

## **Childhood Violence Prevention Education Using Video Games**

LEONARD FONTANA  
*Broward Community College*  
USA  
Lenfontana@aol.com

ADELA BECKERMAN  
*Florida Memorial College*  
USA  
Beckermana@aol.com

This article describes a project that incorporated interactive technology to teach violence prevention knowledge and skills to second grade students. The educational video games presented lessons consisting of animated characters in a story, accompanied by a number of exercises. The research issue was whether students would develop an appreciation and proficiency in the prosocial knowledge, beliefs, and attitudes about behaviors emphasized in the interactive technology materials. Empirical data collected on the students at pretest and posttest indicated change in student knowledge, attitudes, and beliefs in alignment with the sought-after learning objectives.

Studies have clearly identified youth in American society as an at-risk group for violence, both as victims and as perpetrators (Forum on Child and Family Statistics, 1997). The premise that violence is a learned behavior, and the accompanying concern about the role of the mass media and video games marketed to children in promoting this behavior has led to a large number of violence-prevention and conflict-resolution programs targeted towards school-age youth. These diverse educational programs begin with the

assumption that children develop patterns of thought and behavior regarding the solution to interpersonal problems. Children learn the efficacy of violent and nonviolent strategies to problem situations. Such learned patterns of thought and action become the child's customary way of expressing emotions and behaving when confronted with problematic situations. Learned precursors of aggressive and antisocial behaviors have been detected among children as young as 3 years old (Loeber, 1991; Patterson, Reid, & Dishion, 1998). The question facing violence prevention programs is whether nonviolent patterns of thinking and behavior can be purposefully taught to children, and whether learned violent patterns can be unlearned.

Evaluations of violence prevention programs have found generally positive results (Beland, 1991; Grossman et al, 1997; LeBlanc, Lacey, & Adler, 2000; Tolan & Guerra, 1994). While the education programs and materials developed thus far are overwhelmingly classroom-based, many successful programs have been found to extend beyond the classroom (Chaiken, 1997). Finkelhor, Asdigian, and Dziuba-Leatherman (1995), for example, found children who had instruction from parents *and* teachers were more knowledgeable than students whose instruction only took place in the classroom. The development of interactive technology may be one approach to addressing the need for effective programming for use outside of the school setting as for example in the students' home, as well as by the growing home-schooled population.

## INTERACTIVE MULTIMEDIA AND VIOLENCE PREVENTION

Interactive technology is a particularly promising tool for facilitating social learning among young children around conflict resolution and violence prevention. Interactive media can mediate and assist the young child in the creation of a meaningful knowledge structure. The learner is provided with a set of knowledge structures, lessening the demands upon the learner to create meaningful structures. The use of interactive media can, thus, facilitate the young child's ability to understand the meaning and purpose of the educational content being presented (Carlson, 1992).

The lure of interactive and graphic interface introduces a game-like atmosphere attractive to students. Concepts can be embedded in a playful environment in which children have control over the choice of information and sequencing of materials, allowing the materials to be adapted to individual learning styles (Haughland & Slade, 1988). Interactive technology has been found to be an effective strategy in teaching interpersonal skills and strategies (Bosworth, Gustafson, & Hawkins, 1994; Gustafson, Bosworth,

Chewning, & Hawkins, 1987; Orlandi, Dozier, & Marta, 1990). Students can instruct themselves, repeating simulations as often as they wish without the embarrassment of addressing somewhat sensitive issues.

