EFFECTS OF AN ONLINE RATIONAL EMOTIVE CURRICULUM ON PRIMARY SCHOOL STUDENTS' TENDENCIES FOR ONLINE AND REAL-WORLD AGGRESSION

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ABSTRACT
This study investigated the relationship between online and real-world aggressive behavior among primary school students as well as the effects of an online rational emotive curriculum on reducing the tendency of students to display aggression online and in the real-world. We developed an online information literacy course integrated with rational emotive behavior therapy (REBT) to reduce aggressive behavior, using online incidents of hostility as instructional material. An experiment was conducted on four intact Grade 5 classes comprising 67 students using rational emotive curriculum. Control groups comprising 63 students took the same course without the rational emotive curriculum. All of the students participated in one class per week for six weeks consecutively. Our results indicated: (a) a moderate correlation between online and real-world aggressive behavior among primary school students; and (b) the online rational emotive curriculum had a significant effect alleviating aggressive behavior among students with strong hostile tendencies.
Keywords: rational emotive behavior therapy, aggressive behavior, online incidents of hostility, online rational emotive curriculum

INTRODUCTION
With the dawn of the information age, online interaction has become an important aspect of education among children and adolescents (Liu & Chang, 2010; Yagci & Caglar, 2010). Online interaction has both positive benefits as well as negative consequences (Chang, Liu, Lee, Chen, Hu, & Lin, 2011; Chen, Liu, Shih, Wu, & Yuan, 2011; Chiang, Lin, Cheng, & Liu, 2011; Hou, 2010; Liu, Lin, & Chang, 2010; Liu & Lin, 2007; So, 2010; Yagci & Caglar, 2010), enabling participants to exchange ideas freely, thereby attracting others to join the discussion and deepen the understanding of the topic (Hou, 2010; Liu & Chang, 2010; Liu & Lin, 2007). Aggressive behavior is found not only in real-life situations but also online (Yagci & Caglar, 2010) in the form of "flaming", and this type of behavior has seen a dramatic increase following the development of internet technologies. Due to the irrationality of online aggressive behavior, most research on this topic has investigated the causes of such behavior as it relates to the use of technology (Yagci & Caglar, 2010). A few studies have examined the psychological processes associated with online aggression, aiming to develop measures with which to predict, prevent, and treat such behavior (Lin & Hwang, 2005). Although these studies have shed some light on the issue of correcting online aggressive behavior, they have focused primarily on addressing the behavior directly.

Many aggressive outbursts in everyday life are the result of a lack of appropriate instruction, and have been found to be closely related to cognition and emotional factors (Ellis, 2001). Education related to the prevention of such behavior must address cognitive processes, emotional responses, and behavioral patterns. Ellis's (2001) stated that aggressive behavior is generally not caused by the event itself. Negative emotional responses can be mitigated through self-change, self-correcting beliefs, and internal self-persuasion. To prevent aggressive behavior, Ellis (2001) proposed rational emotive behavior therapy (REBT), which assumes that the emotions of troubled individuals are the result of events with corresponding thoughts, feelings, and behavioral patterns (Ellis, 2000, 2001; Gonzalez et al., 2004). In other words, negative emotions and aggressive behavior can be decreased

by self-correcting thinking and internal self-persuading language. In this manner, negative behavior can be transformed into positive thinking and constructive discussion (Gonzalez et al., 2004).

Rational emotive behavior therapy (REBT) was originally applied as a form of psychotherapy with which to alter dysfunctional thoughts, emotions, and actions in real-life situations. Recently, REBT has been adopted by researchers to tackle the issues of online aggressive behavior and internet addiction among adolescents (Ko et al., 2009), and address the relationship between internet addiction and belief of frustration intolerance in gender difference (Ko et al., 2008). Nonetheless, the question of whether a link exists between real-life and online aggression remains unanswered. In addition, determining the means by which to prevent online misbehavior among children and adolescents has not been adequately addressed, particularly with regard to cognitive processes, emotional responses, and behavioral patterns. Because aggressive behavior in childhood and adolescence is a risk factor for violent behavior in adults (Huesmann, 2007), it is crucial to develop measures for the prevention of aggressive behavior at an early age.

