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Web-based Media Literacy to Prevent Tobacco Use among High School Students

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Abstract

Facilitator-led smoking media literacy (SML) programs have improved media literacy and reduced intention to smoke. However, these programs face limitations including high costs and barriers to standardization. We examined the efficacy of a Web-based media literacy program in improving smoking media literacy skills among adolescents. Sixty-six 9th grade students participated in a Web-based SML tobacco education program based on health behavior theory. Pre- and post-test assessments demonstrated statistically significant changes in the primary outcome of total SML as well as each of the individual SML items. However, there were inconsistent changes in other theory-based outcomes including attitudes and normative beliefs.

Keywords: *smoking; tobacco; media; advertising; media messages; media literacy; media education; adolescence; substance abuse; education; school-based*

Tobacco use is the leading cause of preventable death and disability in the United States (U.S. Department of Health and Human Services 2014). Cigarette smoking is implicated in 1 in 5 adult deaths, resulting in over 480,000 premature deaths per year and diminishing a smoker's life expectancy by an estimated decade (U.S. Department of Health and Human Services 2014). In the U.S, more than 80% of established adult smokers began smoking before the age of 18 (U.S. Department of Health and Human Services 2012). Furthermore, almost half of high school students have ever tried cigarette smoking, with rates increasing substantially over the 9th to 12th grades (Centers for Disease Control and Prevention 2013). African Americans and those of lower socioeconomic status (SES) bear the greatest burden of morbidity and mortality from tobacco use (U.S. Department of Health and Human Services 2014). However, relatively few prevention programs have been designed and tested which target minority and lower SES adolescent populations.

Traditional adolescent anti-smoking intervention programs focus on reaching a captive audience in schools while delivering strong messages of health information and social competence. These programs attempt to reduce the effect of social risk factors, such as peer smoking and family smoking, in combination with education about the harms and dangers of tobacco use. Because programs such as these generally have not been successful in achieving long-term reduction in adolescent cigarette use (Wiehe et al. 2005), there is a need to innovate in this area.

The Theory of Reasoned Action (TRA) is a well-accepted model of behavior theory that has been applied to various health behaviors including adolescent cigarette use. It suggests that an individual's health behavior can be predicted by one's intention to perform the behavior, which is shaped by both attitudes towards the behavior as well as subjective normative beliefs related to it (Montaño and Kasprzyk 2008). Subjective normative beliefs are generally understood as the individuals' perception of a behavior as acceptable and normal.

Media play an important role in shaping multiple factors related to cigarette smoking, including knowledge, attitudes, and normative beliefs (National Cancer Institute 2008; Primack et al. 2007). Adolescents are now exposed to over ten hours of media content every day (Rideout, Foehr, and Roberts 2010), and youth are exposed to a substantial amount of media content specifically related to tobacco use (National Cancer Institute 2008; Sargent et al. 2002). Young people are particularly vulnerable to the influence of mass media messages, and they are therefore at risk for early tobacco experimentation (Dalton et al. 2003; Sargent et al. 2002). Increasing youths' smoking-related media literacy (SML) by empowering youths to actively engage with media messages may buffer this influence.

Media literacy has been defined as the ability to access, analyze, evaluate, and produce media messages in a broad range of forms (Aufderheide 1993; Hobbs 1998). Established organizations such as the American Academy of Pediatrics and the Office of National Drug Control Policy have promoted the use of media literacy education to mitigate harmful health behaviors such as smoking and alcohol use in younger populations (American Academy of Pediatrics 2013; Levitt & Denniston 2014; Primack et al. 2014).

Exposure to facilitator-led educational programs for smoking related media literacy has been associated with increased smoking media literacy as well as intermediate smoking outcomes (Austin, Pinkleton, and Funabiji 2007; Bier et al. 2013; Pinkleton et al., 2008; Primack et al. 2014). However, these programs can be limited by factors including high cost, lack of resources to train personnel, and barriers to standardization. Thus, the development of computer-based programs may help increase program fidelity, facilitate dissemination, and support more sustained implementation.

