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Review

Instructional design strategies for health behavior change

Mable B. Kinzie*

Department of Leadership, Foundations and Policy, Curry School of Education, University of Virginia, P.O. Box 400265, Charlottesville, VA 22904-4265, USA

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Abstract

To help health educators build upon the best of different health behavior change theories, this paper offers a unified set of instructional design strategies for health education interventions. This set draws upon the recommendations of Rosenstock (Health Belief Model), Bandura (Social Cognitive Theory), and Dearing (Diffusion Theory), and uses a modified *Events of Instruction* framework (adapted from Robert Gagne): gain attention (convey health threats and benefits), present stimulus material (tailor message to audience knowledge and values, demonstrate observable effectiveness, make behaviors easy-to-understand and do), provide guidance (use trustworthy models to demonstrate), elicit performance and provide feedback (to enhance trialability, develop proficiency and self-efficacy), enhance retention and transfer (provide social supports and deliver behavioral cues). Sample applications of these strategies are provided. A brief review of research on adolescent smoking prevention enables consideration of the frequency with which these strategies are used, and possible patterns between strategy use and behavioral outcomes.

Keywords: Instructional design; Health education; Behavior change

1. Introduction

Individual behavioral factors, such as tobacco and alcohol use, diet, sexual behavior and avoidable injuries, contribute to significant suffering, premature death, and medical costs. Health education is an important tool in response—it can offer useful health enhancement strategies and encourage voluntary informed behavior change [1,2]. While there are a multitude of behavior change theories that instructional designers and health educators might draw upon for guidance, it is not altogether clear which to use, when. Glanz and her colleagues reviewed 536 journal articles on health education over a 2-year period in the 1990s, and found 66 different theories and models informing design efforts. The reviewers note:

> Practitioners of health promotion and education at once benefit from and are challenged by the eclectic and derivative nature of their endeavor: a multitude of theoretical frameworks and models from the social sciences are available for their use, but the best choices and direct translations may not be immediately evident (pp. 30–1) [1].

After selecting a theory suited to guiding education for a particular health behavior change, the designer must determine how to translate theory into practice and identify specific instructional strategies to employ. Complicating this situation further, designers must frequently look to multiple theories for a full complement of instructional strategies. For instance, the Health Belief Model [3] has strengths in guiding information presentation (susceptibility/severity of condition, benefits of behavioral change) and ultimate performance (behavioral cues), while Social Cognitive Theory [4] helps situate behavior in authentic social practice (development of social proficiency and resilient self-efficacy). Because behavior change is, after all, change, Diffusion Theory is eminently appropriate for introducing new behaviors to a sometimes resistant population [5]. Health educators agree with this assessment: These three models were among the top ten models employed across the research reviewed by Glanz et al.

The work reported here is an attempt to provide designers with a complete set of theory-driven instructional strategies for health education. Robert Gagne's *Nine Events of Instruction* were selected as a starting point. Gagne's *Events*, drawing on both behaviorist and cognitivist information processing theory, offer a framework for instructional design that has been employed by decades of instructional designers. (Gagne's well-regarded text, *conditions of learning* [6]

* Tel.: +1-434-977-3314; fax: +1-434-924-1384.
E-mail address: kinzie@virginia.edu (M.B. Kinzie).

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has been released in four editions and cited over 1490 times in prominent journals between 1981 and early 2004 [7].)

For ease of application in health promotion, the *Nine Events* were condensed into five primary stages. This framework was then populated with strategies developed from those recommended by Rosenstock et al. [3], Bandura [4], and Dearing et al. [8], for the design of AIDS prevention. However, these strategies apply not only to prevention instruction, but also to instruction to encourage any health behavior change.

These strategies are presented in this paper, along with examples of how they inform instructional methods. The strategies are then used to guide a literature review targeting research on adolescent smoking prevention, to study the strategies implemented and to note patterns between strategy use and behavioral outcomes.

2. Instructional strategies for health behavior change

As indicated, the starting point for this work was Gagne's *Nine Events of Instruction*, adapted to a five-stage framework. Table 1 illustrates the correspondence between Gagne's original work and the adaptation.

The next step was to populate this framework with specific strategies for encouraging health behavior change, strategies based on the Health Belief Model, Social Cognitive Theory, and Diffusion Theory. To this end, recommendations made by Rosenstock et al. [3], Bandura [4], and Dearing et al. [8], for the design of AIDS prevention education were reviewed. Their recommendations were reduced to a bulleted list of generalized strategies and these strategies were then mapped onto the five stage framework.

For each learning situation (drug prevention, exercise promotion, etc.), designers will need to determine how best to implement the strategies. To provide some examples of how this may be done, education guidelines developed by the Centers for Disease Control (CDC) for adolescent smoking prevention are included, next to the strategies that inform each [9]. Several strategies did not appear to inform any CDC guidelines; in these cases, a recommendation was drafted to complete the set (Table 2).

Table 1
Adaptation of Gagne's nine events for a five-stage framework

#	Five stage framework	#	Corresponding Gagne events
1	Gain attention	1	Gain attention
2	Present stimulus material	2	Inform learners of objective
		3	Stimulate recall of prior learning
		4	Present the stimulus
3	Provide learning guidance	5	Provide learning guidance
4	Elicit performance and provide feedback	6	Elicit performance
		7	Provide feedback
		8	Assess performance
5	Enhance retention and transfer	9	Enhance retention and transfer

While these strategies are informed by theory and have informed practice, do they lead to the behavioral outcomes health educators hope for? In order to study the strategies used and the outcomes obtained, research done for a single application of health education—adolescent smoking prevention—was reviewed.

3. Literature review—method

The literature search was initially focused on health education to prevent the risky health behavior of adolescents (MEDLINE search focusing on "health education *and* adolescent *and* risk)" and was then narrowed to interventions targeting smoking prevention. (This aspect of health education is extremely important, as tobacco use is the "leading cause of preventable death in the United States [9]." Eighty-two percent of regular smokers began this habit before the age of 18 [9] and in 1999, 35% of high school students in this country reported smoking during the previous month [10]. As many as 3000 young people begin smoking each day [9].) To find additional research reports, reference lists from identified publications were examined, as were a variety of on-line reference lists for adolescent health and smoking prevention.

Field trials for school-based interventions lasting over a year (producing potentially more powerful effects), or which were followed-up over a long term (providing information on the attenuation of desired behaviors over time) were selected for review. Eliminated from consideration were any studies that were not conducted in the United States within the last 20 years. Some of these trials were randomized and some were not, due to the difficulties associated with entire-school assignment to intervention and control groups. In all cases, intervention treatments were delivered to entire intact classes (as opposed to individualized instructional methods). Nine interventions remained after applying these selection criteria (school-based, long-term interventions or long-term follow-up, conducted in the United States within the last 20 years). There were no research reports lacking sufficient detail to apply these selection criteria. The outcomes from the nine selected interventions had been described in fifteen research reports (researchers published follow-up reports for some interventions).

To determine which of the *strategies for health behavior change* might have been implemented for each intervention, I used the authors' description of the instructional methods used. While these descriptions were necessarily brief due to the limits of publication, they did provide a way to identify the instructional methods the authors thought were most salient for their interventions. Table 3 uses the *strategies* framework to describe the instructional methods used for the interventions selected. All instructional methods