In light of the above issues, the aim of this study was to develop an online curriculum applying the concept of REBT for use in blogs as part of a literacy course aimed at primary school students. An online learning environment was created with the express purpose of altering cognitive beliefs, countering irrational emotional responses, and establishing a rational system of values. In such an environment, students would be able to face online hostility, and learn to think critically about the information they obtain online. It is expected that this could alleviate the generation of online hostile behavior making online discussions a bastion of rationality and positivity. The study sought to discover the following:

a. Whether a linkage exists between online and real world aggressive behavior among primary school students;
b. To determine the effectiveness of an online curriculum based on REBT for the prevention of aggressive behavior among primary school students.

HOSTILITY AND AGGRESSION

Hostility is the result of a negative evaluation of an entity. Psychologically, hostility is closely related to aggression. Hostility includes a predisposition towards aggressive behavior, expressed mainly through insults, the destruction of objects, and the infliction of harm. "Aggression implies a further step, in the sense that it includes the appearance of behaviors that may be destructive, harmful or punitive when directed to other people or objects" (Ramírez & Andreu, 2006, pp. 280–281). In many cases, hostility is the result of a divergence between the beliefs and concepts of one individual and those of others. An inability to adjust imbalances in one's cognition leads to feelings of anger, which in turn trigger aggressive behavior. In general, hostility is a result of a negative cognitive understanding, an emotional response, or a specific physiological phenomenon. Hostility operates at a negative cognitive level, an angry emotional level, or an aggressive response level; however, aggressive behavior is not an inevitable response when confronted with hostility (Berkowitz, 1998). Berkowitz (1998) proposed a cognitive neo-associative conception of anger to explain how people respond to negative feelings. Based on this proposal, anger represents the emotional response of an individual to a negative incident. The individual initially processes this incident by either attacking or escaping. It is easy to escape if one feels "fear," whereas the emotion of "anger" leads to an angry counterattack. A feeling of anger is not necessarily related to an individual; any negative event can trigger anger (Berkowitz, 1993, 1998).

Aggression is intended mainly to cause harm to other people, with an immediate purpose of hurting the other person. Derlega and Janda (1986) maintained that the intent of aggression is for individuals to protect one's territory and the members of one's in-group or for leaders to ensure the survival of their group. In social psychology, intentional aggression includes angry retaliation, self-defense, and purposeful acts of violence. These behaviors can be classified into two categories according to their goals (Derlega & Janda, 1986; Geen, 1998):

(a) Affective aggression—Aggression has a fixed target and is deliberate, with intent to do physical or mental harm. The goal or reinforcement is to inflict pain or suffering on the victim. This is also called angry aggression, emotional aggression, response aggression, or hostile aggression.
(b) Instrumental aggression—Aggressive behavior is used as a means to seize goods, status, or to achieve objectives.

Geen (1998) described a process of affective aggression and the factors influencing it. Apart from the hostile event that triggers aggressive emotions, *previous experience, social learning, and background* factors may also contribute to aggressive behavior. These are the factors established prior to a demonstration of aggressive

behavior, which may also influence changes in the process of cognition among individuals (Geen, 1998). A great deal of evidence has indicated that non-action responses often occur in conjunction with affective aggression, including hostile cognition, angry emotion, and physical responses; and emotional responses may lead to the attack of an available target (Berkowitz, 1998). Other studies on affective aggression have categorized the factors influencing aggressive behavior as individual factors and environmental factors (Geen, 1998; Bandura, 1986). Individual factors refer to the intrinsic characteristics of an individual leading to aggressive behavior, including influences of gender, personality, and socialization. Environmental factors refer to influences from the external environment causing individuals to exhibit aggressive behavior, including provocation, alcohol, weapons, violence in media, anonymity, and even the weather.

When individual are faced with offensive and discomforting situations online, their emotional response following hostile cognition is considered affective aggression. It is not an instrumental aggression that aims at achieving benefits. In this study, aggression refers to affective aggression.

