



An Interdisciplinary Approach for the Integration and Diffusion of Substance Abuse Prevention Programs

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ABSTRACT

Effective substance abuse prevention programs help students develop knowledge as well as psychosocial competencies that can help them resist or delay the initiation of alcohol, tobacco and other drug (ATOD) use. This paper describes the integration process used in a five-year project, Adoption of Drug Abuse Prevention Training (ADAPT), to study the effectiveness of two methods of drug prevention programming, based on Botvin's Life Skills Training (LST) program.¹ Botvin's standard LST program¹ was implemented in three middle/junior high schools, the integrated or infused delivery of LST (I-LST) was implemented in three similar middle/junior high schools, and both methods of delivery were compared with three matched schools that received no treatment. Rather than implementing the traditional LST program, teachers in the infused condition developed a set of prevention lessons each year from the standard LST curriculum constructs and delivered them within their standard subject areas. This infused or integrated approach provided increased dosages of consistent prevention messages from multiple sources within the school in conjunction with their regular subject matter. Strategies for diffusion and adoption of the infused LST model are discussed as well as the teacher training process, lesson implementation, and evaluation procedures. The participating teachers' experiences, recommendations and difficulties are presented, and a sample program infusion matrix is included. Outcome results indicate that neither standard LST nor an infused LST delivery method was found effective for the entire sample, although some encouraging results were found for the females in the study.

The Adoption of Drug Abuse Prevention Training (ADAPT) project was a five-year study funded by the National Institute on Drug Abuse (NIDA) to test the effectiveness of two different methods of delivery of the proven-to-be-effective prevention program, Life Skills Training (LST).¹ A number of programs, including LST, have been shown to be effective and identified as model programs by the U.S. Department of Education and the Substance Abuse and Mental Health Services Administration.^{2,3} The LST program is a substance abuse prevention and competency enhancement program

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designed to focus on the major social and psychological protective factors that prevent or delay the initiation of alcohol, tobacco, and other drug use.¹

The primary objective of the ADAPT investigation was to compare the effectiveness of an integrated or infused approach to teaching the LST components with the traditional LST method and to compare the effects of both approaches on substance use. The infused Life Skills Training (I-LST) condition utilized the LST components, but with these components integrated or infused into the existing subject curriculum by the classroom teachers. Neither program demonstrated any significant effect on substance abuse by the end of ninth grade.⁴ Both programs did have a significant effect on some skills for girls; the I-LST program had a significant effect on coping with anxiety skills for girls, while the LST program influenced girls' skills more broadly; both programs demonstrated some significant effect on girls' beliefs, attitudes and knowledge of alcohol, tobacco and other drugs; and neither program demonstrated a significant effect on boys' substance use; skills; or beliefs, attitudes and knowledge.

Additional objectives of the ADAPT project were to determine how schools could best adopt such prevention programming as well as to ascertain teachers' willingness to use an integrated approach for drug abuse prevention. The project also examined the efficacy of schools adopting and maintaining an effective substance abuse program if it could be implemented in an integrative or infused mode across the curriculum. The purpose of this article is to review the infusion model for implementing the LST program, summarize strategies for the diffusion and adoption of the infusion model, and to review lesson implementation and evaluation procedures. Recommendations for integrated prevention programs are included.

INTEGRATION OR INFUSION AS AN ALTERNATE DELIVERY MECHANISM

LST has been empirically tested in numerous investigations.^{1,5} The standard LST