The purpose of this pilot study was to explore the acceptability, feasibility, and estimates of program efficacy for 'AD IT UP,' a school-based, computerized anti-smoking curriculum designed to improve student's media literacy skills. Our primary aim was to determine if the curriculum was effective in increasing immediate post-test smoking media literacy. Our secondary aims were to determine if exposure to the intervention was associated with changes in mediators of smoking according to out underlying conceptual model based on TRA, including changes in positive smoking attitudes and factors of perceived normative beliefs involving smoking We hypothesized that after completing the pilot curriculum, students would demonstrate increased smoking media literacy scores (Hypothesis 1), reduced positive attitudes about smoking (Hypothesis 2), and diminished positive normative beliefs in relation to smoking (Hypothesis 3).

Research Methods

We conducted a pilot study of a Web-based SML program that evolved from a previous facilitator-led version of a similar curriculum (Primack et al. 2009; Primack et al. 2014). Data collection for this study was conducted in 2012 and was implemented in collaboration with high school teachers and research staff.

Participants and Setting

Our pilot implementation was conducted at an urban public high school near Pittsburgh, Pennsylvania. The school has a total enrollment of 1383 (2009-2010) students in 9th through 12th grades. The student population is 52% Caucasian. The remaining 48% are predominantly African-American and of mixed race. Nearly three-fourths (72%) of students receive free or reduced-cost school lunch. Our eligible study population consisted of a convenience sample of six classrooms which contained a total of 110 enrolled 9th grade students. The implementation occurred over four 45-minute class periods and was embedded within the regular 9th-grade health class curriculum, which is required of all students. One student opted-out of participation in the program due to refusal of parental consent; 43 students were not able to complete the program because of absence during implementation due to various circumstances, such as illnesses, field trips, or appointments with the nurse or guidance counselors. Therefore, of the 110 eligible participants, 66 students were able to complete the entire curriculum, including both pre- and post-test surveys.

Survey Instruments

Demographic data captured included age, sex, race, and maternal education as a proxy for socioeconomic status.

Student Characteristics included self-report of grades, parents', siblings' and friends' smoking behaviors, and measures of sensation seeking, rebelliousness, self-esteem, and stress using a 10-level Likert scale ranging from "strongly disagree" to "strongly agree."

Smoking Media literacy (SML) was assessed with 9 items modified from a validated 18-item scale (Primack et al. 2006; Primack and Hobbs 2009) with the goal of decreasing respondent burden. Items represented three conceptual divisions adapted from the National Association of Media Literacy's Core Principles of Media Literacy Education (National Association for Media Literacy Education, 2014, 7): authors and audiences (AA), messages and meanings (MM), and representation and reality (RR). Items included statements such as "To make money, tobacco companies would do anything they could get away with" (AA subscale), "Cigarette ads try to link smoking to things that people want like love, beauty, and adventure" (MM subscale), and "When you see a smoking ad, it is very important to think about what was left out of the ad" (RR subscale). All SML measures were measured with 10-level Likert scale ranging from "strongly disagree" to "strongly agree."

Smoking attitudes were measured with 6 items based on a validated 9-item scale (Buller et al. 2003) via a 10-level Likert scale indicating agreement or disagreement with statements such as "Smoking cigarettes is not as bad for a person's health as everyone makes it out to be," "Smoking helps people deal with problems of stress," and "If someone starts smoking every day, it is very hard for them to stop (reverse-coded)."

Smoking normative beliefs were measured with a validated scale assessing three factors: "perceived success of smokers," "perceived parental and peer disapproval" and "perceived prevalence" (Primack, Switzer and Dalton 2007). The first normative beliefs factor "perceived success of smokers" was measured with 3 items assessed with 10-level Likert scales ranging from "strongly disagree" to "strongly agree" with statements such as "'Cool' people smoke cigarettes more than 'uncool' people." The second normative beliefs factor "perceived parental and peer disapproval" was measured with two items via similar 10-level Likert scales, responding to statements such as "According to my mother, it is very important for me to stay off of cigarettes." The third normative beliefs factor "perceived prevalence" asked students to estimate smoking prevalence from zero to 100% in 10% increments in both the general population and among their peers.