ONLINE HOSTILITY AND AGGRESSION
In their study on online hostility among college students, Lin and Huang (2005) defined online hostility as "sensing of malicious intention or unfair event, and mainly a cognitive component of aggression . . . a response of negative tendency or unfair treatment, mostly regarded as an attack of the cognitive component." Offensive online behavior resulting in negative cognition, emotion, or behavior among other people, such as anger, aggression, neglect, and fear are considered the primary source of online hostility. The characteristics of the internet may contribute to dissocial or anti-social behavior among online users, which, in turn, triggers online hostile behavior. Many characteristics of the internet, such as text-based communication, anonymity, lack of social cues, and network communication, reduce the level of self-awareness, self-control, and even the cognitive capability of individuals when online (Derks, Bos, & Grumbkow, 2007). In this manner, negative attitude, beliefs, judgments, and other hostile emotions toward other people can be directly expressed online, hurting other people and producing dissocial or anti-social behaviors.

The most common form of online hostile behavior is "flaming". Flaming refers to speaking incessantly online with what appears to be a ridiculous attitude on an uninteresting topic, which produces unrestrained behaviors in the hacker society (Thompsen, 1993). Flaming is also defined as "hostile, insulting language in computer-mediated communication" (Wang & Hong, 1995, p. 1). The term flaming is a rather extensively used with regard to negative anti-social behavior on the internet. It is also viewed as a component of social emotion, including the expression of hostility, the use of profane words, and the release of strong emotions, which are unrestrained (Thompsen, 1993; Thompsen & Foulger, 1996). People flame when others violate the rules of internet culture, when there is ethnocentrism, and when people misunderstand one another (Wang & Hong, 1995).

In recent years, various forms of flaming have evolved, and cyber-bullying is one of them. Cyber-bullying refers to the behavior of threatening other people through words on either the internet or other related platforms (Li, 2007). Thompsen and Foulger (1996) assumed that flaming has its own developmental stages, and classified flaming into the following five patterns at different stages:

(a) Divergence—At least two different opinions exist with regard to a single problem or particular topic of discussion.
(b) Disagreement—Participants provide direct evidence to support one's own arguments against others. This is merely disagreement without attacking other people's opinions.
(c) Tension—The participant criticizes the opponent's argument by overstating their own beliefs.
(d) Antagonism—The participant attacks the opponent by exposing the opponent's name and personal characteristics, and damaging the opponent's credibility without paying particular attention to the issue of debate.
(e) Profane antagonism—The participant expresses excessive hostility, aggressive behavior, verbal profanity, arrogant words of attack, and mischievous complaints, which is divergent from the original topic, and merely ignoring the original disagreement in the discussed topic.

According to the developmental patterns associated with flaming (Thompsen & Foulger, 1996), an examination of flaming in academic mailing lists (Wang & Hong, 1995), and the cognitive neo-associative concept of anger (Berkowitz, 1998), information conveyed through hostility often shifts the opinions of internet users, thereby creating hostile feelings toward the information. This, in turn, generates anger, hostility, and aggression or causes it to be simply ignored. Different responses caused by the hostile information are generated, according to the previous life experience, personal characteristics, network properties, and environmental factors of the internet user.

Differences in response patterns lead to related discussion strings on the internet. In the discussion string, internet users can observe, learn from, and influence one another, contributing to higher level cognitive processing. If the discussion is rational, and contributes to a deeper discussion of the topic, we call it rational flaming. However, if the discussion becomes irrational, such as calling people names and making hostile attacks, it is an example of online hostility. If such flaming continues, it leads to "profane antagonism", causing people to completely ignore the original topic and leading to hostile or aggressive behavior.

In this study, flaming is associated mainly with the use of text messages involving negative or humiliating information when internet users communicate online, which contributes to anger, hostility, and aggression.