What is particularly promising as a teaching tool for young children is the incorporation of animated characters that illustrate the learning objectives of the curriculum. Research on no-smoking campaigns designed to increase children's awareness of the health dangers associated with cigarettes found that those incorporating cartoon characters had a stronger impact than those employing text-only warnings (Duffy & Burton, 2000). Young children reported that warnings featuring cartoon animals are more "believable." To understand what children are able to detect from observing media characters, Knowles and Nixon (1990) presented children with a stimulus cartoon, without any dialogue or verbal cues, to determine whether they could identify emotions in animated characters. All cues came from the characters' facial expressions, gestures, expressive movements and from the music. Young children, 6 to 7 years old, were able to identify simple emotions such as a character's shyness, curiosity, puzzlement, and reluctance to do something. In other studies (Huston, et al, 1992; Knowles & Nixon, 1990) young children were also found to have the cognitive capacity to incorporate information provided about a character into pre-existing schemata they have about emotions and behavior. Dorr (1983, 1985) found young children readily identify the emotional content of characters when they display facial expressions with which children are familiar in real life. Young children have the capacity to identify characters' feelings, but not to construct a full understanding of the reasons for those feelings.

## RESEARCH ISSUES AND DESIGN

This article describes a study of an experimental educational video game designed to teach violence-prevention knowledge and skills conducted in second-grade classrooms in several South Florida schools. The video game presented animated peace education lessons which highlighted core concepts about problem-solving, conflict-resolution, and violence-prevention. The lessons consisted of animated characters in a story accompanied by a number of exercises. Responses reflecting appropriate attitudes and knowledge were rewarded by positive comments and electronic displays acknowledging appropriate attitudes and skills acquisition. Some of the animated characters were designed to be engaging and heroic. Others were designed to promote antisocial and conflict-promoting attitudes and behavior.

The study examined whether the educational video game was a viable approach to teaching violence prevention. Of particular interest was whether students would develop an appreciation of, and proficiency in, the knowledge of prosocial beliefs, attitudes, and behaviors emphasized in the interactive technology materials. Also of interest was whether the students were enthusiastic about, and would attend to, the video for concentrated periods of time.

Fourteen second-grade classes in five elementary schools were divided into two groups, with eight classes constituting the experimental group and six in the comparison group. The 90 students in the experimental classes had access to the interactive video game and classroom instruction. The 114 students in the comparison group were not engaged in any formalized violence prevention curriculum. The two groups were similar in gender with 44% of the experimental group being male, compared to 57% in the comparison group. The experimental group, however, contained more Hispanic and African-American students (82%) than did the comparison group (55%).

### Pre and Posttest Questionnaire

Students in both the experimental and comparison groups were administered a paper-and-pencil pretest and posttest designed to measure their understanding and agreement with the core concepts of violence-prevention and conflict-resolution emphasized in the video game. The questionnaire was administered to experimental and comparison group students prior to the introduction of the video game to the experimental group, and again after the experimental group had used the video game for several months.

The questionnaire consisted of items designed to assess knowledge and attitudes related to human behavior and conflict resolution strategies. These indicators were adapted from a compendium of assessment tools published by the Centers for Disease Control and Prevention (Dahlberg, Toal, & Behrens, 1998) and research conducted by Dodge, Bates, and Petit (1990). The questionnaire consisted of a series of statements which students were asked to determine to be "true" or "false." A set of 32 statements and vignettes were posed assessing 14 constructs. Seven constructs sought to examine the area of human behavior, specifically examining students' level of knowledge and attitudes about expressions of anger and feelings, mean behavior, interpersonal conflict, personal responsibility, and mutual respect. The other constructs concerned seven conflict resolution strategies—anger management strategies, friendship strategies, talking strategies, adult assistance strategies, thinking strategies, and listening strategies.

The items concerning human behavior included statements such as, “If someone calls you a bad name don’t let them know how they made you feel,” “Some kids are just born to act mean,” and “When you do mean things it is not your fault.” Other items posed a range of statements about conflict-resolution strategies, including those addressing anger management (“It’s OK for boys to fight but not for girls”) and seeking adult assistance (“Only a ‘baby’ asks an adult for help when a bully keeps picking on them.”). The pre/posttest instrument also presented several vignettes posing conflict-prone situations in the school setting. These vignettes challenged students to resolve situations in which students are unwilling to share playground equipment, have not returned borrowed markers, and are bullying.

