoanalysis directly influenced sex education, which was one of the first health promotion programs starting in the 1950s. Drug education also surfaced as another prevention program in the 1960s. This ongoing production of different prevention programs created the need for more comprehensive programs. Preventative programs, combined with the educational and societal thrusts, began the social and emotional learning research and practice (Cohen 2003). Figure 2-1 illustrates these movements.



**Figure 2-1: Timeline of historical events influencing the development of social and emotional learning theories; blue represents societal changes, red represents educational forces, green represents mental health influences.**

Although there is no one definition that can encompass social and emotional learning, researchers in this area all agree that social and emotional learning are necessary to help students become effective members of society. Newest efforts in social and emotional learning have been in the incorporation of technology into the process. As the use of computers in education becomes more prevalent, it becomes increasingly important to discover how technology can be used in all aspects of education to further support, rather than replace, the efforts of teachers. The theory and practice of incorporating technology into social and emotional learning have directly inspired and influenced the current research.

### **2.3 Current Literature**

The current literature for this research is presented in two forms: literature related to the need for emotional learning and literature related to some of the current technology developed to enhance emotional learning.

### **2.3.1 Emotional Learning**

Educators and parents desire that for young people have the ability to achieve, to establish positive relationships, to adapt to the demands of growing up, to contribute to the community and to make responsible decisions. Here again we can see the societal, educational and mental health roots of social and emotional learning, as many schools have adopted programs that target “problem” areas such as risky sexual behavior, violence, school drop out, and drug use in response to these desires. Often these programs become too complex to coordinate and fail. 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 way to address the target areas (Payton et al. 2000)

In the development of social and emotional programs, two theoretical models become very important: theories specific to social and emotional learning, and those pertaining to behavior change and learning theories. This research will not address the latter; however, this will be an important part of future work. The theory of emotional intelligence has become extremely popular over the last ten years. Emotional Intelligence (EI), extended by Goleman, but first identified by Salovey and Mayer "is a type of social intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions." They claim that emotionally intelligent abilities may be categorized into five domains (Salovey & Mayer 1990):

- Self-awareness: observing and recognizing one's own feelings as they occur
- Managing emotions: realizing what is behind a feeling and handling it in an appropriate way

- Motivating oneself: channeling emotions in the service of a goal and delaying gratification
- Empathy: having sensitivity to others' feelings and concerns and taking their perspective; appreciating the differences in how people feel about things
- Handling relationships: managing emotions in others

Emotional Intelligence can be considered a skill-based part of a larger category of emotional needs. The other category of emotional needs is more experiential and, therefore, social in nature. These include the need for attention, to have one's emotional state understood and considered appropriate, to feel connected, to have companionship, and to feel secure (Klein et al. 1997).

### **2.3.2 Current Technological Development**

Next our attention is turned towards current technological developments to support emotional learning. There are many places on the web where girls can read or write their stories such as "GrrlsStories," started by Joanna B. Pinneo. Girls are allowed to submit their stories for a chance to be featured on the site. The site manager will actually be the one who creates the material for the website. Once a story is featured, other girls can place comments on how they feel about the story. This is a powerful site in that it allows girls to share their stories. However, some ownership may be lost because the site manager makes the decision of how the story will be presented. A very important difference between this website and the proposed system is the purposeful reflection upon the emotional content of the story for reflection. There is software that encourages some amount of reflection.

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.). The topics include pressure, achievement, fear, disclosure, relationships, disruptive behavior, expectations, and bullying, but all stories show children displaying courage and compassion when faced with these issues. These activities 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. The members of the project developed a curriculum to support social, communicative, and emotional development of children 4 to 8 years old. The project consists of a wearable technology called the KidsCam, to gather information from daily activities, along with a tangible interface called the Magic Mirror to manipulate the data collected through the wearable. The child or another nearby child can activate the KidsCam, worn by each child in the activity. The purpose is to gather different perspectives of an event. These videos are then transferred wirelessly to a management system. The Magic Mirror allows children to review their video collaboratively and annotate episodes with signs and symbols that make explicit the interpretations of what they see in their experiences. These annotations can be linked to related episodes or other material supporting the pedagogical purpose (Bouras et al. 2000). This environment allows children to construct narratives and annotate some emotions; however, it was not created for the explicit purpose of exploring emotions. Examples of environments designed for the development of children are identity construction environments (ICEs), developed by Bers.

ICEs are designed to support young people in developing personal and moral values (Bers & Cassell 1999). They are meant to engage them in a learning process that integrates personal development with civic education rather than separating the two as most educational programs do. In Storytelling Agent Generation Environment (SAGE) children talk about their lives with a sage who listens and then responds with a relevant tale. They may also add to the library of stories within the sage or design their own storyteller using a visual programming language. Within this environment, they determine the conversational flow and behaviors of the storyteller.

As shown through historical movements, learning programs, and technological developments, many have recognized the need for aiding in the development of one's emotional life. All of this previous work has influenced the design of the proposed system and its constructs for study. The next chapter describes the design of the system that was developed as a next step in developing technologies that have the purposeful reflection on emotions in mind.

## **Chapter 3 Design And Implementation**

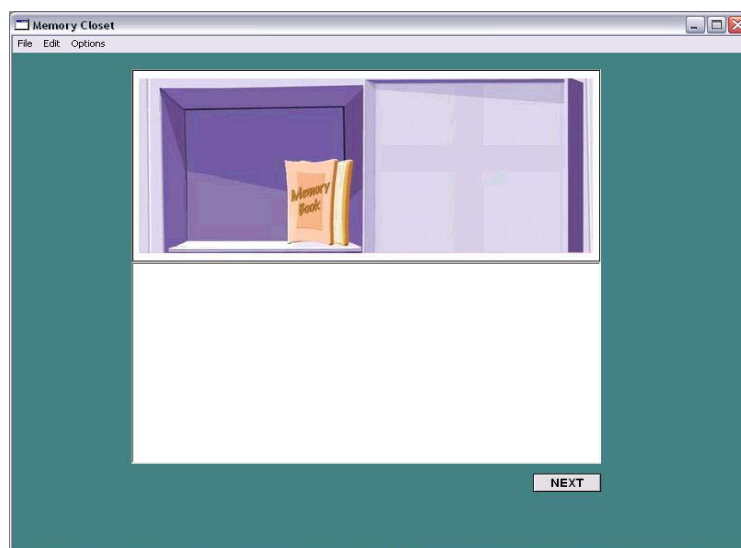
This chapter discusses the system features and some of the relevant theory that motivated them. Girls Involved in Real Life Sharing (G.I.R.L.S.) Talk is an environment geared toward meeting the emotional needs of teens by giving them an opportunity to write about and reflect on their own experiences with the aid of an automated system for suggesting emotions. Two versions of the system were created in order to support the experiment described in the next chapter: the first version system combined pictorial construction with empathetic emotion suggestions, while the second system used only pictorial construction. Sections 3.1 and 3.2 describe features contained in both versions of the system. The features included only in the first version of the system are described in sections 3.3 and 3.4.

### **3.1 Organizing Thoughts Around Personal Narratives**

The emotional importance of expressive writing has been shown by James Pennebaker and colleagues (1986) who suggested that written emotional disclosure has profound effects on both physical and psychological health. Pennebaker asserts that writing about significant life events provides an opportunity for reappraisal of thoughts related to an event. Therefore, a person may gain an increased understanding of her emotional reactions, which might result in reduced

distress (Pennebaker & Beall 1986; Pennebaker 1995). This is not to say that expressive writing works in all cases. As Figure 3-1 shows, the system offers girls the “Memory Closet,” a safe space where they can write about events in their lives. This writing may be a first step toward organizing thoughts related to an event. Additionally, 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. Hiemstra, in identifying the benefits of journaling, states ((2001),

Journaling in its various forms is a means for recording personal thoughts, daily experiences, and evolving insights. The process often evokes conversations with self, another person, or even an imagined other person. Add the advantage available in most journaling formats of being able to review or reread earlier reflections and a progressive clarification of insights is possible.



**Figure 3-1: Memory Closet. A safe space where girls can express themselves.**

Other researchers (Sheffield et al. 2002) have found evidence that in some contexts emotional writing activities may not be as beneficial as Pennebaker and others have found.

These findings do not directly influence this feature of the system since the focus is on the organization of thoughts rather than long-term physical health benefits.

### 3.2 A Story to Think With

The next features encountered in the system—the character selection window and narrative construction interface—may help girls to organize their thoughts further by focusing on the most important people, places, and things in their story and constructing a pictorial narrative around them. The pictorial narrative may serve as what constructionists call an “object to think with”(Papert 1980). By externalizing situations in their lives through expressive narratives and further by creating a pictorial narrative, girls might better internalize and organize meaning. Figure 3-2 depicts the window where girls can begin to concentrate on the important people in the story. This window places girls in the director’s seat and asks them to select the characters who will star in their story. The system is designed with preset characters in order to emphasize the process of constructing the story rather than developing images of characters.



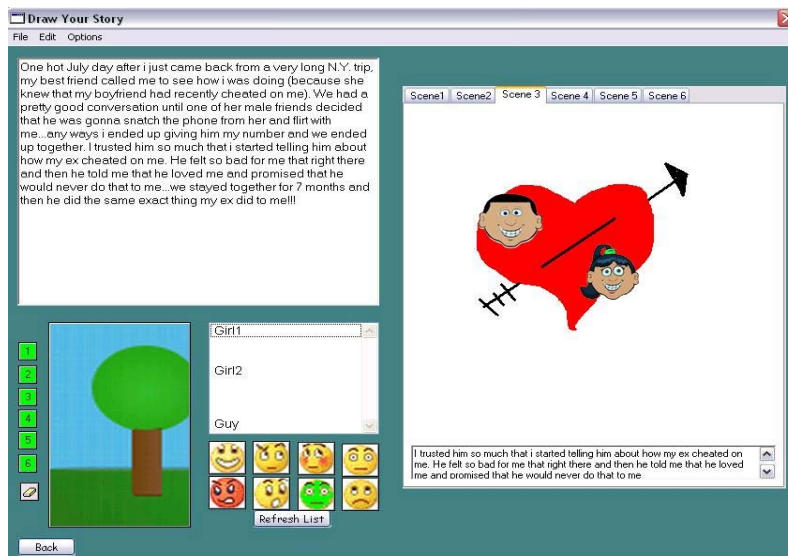
**Figure 3-2: Character Selection Window.** Here girls can cast the characters for their story.

Once students have chosen the stars of their stories, they are given the chance to construct the pictorial narrative. They can choose from a small selection of backgrounds shown in Figure

3-3, but they also have the option to use a small paint program to create their own scenes. As Figure 3-4 shows, the names of the characters chosen in the previous screen 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 use that reflection to select an expression.



**Figure 3-3: Backgrounds that can be selected from scene design window.**



**Figure 3-4: Main narrative construction interface.**

### 3.3 ConceptNet: Setting the Stage for Personal Reflection

Adele Faber and Elaine Mazlish (1980), authors of *How to Talk So Kids Will Listen and Listen So Kids Will Talk*, point out that children often know how to work through problems but do not since they are so accustomed to adults doing it for them. The authors suggest an effective technique of active listening to avoid this tendency: to understand what the child is feeling, suggest a possibility for how the event may have made them feel, and let them talk about the situation (Faber & Mazlish 1980). This technique can be repeated until the child is able to work through her feelings. The G.I.R.L.S. Talk system attempts to use this so-called active listening technique through an adapted version of ConceptNet developed at the MIT Media Laboratory (Liu & Singh 2004).

ConceptNet is a semantic network of common sense knowledge bases consisting of spatial, physical, temporal, and social aspects of everyday life. It contains 300,00 semi-structured English fragments called nodes that are connected by 1.6million edges, which are semantic relations. This ontology of twenty semantic relations includes causality (EffectOf), event hierarchy (SubeventOf), and affect (MotivationOf). Such a structure of the semantic network allows ConceptNet to be amenable to contextual reasoning such as the mood of a story, especially since there are around 34,000 assertions related to affect.

The original version of ConceptNet classifies a small subset of concepts, which are represented in semi-structured English by combining a verb (e.g., “read”) with a noun phrase (“newspaper”) or a prepositional phrase (“in the morning”), and placing the resultant phrase into one of six different affective categories. These six categories are based on the Ekman model of emotions, and include “happy,” “sad,” “anger,” “fear,” “disgust,” and “surprise.” This classification allows these concepts to be identified as especially pertinent to emotion. Thus the

affect of any unclassified concept can be assessed by finding all paths leading to each of these six affectively recognized categories (Liu et al. 2003).

After conducting a search of teen sites<sup>2</sup> where girls can tell their stories, I noticed they used words to express themselves other than this original six. In particular, “jealousy” and “embarrassment” were used more often in these stories<sup>3</sup>. Additionally, to better acknowledge the state of not knowing, “confused” was added to this list. In the future, a larger set of core emotion words could be used from other models. Also, many emotions can be considered a blend of basic emotions, which could lead to a more parsimonious representation. For example, contentment can be considered persistent low-level happiness. After these core emotions are identified, weights (or sensitivities or prior probabilities) can be applied to each emotion based on how likely it is to appear in a given genre. For use in this research, these emotion sensitivities were also adjusted for teenage stories as shown in Table 3-1.