RATIONAL EMOTIVE BEHAVIOR THERAPY

Rational Emotive Behavior Therapy (REBT) was proposed by Albert Ellis in 2000, as an evolution of Rational Therapy (RT) from 1955 and Rational Emotive Therapy (RET) in 1961. REBT assumes on the one hand that people have an intrinsic potential for rational thinking; on the other hand, people are prone to direct emotional responses without reasonable judgment, thereby falling into the trap of irrationality. This therapy involves the reconstruction of the self-statements of individuals, resulting in the adjustment of their behavior. REBT is adopted to guide people to examine and alter their fundamental values. Ellis has comprehensively demonstrated the efficacy of the therapy using the "*A-B-C-D-E* approach". This approach states that in most cases, it is not *A,* the event itself (A, activating event) that contributes to emotional consequences (C, consequences), but rather the associated beliefs (B, beliefs). Through *A*, a disputation (D, disputation) arises, to generate a new effect (E, effective rational outlook). REBT therapy suggests that it is not usually the event itself that causes negative emotions. Negative emotions are also related to corresponding thoughts, feelings, and behavioral patterns (Ellis, 2000, 2001; Gonzalez et al., 2004). In other words, negative emotions can be reduced by self-changing, self-correcting beliefs, and internal self-persuasion, enabling a reduction in hostile behavior, or transforming it into positive thought processes and constructive discussion (Gonzalez et al., 2004).

REBT emphasizes the flexibility of individual beliefs and behavior. The assumption on which the therapy is based is that negative emotions regarding frustration, rigidity, and extreme behavior are generally caused by the creativity and biological tendencies of the individual, although they may also stem from the environment or culture (Ellis & MacLaren, 2005). When one is experiencing emotional pain, he/she is not only affected by the event itself, but also by the fact that it bothers them. According to REBT, people can select whether to be bothered by an event or to moderate negative cognition, emotion, and response through thinking, feeling, and acting (Ellis, 2000, 2001; Gonzalez et al., 2004). In REBT, evaluation is a continuous process. The treatment usually involves diagnosis as a principal method. Using REBT, one can quickly identify adverse events (A) that upset a person the most, the person's irrational beliefs regarding the adverse event, whether or not the person can realize these irrational beliefs, whether or not he or she can strongly dispute (D) those beliefs, and what effective rational outlook (E) might result in. Gonzalez et al.'s showed that REBT is effective for children and adolescents with or without psychological problems. However, the effects were better for mentally unstable people than for mentally healthy people. The longer the therapy was used, the better the results were. This treatment proved more effective for children than adolescents (Gonzalez et al., 2004).

Although the literature associated with the issues of hostility and aggression has shown that an individual with stronger hostile tendencies is more likely to demonstrate aggressive behavior, in this study, we assumed that a link exists between online and real-world aggressive behavior. By implementing an online curriculum integrated with REBT, individuals are able to develop a positive behavioral response model, thereby decreasing or avoiding aggressive behavior both online and in real life environments.

METHOD

This research was a quasi-experimental study, designed to examine the association between online and real-world aggressive behavior among primary school students. In addition, we studied the effects of an online rational emotive curriculum on reducing the tendency of students to exhibit aggression in both the online and real-world. A rational emotive curriculum was integrated with Rational Emotive Behavior Therapy (REBT) to help reduce aggressive behavior in an online course on information literacy, using online incidents of hostility as teaching material.

PARTICIPANTS

The subjects in this study were from four intact Grade 5 classes A, B, C, and D. The students were offered the opportunity to join an information literacy course using online incidents of hostility as teaching material. Classes A and B with 67 students were randomly assigned the role of experimental group, and Classes C and D with 63 students were randomly assigned the role of control group. The experimental groups were offered an information

literacy course combined online rational emotive curriculum, and the control groups received the same information literacy course without online rational emotive curriculum. All of the classes were taught by the same teacher and conducted on the same blog platform (Xuite). All of the students took one class per week for six consecutive weeks.

A questionnaire survey was conducted to divide the experimental and control groups. The students in the four classes were administered the hostile tendency scale (30 questions). An independent-sample t-test was performed on the hostile tendency scores of each class. The average scores of the experimental group and the control group were 61.82 and 65.44, respectively, with insignificant homogeneity in the variance test (F=.13, p=.72). The result was t=-1.94 (not significant), indicating no significant difference in hostile tendencies among the students in the 4 classes. Next, we divided the students into experimental groups and control groups based on the median hostile tendency score of 63.5, with maximum score and minimum score of 92 and 38, respectively. Students in the experimental groups and the control groups were listed on the basis of the scores derived from this scale. Within each group, the students were then divided into sub-groups showing a strong or weak tendency for hostility according to the median score. In consideration of gender and the classes that the students were in, we selected students with similar scores to form experimental and control groups comprising students with a strong tendency for hostility, and experimental and control groups with weaker tendencies. Each group had 6 boys and 6 girls.