Prior to the administration of the questionnaire, construct and content validity testing was conducted. The questionnaire was then administered to second grade students in four school districts in several states. Test-retest reliability was .69 ( $p < .001$ ), indicating commonly accepted scores of reliability. Test-retest correlations of individual items were significant ( $p < .001$ ).

## EDUCATIONAL VIDEO GAME

Data were also obtained from experimental group students during their use of the video game. The video game presented the students with an animated story, the *Invasion of the Foozles*<sup>TM</sup>, and exercises designed to measure their understanding of, and ability to apply conflict resolution concepts and strategies. While the video game was developed for a second grade reading level, the students were not required to read any text. Animated characters accompanied by visual prompts and music recited the story and engaged the students in the video game. Students were free to play the video game as often, or infrequently, as they desired for a period of several months. Students were assigned passwords, which enabled data to be collected by the computer on the amount of time each student spent using the video game, and on responses to questions posed during the game.

The video game was designed to measure students’ identification of conflict-ridden and peaceful concepts, and their appreciation of conflict-prevention and dispute resolution strategies. The *Invasion of the Foozles*<sup>TM</sup> story presents a class of young students who are behaving poorly. The teacher, distressed about her students’ behavior, is happy when a heroic animated character, Gopher Peace, arrives in his colorful spaceship, the Peace Mobile, and transports the class to the planet Bliss. On the planet Bliss, the students witness a land full of people who constantly use Foozles, which, as

presented in the video game, are words and actions such as lying and name-calling that people use to hurt each other. The story demonstrates that Fozzles are hurtful and can become ingrained in the daily interpersonal behaviors of the residents of the planet Bliss. Gopher Peace invites the viewer to develop an appreciation of how harmful Fozzles are and, as an alternative, to consider ways to use peacemaker words, beliefs, and behaviors. The student-visitors to the planet Bliss soon view Fozzles as unappealing, and begin to consider peacekeeping strategies to eradicate Fozzles. They share this knowledge with the people of Bliss. The students' efforts to resolve conflicts and avoid Fozzles continue when they return to Earth and after becoming Peace Rangers™, remove Fozzles from their midst.

After the story, the students were asked a series of questions about whether they liked the story and Gopher Peace, and whether they liked being a Peace Ranger. Their responses were stored in the computer software under each student's file. The students were then invited to play the *Launch the Peace Mobile* game which was designed to assess students' recognition of the difference between Fozzles and peacemaking terms. The student is presented with an array of Fozzles, words such as grabbing, and peacemaking words, like *sharing*, and is asked to load the colorful Peace Mobile rocket ship with peacemaking words. The Peace Mobile is programmed to blast off when filled with nine non-Fozzle words, rewarding the student for selecting desirable terms. Similarly, a buzzing sound is triggered when a student enters a Fozzle word into the rocket ship, alerting the student that a Fozzle has been used and discouraging its use. The game is designed so there is no limit to the number of times a student can try to load the rocket ship with both appropriate and inappropriate words.

In the second game, the *Tunnel Funnel* game, students walk through a dark tunnel and observe three conflict-ridden situations. In each, they are presented with several problem solving strategies, only one of which promotes a peacekeeping approach. In the first conflict situation, a girl (who represents the student playing the game) has the toy she is playing with grabbed away by her brother. Gopher Peace appears and encourages the student to tell the brother how she feels, and ask for the toy back "nicely." The Fozzle characters encourage the student to either hit the brother, or to think of ways to "get even" with him. In the second vignette, viewers are presented with a situation in which a ball they are playing with breaks a vase. In the third, the player witnesses a girl ice-skater fall down. In each situation, the Gopher Peace character appears and encourages the student to use the peacemaking strategy. Fozzle characters also appear, encouraging conflict producing responses.

