When the Researchers Have Gone Home to Write Their Articles. Diffusion and Implementation of School-Based HIV-Prevention Programs in Tanzania.

Herman Schaalma¹, Jo Reinders², Melkioury Matasu³, Sylvia Kaaya⁴, and Knut-Inge Klepp⁵

Abstract

Although many scientific trials have shown that theory- and evidence-based Aids-education programs can make a difference, only a few of these programs seem to find their way to schools that were not included in the scientific trials. This article discusses the diffusion of Aids-education programs from the perspective of health promotion and the theory of diffusion of innovations. It argues that program diffusion should be an integral component of health promotion planning, that health promotion planners should anticipate program diffusion right from the start of program planning, and that planners should actively intervene in the diffusion process by designing theory- and evidence-based strategies to facilitate program adoption, implementation and maintenance. It discusses Intervention Mapping, a protocol for theory- and evidence-based health promotion program development that incorporates program diffusion, and provides some suggestions for studying diffusion related decision-making.

Keywords: AIDS prevention, schools, diffusion, implementation, intervention mapping

Introduction

M. is a small village in the Pare Mountains, northern Tanzania. At first glance, M. seems relatively well situated. Most of the villagers live in brick houses, the village has schools for primary and secondary education, and the local dispensary seems in a rather good shape. However, most of the local youth never make it to the secondary school – a private boarding school with rather high school fees. And despite its nice brick buildings, the dispensary lacks many basic facilities and drugs. In M. Aids prevention is limited to a calendar at the wall of the dispensary, and incidental individual counseling by some of the secondary school teachers. And although the national syllabus for primary science includes some information about Aids, classroom materials specifically designed to educate young people about Aids and prevention have never found their way to the school in M. M. is no exception in Tanzania or other sub-Saharan African countries. Despite the fact that it is widely acknowledged that schools are an important arena to promote the sexual health of young people, and several signed UN conventions from the last decade emphasize the right of young people to education and information, most school-based Aids-prevention programs that have been shown to be effective in scientific trials have never been implemented effectively on a wide scale for a variety of reasons (1). Policy-makers, teachers, community leaders and parents may object to the introduction of Aids-prevention programs because they feel that the topics covered by these programs are too sensitive and may encourage young people to have sex.

Teachers may feel uncomfortable with teaching their students about safer sex, and they may lack opportunities for attending training courses. Schools may lack the additional funding that is usually available during scientific efficacy trials. Countries may still lack policies that are supportive of school-based Aids education. Consequently, when the researchers go home to write their articles, many Aids-prevention programs are likely to die.

In this article, we will address the diffusion and implementation of Aids-prevention programs in the school system from an ecological health promotion perspective. First, we will define health promotion and present a framework for its best practice. We then consider the introduction of Aids education in the school system from the perspective of theories of diffusion of innovations. Subsequently, we will present a protocol for the design of evidence-based health promotion programs that integrates program diffusion and implementation with program planning and design, as well as a conceptual framework for future research on the implementation of HIV-education in the Tanzanian school system. Finally, we will offer some recommendations for future research and practice regarding school-based Aids education.

Health Promotion

Health promotion is defined as the combination of educational and environmental supports for actions and conditions of living that are conducive to health (2) and thus, includes health education. This definition represents the historical development in health promotion from an individual to a more ecological and strategic approach, in which health is viewed as a function of individuals and their environments, including families, social networks, organizations (e.g. schools) and public policy frameworks (3). In the ecological conception of health promotion ‘health behavior’ refers not only to individual behavior, but also to the actions of groups and organizations (e.g. schools). As such, health promotion regards decision-makers as agents in the environment that may become targets for health promotion interventions (4). For example, safer sexual practice among young people may depend on individual knowledge, motivation and skills, but is also determined by the actions of legislators, health authorities, schools and other decision-making groups. From a health promotion perspective interventions are required at each of these levels if sexual risk behavior is to be reduced among sexually active young people.

Health promotion is a planned activity (2,4), based on careful needs assessments that are sensitive to the experiences of, and risks faced by, target populations. Such assessments include analyses of behavioral and environmental causes of a health problem, identification of the determinants and environmental causes of behavior, and of the resources of the community (2,5). This implies that different target populations may require different...
combinations of interventions to change health behavior, and that simple forms of technology transfer, such as exporting effective Western AIDS-education programs to developing countries, are likely to fail. Health promotion is based upon local, collaborative development that is responsive to the particular needs of a population in a specified geographical, economic and cultural context. This enables program developers to identify target populations and to specify intervention goals, not only in terms of change in health status, quality of life, and behavior, but also in terms of environmental conditions.