**Table 3-1: Sensitivities and word additions made to ConceptNet to make it more amenable to teenage stories. Words in gray were added for this thesis.**

<b>Emotion Ground</b>	<b>Original Sensitivity</b>	<b>Adapted Sensitivity</b>
Happy	0.5	0.7
Sad	1.0	0.7
Angry	0.7	0.8
Fearful	0.4	0.6
Disgusted	0.9	0.5
Surprised	0.9	0.7
Confused	-	0.5
Embarrassed	-	0.5
Jealous	-	0.5

<sup>2</sup> For an abbreviated list of sites, See Appendix A

<sup>3</sup> One might note that Clark Elliott’s (1994) model of emotions includes “jealousy” and “shame,” the latter of which is similar to “embarrassment”

For each scene, a girl can set up everything except for the character representing her in the story. To manipulate this character, she must submit the caption to ConceptNet for analysis. Once she does this, the system will try to empathetically suggest emotions that relate to this event. 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-EPN Group

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, 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.”

Why would it be important for these emotions to not only be suggested but also be suggested in an empathetic way? In the doctor-patient relationship, the linkages between empathy and patient satisfaction, empathy and adherence to treatment, and empathy and malpractice suits are frequently cited (Frankel 1995). The more a patient feels empathized with, the more satisfied she will be with the doctor, the more likely she will comply with prescribed treatment, and the less likely she will be to consider litigious actions after an error has occurred. Similarly, the presence of someone who is perceived as caring in the classroom has been shown to be motivating in the long-term for education (Wentzel et al. 2004). Although caring, in an embodied sense, can be expressed through posture, facial expression, and tone of speech, it can

also be expressed through speech content (Bickmore & Picard 2004). Additionally, caring is most often expressed through empathy and comforting.

Although this system is not human, many people in a human-computer interaction relate as they would in a human-to-human interaction (Reeves & Nass 1996). Therefore, the system attempts to present the suggestions with an empathetic tone, much like a doctor or teacher would use.

### 3.4 Continuing personal reflection

To further support this first reflection on her emotions, the student is then taken to an emotional weighting screen shown in Figure 3-5. On this screen, the student can choose from the nine core emotions as well as have the option to choose her own emotion. The weighting can range from “not at all” to “a lot”, and is ideally based on how much the student felt like she experienced the emotion. This reflection is important because this weighting determines how the main character (representing the student) will appear in the main narrative construction screen once the user presses, “Done.”

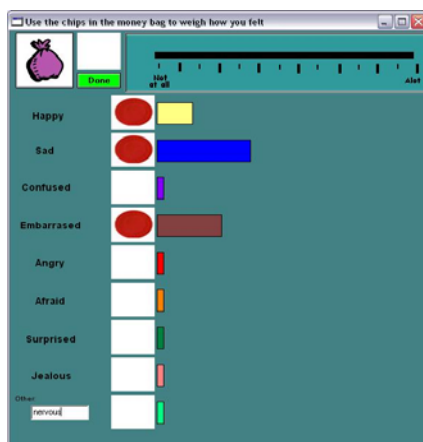


Figure 3-5: Emotion Bank Window. Here girls can think about the general space of their emotional reactions.

The pictorial constructing only version of the system does not contain the emotion suggestion or weighting parts described above. This chapter has described some of the basic elements of the theory that has informed the design of the G.I.R.L.S. Talk system. The next chapter will discuss the methodology used to evaluate the system.

## Chapter 4 Planned Methodology

This chapter will describe the methodologies that were planned for use in studies one and two as well as issues that surfaced during their implementation. As stated earlier, study one was designed to examine the effect of emotions on problem solving, while study two was designed to investigate how digital technology can help address the needs of empathy and emotional self-awareness.

### 4.1 Study 1 Overview

A 3x1 between-subjects design crossed an emotion manipulation (neutral, sadness, anger) with problem solving. All participants were given three problems considered 6<sup>th</sup> grade level based on the Massachusetts Curriculum Assessment System (MCAS) test.

#### 4.1.1 Hypotheses

Evidence discussed in the first chapter suggests that emotions often persist beyond the eliciting situation and affect subsequent behavior and cognition, and that a sad emotional state facilitates analytical problem solving. Therefore, we hypothesized that emotions evoked in the first portion of the study would influence reasoning abilities on math problems in the second. We hypothesized that anger would weaken performance on a reasoning problem, while sadness

would facilitate it. Additionally, we hypothesized that a neutral emotional state would not affect performance.

#### **4.1.2 Participants**

Participants for this study were 17 girls aged 11- 14 in the sixth, seventh, or eighth grade. The mean of the ages was 11.64 with a standard deviation of 1.26. Participants' ethnicity ranged from black, to black and Puerto Rican, black and white, white, and Puerto Rican. Twelve of the participants were from an inner-city school in New Haven, Connecticut, while the other five were from a school in a suburb of Boston, Massachusetts.

Participants were recruited through principals and counselors from middle schools (grade 6-8) in the New Haven area and through the Computer Clubhouse network in the Boston area. Appendix B shows the flyers sent to the Clubhouses. Each participant was randomly assigned to a group once her consent form (shown in Appendix C) was signed. The study took place in a computer room of a New Haven public school as well as a Computer Clubhouse in Boston.

#### **4.1.3 Planned Procedure**

This study consisted of one session lasting no longer than 30 minutes for each participant. When the session began, each participant was given a description of what she would be doing and asked to sign an assent form (see Appendix D). She was then told how to proceed in the study and given a packet that contained instructions, Lerner's emotion manipulation check, and critical thinking problems. Appendix E contains copies of the packet participants received. Once the participant was given instructions, the experimenter started one of the movie clips based on the experimental condition, each lasting about four minutes and left the room. Prior research has found that film clips and self-reflective writing provide an effective means of eliciting discrete target emotions (Lerner et al. 1998; Lerner & Keltner 2001; Lerner et al. 2004; Rottenberg et al.

in press) The anger clip (*My Bodyguard*) portrayed a young man getting pushed around by bullies and refusing to fight back; the sadness clip (*The Champ*) portrayed the death of a young boy's friend; and the neutral clip (a National Geographic special) portrayed fish at the Great Barrier Reef. To make the emotional experience more personally meaningful and intense, we asked participants in the anger and sadness conditions to describe how they would feel if they were in the situation depicted in the clip. For the neutral condition, participants were asked to describe their daily activities. Next, participants were asked to report their feelings during the video using an adapted version of Lerner's emotion manipulation check (Lerner et al. 2004). Twelve affective states were included on the form; however, only five were of interest. Terms related to sadness included "blue," "downhearted," and "sad," and words related to anger included "mad" and "angry." Responses on scales ranged from zero, meaning the participant did not experience the emotion at all, to eight, indicating the participant experienced the emotion more strongly than ever before.

Once a participant completed this emotion manipulation check, she was prompted to solve three analytical problem-solving tasks drawn from the Massachusetts Curriculum Assessment System test. The last page of the packet thanked the subject for participating, and also encouraged her to let the researcher know if she was experiencing any lingering emotions as a result of the study.

#### **4.1.4 Measures**

This study was designed as a between subjects study with three treatment variables. The first measure used was an emotion manipulation check to determine whether the desired emotion (sad, angry, neutral) was elicited. To analyze this measure, a mean was generated from the terms related to "sadness" and "anger." The mean was then found over all the subjects in each

condition. The second measure was the three problems selected from the Massachusetts Curriculum Assessment System test. These problems were analyzed, first by coding the problems according to a correctness scheme discussed in the next chapter, and second by using descriptive statistics of the means generated from the scheme.

#### **4.1.5 Challenges to Planned Procedure Implementation**

Study 1 was conducted in two locations – a Boston Computer Clubhouse and a New Haven public school. To avoid cross-contamination between the conditions in this study, at both locations participants were asked to wait outside the computer lab while other participants watched their video. At the Computer Clubhouse, once one group was finished viewing the clip, they moved to the other side of the computer room to complete their questionnaires. Unfortunately, the clubhouse was very near the pool tables and lounge area so the environment was very loud and distracting.

A distracting environment was also present at the New Haven school. On the first day this study was conducted, we were able to utilize an audiovisual room. Participants waited in the computer lab while other groups filtered into the room. Once a group finished watching the video, they went into the library, sat at separate tables, and completed their questionnaires. The second day presented challenges not encountered in the first. The closet we had originally used was already occupied so we moved the video watching into the hallway, and kept the procedure of moving into the library for filling out the questionnaire packet. Unfortunately, during one of the group's viewings, a class switched rooms and the video had to be restarted. This affected two of the participants from the sad condition and may have caused the emotion elicitation effect to be less intense.

## **4.2 Study 2 Overview**

### **4.2.1 Hypotheses**

The purpose of this portion of the study was to show that the analysis of stories supported by empathetic emotion suggestions could enhance affective development. We hypothesized 1) that building a pictorial narrative, including 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.

### **4.2.2 Participants**

Participants, twelve of which were *also involved in the first study*, were 17 girls ages 11-14 in the sixth, seventh, or eighth grade. 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 all attending a New Haven public school. During the course of the study, three girls were dropped; one because of a fighting-related suspension, another because of severe reading and writing difficulties that made it extremely hard for her to compose stories, and the third because of absences related to a school-required reading program. Participants were recruited through principals and counselors from middle schools (grade 6-8) in the New Haven area. Appendix F shows the proposal sent to the principal of the school for the study.

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 once her consent form (shown in Appendix G) 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.

The study took place in a computer room of a New Haven public school. It is noted that the researcher's presence and the knowledge that an experiment was taking place had some effect on the outcome; however, it is believed that an unfamiliar setting (e.g., a research laboratory) would have further compounded these effects.

### **4.2.3 Procedure**

The participants were divided randomly into two groups. The first group –hereafter referred to as the Empathy with Pictorial Narrative (EPN) group – was asked to create a pictorial narrative (digital story explication) and given empathetic emotional suggestions to support their reflection. The second group – the Pictorial Narrative (PN) Group – only took part in the digital story explication. This study consisted of seven meetings over the course of three weeks, each lasting one hour. In each meeting, girls were scheduled to come with their groups (EPN and PN). Because of challenges discussed in the next section, groups did not always attend sessions together and some had to attend individually. All who are included in the results section attended the same number of times. During the first and last visits, participants took the Mayer-Salovey-Caruso Emotional Intelligence Test – Youth Version (MSCEIT:YV™).

During each of the next five visits, participants interacted with the G.I.R.L.S Talk software. Each day they were asked if there was anything that they had problems with or something they would like to see done differently with respect to the software. On the last day of these visits, students filled out exit interview sheets and were then pulled aside one-by-one to answer follow-up questions. During the final visit, students retook the MSCEIT:YV™. They

were all given an explanation as to why they had to retake the test, and given a chance to ask further questions.

Table 4-1 displays the daily agenda used for the study.

**Table 4-1: Daily Agenda used during study**

Day 1	Agenda Item
10 minutes	Talk about project and its purpose Sign assent forms (see Appendix H)
40 minutes	Work on MSCEIT:YV™
10 minutes	Pick out diary Fill out daily school schedule Receive study schedule (see Appendix J)
Day 2	Agenda Item
5 minutes	Talk about purpose of everything
10 minutes	Show example project – boyfriend issues Quickly discuss opinions  Discuss type of story/stories would like to write this session Possible topic: Think of an object that is important. Write a story about why, who gave it to you, and what it means to you. It could be any object.
40 minutes	Overview of how to work with software while writing own story 10 –minutes begin writing story 5 – minutes 25- creating scenes, choosing characters and (if in the EPN group) going through reflection process
5 minutes	Wrap up
Day 3	Agenda Item
5 minutes	Ask if there are any questions from the last meeting Take pictures
50 minutes	Continue working on story from session one
5 minutes	Wrap up
Day 4	Agenda Item
5 minutes	Ask if there are any questions from the last meeting. Fill out short questionnaire to see if there are any questions EPN Group - Remind of necessity of filling out emotional weighting screen to see the

	character representing their emotions
5 minutes	Show example project – family struggles Quickly Discuss opinions  Discuss type of story/stories would like to write this session Possible topics: Talk about a time that you got in an argument with someone in your family or when persons in your family got in an argument
45	Pass out FAQ sheets (see Appendix I) Work on individual stories
5	Wrap up
<b>Day 5</b>	<b>Agenda Item</b>
5 minutes	Ask if there are any questions from the last meeting
50 minutes	Pass out FAQ sheets Continue working on second story
5 minutes	Wrap up
<b>Day 6</b>	<b>Agenda Item</b>
10 minutes	Fill out exit interview sheets
50 minutes	Pass out FAQ sheets Option of working on first or second story or beginning a new story Pull out individuals to do follow-up interview questions (5 – 10 minutes/person)
<b>Day 7</b>	<b>Agenda Item</b>
50 minutes	Retake MSCEIT:YV™
10 minutes	Explain why had to take test again Ask if there are any questions about anything

#### 4.2.4 Measures

The above procedure was implemented for both hypotheses; however, there were different measures associated with each. The next two sections will discuss the measures used for each hypothesis.