## DATA ANALYSIS

Initial analysis compared the pretest and posttest questionnaire scores for the experimental and comparison groups. These scores consisted of the summation of correct responses divided by the total number of questions; the score of 100 indicates that correct responses were given to every question posed. An analysis of variance for repeated measures found a significant difference ( $p < .001$ ) between the two group scores. The average score for the experimental group *increased* from 74 to 77 while the average score of the comparison group *decreased* from 77 to 75.

An analysis of variance for repeated measures also examined whether there was a significant difference in the students' knowledge and attitudes regarding human behavior and their conflict resolution strategies between the time of the pretest and posttest (Table 1). As indicated earlier, the questionnaire statements reflected 14 constructs, 7 of which addressed knowledge and attitudes regarding human behavior and 7 of which addressed knowledge and attitudes regarding conflict resolution strategies. Students' scores on each construct indicated the number of correct responses to the questions that measured that construct.

The use of Repeated Measures ANOVA allowed for an examination of whether the increase found between the pretest and posttest scores was significantly greater for the experimental group than for the comparison group. An  $F$  ratio was calculated to measure the amount of between-groups and within-groups variance for the pretest and posttest score of each group. Paired sample  $t$ -tests were also examined to affirm whether gains found to be significant could be attributed to the experimental or comparison group.

Significant positive changes were found in the level of the experimental group's knowledge and attitudes about human behavior and in their understanding of how to respond to potentially conflict-ridden situations (Table 1). When compared to the students in the comparison group, the experimental-group students demonstrated positive change in their understanding of the nature of "interpersonal conflict," indicating a heightened recognition that all children have disagreements. While both the experimental and comparison group students demonstrated significant change in the area of "responsibility," the changes were in the opposite direction. The experimental group students indicated a significant *increase* in their recognition that children are responsible for their behavior, while the comparison group students experienced a significant *decrease* in their appreciation of this concept.

**Table 1**  
Repeated Measures ANOVA. Pretest and Posttest Mean Scores on Indices

Indices	Pretest Mean Experimental Comparison		Posttest Mean Experimental Comparison	
	(n=90)	(n=114)	(n=90)	(n=114)
Knowledge and attitudes about human behavior				
Feelings	4.8	4.8	5.0	4.7
Anger	6.6	6.5	6.4	6.6
Expression of feelings	4.8	4.8	5.0	4.7
Acting mean	4.7	4.4	4.6	4.3
Interpersonal conflict <sup>b</sup>	4.3	4.6	4.9	4.6
Responsibility <sup>a</sup>	6.0	6.5	6.4	6.1
Respect	5.4	5.4	5.6	5.4
Knowledge and attitudes about conflict resolution				
Anger management <sup>b</sup>	6.7	6.9	7.8	7.2
Friendship strategies	4.4	4.6	4.3	4.4
Talking strategies	4.3	4.3	4.5	4.4
Adult assistance strategies	4.6	4.9	5.2	5.3
Thinking strategies	5.3	5.3	5.5	5.4
Listening strategies	5.0	5.3	3.4	3.5
Vignette <sup>a</sup>	9.6	10.6	10.5	10.3

<sup>a</sup> $p < .001$ , <sup>b</sup> $p < .01$

Experimental group students also demonstrated a heightened understanding and appreciation of two of the conflict management strategies emphasized in the video game. They indicated significantly greater acuity in considering the benefits of “anger management strategies” than the comparison group students. While both the experimental and comparison group demonstrated significant change in the area of “behavioral strategies,” the changes were in the opposite direction. The experimental group indicated a significantly *increased* appreciation of behavioral strategies while the comparison group students demonstrated a significant *decrease* in this area.

ANOVA did not indicate significant increases in all of the dimensions emphasized in the interactive curriculum. Significant change was not recorded for most of the areas of knowledge and attitudes about human behavior and conflict resolution strategies. The paired sample *t*-tests, however, found

significant pretest-posttest changes in two areas that, while not meeting the threshold required for the Repeated Measures ANOVA, suggests that further refinement of the video game may result in reaching the expected learning outcomes. Experimental group students, at the time of the posttest, demonstrated enhanced recognition of the importance of showing “respect” ( $t=1.97$ ,  $p=.05$ ) and of using “thinking strategies” ( $t=2.15$ ,  $p<.05$ ) for “problem-solving.”