program is a 3-year prevention curriculum initiated in sixth or seventh grade and typically includes one or two teachers who implement the LST curriculum within the framework of a single course, such as health classes. ADAPT utilized the traditional LST delivery in three rural schools, while implementing the I-LST in three matched schools. Results were compared to students in three additional matched schools who did not receive the prevention programming. Due to the nature of the infused delivery method, the dosage and implementation mechanisms were different for the two program conditions. The standard LST curriculum consisted of 15 lessons in the first year (seventh grade), 10 in the second (eighth grade), and 5 (or 7 depending on time) in the third year (ninth grade). The core LST components consisted of self-image and self-improvement; decision making; smoking, marijuana, and alcohol myths and realities; smoking and biofeedback; advertising awareness; coping with anxiety; communication skills; social skills; and assertiveness. In contrast, the I-LST approach had no set number of lessons. Instead, these same LST core components were taught to each student in at least one subject area, but usually in a number of subjects. During training, teachers completed a matrix to match the LST lesson objectives of the skill areas to their respective lessons. Teachers also made certain that students received at least the same number of lessons in each year as recommended in the standard LST curriculum. As can be seen from the sample *I-LST Program Matrix* presented in Figure 1, for the ninth grade in one I-LST school, a complete LST program was infused for all students at the targeted grade level. For example, in one I-LST school, 48 lessons were implemented in seventh grade compared to the standard 15 LST lessons in seventh grade; 30 lessons were implemented in eighth grade compared to the 10 standard LST lessons; and 30 were implemented in ninth grade compared to the five standard LST lessons. Thus, students in the I-LST condition received at least the minimum program dosage of LST

skills without time taken from the standard school curriculum. The dosage that each individual student received varied somewhat by his or her attendance, implementation timing, and class schedules. However, all students in the I-LST condition had the potential to receive an increased dosage of LST skills lessons than those students in the standard LST condition.

It was harder for teachers in that they did not follow the "canned" program but integrated it into their subject area. Therefore, the major strategy used by ADAPT staff for facilitating the adoption of I-LST was to assist teachers with the integration of LST components into their normal curriculum. Such an approach has been labeled constructivist by Gatewood,⁶ who contends that integration is best accomplished by interdisciplinary or multidisciplinary teams of teachers who meet to discuss and identify ways to teach natural links among subjects. The assumption made is that optimal learning occurs when information is embedded in meaningful contexts, applications and multiple representations are provided, and there are opportunities for learners to generate personally relevant questions.

Gatewood also suggests⁶ that integrating concepts is especially well suited for middle school students because they have been more thoroughly prepared with a base of knowledge and skills for problem solving within various disciplines. In the field of substance abuse prevention, the term infusion is often used to describe the integration of prevention constructs and processes into the standard academic subjects of a school curriculum. This requires the active involvement of teachers in the design and delivery of the prevention content and its implementation in their regular subjects and classes.

In order to maximize the integration of drug and alcohol prevention messages across the curriculum, ADAPT included teachers of science, English, social studies, geography, math, art, music, physical education, reading, and language arts although not all subjects were utilized at each school.



Figure 1. 9th Grade I-LST Program Matrix

Life Skill Component	Objectives	Teacher					
		1	2	3	4	5	6
Drug Abuse: Causes & Effects	Identify the causes of drug use						X
	Identify the major social factors promoting drug use						X
	Describe physical and psychological dependence	X	X				
Decision Making	Review the 3-C formula for making decisions					X	
	Apply the decisions-making formula to a variety of situations through in-class practice					X	
Media Influence	Identify the sources of media influence	X	X				
	Discuss the impact the media have on attitudes and behavior	X	X				
	Formulate alternative responses to pro-drug media influences	X	X				
	Use critical thinking skills to resist pro-drug media influences	X	X				
Coping with Anxiety	Identify techniques for coping with anxiety		X			X	
	Review and practice progressive relaxation, deep breathing, and hand warming					X	
	Review and practice cognitive self-control skills for dealing with anxiety	X				X	
Social Skills	Identify and use common greetings and brief exchanges			X			
	Identify and use skills for starting, continuing and ending conversation			X			
	Discuss situations which require "deeper" conversation			X			
	Identify techniques for "deep" conversations			X			
Assertiveness	Identify situations which warrant assertive responses				X		
	Identify and use verbal assertive skills				X		
	Identify and use non-verbal assertive skills				X		
Peer Pressure	Identify situations involving peer pressure to engage in drug use	X					X
	Identify and practice techniques for dealing with peer pressure to smoke, drink or use drugs	X					X

Health teachers also often participated and were helpful in covering critical components of LST that other teachers were unable to integrate. Such an integrated approach to prevention also increases the probability the components will become an integral part of the ongoing permanent curriculum. Perhaps most importantly, it represents a mode of drug prevention programming that is potentially easier for a school to adopt and maintain; therefore,

it may be less of a burden on both the already limited time for health education and for time away from other content areas. A well-implemented, infused program that includes faculty from various academic areas can send consistent prevention messages to students through multiple channels and help as many faculty as possible to develop a sense of ownership and commitment to the prevention effort. The focus of an infused curriculum is to enhance

the regular subject area by increasing student knowledge, understanding, and motivation while building prevention-related personal competencies.