Table 1
Relationships Between the "AD IT UP" Curriculum and a Conceptual Model of Media Literacy

Media Literacy Domain	Related Media Literacy Core Concepts[39]	"AD IT UP" Lesson	"AD IT UP" Key Question(s)
AA: Authors and Audiences	AA1: authors create media messages for profit and/or influence	Author	Who are the authors of this message and why did they produce it?
	AA2: authors target specific audiences	Directed At	Who is this message directed at and why?
MM: Messages and Meanings	MM1: messages contain values and specific points of view	Idea	What are the ideas or values represented?
	MM2: different people interpret messages differently		How would different people interpret these Ideas differently?
	MM3: messages affect attitudes and behaviors	Techniques	What are the production Techniques used?
	MM4: multiple production techniques are used		How are these Techniques likely to be effective?
RR: Representation and Reality	RR1: messages filter reality	Unspoken	What is Unspoken or omitted from this message?
	RR2: messages omit information		
	Facilitation of movement from altered attitude and norms toward intention and behavior	Put it together	Put everything we have learned together and analyze media messages!

Procedures

Approval to administer the 'AD IT UP' program was granted by the superintendent of the school district and the University of Pittsburgh Institutional Review Board (IRB). All 9th grade students enrolled in the 6 health classes were invited to participate in the 'AD IT UP' curriculum. Opt-out consent letters were sent home via mail to parents and guardians. This letter described the study, explained participant rights, and provided instructions for withdrawing from the program if parents or students elected not to participate. Students who completed the curriculum were given an aluminum water bottle as compensation for their time.

Students worked individually on computers in the computer laboratory of the high school and were assisted by study personnel trained in study implementation. To ensure confidentiality, students were required to create personal logins and passwords to access the Web-based curriculum. In addition, names were not collected and personal identifiers were not linked to the data. Pre- and post-test surveys were electronically administered to measure SML, smoking attitudes and normative beliefs. Students were given four 45-minute class sessions to complete the entire program and were encouraged to work at their own pace.

Intervention Program. 'AD IT UP' is a theory-based anti-smoking media literacy program developed with foundation grant funding. The Web-based 'AD IT UP' program was derived from a previously developed facilitator-led curriculum of the same name. The program is designed to teach youth to think critically about media messages, focusing on media messages involving tobacco use. Each letter of 'AD IT UP' represents one of the six key lessons and questions in the curriculum. As is indicated in Table 1, each of the lessons also corresponds to a core domain in the conceptual model of media literacy adapted from the National Association of Media Literacy's Core Principles of Media Literacy Education document (National Association for Media Literacy Education 2014, 7).

The program was designed for a target audience of 9th grade students for two reasons. First, at this age participants generally have the cognitive skills of abstract thought valuable for understanding and applying media literacy concepts. Second, because cigarette smoking dramatically increases after 9th grade (Centers for Disease Control and Prevention 2013), intervening at this time could have strong potential for reducing smoking initiation and/or maintenance. Furthermore, the program was designed to be appealing to African Americans and those of lower SES because these populations bear the greatest burden of morbidity and mortality from tobacco use (U.S. Department of Health and Human Services 2014). Previously published work details specific ways in which the curriculum was targeted to these audiences (Primack et al. 2009; Primack et al. 2014).

Data Analysis. We first performed descriptive data analysis of baseline responses, computing means and standard deviations. Then, we used two-tailed *t*-tests compare outcome variables—smoking media literacy, positive smoking attitudes, and smoking related normative beliefs—before and after implementation. In order to examine the effect size of each difference, we used Cohen's *d* (Cohen 1960), an established measure of effect size. The test for outcome variables were considered significant for two-tailed $p<0.05$.

Results

Of the 110 eligible students representing six classrooms, 66 students (60%) successfully completed the program and both pre- and post-test surveys. Other than one parental refusal of consent for study participation, all other dropouts from the program were due to inability to complete the curriculum due to absenteeism. Comparison of baseline demographics between study dropouts and participants with chi-square tests showed no statistically significant differences in sex, race, age, and maternal education. All students who were present for all four implementation sessions were able to complete the Web-based program.

Baseline demographics (Table 2) showed that about half of the study participants were female (52%) and 44% of participants self-reported race as non-white (23% Black and 21% "Other"). Chi-square analyses indicated that here was no statistically significant difference between the proportion of non-white individuals included in the study and those enrolled in the school but not included ($p=0.50$). Half of participants reported that their mothers had not attained a college degree. Over half of the students self-reported grades in the ranges of A's and B's (58%). Almost two-thirds (65%) of the students reported a parent who smoked, and half of the students reported having a friend who smoked. Personal characteristics were self-assessed on a 10-level scale. Students self-reported a moderate degree of sensation seeking and rebelliousness (both M=4.5; SD 2.5 and 2.7, respectively) and mildly elevated self-esteem (M=5.6; SD 3.1) and stress in their lives (M=6.2; SD 2.8).