INSTRUMENTS
Three instruments were used in the study, covering a hostile tendency scale, real-world aggression scale, and online aggression scale.

Hostile Tendency Scale
The scale initially had 48 questions, which was later reduced to 30 questions through factor analysis. The KMO value was 0.87, indicating that this scale well suited for factor analysis. This explained 57.7% of the total variance. The overall internal consistency reliability (Cronbach's factor) was 0.88. These 30 questions covered six independent factors including experience with online hostility, witness to online hostility, hostile attitudes, internet characteristics, online interpersonal suspicion, and self-esteem.

Real-world Aggression Scale
The scale initially had 30 questions, which was decreased to 16 questions through factor analysis. The KMO value was 0.94, indicating that this scale very well suited for factor analysis. This explained 56.87% of the total variance. The overall internal consistency reliability (Cronbach's factor) was 0.91. These 16 questions covered three independent factors, including verbal attacks, physical attacks, and emotional responses to an object.

Online Aggression Scale
The scale initially had 30 questions, which was decreased to 20 questions through factor analysis. The KMO value was 0.90, which indicates that this scale very well suited for factor analysis. This explained 58.42% of the total variance. The overall internal consistency reliability (Cronbach's factor) was 0.88. These 20 questions covered four independent factors, including verbal attacks, group attacks, expression of anger, and ignoring the rights of other people.

PROCEDURE
Both the experimental groups and control groups used the same blog platform (Xuite) for hands-on blog exercises and were exposed to the same stimulus of online hostility. Children from the control group shared the same accounts for the study, which was equivalent to having partial internet anonymity. The experimental group was provided online rational emotive curriculum adjusted to the information literacy course, enabling students to realize the irrational aspects of online hostile incidents, thereby discovering what kind of thought processes, emotions, and responses these irrational aspects would incite in them and other people. They also learned how to resist irrational responses and seek a more appropriate response to the incident. The control group did not have this training. The teaching hours were the same for all groups (6 classes, 240 minutes in total). To avoid the John Henry Effect and the Hawthorne Effect, the students did not know which group they were in during the entire teaching and testing process. They were informed only after the teaching experiment had been completed.

RESULTS
The Relationship between "Online Aggression" and "Real-world Aggression": Correlation Analysis Prior to Teaching
The four Grade 5 classes were evaluated using scales to determine the level of both online aggression and real-world aggression. The scores for online aggression ranged between 20 and 65, and the scores for real-world aggression ranged between 21 and 43. The average of the two scores was subjected to correlation analysis. Table 1 shows that the Pearson product-moment correlation factor between the two variables was .62, indicating that

the variables were significantly correlated. A correlation factor of .70 ~.99 is considered highly correlated, .40~.69 is considered moderately correlated, and .10~.39 is considered in low correlation. According to this standard, online aggression and real-world aggression were moderately correlated with statistical significance prior to instruction.

Table 1 Descriptive Statistics and Correlation Analysis of Online Aggression and Real-world Aggression before Teaching

	Item	N	Mean	SD	r
Online aggression	20	67	2.28	9.65	.62**
Real-world aggression	16	63	1.91	8.85	

**p<.01

After removing the effects of hostile tendencies causing aggression (third variable), the net correlation of the two variables was .53, p<.001. This is significant, indicating that these two variables were still moderately correlated with statistical significance.

The Relationship between Online Aggression and Real-world Aggression: Correlation after Teaching
The four Grade 5 classes were evaluated using scales to determine the level of both online aggression and real-world aggression. Scores of online aggression ranged between 27 and 63, and the scores of real-world aggression ranged between 21 and 34. The average of the two scores was subjected to correlation analysis. Table 2 shows that the Pearson product-moment correlation factor between the two variables was 0.46, indicating that they were significantly correlated. Therefore, a moderate correlation existed between online aggression and real-world aggression with statistical significance following completion of the course.