The basic LST program emphasizes interactive approaches; therefore, to address this interactive approach, ADAPT staff employed a step-by-step approach to curriculum integration that identified and linked key objectives in middle school academic subjects (e.g., history, English, language arts,



math science, music, art, and physical education) and key objectives for each of the LST constructs.⁷ This model provides a structure for teachers to create integrated lesson plans while identifying the best interactive teaching approaches for accomplishing dual or multiple objectives, i.e., subject-specific and prevention objectives.

The first step in the integration process was for teachers to brainstorm a list of associations, relationships, or similar concepts/ideas between their academic area(s) and the life skills included in LST. Utilizing their current curriculum, teachers focused on themes, events, issues, or overlapping skills and concepts between their curriculum and the life skills they were asked to integrate. For example, teachers found that communication skills could be addressed in a language arts class, or that the short- and long-term physiological effects of alcohol and tobacco could be addressed in a science class. Teachers used an “Associations and Relationships” worksheet to list appropriate associations and ideas. Teachers were encouraged to consider connecting as many different life skills as possible to their current curriculum. They were then asked to share their brainstorm lists with other teachers in the workshop. In this way, they could solicit ideas from other teachers as well. Some districts sent teams of teachers that were already familiar with working together to identify themes and threads across the academic disciplines. If they were participating in the workshop as a member of a team, they were asked to complete the brainstorm lists together.

The second step in the integration process involved teachers completing a “Curriculum Integration Worksheet.” In this process, teachers referred to their “Associations and Relationships” worksheet to identify specific ideas to develop into learning activities for their lesson plans. They selected the content and focus of the learning activity, identifying the topic area within their academic discipline, as well as the life skill of focus. Teachers wrote learning objectives for both areas that clearly described the expected student behavior or perfor-

mance as a result of the learning activity. They also created the integrated learning activities according to the integration structure suggested by Cinelli, Rose-Colley, and Bechtel,⁷ which is organized around Bloom’s Taxonomy⁸ for the cognitive learning domain. The levels of Bloom’s Taxonomy were reviewed so that teachers understood each level and the desired behaviors expected at each level.

The third step in the integration process was for teachers to fully develop their integrated lesson plans. The integration model used Hunter’s “Instructional Theory into Practice”⁹ lesson plan format. It was stressed to the teachers that the lesson plans needed to address both the academic objective(s) as well as the life skill objective(s). Teachers were also encouraged to be certain that the activities were developmentally appropriate and that the lessons included facilitation, coaching and behavioral rehearsal of skills as well as student-centered learning strategies.

METHODS

Study Characteristics

The investigation utilized a prospective, group-randomized design in nine rural school districts in Pennsylvania. Two main criteria were used to determine a school’s eligibility for the study: 1) low socioeconomic status, as indicated by a minimum of one-third of the student body in a school district qualified to receive free or reduced lunch and 2) relatively small size, as indicated by a school district enrollment of less than 1,000. During the academic year 1999–2000, nine middle/junior high schools meeting the criteria were randomly assigned to one of three conditions: standard LST, I-LST, and comparison. The students in the LST condition received the standard three-year LST curriculum,¹ while students in the I-LST condition received an infused or integrated three-year program based on the LST curriculum. The comparison condition students received no treatment.