We hypothesized that after completing the pilot curriculum, students would demonstrate increased smoking media literacy scores (Hypothesis 1), reduced positive attitudes about smoking (Hypothesis 2), and diminished positive normative beliefs in relation to smoking (Hypothesis 3). We observed a mean increase of 1.9 (95% CI, 1.4-2.5, $p<.001$) in the students' smoking media literacy (SML) score, measured on a 10-level scale, from pre- to post-test. This change corresponded to a large effect size (Cohen's *d*=0.98). Pre- and post-test SML items from the 9-item scale were found to have high internal consistency (Cronbach's alpha=0.84 and

0.96, for pre- and post-tests respectively). Each individual smoking media literacy item also demonstrated statistically significant increases over the course of the study (Table 3).

Table 2
Baseline Student Characteristics

	N (%)
Age	
≤15	38 (58)
>15	28 (42)
Gender	
Male	32 (48)
Female	34 (52)
Race	
White	37 (56)
Black	15 (23)
Other	14 (21)
Maternal Education	
Did not graduate high school	9 (14)
Graduated from high school but not college	24 (36)
College degree or higher	33 (50)
Grades	
A's & B's	38 (58)
Lower than B's	28 (42)
Family and Peer Smoking	
Parental smoking	
Yes	43 (65)
No	22 (33)
Sibling smoking	
Yes	18 (27)
No	43 (65)
Friend smoking	
Yes	33 (50)
No	33 (50)
Other Variables[a]	
Sensation Seeking, mean (SD)	4.5 (2.5)
Rebelliousness, mean (SD)	4.5 (2.7)
Esteem, mean (SD)	5.6 (3.1)
Stress, mean (SD)	6.2 (2.8)

N = 66
[a] These variables were measured on a 10-level Likert scale with 1 = Strongly Disagree to 10 = Strongly Agree.

However, changes in positive cigarette attitudes and normative beliefs were generally non-significant (Table 3). The only statistically significant change in cigarette attitudes was the item "smoking helps people deal with problems of stress" with a mean decrease of 1.3 (95% CI, 0.5-2.0, *p*<0.001). This change was in the hypothesized direction. The 6 attitude items had high internal consistency in both pre- and post-testing (Cronbach's alpha=0.81 and 0.83, respectively).

Two of the three normative belief scales ("perceived prevalence" and "perceived success of smokers") demonstrated statistically significant paradoxical increases after program implementation. While before the intervention the two perceived prevalence items had only fair internal consistency (Cronbach's alpha=0.51), after the intervention these items demonstrated good internal consistency (Cronbach's alpha=0.75). In terms of

Table 3
Comparison of Outcomes in Pre- and Post-intervention

Outcome	Intervention				P-Value[c]
	T1	T2	δ^a	d^b	
Total Smoking Media Literacy (SML)[d]	6.4	8.3	1.9	0.98	<0.001
To make money, tobacco companies would do anything they could get away with. (AA1)	8.2	9.0	0.9	0.37	0.01
Certain cigarette brands are specially designed to appeal to young children. (AA2)	4.7	8.5	3.8	1.44	<0.001
Cigarette ads try to link smoking to things that people want like love, beauty, and adventure. (MM1)	6.7	8.9	2.1	0.83	<0.001
Wearing a shirt with a cigarette logo on it makes a person into a walking advertisement. (MM1)	7.0	7.8	0.8	0.29	0.04
There are often hidden messages in cigarette ads. (MM4)	6.8	8.9	2.1	0.87	<0.001
Movie scenes with smoking in them are constructed very carefully. (MM4)	4.8	7.4	2.6	0.93	<0.001
Cigarette ads show scenes with a healthy feel to make people forget about the health risks. (RR1)	6.3	8.2	1.9	0.72	<0.001
Most movies and TV shows that show people smoking make it look more attractive than it really is. (RR1)	6.1	8.0	2.0	0.68	<0.001
When you see a smoking ad, it is very important to think about what was left out of the ad. (RR2)	6.8	8.3	1.5	0.52	<0.001
Total Cigarette Attitudes[d]	2.9	2.7	- 0.2	0.13	0.27
Smoking cigarettes is not as bad for a person's health as everyone makes it out to be.	2.8	2.5	- 0.3	0.12	0.42
Smoking cigarettes at parties is fun.	2.4	2.3	- 0.1	0.05	0.70
Smoking helps people deal with problems of stress.	4.1	2.8	- 1.3	0.44	<0.001
Smokers are more fun to be around than nonsmokers.	2.5	2.4	- 0.1	0.06	0.62
If someone starts smoking every day, it is very hard for them to stop. (reverse coded)	3.2	3.6	0.4	0.14	0.37