Health promotion programs are most likely to be effective when they are theory- and evidence-based (4,6). Health promotion planners need to identify theory-based methods that have proven, or are likely, to be effective in changing (correlates of) behavior, and they need to translate these methods into educational strategies and materials that fit target populations and intervention contexts.

Several reviews of AIDS-prevention programs have suggested that these basic tenets of health promotion also hold for the promotion of safer sexual behavior. AIDS-prevention programs that take account of target population characteristics as well as cultural and environmental contexts, and that are based upon social cognitive theories have shown to generate positive changes in adolescents' sexual-risk behavior (7-10). These programs go beyond increases in knowledge and target the proximal cognitive determinants of decision-making and goal enactment as specified by social cognitive theories (11). They include behavior-specific skill development (e.g. regarding the refusal of unwanted sex, the postponement of sexual intercourse, carrying condoms, and ensuring condom availability) and a training of generic social skills, such as decision-making, communication, refusal and negotiation skills, and employ methods as discussion groups, planning exercises, social rehearsal, modeling and role play and other drama techniques (11-13).

Although most of the scientific trials with AIDS-prevention programs have been conducted in Western countries, especially the USA (9,14), the scientific literature also reports examples of promising trials in sub-Saharan African countries (15). Kaaya and colleagues identified 11 scientific evaluations of AIDS-prevention programs, among them the Ngao trial in Northern Tanzania. The Ngao program focused on increasing AIDS-related knowledge and awareness, fostering attitudes and subjective norms reducing intentions to engage in and actual AIDS risk-related behaviors, and enhancing social skills that may increase young people’s abilities to avoid high-risk situations. The program relied on classroom activities that could be easily implemented with a minimum of resources, and included traditional didactic methods to disseminate information, creative assignments and interactive techniques, such as classroom discussions and role-plays. Evaluation of Ngao showed that the program had favorable effects on AIDS-related knowledge, and on attitudes, subjective norms and intentions to engage in sexual intercourse (16), although some effects were gender specific (17).

When scientific trials suggest that we are able to design programs that can reduce young people’s sexual risk behavior, the issue of the widespread diffusion, adequate implementation and maintenance of such programs becomes relevant. The assumption is often made that after a program is developed, and its potential effectiveness shown, widespread adoption and implementation will occur automatically. This, however, is seldom the case, and there is now ample evidence that even initial attempts to implement a program does not typically lead to sustained use of an effective program. In many cases, programs that have shown promising results in scientific trials are simply not known, not used, or are used in an incomplete or incorrect way.

As an example, in 1997 it was investigated to what extent the Ngao program still was being implemented in the original 18 schools. Interviews with health care workers employed at the health institutions from which health personnel had been recruited and trained for the Ngao program, revealed that 10 out of 30 knew of Ngao program activities still being implemented. However, none of these health care workers reported in 1997 to be engaged in any collaboration themselves with teachers in implementing the program activities. In contrast, 29 out of 36 interviewed teachers (two from each of the 18 original schools) were aware of the Ngao program, and of these, all reported the Ngao program still being used in their schools. Five of the seven teachers not being aware of the program had been employed for two years or less at their current schools, i.e. they were hired long after the original study was conducted (18).

In addition to the Ngao programs, other school-based initiatives have been launched in Tanzania, both through the Ministry of Education and Culture and through various non-governmental organizations (including the African Medical and Research Foundation, the Tanzanian Red Cross Society, and UNICEF). Although no nation-wide study has been conducted to assess the extent to which such programs are being disseminated and implemented throughout the country, a national workshop on AIDS Preventive Education in Schools in May 1997, provided an important overview. According to the Ministry of Health and Culture, between 1993 and 1994, 18,000 out of 21,600 primary school teachers had attended in-service training seminars (supported by UNICEF), a teachers’ guide had been developed, and an AIDS component had been included in the syllabus for primary science (19). An evaluation of the National School Health Program did, however, revealed that there were serious problems in implementing this program due to (among others, and in addition to lack of funding): 1) lack of school health policy, 2) a deficient and disintegrated school health education, 3) inadequate provision of health services, and, 4) inadequate coordination of project activities (20). These findings are largely consistent with findings from the Healthy Schools Project in Arusha and Kilimanjaro in 1997, and do, most likely, also reflect the situation with respect to AIDS education across the country.