##### 4.2.4.1 Hypothesis 1: Identifying the feelings of others

For this hypothesis, the groups (EPN and PN) could be considered as one since both had to label the emotions of the other actors when building the pictorial narratives. Therefore a pre-post within group design was used. To determine if participants were better able to identify the

feelings of others, the MSCEIT:YV™ was administered before and after the interaction with the G.I.R.L.S. Talk software. This test combines four measures, considered both experiential and strategic in nature, to determine a respondent's emotional intelligence. The first branch of the emotional intelligence score is the *perceiving emotions score*. This score indicates the degree to which the respondent can identify emotion in himself or herself and others. The *facilitating thought score*, the second branch of the test, indicates the degree to which the respondent can use his or her emotions to improve thinking. The *understanding emotions score*, used as the third branch, denotes how well the respondent understands the complexities of emotional meanings, emotional transitions, and emotional situations, while the *managing emotions score* registers how well the respondent is able to manage emotions in her own life and in the lives of others (Systems 2005). The *perceiving emotions score* was the only score used in the analysis for this hypothesis.

#### **4.2.4.2 Hypothesis 2: Supporting greater emotional self-awareness**

For this hypothesis, a pre-post test comparison group (EPN and PN) experimental design was used. Three measures were used to test this hypothesis. Again, the MSCEIT:YV™ was utilized. In this analysis, all four scores (rather than just the first branch as with the first hypothesis) were taken into consideration. A descriptive analysis comparing the means of each administration of the test was performed.

Semi-structured interviews consisting of binary, Likert-scale, and open-ended questions, served as a second measure for this hypothesis. These questions were 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 EPN group, additional questions related to the student's opinion of the empathetic emotion suggestions were included. Each participant was also able to ask the

researcher any questions they had. 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 final 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.

#### 4.2.5 Adapting the Procedure

During the second session, I noticed that even though people could draw their own scenes using the paint program, the majority opted not to do so. When I asked two students why they were not doing this, both said that they wanted a bigger variety of scene, but they could not draw. During the next session I started showing students how to import images from the Internet and make them their own inside the paint program, which they enjoyed. It was at this point that I wanted to gauge whether there were other things that they felt were keeping them from creating a story they could be proud of, so I passed out a fill-in-the-blank sheet on the fourth day (see Appendix K). The responses I prompted them to give on this sheet included: One thing that I liked about last time..., One thing that I disliked about last time..., and One thing that I would change about the program we’ve been working on... Table 4-2 displays the answers given.

**Table 4-2: Mid-workshop questionnaire responses. The non-shaded areas are from the EPN group, while the grey shaded answers are from the PN Group (grammar and spelling errors as in original)**

One thing I liked about last time...	One thing I disliked about last time...	One thing I would change about the program we’ve been working on...
I COULD EXPRESS MYSELF	Nothing	More scenes and Characters
Creating story	Nothing	Nothing

Everything	Nothing	Nothing
We animated our stories	I erased my hole picture	Nothing
I like being on computer	Nothing	Nothing
It's going to the computers	Nothing	Nothing
We got to make our stories like we wanted to.	Nothing	Nothing
Is that we were able to make our own background	Nothing	I wouldn't change anything
Everything	Nothing	Everything
I liked that we got to write stories and put characters with it	Nothing	That they have more people and scenes and that it could have other things like animals and other things to.
That we got to make stories	Is we can't listen to music	Nothing but we could listen to music?
We got to be creative	I couldn't get as creative as I wanted to.	Help people be more creative
That I can make my own body	Nothing	Nothing

Based on the responses gathered from the mid-workshop questionnaire, I talked to the girls about changes that we could make to the workshop. The first issue they all wanted to address was the lack of music; school rules would not allow any profanity to be used in the computer lab. The final decision that was made after discussion was that someone could bring in a compact disc of choice, and if everyone agreed on the artist (acceptable by school guidelines), then we could play it on my computer.

To address the desire for more scenes to work with, I challenged them to make more of their own. They were not sure where to find good images, so I pointed them to Google™ images. This direction satisfied the majority of the participants.

I also spoke more to the one respondent, Rebakah (PN group), an eighth grade student, felt like she could not be as creative as she wanted. At first, she could not really describe what she felt was limiting her experience with the software. Later I found out that the themes (“something someone gave me that is important to me” and “one time I had a conflict with someone”) were

not something she felt like she had much to share about. We later discussed again that she did not have to write in these themes, and she decided to write about why she would be a great actress.

#### **4.2.6 Challenges to Planned Procedure Implementation**

In preparation for the workshop, three weeks prior, I traveled to New Haven to meet with the principal, counselors, and staff of the middle school where I would be working. During the first visit, I further discussed the proposal that was sent to the principal before I arrived. I also demonstrated the software and asked if she felt there needed to be any changes before I worked with the girls. We also discussed how many girls I would need to work with (36), and the times we would need to use the facilities. Everyone was extremely welcoming and helpful, and I was excited about the possibilities. The second visit was more clerical than the first. We discussed a schedule that I designed and I gave the parental consent forms, with a letter from the principal attached (see Appendix L), to the counselor. The counselor was to work with the two other counselors to identify 40 students, have a short meeting with them, and then give them the forms for their parents to sign. Unfortunately, this did not occur as planned.

One busy counselor simply forgot to pass out the forms, while the other gave the forms to the teachers, who later forgot which student they had given them to. Additionally, the teachers were not all informed that I would be borrowing their students over the next few weeks. The culmination of this set of events was my arriving February 28<sup>th</sup>, only to find no students able to participate. Therefore, I spent the first week working with the counselors and students to recruit participants. The first thing I did was to pass out more consent forms, with a new due date of March 4<sup>th</sup>. I also changed the original schedule, consisting of four weeks of interaction, into three weeks with an additional day for wrapping up the workshop. A letter introducing my work

and myself along with a schedule of dates and times when specific students would be missing class was passed out to all of the teachers during this week (see Appendix M). By Friday March 4<sup>th</sup>, I had only eight signed consent, so we decided to let girls turn them in up to the next Wednesday, since this would be the only way they could participate in all of the sessions necessary. Once all the forms were turned in we had 17 respondents. My seventeen out of forty (42.5%) respondents turned out to be very good as compared to the five out of sixty (8.3%) responses obtained by the counselors for a field trip form they had passed out.

Other events that could not be predicted prior to starting required further adjustments to the protocol. Three field trips, a visit from a famous author, a short suspension for disrupting class, a monthly book bowl competition, illnesses, and general absences, made it almost impossible to have students there during their scheduled times. Appendix N shows the attendance sheet that was used, along with the period each student attended or why she missed a session. As shown in the attendance sheet, I also had to make changes to the schedule based on the Social Studies teachers who wanted their students to do Internet research in the computer lab we were using.

Getting the students to take the MSCEIT:YV™ also proved a major problem. The MSCEIT:YV™ consists of five sections lettered A to E. Although Section E is only one wrap-up question, the participants did not find this out until the end. By the time they reached Section C, I heard complaints ranging from, “How much longer is this going to take?” to “Do I have to go all the way to Section E?” I asked the students to do they best they could to finish, which they did. I later found out that students began to choose any answer so that the test would end. One student said, “I just started clicking on anything rather than read it so I could finish.” When two of the students were taking the post-test, the Internet lost connection. They were almost finished

when this occurred so they were unwilling to take the test again. Therefore, I only have results for ten girls.

Keeping students in the study was also tough. As mentioned above, three students were dropped during the course of the study. Although everyone was assigned to a group randomly, all three of these students were a part of the Pictorial Narrative (PN) Group. To avoid hurting anyone's feelings, I never told them that they were no long part of the study, and allowed them to come whenever they remembered they were supposed to have a session. The first participant I had to drop was Delilah<sup>4</sup>. From the beginning, Delilah was behind the other participants because of a sickness-related absence. Once I finally was able to work with her along with her group, she was around for two sessions before she was suspended for fighting. This fight, instigated by another member of the PN group who was not subsequently suspended, occurred in the lunchroom, and was actually written about by a couple of the participants.

Robyn, a 7<sup>th</sup> grader, also had to be dropped from the study. I noticed during the first couple of interactions with the software that, although others were moving along smoothly, Robyn struggled to formulate a story. Because methodologically I was not supposed to help in the construction of stories, I could not give her specific attention. After speaking with one of her teachers, I found out that she was involved in a special reading and writing class. This class was especially for students who had extreme language difficulties. Robyn would often get frustrated and not want to work with the software, so I made the decision to drop her from the study. Again, she was free to come to the sessions if she liked, but I tried to give her the liberty to do as she chose. The last student that had to be removed from the study was Sarah a sixth grade student. All sixth grade students were required to be a part of a Read 180 program, and while during the first few sessions my workshop did not interfere, during the last two she was not able

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<sup>4</sup> All names have been changed throughout this thesis

to attend. I was able to arrange for her to make up one of these two sessions, but we could never find a good time for her to finish.

### **4.3 *Protection of Participants***

Approval from the Committee on the Use of Human as Experimental Subjects (COUHES) was obtained before proceeding with both studies. Included in the procedure were both parental consent and participant assent. If parents chose to be present, they had the option of coming to the computer facility. In the assent form, students were informed that others might be able to read what they wrote. They had the chance to strip the story of identifying names and other things if they wanted. They also had the option of not sharing their stories at all or even not participating. Participants were given the option of speaking with the researcher further, if telling stories evoked bothersome or lingering emotions. If the situation was beyond the scope of the researcher's capabilities, the participants were referred to the school counselor. If a student revealed incidents of abuse or other things of special concern, as in one case, they were reported it to the counselor and left to her discretion for a follow-up.

# Chapter 5 Results

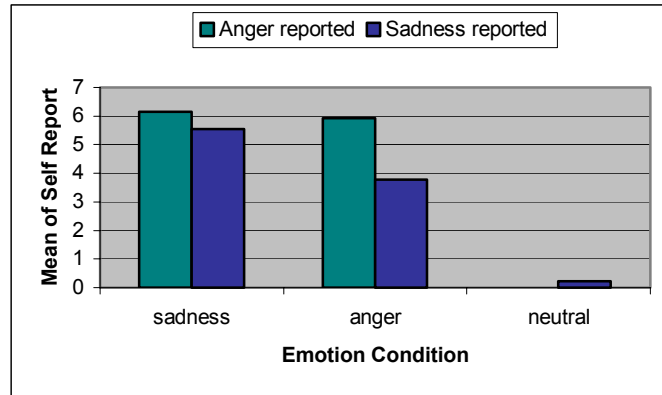
This chapter discusses the results of the measures utilized during the procedures of study one and study two that were obtained from the methodologies discussed previously.

## 5.1 *Study 1 Results*

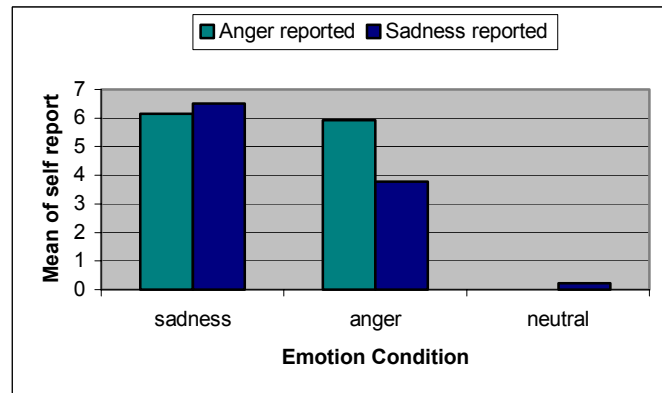
The hypothesis for study one was that an angry emotional state would weaken performance on a reasoning problem, while a sad emotional state would facilitate execution. Additionally, a neutral emotional state would neither inhibit nor enhance performance. Two measures – an emotion manipulation checklist and three critical thinking problems – were used in this study.

As mentioned previously, the emotion manipulation check contained three terms related to sadness; “blue,” “downhearted,” and “sad.” During this study, a few students asked for the definition of “blue.” Looking at the raw self-report scores, it seems probable students did not connect “blue” with the feeling of sadness. Half of the students in sadness condition rated their feelings of sadness greater than seven for the terms “downhearted” and “sad,” but rated “blue” as less than one, which deviates greatly from their other judgments. Taking this into consideration, the means were generated, using only the “sad” and “downhearted” scores. Figure 5-1 shows the results before this adjustment, while Figure 5-2 shows the results after the adjustment. Note that

in the former, self-reported anger is greater than self-reported sadness, while in the latter the opposite is true.