Table 2 Descriptive Statistics and Correlation Analysis of Online Aggression and Real-world Aggression after Teaching

	Item	N	Mean	SD	r
Online aggression	20	67	2.21	7.37	.46**
Real-world aggression	16	63	1.86	7.79	

**p<.01

After removing the effects of hostile tendency causing aggression (third variable), the net correlation of the two variables was 0.40, p<0.001. This is significant, indicating that these two variables were still moderately correlated with statistical significance.

The tests before and after teaching show that online aggression and real-world aggression of elementary school students were moderately correlated with statistical significance. The correlation was still significant even after the effects of hostile tendencies were excluded.

Online Rational Emotive Course and Decrease in Overall Aggressive Tendencies
The average score on the 20-question online aggression scale and the 16-question real-world aggression scale for each of the 48 selected students were summed to determine the average scores. After subtracting the inconsistency caused by different numbers of questions in the two scales, we obtained average aggression scores for each student.

The average aggression scores for the students in the groups with strong and weak hostile tendencies before and after the course were subjected to descriptive analysis. The compiled results are shown in Table 3.

Table 3 Descriptive Statistics of Aggression Score of before Teaching and after Teaching

Hostile tendency	Group	N	Before teaching		After teaching	
			Mean	SD	Mean	SD
High	Experimental	12	2.38	.52	2.12	.43
	Control	12	2.46	.44	2.41	.34
Low	Experimental	12	1.99	.36	2.05	.28
	Control	12	1.98	.42	1.84	.31
Overall	Experimental	24	2.18	.48	2.08	.36
	Control	24	2.22	.48	2.13	.43

In this study, we used a mixed design of three factors, A*B*C. Factor A had two values: pre- and post-tests.

Factor B had two values: with and without online rational emotive curriculum (experimental group and control group). Factor C had two values: strong and weak hostilie tendencies. Three-factor ANOVA (mixed-design analysis of variance) analysis helped us to comprehend the effects of an online rational emotive curriculum on overall aggressive tendencies. From the ANOVA analysis, we see that the main effects of factors A and C were significant, whereas the main effect of factor B was not. The three-way interaction of A*B*C reached a significant level.

Table 4 shows that the three-way interaction of A*B*C with F=5.05, p<0.05 was significant. The two-way interactions were analyzed and are summarized in Table 5.

Table 4 Three Way Interaction of A*B*C

	SS	df	MS	F
A	.23	1	.23	4.65*
B	.04	1	.04	.14
C	3.34	1	3.34	.28**
A*B	.00	1	.00	.00
B*C	.53	1	.53	2.01
A*C	.08	1	.08	1.53
A*B*C	.25	1	.25	5.05*
Error from within	2.18	44	.05	
Error from between	11.48	44	.26	

*p<.05 **p<.01

In Table 5, we can see that the interaction of A*C in the experimental group was significant, with F=5.22, p<0.05, suggesting that the aggression scale scores of the experimental groups were affected by pre- and post-test, and by strong and weak hostile tendencies. The interaction of B*C of the post-test with F=6.29, p<0.05 was significant, indicating a significant difference between the scores of students from the two groups with strong and weak hostile tendencies in the post-test. Next, we compare the testing of the simple main effects in the two groups.

Table 5 Simple Interaction Effect of Three Way ANOVA Analysis

	SS	df	MS	F
A*B				
Strong hostile tendencies	.00	1	.00	.00
Weak hostile tendencies	.12	1	.12	2.18
A*C				
Experimental	.30	1	.30	5.22*
Control	.03	1	.03	.61
B*C				
Pre-test	.03	1	.03	.13
Post-test	.75	1	.75	6.29*

*p<.05

*The Interaction between A*C*
Table 6 presents analysis of the main effects of pre- and post-tests and strong and weak hostile tendencies for the experimental groups. Results indicate that the aggression scores of the students with strong hostile tendencies were significantly different in pre- and post-test, with F=8.56, p<0.01. The average scores for the group with strong hostile tendencies were 2.38 in the pre-test and 2.17 in the post-test. The latter was significantly lower than the former, suggesting that the aggression scores of the students in the group with strong hostile tendencies were significantly lower following administration of the online rational emotive curriculum. Unlike the group with strong hostile tendencies, there was no significant change between the pre- and the post-test for the group with weak hostile tendencies. We conclude that the online rational emotive curriculum had an inverse effect on the aggression scores among students with strong hostile tendencies. After learning to resist their irrational emotional responses, the students with strong hostile tendencies were able to respond to hostility provoking events in a more rational manner.