### Performance on the Video Game

As indicated earlier, the video game program posed questions to the individual user and measured the duration of usage. Students’ responses during their first encounter with the games were examined to measure their reaction to the characters in the stories and what they learned from the story and educational games. The data analysis indicates positive changes following use of the video game. The majority of the students were able to process the intent of the *Invasion of the Fozzles* story, recognizing the merits of the messages conveyed by the animated Gopher Peace character and appropriately applying the lessons learned to the two games. Almost all (96%) of those students who played the *Launch the Peace Mobile* game were able to load the Peace Mobile with the appropriate nine words, enabling the rocket ship to blast off, and most (74%) accomplished this without loading any Fozzles. Students also appropriately applied the learned lessons to the *Tunnel Funnel* game, selecting the peacemaking strategies that were encouraged by Gopher Peace in the toy-grabbing (88%), vase-breaking (88%), and fallen-skater scenarios (87%).

One of the stated goals of the research was to measure “enthusiasm” for the games. The students’ enthusiasm for the games was indicated by the amount of time they spent on the video game, their responses to questions about the characters and the stories, and the reports given by teachers, which are described in the next section of this article. When asked to rate the games, most rated the *Launch the Peace Mobile* game (83%) and *Tunnel Funnel* game (81%) as “great.” The length of time the students played the games was also tracked. Students were found to play the games for concentrated periods of time with a median period of two minutes time spent on *Launch the Peace Mobile*, and three minutes spent on *Tunnel Funnel*.

Further analysis examined whether there was a relationship between the amount of time spent on the *Tunnel Funnel* game and any changes in students’ knowledge and attitudes in the areas emphasized in the video game. A significant positive relationship was found between the time students spent playing the *Tunnel Funnel* game and their overall game scores for the three

vignettes presented ( $r=.388$ ,  $p=.00$ ). Student willingness to concentrate on the game yielded an enhanced understanding of the prosocial methods of handling the conflictual situations presented in the video game.

The relationship between students' performance on the games and changes in their knowledge and attitudes as measured with the paper and pencil questionnaire was examined. Significant relationships were found between time spent on the *Launch the Peace Mobile* game and increases in the areas of "expression of feelings" ( $r=.308$ ,  $p=.00$ ), "respect" ( $r=.362$ ,  $p=.00$ ), and "behavioral strategies" ( $r=.270$ ,  $p=.01$ ). Significant relationships were also found between time spent on the *Tunnel Funnel* game and increases in the areas of "feelings" ( $r=.266$ ,  $p=.01$ ), "expression of feelings" ( $r=.0229$ ,  $p=.03$ ), "respect" ( $r=.262$ ,  $p=.01$ ), "behavioral strategies" ( $r=.301$ ,  $p=.01$ ), and an appreciation of "adult assistance strategies" ( $r=.321$ ,  $p=.01$ ).

### Teachers' Evaluation of the Educational Video Game

The eight teachers in the experimental group were asked to complete a questionnaire about their students' experiences using the video game, and about their own perceptions of its educational value. All of the teachers reported that most of their students were enthusiastic about using the video game and talked about the characters or the story line with their teachers and other students after playing the games. As one teacher noted, "[The students] recalled how the Fozzles responded and they reminded each other not to follow the 'Fozzle way.'"

The student's enthusiasm was further affirmed by the finding that none of the students had to be pressured to use the video game. Most of the teachers noted that their students "love" playing on computers and never resist an opportunity to do so. Teachers noted that their students' "...interest as well as enthusiasm grew," that they "really enjoyed working on the video game," and that they "...love computers and wanted to [play the video game] over and over at anytime."