**Figure 5-1: Means of self-reported sadness and anger on the emotion manipulation check used after watching film clips.**



**Figure 5-2: Mean self-reported sadness and anger. Excludes the term “blue” for sadness condition.**

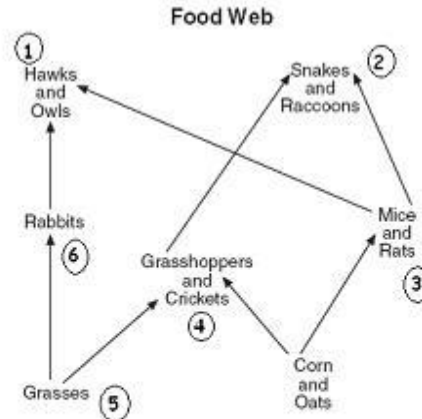
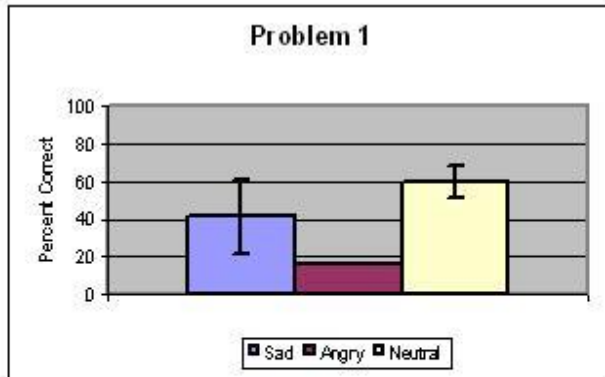
As discussed in Chapter 4, three problems were given to the students to solve once they finished watching the film clips and filled out the emotion manipulation check. Since some participants put more than one answer for the first problem, three different coding schemes were used (see

Table 5-1). Scheme A gave no points if the correct answer was given along with an incorrect answer. In this same situation, scheme B gave half of a point, while scheme C gave a full point. The results of using these three schemes are reflected in Figure 5-3, where the error bars indicate how the graph would look using a different scheme. If a student gave “5” as the answer, she was given zero points for all three schemes. However, a full point was given if the student chose “3” as her answer. If more than one answer which included the correct answer, such as “3 & 4”, the student was given zero points in scheme A, one-half of a point in scheme B, and a full point in scheme C. These results indicated that those in the neutral condition performed better than both the sad and angry conditions, and those participants in the sad condition performed better than those in the angry condition.

Figure 5-4 shows the results of the second problem solved by participants. This graph shows participants in the angry condition performing better than the sad and neutral conditions, which performed equally. As shown in Figure 5-5, for the third problem solved, only two participants in the sad and angry conditions obtained the correct answer.

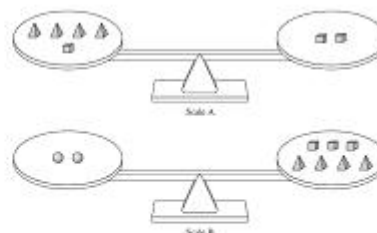
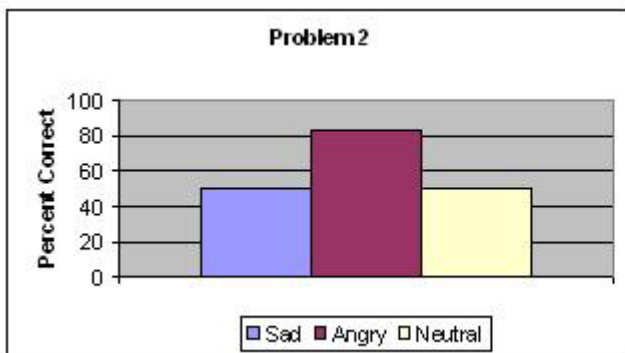
**Table 5-1: Coding Scheme used for first problem encountered by participants**

	<b>No correct answer</b>	<b>Correct Answer plus incorrect answer</b>	<b>Correct Answer</b>
Scheme A	0	0	1
Scheme B	0	0.5	1
Scheme C	0	1	1



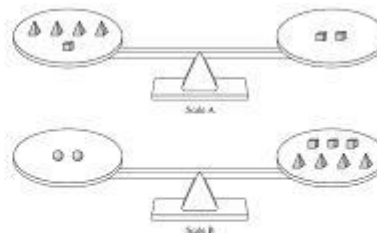
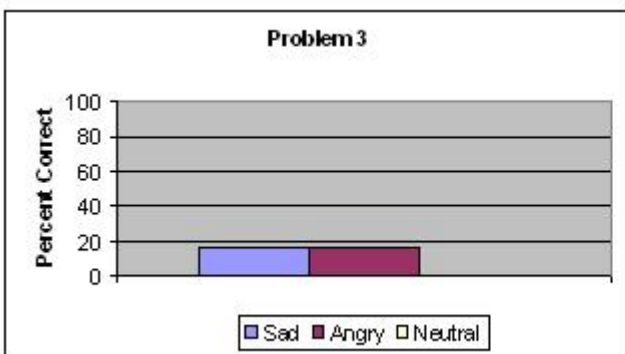
If the corn and oats were completely removed from the above food web, which of the groups (1-6) would be the most affected?

Figure 5-3: Results of first problem solved by participants in first study. Error bars indicated how graph would look with each of the three coding schemes. Top bar corresponds to Scheme C, Bottom bar to Scheme A. The top of each mean bar corresponds to Scheme B.



Using Scale A, how many pyramids balance 1 cube?

Figure 5-4: Results of second problem solved by participants.



Using your answer in part (a) and using Scale B, how many pyramids balance 1 sphere?

Figure 5-5: Results of third problem solved by participants.

## 5.2 Study 2 Results

For this study, the hypotheses were 1) that building a pictorial narrative, including labeling the emotions of other actors, will 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 will support greater emotional self-awareness than only building the pictorial narrative. Three measures – the MSCEIT:YV™, the narratives constructed by the participants, and the exit interview – were used in this study.

### 5.2.1 Hypothesis 1

#### 5.2.1.1 MSCEIT:YV™

Figure 5-6 displays the pre-and post-test results of the perceiving emotions branch of the MSCEIT:YV™. These results show a decrease in the majority of the post-test scores. The mean, as shown in Figure 5-7, for both administrations of the test was 58.46, while the standard deviation was 5.69 for the pre-test and 8.04 for the post-test.

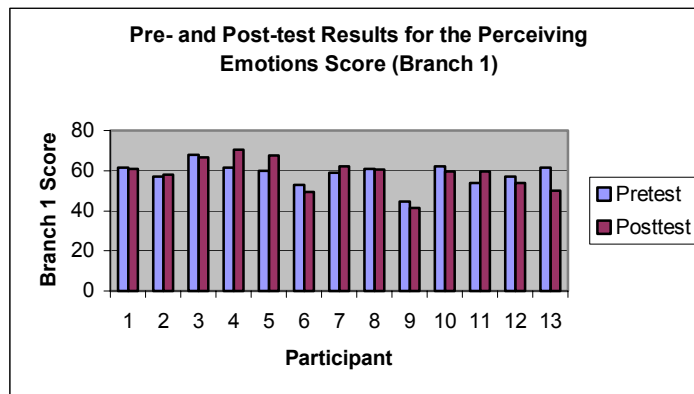


Figure 5-6: Pre-test and Post-test results for perceiving emotions branch of MSCEIT:YV™.

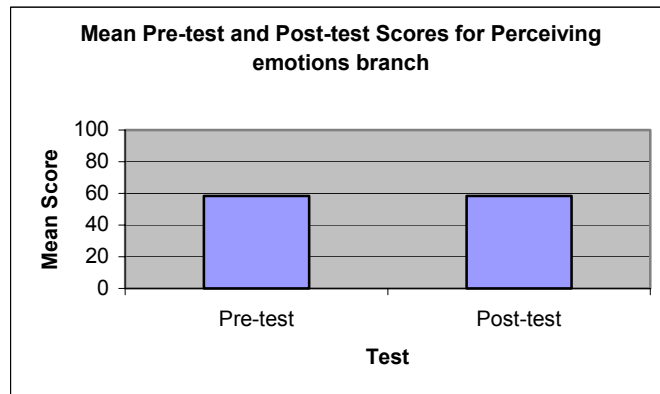


Figure 5-7 Mean pre-test and post-test scores for the perceiving emotions branch of the MSCEIT:YV™.

### 5.2.2 Hypothesis 2

Figure 5-8 displays the pre-test and post-test scores attained by the participants on the MSCEIT:YV™ with all the branches considered. As shown in Figure 5-9, the mean scores for the pre-test ( $\mu = 181.538$   $SD = 23.811$ ) and post-test ( $\mu = 176.192$   $SD = 22.40$ ) differ by a small amount, but still decrease for the second administration. This decrease becomes clearer by looking at the differences in scores on this measure between the pre-test and post-test administration shown in Figure 5-10, which shows 61.5% of the scores decreasing the second time. Because of the prediction that students did not try during the post-test (discussed in the previous chapter), further statistical analysis was not done on the data.

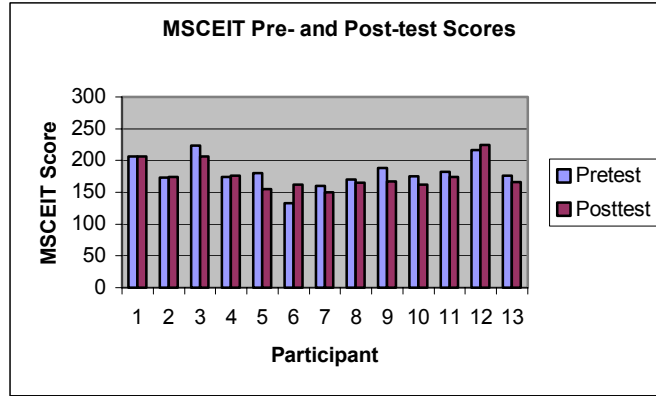


Figure 5-8: Participant pre- and post-test scores on full MSCEIT:YV™.

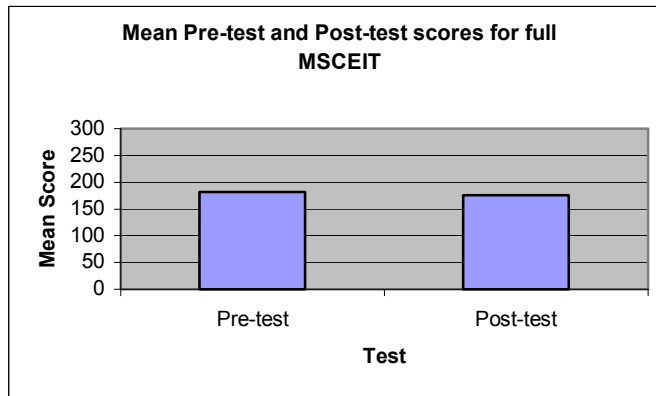


Figure 5-9: Mean scores for MSCEIT:YV™ pre-test and post-test scores.

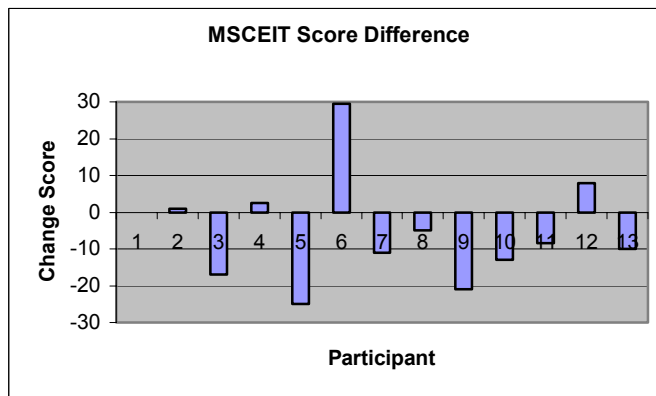
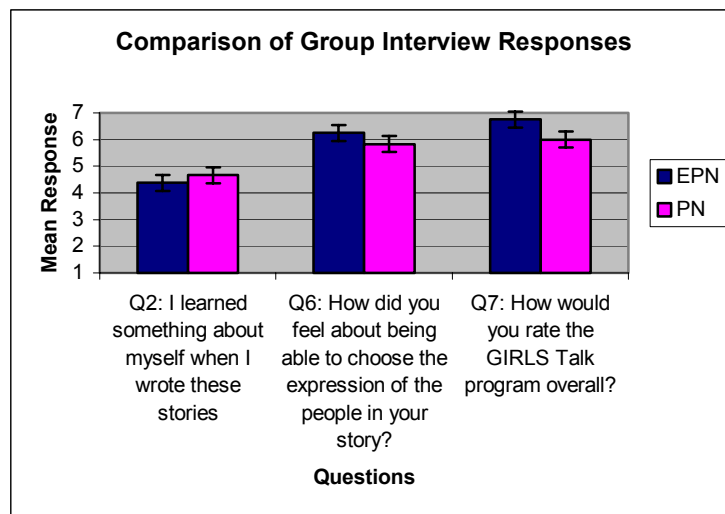


Figure 5-10: Difference between pre- and post-test score.

### 5.2.2.1 Exit Interview

During the last two sessions, participants were asked to fill out a short questionnaire (shown in Appendix O and Appendix P) and then allowed to wrap up their last story. While

others were working with the software, I pulled students aside to speak with them individually for five to ten minutes each about their responses as well as some of the follow-up questions found in Appendix Q. For both groups, the questionnaire consisted of Likert scale and open-ended questions. The EPN group, had three questions related to the empathetic emotion suggestions that the PN group did not. Figure 5-11 shows the mean response to the Likert scale questions that were the same for both groups. Based on their responses, girls in the EPN group enjoyed “choosing the expressions for different actors in their stories” (0: I totally hated it, 7: I totally loved it) and “interacting with the software overall” more than the PN group. At the same time, they indicated neutrality regarding how much they learned about themselves during the workshop.