The impact of the programs on the students has been assessed through five student surveys, from a pre-intervention survey at the beginning of seventh grade

(T1) through four additional yearly surveys, including T5, one year post program implementation. These results are reported elsewhere.^{4,10,11}

Protocol

A total of twenty-three seventh grade teachers from three school districts, trained in the I-LST condition, delivered integrated lessons to their cohort of seventh grade students during the first year of implementation (1999–2000), followed by nineteen eighth grade and eighteen ninth grade teachers in the following years. The I-LST training included extent of drug use and abuse, prevention strategies, LST, and how to use these constructs in their own classrooms. Teachers at each school formed interdisciplinary teams to develop an implementation plan for their school, with one teacher identified as the lead or contact teacher in the school.^{12,13}

In order to ensure program fidelity and correct dosage for each student in the I-LST schools, an *I-LST Program Matrix*, presented in Figure 1, was completed during the initial training sessions. Each teacher was encouraged to choose the five topics most relevant to his/her curriculum. Based on these choices, the team then completed the matrix to ensure that all components were covered. The school-wide matrix stipulated which lessons each teacher would cover and which LST components would be included in these lessons, helping to ensure that all of the LST components would be covered.

Teachers generated subject-specific lessons to integrate the LST principles and methods. For example, a normative beliefs clarification lesson could be infused into the math skill of graphing. Instead of graphing arbitrary numbers from a mathematics textbook, the students could graph the percentage of U.S. students their age that do *not* use marijuana. Each teacher on the seventh grade interdisciplinary teams developed five lessons to implement in their classes, eighth grade teachers developed four lessons, and ninth grade teachers developed three lessons. Depending on the size of the school and the grade level, the



number of teachers on the interdisciplinary teams varied from three to fourteen. In some schools, one teacher taught two subject areas, and thus could represent two disciplines. Project staff collected and reviewed lesson plans using the *Lesson Plan Assessment Form*, made suggestions for improvement where necessary, and made final reviews of lesson plans prior to classroom implementation. Most suggestions reflected a need for more interactive activities and behavioral rehearsal. Ongoing contact by project staff and the School Coordinator ensured that questions could be addressed as the process evolved. These steps represent an additional effort to assure program fidelity.

Teachers evaluated lesson effectiveness after each session using the *Classroom Implementation Evaluation*. Attendance data from these forms also permitted project staff to determine overall dosage level (i.e., a minimum of 15 lessons in seventh grade, 10 in eighth, and five in ninth). Students' responses, how well the academic and LST objectives were met, and the degree to which students engaged in behavioral rehearsal or role playing were recorded. Finally, teachers described in writing the overall student responses to each lesson, including what worked well and what could have been improved. Over the course of the program, students participated in 81% of the lessons in the LST schools, and 84% of the lessons in the I-LST schools, reflecting the average attendance pattern of approximately 93% attendance per day. It is worth noting that 30 lessons offered at the eighth grade level, for example, represents the total number of lessons implemented at the school level, not at the individual level.

ADAPT staff made every effort to ensure the LST program was delivered as designed. The initial LST training was provided by LST-trained Princeton Health Press staff and ADAPT staff also participated in that cycle in order to provide training in subsequent years. In addition, the design of the I-LST teacher training assured the inclusion of all program components in the regular school curricula for all students.

Evaluation Strategy

A variety of measures were used to assess the project including intervention dosage (i.e., a minimum of 15 lessons in seventh grade, 10 in eighth, and five in ninth for both the LST and I-LST conditions), students' response to lessons, teachers' quality and degree of implementation, and teachers' reaction to the integration materials, training and support. Process evaluations also determined teachers' overall assessment of the staff development and training sessions and integration materials. Formative evaluation was extensively used to ensure optimum program fidelity, including lesson plan assessment, teacher self-survey of lesson plan implementation, and on-site teacher observation, plus a year-end focus group, which provided teacher feedback to ADAPT.

The classroom observations included one lesson taught by each teacher that was also video taped by ADAPT staff. Reviews of the videos helped in evaluating the degree of fidelity to the planned lesson, the ability of the teacher in implementing the lesson, and the overall response of students to the lesson. Staff observers then completed the *Teacher Evaluation Form for Class Observation*, which was compared with the *Classroom Implementation Evaluation* to determine the overall degree of implementation.