All of the teachers reported the students could work on the video game independently and did not need assistance on any ongoing basis while playing the games. All of the teachers affirmed the benefits of the video game, sharing positive comments, such as, "Students were able to interact personally with the program," "The concepts and ideas were reinforced and clarified," and "[The students] got to hear and see what was going on and it kept their attention; they focused on the computer."

Despite this, the teachers reported considerable variation in their students' ability to understand all of the components of the video game. About

one third of the teachers thought the material was too “challenging,” noting that some of the vocabulary used was too difficult. In contrast, one third of the teachers reported the video game was “too simple.” These teachers indicated their students enjoyed playing the computer games and enjoyed the graphics and the animated characters, but did not find the story and games challenging.

All of the teachers suggested that other Gopher Peace and Peace Ranger stories should be developed in the format of interactive technology. Most also noted it would be beneficial to have their students use Gopher Peace stories and games in video game format at home, and that parents would be receptive to its use at home. Two of the teachers were hesitant, however, because they did not know if their students have a computer or have access to one at home.

## DISCUSSION

The idea of using video games technology to deliver a violence prevention curriculum is relatively new to childhood education. This research sought to address the question of whether video games technology can be used as an effective forum and safe haven for children to learn and test newly acquired knowledge regarding violence prevention and conflict resolution. The research examined whether animated games and stories embedded in an interactive video game format could facilitate the educational objectives of a violence-prevention program for second-grade students. The research found the interactive video game a valuable learning platform that effectively conveyed the message of conflict resolution. The animated characters encountered in the stories appeared to be able to convey serious lessons regarding conflict resolution. Most students followed the lead of the animated peacemaking character in the choices they made when playing the games. Empirical data collected on the students as a pretest and posttest indicated changes in students’ knowledge and attitudes in alignment with many of the sought-after learning objectives of the video game. Positive changes occurred in the areas identified in the research as: “interpersonal conflict,” “responsibility,” “respect,” “anger management strategies,” “thinking strategies,” and “behavioral strategies.” The research also found time spent playing the games correlated with achieving high game scores and an enhanced appreciation of “expression of feelings,” “feelings,” “respect,” “adult assistance strategies,” and “behavioral strategies.”

Of significance when considering the issue of portability between home and classroom use, is the findings that students were able to play the video

game independently without continual assistance or supervision of their teacher or other students, and enjoyed interacting with the characters in the story and playing the games presented.

The research suggests the potential positive benefits of delivering the violence prevention message to elementary school-age children through the platform of “playing a video game.” In light of the changes that occurred to the second-grade students in the study, such technology in peace-education and conflict-resolution programming may deserve a new status as a potential contributor to the development in children of prosocial attitudes. Recent research suggests that children may make more use of a computer at home than at school, and the most popular activity on the home computer are games (Mumtaz, 2001). Playing video games is a common activity for most children. Using conflict resolution curriculum content in a video game format appears to have the advantages of teaching students from an angle that is interesting and relevant and transferable to a child’s home computer.

While socio-dramatic games are already used in the classroom, the introduction of such games into the classroom through computer technology has, at times, been met with resistance from both teachers and students. Studies have found that students often view educational software as boring (Giacquinta, Bauer, & Levin, 1993). Teachers’ resistance may be based on the perception of video games as mere entertainment, apprehension of computer-assisted instruction, or experiences with poorly designed hardware and software (Bennet, Wood, & Rogers, 1997). The Peace Rangers videogame, in contrast, was found to obviate such resistance among teachers and student concern that educational games are boring. Students in the experimental group who successfully played the video games were involved in a concentrated and attentive learning experience. The teachers in the study welcomed the technology-centered learning environment presented. The video game offered them a valuable resource that could be aligned with the classroom curriculum and serve to make the subject matter entertaining and vibrant for their students. The experiences of the students and teachers suggest that video games as an instructional tool may increase students’ attention and concentration.

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