**Figure 5-11: Mean responses to Likert Scale questions on exit interview.**

The open-ended questions of the exit interview were hand-coded to identify themes surfacing. Two major themes – reflection on feelings of self and others, and personal and personalized expression – developed out of conversations during the interviews. In each condition, the software prompted the students to select a character and then use the emotion faces to determine what the expression of that character would be. 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”* – EPN Group

*“Because however they were in my story, like mad or scared, that’s what I did”* – PN

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 mian [sic]”

**Shaundra:** “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.”

**Shaundra:** “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 in this and another case that, rather than doing a direct reflection or thinking about how the person may have been feeling, the girls matched facial expressions. It is unclear whether these participants made the connection between facial expressions and emotions, but this participant viewed twenty-two different expressions in her scene in a three-character story before settling on the one she wanted to use.

The ideas of both personal and personalized expression came out often during the interviews. For example, 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.” – EPN 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:

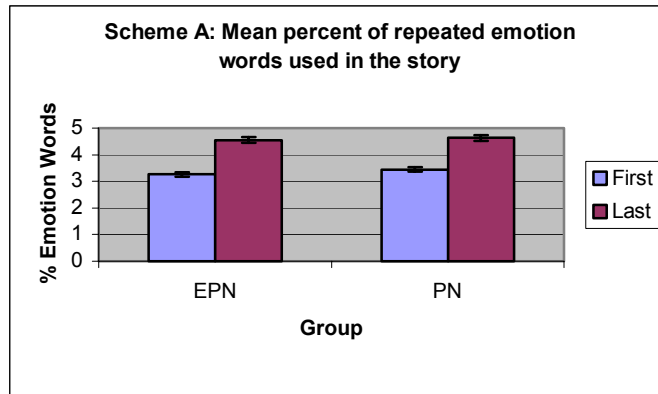
*“I just liked that I got to write my story however I wanted and then create scenes around it”* – EPN Group

*“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”* – PN

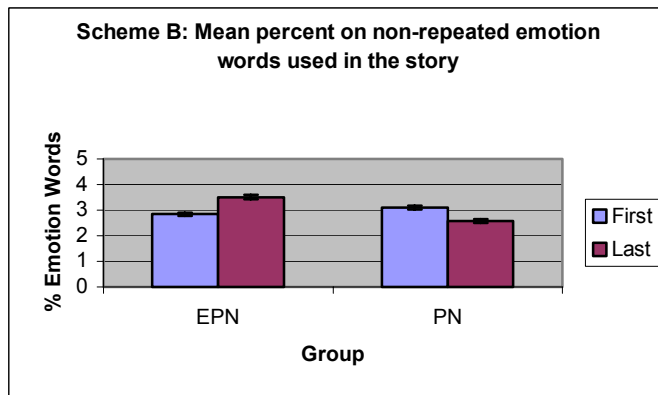
### **5.2.2.2 Narratives Constructed**

An examination of the narratives constructed sheds light on important aspects of the learning that seem to have occurred during the workshop. Over the course of the five sessions dedicated to constructing narratives, students produced anywhere from one to six stories, totaling 28 stories for the groups. The EPN 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 of each story. Two different analyses were done on each narrative created with respect to the number of emotion words used in the story (see Appendix R for the words used in coding). For this analysis, only the first and last stories for each participant were analyzed 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 the first scheme – Coding Scheme A – the total number of emotion words used in the final story was counted without respect to repeated words. For instance, if “sad” was used three times, it was counted each time. In Coding Scheme B, the total number of distinct emotion words used was counted with repeated words only counted once. In both schemes, the total number of words in the story normalized the number of emotion words used.



**Figure 5-12: Mean percent of repeated emotion words used in the story. Calculated by counting each occurrence of emotion words and dividing by total amount of words in story. Error bars indicate the standard deviation of the count.**



**Figure 5-13: Mean percent of non-repeated emotion words used in the story. Calculated by counting each occurrence of emotion words once and dividing by total amount of words in story. Error bars indicate the standard deviation of the count.**

This chapter presented the results of the data analysis for each study. The next chapter will discuss these results and present conclusions and future work in light of this discussion.

## Chapter 6 Discussion And Conclusion

*“All I can really tell you is that all this wanting hurts, that words are inadequate, and that explanations are poor substitutes for living the truth of emotional experience”*

-Alan Fogel, *Emotion, Development, and Self-Organization*

### 6.1 Study 1 Discussion

The hypothesis for this study was that an angry emotional state would weaken performance on a reasoning problem, while a sad emotional state would facilitate execution. Additionally, a neutral emotional state would neither inhibit nor enhance performance. The results of the first problem partially support the results that were hypothesized. Regardless of the coding scheme used, those in the neutral condition performed better on the problem solving than those in the sadness and anger conditions. More importantly, those in the sadness condition performed better than those in the anger condition.

The results for the second problem seem to not support the hypothesis. However, this may be a result of the time gap between the first and second problems during which the original emotions could have faded. If the emotions originally evoked were no longer present, any result could have been attained. It is also possible that emotions (e.g., frustration) that were evoked

during the first problem-solving task could have changed the original reported emotions. Another explanation could be that the combination of strongly reported combination of anger and sadness could have been present for the sadness condition, but faded for the anger condition.

Since there were only two people able to solve the third problem, the problem may have been too difficult for the participants, depending on mathematical ability rather than analytical thinking. It is noted; however, that the effects of time and task on mood as discussed for problem are likely to have occurred for this problem.

## **6.2 Study 2 Discussion**

### **6.2.1 Empathetic Suggestions**

Participants in the EPN 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 this system feature). Based on their responses to the question “How much did you like the program suggesting emotions to you?” students liked the program ( $\mu = 5.5$ ,  $SD = .92$ ) doing this. Although students felt the suggestions were only correct a little more than half of the time ( $\mu = 5$ ,  $SD = 1.06$ ), they were usually not completely annoyed ( $\mu = 5.125$ ,  $SD = 2.6$ ). 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 rating ( $n = 3$ ) 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.”

Other students 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.

An observation that can be made about the common sense reasoning technology is that the number of abbreviations, misspellings, grammatical mistakes, or slang used probably hampered the system's ability to produce correct responses. Future work could involve preprocessing the submitted text 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.

### **6.2.2 Developing Empathy**

The first hypothesis was that labeling the emotions of other actors would lead to a better ability to identify the feelings of others. The MSCEIT:YV™ was planned as the primary indicator for this hypothesis, so it is difficult to say conclusively that the software helped either group to improve in this area. Fortunately, there are other data from the interviews discussed later that can give insight into the learning that took place as a result of interacting with the software.

### **6.2.3 Greater Emotional Self-awareness**

The second hypothesis predicted that participants in the EPN group would have greater emotional self-awareness, as compared to the PN group, as a result of interacting with the software. Looking only at the results of the MSCEIT:YV™, which give the impression of lessened emotional intelligence, this hypothesis seems to not be supported. However, as discussed in the previous chapter, students were very unhappy about having to retake the MSCEIT:YV™. It is possible that the G.I.R.L.S. Talk system negatively affected emotional

self-awareness, but other data suggest otherwise; verbal statements that the girls guessed throughout much of the test, the unusually fast speed at which most of the tests were completed, and additional evidence discussed below.

One such indication is the change in the levels of emotional expressivity of the EPN group. By the last week of the workshop, the EPN group increased in both the mean percentage of repeated and non-repeated emotion words used. While 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. The argument could be made that the difference 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 valence of the emotions in the stories decreases. However, it was found that the inverse occurs after interacting with the software. Since emotional expressivity can be an indicator of greater emotional self-awareness, this finding suggests that the software seems to have bolstered rather than hindered the girls' emotional intelligence, as the MSCEIT:YV™ scores implied.

This behavioral indication of increased emotional self-awareness contrasts with the lower rating of the EPN group on the exit interview scale rating – “I learned something about myself when I wrote stories.” This lower rating, which is not statistically significant, suggests that the EPN group did not meta-cognitively connect their apparent reflection on their emotions (as shown in their increased emotional expressivity) with learning about themselves personally.

#### **6.2.4 Interview Themes**

Two major themes – reflection on feelings of self and others, and personal and personalized expression – were presented in the previous chapter. The former theme provides 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. The latter themes mesh well with the constructionist ideal of personally meaningful projects. During the course of the workshops, 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.

#### **6.2.5 Learning Stories**

In this section, I present two participants that exemplify some of the learning that took place during the course of the workshop. Although these cases do not generalize over the entire group, they do demonstrate that some of the goals of the system design were accomplished.

##### **6.2.5.1 Ruth - EPN Group**

Ruth is a twelve-year-old girl whose family is from Puerto Rico who was placed randomly into the PN Group. She struggles with the English language, as demonstrated through her required participation in the school's Read 180 program. She is very quiet and soft spoken; however she wrote six stories (the most of all the participants) over the course of her five visits. She very seldom went back and revised any stories, and tended not to ask for any help except when she decided she wanted to make her own scenes by adapting pictures off the Internet.

Ruth's stories began as descriptive narratives that presented events in almost list fashion. Her first story, called "teddy bear," and the captions from her narrative, is below.

*Memory Closet*

teddy bear. it remembers me wend i was little because my mother gave me the teddy bear wend it was my birthday and the teddy bear make me remember me that my mother gave the teddy bear.i and i got that teddy bear wend i was 5 years old to 11years old . i love my teddy bear beacase my mother gave me that teddy bear wend i was little i sleep with my teddy bear and my teddy bear name is fluffy beacause its so fluffy and thats why i love my teddy bear. Love, ruth.



it remembers me wend i was little because my mother gave me the teddy bear wend i was in my room my family was there wend i was on my room. My mother was there me my aunt, uncle, grandfather, grandmother.

**Figure 6-1: First story created by Ruth (EPN Group). Here she uses a more list-like narrative.**

By her fourth story, Ruth writes a story in her memory closet very similar to the first. However, once she begins to construct the pictorial narrative around it, she gives thicker descriptions of the course of events as well as begins to focus, in her narrative, on the emotions in the story. This story, written within a theme she chose herself and entitled "Me and my friend", describes a day with her best friend Naomi.

*Memory Closet:*

Me and my friend: This is me ruth my friend is naomi me and naomi is my best friend we are always laughing and we play together and naomi went to my house and we went to the park to the school and my house.

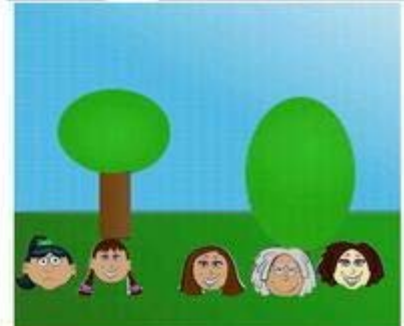
*Narrative Construction Interface*



This is me and my friend naomi and naomi is saying hi to my mother and telling if her mother gave her permission to stay on ruth house and naomi say yes. then we went to the my bedroom to do are homework. then my mother made food .



This is me on my bedroom doing my homework with naomi then my moter came to my bedroom then she say she made food then we whent to the park.



This is we on the park eating our sandwich and then we see naomi mother coming to the park with naomi grand mother. Then my mother was talking to naomi grandmother and mother. Then we went to the house then naomi feel kind of sad.



This is my mother talking to naomi mother and grandmother and we were at the den and naomi stay and we went to the church and naomi mother was there and her grandmother.



This is me and naomi playing on the bedroom and i was on the closet looking for my toys then wend i go to the bed naomi was sad beacause she missed her mother. then i was sad baecause she was sad then we went to the church.



Then we were at the church and the church was full with people then my mother was talking to me if naomi mother came to tell naomi. then there was naomi mother with naomi grandmother. then my talk to naomi mother that naomi was feeling sad. then naomi feel happy.

Figure 6-2: Fourth story written by Ruth (EPN Group). In this story she has shifted from a list-like narrative to a more emotionally expressive form of writing.

### 6.2.5.2 Sheila - PN Group

Sheila is an eighth grade student who, over the course of three weeks, became very comfortable with telling me about her personal life and the challenges she was encountering with the “love of her life.” All of her stories dealt her boyfriend in some form or fashion. She was the first person to decide that the character in her story needed a body.

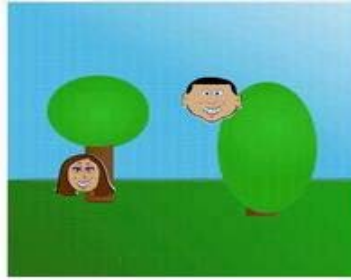
#### *Memory Closet*

My most important object was a picture that i got from my boy friend name roger that i really like. The reason that i like the that picture so much i not going too lie but it's because of his body figure . His body figure ,he has all that muscle, gose to the gym every day too work out ,sgose to work which he works at trumble mall. But the the picture he gave me waz too show me his boby because he wouldn't show me his body in person at first because he tought that the reason i would go with him. I remeber the first time i met him he was visting his cusin in west haven but they came too new haven to do something, but when he saw me walking down the street he holla yeeeerrrrr. i look at him he look at me his cusin stop the car he came out , he was like shorty let me holla at cha for a min i was like alright he waz like was good u got a man are what "i said naaa i don't have a man so he was like let me get them ##### i was like sure as long as i can get yours too" . we called each other than dec 4,2004 we stated too date.