RESULTS

Degree to which Implementation Continues

In the school year after the completion of the ADAPT project, 69% of the ninth grade teachers, 29% of the eighth grade teachers, and 52% of the seventh grade teachers reported continuing to teach the LST components on their own. This suggests that the I-LST program was successfully adopted in the three districts, along with LST in the other three program schools. While the ninth grade teachers utilized the LST model more, in the seventh and eighth grades, where more time had elapsed since the program ended, more teachers continued to use the I-LST model

in their own subject areas. In the school districts in the I-LST condition, teachers in seventh and eighth grades were generally more familiar with the notion of curriculum integration/infusion than teachers in the ninth grade. It was more common to find teams of teachers who integrated the curriculum in the middle/junior high school than in the high school, and in some of the districts, the ninth grade was a part of the high school. In schools where teachers were already accustomed to working in teams to integrate/infuse the curriculum, perhaps it is not surprising that they were more likely to continue to use the I-LST model in their own subject areas. Teacher ownership also appeared to be an outcome of this approach, and thus teachers were more likely to incorporate the infused lessons into their teaching. Perhaps when teachers invest the additional thought, time, and creativity in preparing infused lessons they are more likely to take ownership of them and continue their implementation. Thus, using an infused approach may facilitate program institutionalization, regardless of increased demands on teachers and district financial constraints.

Based on the teachers' surveys, year-end focus groups, and observations, ADAPT staff concluded that most teachers have accepted, implemented and adopted the I-LST program and methods, and continue to do so. Teachers understood and adopted the integration approach, and implemented the program in the desired manner, often with a great deal of creativity and initiative. They were careful to address both the LST and academic objectives in their lesson plans. As can be seen from the sample *I-LST Program Matrix*, presented in Figure 1, for the ninth grade in one I-LST school, a complete LST program was infused for all students at the targeted grade level.

What Worked Well

According to year-end focus groups, the majority of I-LST teachers agreed that infusing the LST curriculum into the mainstream subject curriculum provided a more effective way to reach the students. Even though a few teachers found the integrated



approach to be challenging initially, overall, teachers were enthusiastic about and supportive of the integrated approach, particularly those teachers who were already used to working in a team environment. Teachers in both the LST and I-LST conditions noted that the training was vital to their ability to effectively deliver the prevention curriculum. I-LST teachers reported that the training was critical in adequately preparing them to integrate LST components into their curriculum. They indicated that the training was especially effective in their development and implementation of infused lessons, and that the step-by-step process and manual were valuable in guiding the development of their lesson plans. The first year participating teachers were especially helpful with recruiting and supporting new teachers in the program. Project staff invited first year participating teachers to be a part of the training for subsequent years in their respective schools. There they informally shared their experience with their fellow teachers, increasing interest and awareness of the program. They also gave examples of their lesson plans and discussed the importance of coaching and behavioral rehearsal in helping students master the life skills.

Similar to those teachers in the LST condition, teachers in the I-LST condition reported a higher degree of comfort with the process after successfully delivering a few lessons, indicating that the process got easier and that they realized the importance of their involvement in the prevention effort. Likewise, in both conditions, teachers reported that the majority of their students actively participated in the lessons and were able to think critically about drug use and life skills. Teachers in the I-LST condition reported that most of their students responded with interest and enthusiasm to the infused approach, liked the integration of substance abuse prevention into other subject areas, and were more engaged and eager to participate in class. Moreover, their students especially liked the facilitative classroom environment and the hands-on approaches of behavioral rehearsal and role

playing. Teachers also noted that after several weeks of I-LST implementation, students became familiar with the life skills because they had been introduced to them in various classes, and this repeat learning was helpful.

The integration process appeared to work best when teachers worked in teams, allowing for better coordination of lessons, more complete coverage of the life skills, and more sharing of ideas. Teachers suggested that having the opportunity for weekly or bi-weekly team meetings increased their ability to work together and get help from others if they experienced difficulties.