Table 6 Simple Main Effect of A and C

	SS	df	MS	F
A				
Strong hostile tendencies	.40	1	.40	8.56**
Weak hostile tendencies	.02	1	.02	.30
C				
Pre-Test	.88	1	.88	4.40*
Post-Test	.03	1	.03	.20

*p<.05

Table 6 also shows a significant difference between the experimental groups with strong and weak hostile tendencies in the pre-test the aggression scores (F=4.40, p<0.05) (factor C). The average aggression score for the group with strong hostile tendencies was 2.38, whereas the average score for the group with weak hostile tendencies was 1.99. It is clear that in the pre-test, the aggression score for the group with strong hostile tendencies was much higher than that for the group with weak hostile tendencies. However, in the post-test, the aggression scores did not show a difference between the two groups. The difference in the scores between the groups with strong and weak hostile tendencies in the pre-test was greater than the difference in the post-test. The scores in the post-test showed little difference between the two groups. This suggests that the online rational emotive curriculum helped to diminish the effects of hostile tendencies on aggression.

Interaction between B*C
Table 7 shows the main differences between the experimental and control groups in the post-test for those with strong and weak hostile tendencies. Results show a significant difference in the aggression scores for the control groups with strong and weak hostile tendencies in the post-test, with F=18.44, p<0.001; however, the aggression scores showed little difference between the experimental groups with strong and weak hostile tendencies in the post-test, with F=.02, p<0.05. After the regular course, the students in the control groups with strong hostile tendencies still had significantly higher aggression scores than those in the control groups with weak hostile tendencies. The effect of hostile tendencies on aggression scores was greater in the control groups. Conversely, after administration of the online rational emotive curriculum, the aggression scores were similar for all students in the experimental groups whether they had strong or weak hostile tendencies.

Table 7 Simple Main Effect of B and C

	SS	df	MS	F
B				
Strong hostile tendencies	.51	1	.51	3.40
Weak hostile tendencies	.26	1	.26	2.95
C				
Experimental	.03	1	.03	.20
Control	1.93	1	1.93	18.44***

***p<.001

The main effect of factor A shows that the aggression scores for both groups were lower in the post-test than in the pre-test. Analysis of B*C interaction showed that in the post-test the aggression scores of the control groups were largely influenced by hostile tendencies. This suggests that although the online information literacy course without REBT for the control groups was able to lower the average aggression scores in the post-test, the aggression scores for students with strong hostile tendencies were still much higher than those for students with weak hostile tendencies. Therefore, we determined that the online information literacy course without REBT had less of an effect on hostile tendencies. Conversely, the aggression scores for the experimental groups, who had received the online rational emotive curriculum, were significantly lower in the post-test than in the pre-test. The online rational emotive curriculum reduced the aggression scores of students with strong hostile tendencies to a level similar to those of students with weak hostile tendencies. Prior to the course, the aggression scores of students with strong hostile tendencies in both groups were at the same level, and the scores of both groups were reduced after the course. The aggression scores for the students in the experimental groups with strong hostile tendencies decreased more than those for the students in the control groups. However, for the students with weak hostile tendencies, the aggression scores of the control groups decreased more than those of the experimental groups. This indicates that the online rational emotive curriculum had a more pronounced effect on the students with strong hostile tendencies in reducing their aggressive tendencies. For the students with weak hostile tendencies, the general course showed a more significant influence on decreasing aggression scores.

Factor A showed a significant difference in aggression scores between the pre- and post-tests. Regardless of

whether they were in the experimental groups or the control groups, or among students with strong or weak hostile tendencies, the aggression scores in the pre-test were always higher than those in the post-test. Factor C shows that the average aggression scores of the students with strong hostile tendencies were significantly higher than those of students with weak hostile tendencies. Regardless of whether they were in the experimental groups or control groups, or in the pre-test or in the post-test, the average aggression scores of students with strong hostile tendencies were always higher than those of students weak hostile tendencies.