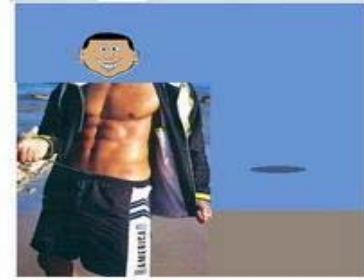
## Narrative Construction Interface



I remeber the first time i met him he was visting his cusin in west haven but they came too new haven to do something, but when he saw me walking down the street he holla yeeeeeerrrrrr. i look at him he look at me his cusin stop the car he came out , he was like shorty let me holla at cha for a min i was like alright he waz like was good u got a man are what "i said naaa i don't have a man so he was like let me get them ##### i was like sure as long as i can get yours too"



we called each other than dec 4,2004 we stated too date.



My most important object was a piture that i got from my boy friend name roger that i really like. The reason that i like the that picture so much i not going too lie but it's because of his body figure . His body figure ,he has all that muslce, gose to the gym every day too work out ,gose to work which he works at trumble mall. But the the picture he gave me waz too show me his boby because he wouldn't show me his body in person at first because he tought that the reason i would go with him.

Figure 6-3 First story written by Sheila (PN Group). This story lead others to create bodies for their stories, and find other ways to re-appropriate the software.

After Sheila created this story others began to copy what she had done and make the pictures appropriate to their stories. Using pictures as bodies was not thought of in the original design. In fact, bodies were purposefully not created to avoid making the girls feel uncomfortable about their bodies. This re-appropriation of the system tools was innovative and interesting in that it shows a participant using the tools in a personally meaningful way.

### 6.3 Thesis summary

This thesis makes three main contributions: 1) new insights into the effects of immediate emotions in middle school academic situations, 2) a new system for supporting emotional self-awareness and empathy for teenage girls, and 3) new insights into the value of utilizing constructionist technologies in proactive emotional health systems. Chapter 3 presented a digital

story explication system able to support emotional reflection via common sense reasoning technology. The system utilizes personally meaningful stories as a tool to help girls reflect upon personal experiences, and empathetically suggests emotions related to these events.

Chapters 4 and 5 presented the methodologies and results of both studies included in this thesis. The first study explored the relationship between immediate emotions and academic problem solving. Results of this study were that an angry state depressed performance on an analytical thinking task more than a sad state, while learners in a neutral state performed better than both conditions. The importance of this study is that it shows some evidence of the necessity for addressing emotional needs.

The second study discussed in this thesis investigated novel uses of technology developed specifically for addressing emotional needs, namely, self-awareness and empathy. This study was conducted with seventeen teenage girls who used either the digital story explication system supported by common sense reasoning technology or just the digital story explication system. An analysis of the stories created during the study, both groups showed an increase in the mean percentage of repeated emotion words used. Further, the group whose reflection was supported showed an increase in the mean percentage of non-repeated emotion words. This increased emotional expressivity is an important indication of movement towards greater emotional self-awareness. Additionally, as shown by their interview responses, the participants had to reflect on the emotions of others involved in their stories; an important step towards empathy. Finally, participants also felt comfortable with expressing themselves with the system and utilized it in creative and novel ways.

## **6.4 Future Work**

Although this thesis has revealed news possibilities for using technology to address emotional needs, there is more data that needs to be collected before we really understand the full implications of the work – for example, a study conducted over a longer period of time, with follow-ups observing not only changes in expressivity, but also situational changes in behavior. With longer periods of time, the MSCEIT:YV™ could also be utilized in a way that achieves results that accurately reflect the emotional intelligence skills of participants.

Future development could also involve the construction of a database of stories created with the G.I.R.L.S. Talk system, combined with an additional feature that presents stories to girls that are similar to their own. These stories could be similar not only in thematic, but also affective content. A feature such as this could help speak to the emotional need of connection. Girls may feel comfort in knowing that others are experiencing similar situations and having comparable feelings as well. A different feature could allow girls to revise their own narratives, either as advice for someone in a similar situation or as a discussion of how they would do things differently in the future.

Another conceivable direction for proactive emotional health technology is the introduction of an animated character into a system. In one view, this agent could further support and encourage the reflection process. Alternatively, girls could design this agent's look and expressions and program it to tell their stories. One could imagine the emotions of the agent transforming as the emotional content and valence of the story adapt.

Exploring further means of personal expression could also be beneficial. How would the girls' expressions change if they could enter their stories via recorded language rather than text? This might allow them more flexibility in their expression, in that they would not be limited to

what they can type. Technologically enhanced forms of expression, such as art and dance, could also be interesting directions.

## ***6.5 Reflecting and Reevaluating***

As we pulled up to the school building, I stood in awe of the wonderful multimillion-dollar facility. From the principal's office, I could see the entire second floor through all the windows. The design reminded me of my own lab in Cambridge. I could see how seamless and transparent architecture could foster not only collaboration, but also community in a district where the world is easily forgotten. The school's library was stacked with books by African-American authors as well as books on African-American inventors, astronauts, and politicians. The computer lab was complete with the latest software and rotatable monitors. I cannot remember if it was the student chasing down the principal to swear at him, or the two fights that broke out, within five minutes of each other, one between boys, the other between girls, that forced me into the reality of the situation – and at the same time reminded me what brought me to this place.

Although this new building is a dream compared to its predecessor, often referred to as “the factory,” a new environment alone could not solve this school's challenges. That is, access alone is not enough. Dr. James Comer of the Yale School Development program stresses the importance of emphasizing children's development in the educational process (Comer 1997). For over thirty years, he and his teams have integrated a focus on cognitive, physical, speech and language, ethical, social and psychological areas – what they call developmental pathways. The new building in this sense may have spoken to the psyche of the students; however, there still needed to be a continuous focus on the other pathways. How can students learn in this

environment? Further, when the school environment is “heaven” compared to the home environment, how can they be expected to be in the right mindset to even be *able* to learn?

A researcher must always reevaluate her purpose in light of experience. My experiences with the girls and at the middle school support the stated importance of addressing emotional needs, and at the same time shaped my vision of the role that digital technology can play in this area. There are many questions remaining related to proactive emotional health technologies, but with new tools and technology we can begin to make definitive steps towards answering them.

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## Appendix A Abbreviated List Of Researched Teen Sites

GIRLS' Coalition of Greater Boston

<http://www.GIRLScoalition.org/>

Teen Talk

<http://www.teentalk.com/>

CenterWeb: Advice for Teens

<http://www.domini.org/centerweb/home.htm>

Guideposts Sweet 16

<http://www.guidepostssweet16mag.com/>

Children's Healthcare of Atlanta

<http://www.choa.org>

Coffeerooms™ gurlfrinds

<http://www.gurlfriends.com/>

For Kids and Teens

[http://www.baltimorepsych.com/Kids\\_Pages.htm](http://www.baltimorepsych.com/Kids_Pages.htm)

Hope United

<http://www.geocities.com/vaarthi9/hopeunited.html>

I really hate school

<http://www.ireallyhateschool.com/>

Idealist Kids and Teens: Action Without Borders

<http://www.idealists.org/kt.html>

JustSmile Ministries: Christian advice for teens

<http://www.justjosue.org/justsmile/>

Kids Help Phone

<http://kidshelp.sympatico.ca/en/home.asp>

Kids-in-Crisis

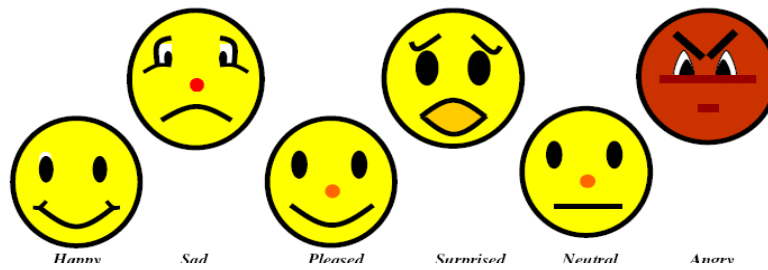
<http://www.geocities.com/Heartland/Bluffs/5400/>

Adolessons Teen Advice by Lucie Walters

<http://www.lucie.com>

## Appendix B Recruitment Flyer

Participate  
In Research Study



GIRLS, ages, 9-15

**Need more information?**

See Yvette in Computer Clubhouse

or

Contact [sbdaily@media.mit.edu](mailto:sbdaily@media.mit.edu)

# **Appendix C COUHES Consent Form Study I**

## **CONSENT TO PARTICIPATE IN NON-BIOMEDICAL RESEARCH**

### **Emotions in Learning**

#### **Parental Consent Form**

Your child is being asked to participate in a research study conducted by Shaundra Bryant Daily, M.S. and faculty sponsor Rosalind Picard, Sc.D., from the Media Laboratory at the Massachusetts Institute of Technology (M.I.T.) The results of this study will contribute to Shaundra Bryant Daily's thesis. Your child was selected as a possible participant in this study because she is between the ages of 11 and 17. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

#### **• PARTICIPATION AND WITHDRAWAL**

Your child's participation in this study is completely voluntary and you are free to choose whether you want your child to be in it or not. If you choose to permit your child to be in this study, you may subsequently withdraw your child from it at any time without penalty or consequences of any kind. The investigator may withdraw your child from this research if circumstances arise which warrant doing so.

#### **• PURPOSE OF THE STUDY**

The purpose of this study is to determine how adolescents' emotions affect their problem solving abilities.

#### **• PROCEDURES**

If you volunteer your child to participate in this study, we would ask your child to do the following things:

(All interactions will take place on the computer; the researcher will not be present during the study.)

- Watch a movie about an event that is considered angry, sad, or neutral in emotional content
- Write or read a story about an event that made her happy, frustrated, angry, confused, strong, enthusiastic, or sad, or asked to write about everyday tasks with no emotional charge.
- Fill out a questionnaire about how she feels at that moment
- Read a story about someone else that experienced a similar situation and had a similar emotional reaction to the event.
- Solve a causal reasoning, logical thinking, or science problem (based on Massachusetts Competency Assessment Scales standards)
- Fill out another questionnaire about use of the internet for story sharing (first visit only)

- This study will occur at the MIT Media Laboratory or within the clubhouse and will last approximately *1 hour*. The study will take place over 1 week. If you choose not to have your child participate, she may continue doing class work as usual.

- **POTENTIAL RISKS AND DISCOMFORTS**

There are no foreseeable risks in this study. When your daughter recalls an emotional experience, it may re-evoke some old emotions. However, any elicited emotions are expected to be less intense than the original emotions. Any feelings she experiences during the study should be within the range of her ordinary feeling experiences.

- **POTENTIAL BENEFITS**

Potentially, your child could help, or be helped through the writing and reading of stories and have a chance to think about her emotions in ways she may not have before.

- **PAYMENT FOR PARTICIPATION**

There is no payment for participation in this study.

- **CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with your minor will remain confidential and will be disclosed only with you and your minor's permission or as required by law.

All compositions your child makes writing will be coded to protect your child's anonymity. All data will be stored on a personal computer at MIT, accessible only by the researcher and her faculty supervisor.

Your child's written compositions may be reported publicly after deleting any personally identifying information, like full names, telephone numbers, and addresses, which may occur.

- **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact

*Principal Investigator*  
Shaundra Bryant Daily  
E15-120g, 20 Ames Street  
Cambridge, MA 02139  
617-253-6341

*Faculty Sponsor*  
Dr. Rosalind Picard  
E15-020g, 20 Ames Street  
Cambridge, MA 02139  
617-253-0369

- **RIGHTS OF RESEARCH SUBJECTS**

You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you feel you have been treated unfairly, or you have questions regarding your rights as a research subject, you may contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E32-335, 77 Massachusetts Ave, Cambridge, MA 02139, phone 1-617-253 6787.

**SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE**

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

\_\_\_\_\_  
Name of Subject

\_\_\_\_\_  
Name of Legal Representative (if applicable)

\_\_\_\_\_  
Signature of Subject or Legal Representative

\_\_\_\_\_  
Date

**SIGNATURE OF INVESTIGATOR**

In my judgment the subject is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

\_\_\_\_\_  
Signature of Investigator

\_\_\_\_\_  
Date

## Appendix D COUHES Assent Study II

### Emotions in Learning

1. My name is Shaundra Bryant Daily.
2. We are asking you to take part in a research study because we are trying to learn more about how your emotions affect your learning.
3. If you agree to be in this study, during your visit, you will be asked to watch a movie, imagine yourself in the main character's position, and write about it. Once you have written a story you may be given another story to read. After you have completed these tasks, you will be asked to fill out a questionnaire. The last thing you will do is to solve two problems.
4. If you agree to be in this study, it will not hurt you in any way. Any story you give me will be kept with only your ID number attached, and nobody besides me will know that the ID number refers to you. If I show your story to my boss or publish it in an article it will be done so without your name attached, and any names you refer to in the story will be changed, so that nobody can identify you or the people it talks about.
5. You may have fun writing stories and thinking about your feelings
6. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes" you can still decide not to do this.
7. If you don't want to be in this study, you don't have to participate. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study now. If you have a question later that you didn't think of now, you can call me 617-304-6500 or ask me next time. You can also call the Chairman of the Committee on the Use of Humans as Experimental Subjects at M.I.T. at 1-617-253 6787 if you feel you have been treated unfairly.
9. Signing your name at the bottom means that you agree to be in this study. You and your parents will be given a copy of this form after you have signed it.