Smoking makes a person look more sexy.	2.4	2.4	- 0.1	0.03	0.82
Total Perceived Prevalence (%)[e]	63	66	4	0.22	0.049
Perceived Prevalence in all people	70	72	2	0.12	0.34
Perceived Prevalence in same age group	54	60	6	0.26	0.03
Total Perceived Success of Smokers[d]	3.5	4.0	0.5	0.20	0.04
"Cool" people smoke cigarettes more than "uncool" people.	3.2	3.4	0.3	0.09	0.36
A wealthy person is more likely to smoke cigarettes than a poor person.	4.3	4.6	0.3	0.10	0.35
A successful person is more likely to smoke cigarettes than an unsuccessful person.	3.0	3.9	0.9	0.36	<0.001
Total Perceived Parental and Peer Disapproval[d]	7.5	7.6	0.2	0.06	0.60
Perceived parental disapproval	8.4	8.3	- 0.1	0.04	0.76
Perceived peer disapproval	6.5	7.0	0.5	0.17	0.12

N = 66

[a] Differences between follow-up and baseline.

[b] Cohen's d, a measure of effect size defined as the difference between two means divided by the standard deviation.

[c] These *P*-values were computed using *T*-tests comparing scores at time 1 and time 2.

[d] These variables were measured on a 10-level Likert scale with 1 = Strongly Disagree to 10 = Strongly Agree.

[e] These variables were measured with numbers between 0 and 100 representing the average perceived prevalence for smoking

total perceived success of smokers, this pre- and post-test scale as compiled from 3-item measures were found to have good internal consistency (Cronbach's alpha=0.73 and 0.84, respectively). The increase in the item "a successful person is more likely to smoke cigarettes" drove the significant increase in the overall scale. Pre- and post-test total perceived parental and peer disapproval also demonstrated good internal consistency (Cronbach's alpha=0.72 and 0.78 respectively), and none of these items significantly changed during the course of the study.

Discussion

The successful implementation of this pilot study demonstrated that this Web-based curriculum was feasible to implement in a school setting. Furthermore, it was acceptable to students, teachers and school administration. Implementation within four sessions of an existing schedule of health classes minimized implementation burden. The teachers verbally reported that they found the curriculum useful in meeting their teaching goals. Furthermore, research staff observed that the students appeared to have enjoyed participating in the program and that there was minimal student difficulty with program navigation and comprehension of curriculum content. This was evidenced by the limited questions posed to the research staff during program implementation. Furthermore, it is notable that all students who were present during all sessions of study implementation were able to complete the curriculum.

This pilot study found that there was a statistically significant increase in smoking media literacy from pre- to post-test. This finding is consistent with the results from the recent study of facilitator-led version of the same curriculum in that students exposed to a smoking media literacy based education program had significant improvement in smoking media literacy (Primack et al. 2014**).** These findings parallel others' studies in confirming the potential success of health-promoting media literacy education in adolescents (Bergsma and

Carney 2008, Pinkleton et al. 2007). Our pilot study extends prior studies by utilizing a purely Web-based curriculum, therefore maximizing program fidelity and thus increasing rigor of experimental design, to explore the potential implementation and success of health-promoting media literacy education in a classroom setting.

While the study was successful in increasing smoking related media literacy, exposure to the pilot intervention was not associated with statistically significant decreases in total positive cigarette attitudes. This finding is consistent with the results from the facilitator-led version of the curriculum (Primack et al. 2014). In a way, this is not surprising as both curriculums focused on educating the core lessons of smoking related media literacy rather than smoking related attitudinal measures represented in our survey (e.g. "smoking cigarettes at parties is fun"). Furthermore, it should be considered that that general attitudinal changes might require a certain temporal element; therefore for media literacy programs to mediate attitudinal changes, more time might need to pass before such effect can be measured. In our study, the single attitudinal item that demonstrated a significant decrease was the statement "smoking helps people deal with problems of stress." As the pilot curriculum did emphasize the physiological effect of cigarette smoke, such as increase anxiety and heart rate, the health content of the curriculum might account for the significant decrease in this attitudinal item.