School administrators also reported a high degree of satisfaction with the program. They welcomed a state-of-the-art prevention program in their schools and liked the integrated approach. Moreover, they had favorable responses to the teacher stipends, materials, staff development, and the School Coordinator's contact and assistance. Administrators appreciated receiving the School Reports and were anxious to discuss their content as well as substance abuse prevention.

Difficulties Encountered

Some teachers expressed their concerns about the amount of work required initially to develop their lessons and to participate in the program. Although I-LST teachers only needed to develop five lessons in seventh grade, four in eighth, and three in ninth, teachers who were unfamiliar with an integrated, team approach found the task of creating lesson plans more difficult. Based on this feedback, ADAPT staff modified subsequent workshops to give the teachers more lesson plan development time on-site, with staff assistance and encouragement. Expectations for the teachers (number of lessons to be created, due dates for lesson plan submission, procedures for gathering attendance data, guidelines for scheduling classroom observations and completing lesson evaluations, and expectations for participating in year-end focus groups) were also more clearly stated in writing at the outset, listing specific tasks

to be accomplished, and timelines for accomplishing each task.

Although a few teachers found it challenging to cover all of the traditional material while integrating other material into their lessons, the majority found it was easier than they first expected to integrate life skills into their lessons; thus, they easily adapted to the process. Teachers reported that certain life skills were easier to integrate than others, and that some subject areas were more amenable to integration. For example, most teachers found that decision making, communication and normative education were relatively easy to integrate, with normative education most easily integrated into math, while communication skills and decision making lent themselves to English. When teachers faced difficulties in integrating a component, the health teachers were called upon to include this in their curriculum.

DISCUSSION

Prevention programs must be able to compete with budget barriers and time constraints of teachers. Programs must also be matched with the delivery mechanisms that are most cost and outcome effective for both the immediate time of program adoption and also for continued utilization in following years.

Facilitating the integration of substance abuse prevention programs into academic courses is a strategy that can be employed to increase students' dosage of alcohol, tobacco, and other drug prevention constructs. This integrative process involves a greater number of teachers in the total prevention process and allows students to receive consistent prevention messages across the curriculum from a variety of teachers. In the future, as pressures increase for school reform and academic standards enforced by state or federal standardized achievement tests, school administrators will need to find effective and complementary means for providing comprehensive prevention education. If prevention objectives can be effectively woven into the academic curriculum, such an infused process



may provide the best opportunity to affect both academic performance and student behavior. A team approach for the implementation of prevention constraints across the curriculum, regardless of the prevention program chosen, can provide a practical—and effective—way to integrate prevention into the curriculum. The I-LST model could be used as a strategy for teaching life skills and other prevention constructs as well as the existing school curricula.

LIMITATIONS

One limitation of this project was the variability among teachers' design and delivery of the infused lessons; however, this was addressed, in part, by having project staff review lesson plans ahead using the *Lesson Plan Assessment Form*. Project staff also observed the implementation of lesson plans, evaluating the efficacy of lesson plan implementation using the *Classroom Implementation Form*. Moreover, teachers' performance was evaluated using the *Teacher Evaluation Form for Class Observation*. This evaluation considered several factors, including preparedness, ability to engage students actively in the learning process, enthusiasm and attitude regarding substance abuse prevention, and effectiveness of encouraging behavioral rehearsal of skills. Students' level of participation was also evaluated. Several lessons were also videotaped so that separate evaluators could rate both lesson plan implementation and the teacher effectiveness.

Another limitation of the project was the potential for some students in the I-LST condition to be exposed to more lessons

than the traditional recommended amount in the LST program. This was addressed, in part, by having teachers from various disciplines work collaboratively to prepare the I-LST Program Matrix prior to implementation of the I-LST lessons. An additional limitation of the project was relying, in part, on the attestations of the teachers regarding their students' responsiveness to the I-LST and LST lessons; however, students' feedback on their experiences with both delivery modes matched the reports of their teachers' perception of their engagement with the lessons. Students' responsiveness was also monitored by project staff during their observation of the implementation of lesson plans. These observations confirmed teachers' attestations of students' responsiveness to lesson plans delivered in both I-LST and LST conditions.

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