DISCUSSION

By analyzing the scale measurements of elementary school students before and after the online information literacy course in this study, we found that real-world aggression and online aggression were moderately correlated. Even after subtracting the third variable—the effect of hostile tendencies—these two were still moderately correlated. In other words, students with a strong tendency to exhibit aggression in real life are likely to display aggressive behavior on the internet. Conversely, students who were aggressive toward others online were also likely to display aggressive behavior in real life. Currently, most information literacy courses in elementary schools have focused on the skills used to operate computers, and usually ignore the fact that incidents of hostility take place more frequently on the internet. Students who develop computer skills also acquire aggressive internet behavior, causing online aggression to spread. Integrating an online rational emotive curriculum into an information literacy course enables students to learn how to respond to incidents of hostility rather than randomly spreading the hostility. By doing so, the tendency of students to display aggression is reduced both online and in real life.

Through analysis using three-way ANOVA we observed interactions among the three factors associated with pre- and post-tests as variables—before and after the online information literacy course, with and without the online rational emotive curriculum, for groups with strong and weak hostile tendencies. In the pre-test aggression scores, the difference between students with strong and weak hostile tendencies in both the experimental groups and the control groups was greater than that in the post-test. However, the difference in scores for the post-test between the students with strong and weak hostile tendencies in the experimental groups was insignificant. This suggests that the online rational emotive curriculum decreased the aggression scores of the students with strong hostile tendencies in the experimental groups more effectively than courses without this supplementary training. Resisting the irrational emotional responses enabled the students with strong hostile tendencies to respond to hostile incidents in a rational manner. The online rational emotive curriculum is able to reduce the effects of hostile tendencies on aggression. These results are in agreement with the affective aggression theory proposed by Geen (1998), which holds that hostile incidents, previous experience, physiological factors, and social learning can influence aggressive tendencies (hostile tendencies). This study uses the power of education through an online rational emotive curriculum, to redirect the aggressive behavior of students toward more positive responses, thereby reducing the occurrence of aggressive behavior.

Although the online information literacy course without REBT (control group) was also able to lower the average aggression scores in the post-test, the aggression scores of students with strong hostile tendencies were still much higher than those of students with weak hostile tendencies. The course without REBT had a far less obvious effect on hostile tendencies. On the contrary, the post-test aggression scores of the experimental group were significantly lower than those of the pre-test. The online rational emotive curriculum not only decreased the aggression scores of students with strong hostile tendencies, but also dropped the scores to levels comparable to those of students with weak hostile tendencies.

We determined that the online rational emotive curriculum and hostile tendencies mutually influence aggression scores. The decrease was greater for students with strong hostile tendencies in the experimental group. However, for students with weak hostile tendencies, the control groups showed a greater decrease in the aggression score. This suggests that the online rational emotive curriculum had a significant effect on students with strong hostile tendencies, effectively reducing their aggression. For students with weak hostile tendencies, taking the general course lowered the aggression scores through a wider range.

It should be noted that before children establish rational concepts, they may have difficulty in understanding hostile incidents. To handle hostility, they usually respond with an intuitive emotional reaction. Therefore it is important to educate them and make them aware that everyone has their own emotions; that it is normal to have negative emotions when confronted by an incident of hostility and the key is learning how to deal with them. Through the integration of the rational emotive curriculum into the online information course, these young students gained experience in rationally dealing with incidents of hostility, empowering them to make correct judgments. By learning to resist their irrational emotions, they can work out better solutions.

CONCLUSION

This study investigated the linkage between online and real-world aggressive behavior, among primary school students in four intact classes. We investigated the effects of an online rational emotive curriculum integrated within an information literacy course to reduce the tendency of students to display aggression online and in the real-world. The results show a moderate correlation between online and real-world aggressive behavior among primary school students. In addition, we demonstrated that the online rational emotive curriculum had a significant effect on students with a strong tendency for hostile behavior, and helped to alleviate this problem.

In the future, comparative studies with and without an online rational emotive curriculum need to be conducted with students from different grades and levels using various online platforms. This would enable more students to rationally deal with hostile incidents on the internet, thereby preventing them from spreading hostile and aggressive behavior. This, in turn, will help them to reduce hostile and aggressive behavior in their everyday lives.

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