Exposure to the pilot intervention was associated with unexpected statistically significant increases in selected normative beliefs items. Perceived prevalence of smoking relates to smoking behavior in that youths' overestimation of smoking prevalence is associated with increased likelihood of smoking (Primack, Switzer, and Dalton 2007). The curriculum does mention that cigarette smoking is a leading cause of preventable morbidity and mortality in the United States. Students may have inadvertently inferred that cigarette smoking was even more common behavior than they had previously thought. It is known that there can be immediate paradoxical increases in similar smoking-related outcomes after prevention programming simply because smoking is brought to participants' minds as a social phenomenon (Wiehe et al., 2005).

It is not clear why there was a paradoxical increase in the item "A successful person is more likely to smoke cigarettes than an unsuccessful person." One possibility is that the curriculum—as do many media literacy programs—involved the viewing of multiple advertisements for cigarettes. Although the advertisements were displayed in the context of learning to analyze, evaluate, and often criticize their content, it is possible that, on a subconscious level, participants may have perceived some of these advertisements (which often portray successful individuals) as intended by the advertisers. Additionally, other studies have noted the potential for unintended effects of exposure of educational material related to substance use (Austin, Pinkleton, and Funabiji 2007; Pinkleton et al. 2007).

It may be that a program targeted towards education of smoking media literacy might not effectively change attitudes and normative beliefs regarding smoking, particularly in the immediate post-intervention setting. Therefore it may be relevant to broaden the Theory of Reasoned Action as a theoretical model in the process of study curriculum design to include other more emotional components, such as those suggested by the Message Interpretation Process Model (MIP) (Austin, Pinkleton, and Funabiji 2007). In contrast to the more logical process outlined by TRA, behavior models exemplified by the MIP emphasize that the decision processes leading to behavior choices are partially logical and partially emotional, with both affecting personal relevance, identification with portrayals, and expectancies for behavior. Thus future studies may benefit from an expansion of theoretical constructs.

In addition, this pilot implementation also revealed a potential challenge towards future broad classroom-based implementation of this program. Of the 9th grade students eligible and consented for this pilot study, roughly two out of every five students were unable to complete the post-test due to absenteeism from one or more program sessions. All students present for all program sessions were able to complete the study and the Web-based curriculum was acceptable and effective in increasing SML for students present for the curriculum. While there were no basic demographic differences between the study dropouts and participants, it is impossible to draw conclusions regarding acceptability and effectiveness for those students with absenteeism. This sizable

population of students with absenteeism is reflective of U.S. public schools' struggles with chronic absenteeism, defined as missing 10% or more scheduled days of schools per year (Balfanz and Byrnes 2012). Though an estimated 10-15% of students in U.S. public schools are chronically absent, schools in low SES areas report a rate of one-quarter to one-third chronically absent students, with rates increasing in high school (Balfanz and Byrnes 2012). In future studies, it may be valuable in exploring ways to increase flexibility in program implementation while taking advantage of Web-based curriculum fidelity. Flexibility in method of program implementation, such as makeup sessions or the options to complete the curriculum as homework or during independent study, might allow students with absenteeism to complete the program.

As a pilot implementation of an experimental curriculum, this study had methodological limitations, including limited statistical power due to small sample size and the lack of a control group. As expected in a classroom Web-based intervention, potential contamination may not be eliminated when students work side-by-side though individually on computers in the same classroom. The results may not be generalized to other parts of the U.S. as the study involved one urban public high school in one region of the country. Selection bias is another potential concern due to absenteeism.

Conclusion

This pilot study is innovative in demonstrating that smoking related media literacy can be taught in a school-based curriculum via a Web-based education program that maintains implementation fidelity. Furthermore, the pilot study showed that this curriculum can be successfully implemented and was acceptable to school administrators, teachers, and students. While the study results demonstrate that such a Web-based curriculum can effectively improve high school students' smoking-related media literacy, the study did not achieve other expected outcomes based on the theoretical model fundamental to the study design. Thus, further studies with more nuanced theoretical models may be valuable. Additionally, it would be beneficial for future studies to examine efficacy of the curriculum in influencing other clinically relevant measures such as smoking intentions and behaviors.

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