---

Name of Subject

---

Date

## **Appendix E Study 1 Participant Packet**

We want you to attempt to identify with the main character in the video. That is, imagine how you would feel if you were experiencing the situation portrayed. If at any point you wish to cease watching the clip, you may cover your eyes, cover your ears, and/or stop watching all together.

Before watching the film, we would like you to sit back and relax for a minute or so. Try to clear your mind and take a couple of deep breaths. This will help you focus in the imagination study.

**Anger Condition:<sup>5</sup>**

Please imagine, as best you can, that you are the character getting pushed around and not fighting back. How would you describe the feeling to a friend?

**Sadness Condition:**

Please imagine, as best you can, that you are the boy having the feeling of losing someone you love. Think about this feeling. How would you describe the feeling to a friend?

**Neutral Condition:**

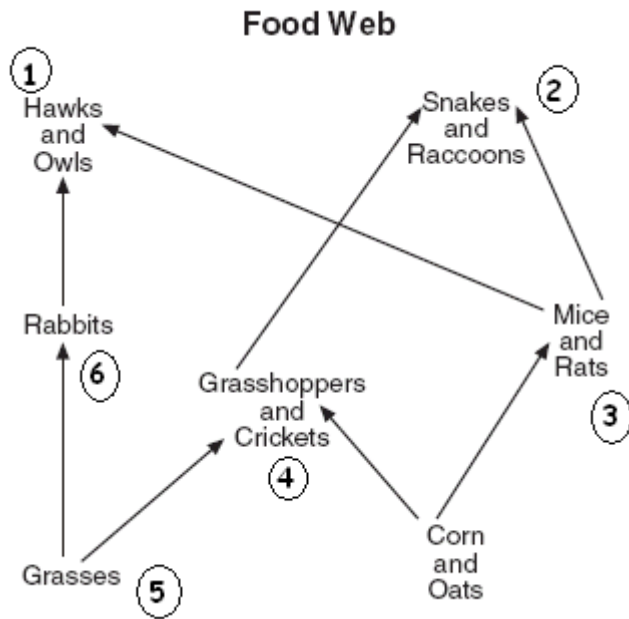
Please describe, as best you can, how you typically spend your evenings. You might begin by writing down a detailed description of your activities, and then Figure out how much time you devote to each activity.

---

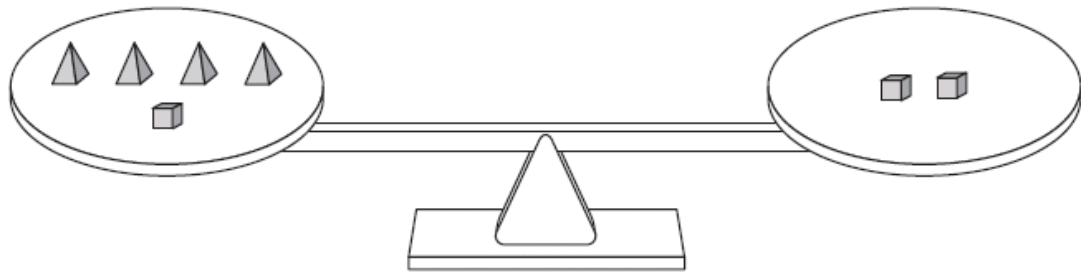
<sup>5</sup> Only one condition was included in an individual packet. All have been included here to save space.

Please think back to the film clip that you watched earlier. Please indicate the greatest amount, if at all, you experienced the following emotions. A "0" on this scale means that you did not experience the emotion at all. An "8" means that you experienced the emotion more strongly than ever before.

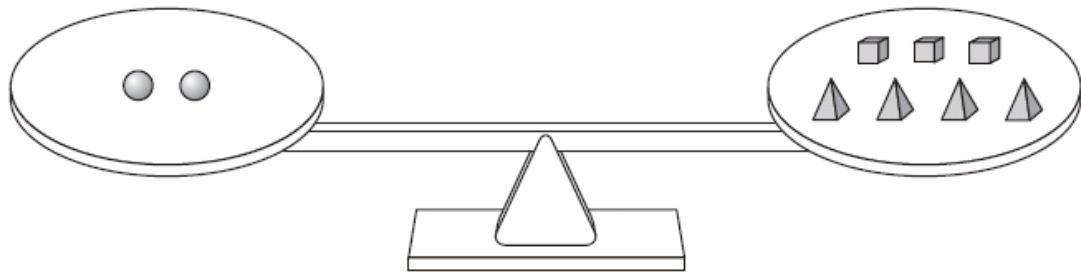
0	1	2	3	4	5	6	7	8
Not at								More
All								Strongly
								Than
								Ever
___ Amazed								___ Fearful
___ Angry								___ Happy
___ Anxious								___ Interest
___ Blue								___ Irritated
___ Bored								___ Mad
___ Downhearted								___ Sad



If the corn and oats were completely removed from the above food web, which of the group number (1-6) would be the most affected?



Scale A



Scale B

- a. Using Scale A, how many pyramids balance 1 cube?
- b. Using your answer in part a and using Scale B, how many pyramids balance 1 sphere?

Thank you for participating. Please close your booklet and wait for others to finish. Shani will then come around and pick everything up. If you would like to speak more about your experiences or if you are feeling upset, please let Shani know.

# Appendix F School Proposal

## *Proposal to Conduct a Research Study*

### *Research Overview*

The purpose of this thesis is to help address emotional needs and develop emotional intelligence. The system, G.I.R.L.S. Talk (Girls Involved in Real Life Sharing), will allow users to reflect actively upon the emotions related to their situations through the construction of pictorial narratives. Users will be able to gain new knowledge and understanding about themselves and others through the exploration of authentic and personal experiences. The system will employ new common sense reasoning technology, enabling it to infer affective content from the users' stories and support emotional reflection. A similar story will be extracted from the database and displayed to the users, allowing them to hear real stories, share their feelings and experiences, and reflect upon these in relation to their personal situations. We expect that such reflection may facilitate development of new perspectives on dealing with life's events.

More information as well as screen shots of the software can be found at:

<http://www.media.mit.edu/~sbdaily> in the “Research” section

### *Study Overview*

The purpose of this study is to show that the deconstruction of stories, when supported by empathetic emotion suggestions, can enhance affective development; specifically emotional self-awareness. The participants will be divided randomly into two groups. The first group will have no interaction with the technology. The second will be asked to create the narrative and be given the empathetic emotion suggestions. This study consists of six meetings over three weeks. In each meeting, the girls will come to the session with their groups. Group 2 will only participate in the first and last sessions. In the first session each girl will be given the Mayer-Salovey-Caruso Emotional Intelligence Test – Youth Version (MSCEIT:YV™), an affective development test. In each session, the group will be given two possible themes to write about, using the G.I.R.L.S. Talk software, relating to personal experiences in school or at home. After the three weeks have ended, they will be given an affective development post-test to help gauge their growth, and be interviewed about their experiences.

*More information about the MSCEIT:YV™ can be found at:*

[http://www.unh.edu/emotional\\_intelligence/eitests2.htm](http://www.unh.edu/emotional_intelligence/eitests2.htm)

### ***Participants***

To conduct this study, we would like to work with 36 girls ages 10-14 in your school. Only 24 of the girls will participate in all of the sessions. The others will be asked to take a test on the first and last days of the study. All participants will receive a small gift such as a diary or a gift certificate for their participation.

### ***Benefits***

This research will benefit both the researcher and the participants. Teens with good emotional health are typically in control of their thoughts, feelings, and behaviors. They usually feel positively about themselves and have good relationships. While drugs, alcohol, promiscuity and depression are sometimes symptoms of normal teen experimentation, they may also be an indication of teens with poor emotional health. Leading a fulfilling life is tied to being aware of one's emotional needs and being able to meet them (Csikszentmihalyi 1990; Goleman 1995).

Additionally, Shaundra Daily would be available to help around the school where necessary while she is in [city name]. She has tutored in both math and science for over 10 years, and would be happy to do this at the school.

### ***Technical Needs***

We will need access to a computer room with at least nine computers and internet access. Two programs, the G.I.R.L.S. Talk software and a small Paint Program will be installed on these computers. They can be removed or kept once the study is completed.

### ***Timeline***

We would like to start working in an after school setting the first week in February and continue the following three weeks. The days we work on are flexible, however we would like to propose a schedule with the following days:

Week 1	Week 2	Week 3	Week 4
January 31 – February 3	February 7 – February 10	February 14 – February 17	February 21 – February 24

### ***Researcher Information***

**Shaundra B. Daily** is a graduate student at the MIT Media Laboratory, working in both the Affective Computing and Future of Learning Groups. She holds a Bachelor's in Electrical Engineering with honors from the Florida State University, and a Master's degree, in Electrical Engineering and Computer Science, from Florida Agricultural and Mechanical University. There she directed the Technical OutReach Community Help (TORCH) program geared toward addressing the digital divide as well as tutored students in math and science courses. Her main interests include the design and evaluation of interfaces designed to support affective development through writing, constructing, and other forms of expression as well as technologically supported community and economic development.

Any further questions can be directed to either the researcher or her faculty supervisor.

*Principal Investigator*  
Shaundra Bryant Daily  
E15-120g, 20 Ames Street  
Cambridge, MA 02139  
617-253-6341  
[sbdaily@media.mit.edu](mailto:sbdaily@media.mit.edu)

*Faculty Sponsor*  
Dr. Rosalind Picard  
E15-020g, 20 Ames Street  
Cambridge, MA 02139  
617-253-0369  
[picard@media.mit.edu](mailto:picard@media.mit.edu)

# Appendix G COUHES Consent Form Study II

## CONSENT TO PARTICIPATE IN NON-BIOMEDICAL RESEARCH

Using Technology to Support Affective Development

### Parental Consent Form

Your child is being asked to participate in a research study conducted by Shaundra Bryant Daily, M.S. and faculty sponsor Rosalind Picard, Sc.D., from the Media Laboratory at the Massachusetts Institute of Technology (M.I.T.) The results of this study will contribute to Shaundra Bryant Daily's thesis. Your child was selected as a possible participant in this study because she is between the ages of 10 and 15. You should read the information below, and ask questions about anything you do not understand, before deciding whether or not to participate.

#### • PARTICIPATION AND WITHDRAWAL

Your child's participation in this study is completely voluntary and you are free to choose whether you want your child to be in it or not. If you choose to permit your child to be in this study, you may subsequently withdraw your child from it at any time without penalty or consequences of any kind. The investigator may withdraw your child from this research if circumstances arise which warrant doing so.

#### • PURPOSE OF THE STUDY

The purpose of this study is to show how technology can support emotional reflection and understanding.

#### • PROCEDURES

If you volunteer your child to participate in this study, we would ask your child to do the following things depending on the group she is assigned to:

Group 1 – six consecutive weeks

- Take an affective development test
- Create a pictorial narrative about experiences
- Re-take the affective development test to see if interaction with the technology has supported her growth
- Answer quick questions in an interview related to her experiences during the sessions

Group 2 – six consecutive weeks

- Take an affective development test
- Create a pictorial narrative about experiences and receive a suggestion from the technology about emotions related to the event
- Re-take the affective development test to see if interaction with the technology has supported her growth
- Answer quick questions in an interview related to her experiences during the sessions

Group 3 – two non-consecutive weeks

- Take an affective development test
- Re-take the affective development test to see if interaction with the technology has supported her growth
- Answer quick questions in an interview related to her experiences during the sessions

- **POTENTIAL RISKS AND DISCOMFORTS**

There are no foreseeable risks in this study. When your daughter recalls an emotional experience, it may re-evoke some old emotions. However, any elicited emotions are expected to be less intense than the original emotions. Any feelings she experiences during the study should be within the range of her ordinary feeling experiences.

- **POTENTIAL BENEFITS**

Potentially, your child could help, or be helped through the writing and reading of stories and have a chance to think about her emotions in ways she may not have before.

- **PAYMENT FOR PARTICIPATION**

Your daughter will receive a small gift or gift certificate for participating in this study.

- **CONFIDENTIALITY**

Any information that is obtained in connection with this study and that can be identified with your minor will remain confidential and will be disclosed only with you and your minor's permission or as required by law.

All compositions your child makes writing will be coded to protect your child's anonymity. All data will be stored on a personal computer at MIT, accessible only by the researcher and her faculty supervisor.

Your child's written compositions may be reported publicly after deleting any personally identifying information, like full names, telephone numbers, and addresses, which may occur.

- **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact

*Principal Investigator*  
Shaundra Bryant Daily  
E15-120g, 20 Ames Street  
Cambridge, MA 02139  
617-253-6341

*Faculty Sponsor*  
Dr. Rosalind Picard  
E15-020g, 20 Ames Street  
Cambridge, MA 02139  
617-253-0369

- **RIGHTS OF RESEARCH SUBJECTS**

You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you feel you have been treated unfairly, or you have questions regarding your rights as a research subject, you may contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E32-335, 77 Massachusetts Ave, Cambridge, MA 02139, phone 1-617-253 6787.

**SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE**

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

\_\_\_\_\_  
Name of Subject

\_\_\_\_\_  
Name of Legal Representative (if applicable)

\_\_\_\_\_  
Signature of Subject or Legal Representative

\_\_\_\_\_  
Date

**SIGNATURE OF INVESTIGATOR**

In my judgment the subject is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

\_\_\_\_\_  
Signature of Investigator

\_\_\_\_\_  
Date

# Appendix H COUHES Assent Form Study II

## ASSENT TO PARTICIPATE IN RESEARCH

### Using Technology to Support Affective Development

1. My name is Shaundra Bryant Daily.
2. We are asking you to take part in a research study because we are trying to learn more about how your emotions affect your learning.
3. If you agree to be in this study, you will be asked to do three things, during your six visits. The first will be to take a test relating to your understanding of your emotions during the first and last sessions. The second is to write stories about your experiences and build cartoons about them. The third will be to answer questions about your experiences after all of our sessions.
4. If you agree to be in this study, it will not hurt you in any way. Any story you give me will be kept with only your ID number attached, and nobody besides me will know that the ID number refers to you. If I show your story to my boss or publish it in an article it will be done so without your name attached, and any names you refer to in the story will be changed, so that nobody can identify you or the people it talks about.
5. You may have fun writing stories and thinking about your feelings.
6. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say “yes” you can still decide not to do this.
7. If you don’t want to be in this study, you don’t have to participate. Remember, being in this study is up to you and no one will be upset if you don’t want to participate or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study now. If you have a question later that you didn’t think of now, you can call me 617-304-6500 or ask me next time. You can also call the Chairman of the Committee on the Use of Humans as Experimental Subjects at M.I.T. at 1-617-253 6787 if you feel you have been treated unfairly.
9. Signing your name at the bottom means that you agree to be in this study. You and your parents will be given a copy of this form after you have signed it.

---

**Name of Subject**

---

**Date**

# Appendix I Frequently Asked Questions Sheets

## G.I.R.L.S. Talk Software Group 1 FAQ

### **How do I start?**

To begin enter user id number you were given.

### **How do I draw my own background?**

click on “Options”

Click on “Draw My scene”

Choose “New” from window that pops up

Choose “Jumbo” for the size

### **How do I save the background I have drawn?**

Click on File

Click on “Save as”

Name the file “scenex.jpg”, where x is the scene you are drawing (for example, if I was drawing scene 1, I would name my file “scene1.jpg”

Exit the program

### **How do I see the background I have drawn?**

Make sure you are in the scene number you just created

Click on “Options”

Click on “See my Scene”

### **Why can't I see the main character?**

Enter your caption for the scene

Click on “Submit” and wait

Once you make choices in the next screen your character will appear

### **How do I exit the program?**

Click on “File”

Click on “Exit”

You will be asked if you want to save your work, so click on “Yes”

Make sure the file is saved in “C:\GIRLSTalk”

**\*\*\*When it asks if you want to overwrite say “Yes”\*\*\***

**G.I.R.L.S. Talk Software  
Group 2  
FAQ**

**How do I start?**

To begin enter user id number you were given.

How do I draw my own background?

click on "Options"

Click on "Draw My scene"

Choose "New" from window that pops up

Choose "Jumbo" for the size

How do I save the background I have drawn?

Click on "File"

Click on "Save as"

Name the file "scenex.jpg", where x is the scene you are drawing (for example, if I was drawing scene 1, I would name my file "scene1.jpg")

Exit the program

How do I see the background I have drawn?

Make sure you are in the scene number you just drew

Click on "Options"

Click on "See my Scene"

How do I exit the program?

Click on "File"

Click on "Exit"

You will be asked if you want to save your work, so click on "Yes"

Make sure the file is saved in "C:\GIRLSTalk"

**\*\*\*When it asks if you want to overwrite say "Yes"\*\*\***

## Appendix J Sample Group Schedule



### **GROUP 1** **6<sup>th</sup> and 7<sup>th</sup> Grade** **[name]**

Monday, March 7

Period 1

Wednesday, March 9

Period 2

Friday, March 11

Period 3

Tuesday, March 15

Period 5

Thursday, March 17

Period 6

Monday, March 21

Period 1

Wednesday, March 23

Period 2

## **Appendix K** Mid-workshop questionnaire

One thing that I liked about last time:

One thing that I disliked about last time:

One thing that I would change about the program we've been working on

## Appendix L Parent Letter

[SCHOOL NAME]  
Address  
[Name], Principal  
[Name], Asst. Principal  
Tel: [Number]

March 7, 2005

Dear Parents:

Shaundra Bryant Daily, an Engineering Master's student from the Massachusetts Institute of Technology will be joining us from February 28 – March 25. During this time, she will be working with students for one hour twice a week to create stories using a new software she has designed. The purpose of this story is to help the girls become more emotionally self-aware. We would like for your child to participate in this study if she is interested. Enclosed is a consent form that must be signed by you in order for your child to participate. She will receive a diary with lock and key for her participation, and if she chooses not to participate at any time she may do so. If you have any further questions you may contact her directly at (617)304-6500 or [sbdaily@mit.edu](mailto:sbdaily@mit.edu).

Please read and sign the attached form under “Signature of Research Subject or Legal Representative”. Print your name on “Name of Legal Representative” and sign on “Signature of Legal Representative”.

**Consent Form Due Date: Friday, March 4, 2005**

Thank you,

[Principal]

## Appendix M Teacher Correspondence

March 8, 2005

Dear [Name]

Hello. My name is Shani Daily. I am a graduate student at the MIT Media Lab. I will be here for the next month working with some of the female 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> graders on software I developed to help them think about their emotions. Attached is a schedule I have created for the next three weeks. If any of the days interfere with a test/quiz, we can work around it. If you have any questions/concerns, I can be reached at [sbdaily@mit.edu](mailto:sbdaily@mit.edu) or 617.304.6500.

Regards,

Shani Daily

Attachments: schedule of appointments for students

Tentative Student Schedule, March 7 – March 24

Monday	Tuesday	Wednesday	Thursday	Friday
7	8	9	10	11
Period 1 Rhonda <sup>6</sup> Nyah Brianna Latanya Elma Moneisha Latara Alexis	Period 1 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah	Period 2 Rhonda Nyah Brianna Latanya Elma Moneisha Latara Alexis	Period 2 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah	Period 3 Rhonda Nyah Brianna Latanya Elma Moneisha Latara Alexis
14	15	16	17	18
Period 3 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah	Period 5 Rhonda Nyah Brianna Latanya Elma Moneisha Period 4 Latara Alexis	Period 5 Ruth Naomi Deborah Mary Delilah Rebekah Period 4 Robyn Sarah	Period 6 Rhonda Nyah Brianna Latanya Elma Moneisha Latara <b>ALEXIS</b>	Period 6 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah
21	22	23	24	25
Period 1 Rhonda Nyah Brianna Latanya Elma Moneisha Latara Alexis	Period 1 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah	Period 2 Rhonda Nyah Brianna Latanya Elma Moneisha Latara Alexis	Period 2 Ruth Naomi Deborah Mary Delilah Rebekah Robyn Sarah	

---

<sup>6</sup> All names have been changed.

## Appendix N Attendance Sheet

Day				M	T	W	R	F	M	T	W	R	F	M	T	W	R	T
Period				1	1	3 or 6	4 or 5	2	2	4 or 5	4 or 5	6	6	1	1	2	2	3
ID#	Comp	Grade	HR	7-Mar	8-Mar	9-Mar	10-Mar	11-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	21-Mar	22-Mar	23-Mar	24-Mar	29-Mar
91	11	6 243	x,1			x,3		x,2		x,5		x,2		x,1		x,2		
31	13	6 243	x,1			x,3		x,2		x,5		x,2		x,1		x,2		
12	20	6 242	N			x,3,x,4		x,2		x,5		x,2		x,1		x,2		
790	14	6 242	x,1			x,3		x,2		x,5		x,2		x,1		x,2		
508	16	7 328	x,1			x,3		x,2		P	x,5	F		A	x,4,x,5	x,2		
767	18	7 311	x,1			x,3		x,2		x,5		F	x,3	x,1		x,2		x,3
397	22	8 309	x,1			x,6		x,3		x,6		A		x,1		x,2		x,3
48	21	8 323	x,1			x,6		x,2		x,6		x,3		x,1		x,2		
422	12	7 311		N			x,6			x,5	A	x,5	x,3		x,1		x,2	x,3
473	11	6 242		x,1			C	S			x,5		x,3		x,1,x,2		x,1,x,2	
277	13	7 328		x,1			C	x,3			x,5		x,3		x,1		x,2	
146	22	6 252		x,1			C	x,3			A	x,6	x,3	D	D	D	D	
292	14	7 324		x,1			C	x,3			x,5		x,3		x,1		x,2	
872	16	7 311		x,1			C	x,3			A	x,6	D	D	D	D	D	
335	18	8 309		A	x,6	x,4					x,6	x,3	F		x,1		x,2	
77	20	8 309		x,1		x,4					x,6		F		x,1		x,3	x,3
205	21	6 243		N			C	x,3		P	P	P	D	D	D	D		

N= No Sheet signed  
 A = Unexplained absence  
 S= Sickness

C = Conflict with another class  
 P = Suspension  
 F = Field Trip

D = Dropped from study

# Appendix O Exit Interview EPN Group

## G.I.R.L.S. Talk Program GROUP 1

Name:

1. For each question, please mark True or False

- a. I liked coming only because I got to miss class. \_\_\_\_\_
- b. I liked coming because I got to miss class and I liked working on the G.I.R.L.S. Talk program. \_\_\_\_\_
- c. I would like to share one of my stories on the internet. \_\_\_\_\_

2. I learned something about myself when I wrote these stories.

1	2	3	4	5	6	7
1= I didn't learn anything at all			4= I feel neutral			7 = I learned a lot about myself

3. How much did you like the program suggesting emotions to you?

1	2	3	4	5	6	7
1=I totally hated it			4 = I felt neutral			7 = I totally loved it

4. How often did you think the suggestions were correct?

1	2	3	4	5	6	7
1 = Never correct			4 = Half the time correct			7 = Always correct

5. When it was incorrect I felt:

1	2	3	4	5	6	7
1= Completely annoyed			4 = Half the time annoyed			7 =Not at all annoyed

6. How did you feel about being able to choose the expression of the people in your story?

1	2	3	4	5	6	7
1= I totally hated it			4= I feel neutral			7 = I totally loved it

7. How would you rate the G.I.R.L.S. Talk program overall?

1	2	3	4	5	6	7
1= I			4 = I feel			7 = I
totally			neutral			totally
hated it						loved it

8. If the suggestions didn't annoy you, Why not?

9. If the suggestions annoyed you, Why?

10. How did you choose the expressions of the other people in your story?

11. In the Emotional weighting, how did you decide where to put the chips?

# Appendix P Exit Interview PN Group

## G.I.R.L.S. Talk Program GROUP 2

Name: \_\_\_\_\_

1. For each question, please mark True or False

I liked coming only because I got to miss class. \_\_\_\_\_

I liked coming because I got to miss class and I liked working on the G.I.R.L.S. Talk program. \_\_\_\_\_

I would like to share one of my stories on the internet. \_\_\_\_\_

2. I learned something about myself when I wrote these stories.

1	2	3	4	5	6	7
1= I didn't learn anything at all			4= I feel neutral			7 = I learned a lot about myself

3. How did you feel about being able to choose the expression of the people in your story?

1	2	3	4	5	6	7
1= I totally hated it			4= I feel neutral			7 = I totally loved it

4. How would you rate the G.I.R.L.S. Talk program overall?

1	2	3	4	5	6	7
1= I totally hated it			4 = I feel neutral			7 = I totally loved it

5. How did you choose the expressions of the other people in your story?

## Appendix Q Follow-up Interview Questions

Have you ever done anything like this before?

Was there anything about the program that you really disliked? If no dislikes, what parts were your least favorite?

Was there anything about the program that you really liked? (Or: What were your favorite parts?)

How would you change it?

What was your favorite story and why?

Would you want to continue using it when I'm not around?

Do you have a question or comment for me about any of what we talked about today or any other time?

## **Appendix R** Coded Emotion Words

afraid  
angry  
confused  
depressed  
devastated  
embarrassed  
excited  
feel bad  
feel better  
happy  
jealous  
joy  
like  
love  
mad  
nervous  
sad  
scared  
surprised  
terrified  
upset