Now why haven’t programs specifically designed to specifically designed to educate young people about AIDS and prevention have found their way to the schools, and how can health promoters facilitate the diffusion and implementation of such and alike programs in the future?
Conceptual Framework: Diffusion of Innovations

The introduction of Aids-prevention programs in the school system can be regarded as the introduction of an innovation that usually demands changes in teachers’ behavior, pedagogic and didactical skills, and the schools’ management. Diffusion of innovation theory provides a conceptual framework for how to get Aids-prevention programs adopted, implemented and maintained over time (4,21). According to this theory, program diffusion is thought of as moving from awareness of a program, through decisions to adopt a program, to initial and sustainable program use. Diffusion is described as a three-staged process: (a) Adoption refers to the uptake of a program by potential users and depends on knowledge of a program, awareness of an unmet need, and the assumption that the program may meet the perceived need and therefore will be given a trial; (b) Implementation refers to the initial use of the program; and (c) Sustainability refers to the maintenance and institutionalization of a program as part of routine educational practice (4,21-22).

Adoption. Rogers (21) describes program adopters as moving through the stages of awareness, interest, trial and adoption. School administrators and staff have to have knowledge of the existence of an Aids-prevention program, they need to have an interest in using the program, and they have to decide to give it a try. According to Rogers, all adopters go through these stages, but the time required to complete these stages will depend on characteristics of both the adopters and the program (21-22). Some people are more open-minded regarding innovations than others, and some are more easily convinced of the need of the innovation; some innovations are more easily diffused than other. Rogers (21) has identified characteristics of an innovation that are most likely to affect the speed and extent of the adoption a diffusion process (see Table 1). Health promotion planners should ensure that these features are considered and addressed when programs are designed and produced, and are communicated to potential program users.

Rogers (21) describes the process of adoption as a normal, bell-shaped distribution with five adopter categories: innovators, early adopters, early majority adopters, late majority adopters and laggards. Innovators are labeled as being eager to try new ideas while taking the risks for failure and loss. When compared to innovators, early adopters are characterized as being more respected by their network peers. Since they are perceived as taking deliberate, wise decisions, they are assumed to operate as role models for the early majority who generally take more time for their innovation decision making. Early majority adopters have the gateway capacity to reach the average members of a social system. Late majority adopters and laggards are characterized as gradually more closed to new ideas, while their innovation adoption is most determined by social or economic pressures. Of course, potential adopters can decide not to adopt a new program. This decision can be either an active process or simply a passive failure to become familiar with the program and to decide.

Table 1 Attributes that are key determinants of the speed and extent of the diffusion of school-based health promotion programs

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Key question</th>
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<tbody>
<tr>
<td>Relative Advantage</td>
<td>Is the program better that current teaching practice?</td>
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<tr>
<td>Compatibility</td>
<td>Does the program fit with the school system?</td>
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<tr>
<td>Complexity</td>
<td>Is the program easy to use?</td>
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<tr>
<td>Trialability</td>
<td>Can the program be tried before making a decision to adopt?</td>
</tr>
<tr>
<td>Observability</td>
<td>Are the results of the program observable and measurable?</td>
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<tr>
<td>Impact on social relations</td>
<td>Does the program have a disruptive effect on the social environment?</td>
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<tr>
<td>Reversibility</td>
<td>Can the program be reversed or discontinued easily?</td>
</tr>
<tr>
<td>Communicability</td>
<td>Can the program be understood easily and clearly?</td>
</tr>
<tr>
<td>Time</td>
<td>Can the program be adopted with a minimal investment in time?</td>
</tr>
<tr>
<td>Risk and uncertainty level</td>
<td>Can the program be adopted with minimal risk and uncertainty?</td>
</tr>
<tr>
<td>Commitment</td>
<td>Can the program be used effectively with only modest commitment?</td>
</tr>
<tr>
<td>Modifiability</td>
<td>Can the program be updated and modified over time?</td>
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Implementation. Program implementation refers to questions about completeness and fidelity. Fidelity refers to the degree to which a program is implemented with its methods and strategies intact; completeness to the proportion of program activities and components that are actually delivered (23). Program adoption is by no means a guarantee for quality implementation. In health promotion practice program users frequently only implement parts of a program, or implement program components the wrong way. Another observation is that program users adapt programs to their own situation and capability – varying from small changes to major revisions. Such reinvention may foster program ownership and commitment – not just important for program implementation but also for sustainability. However, program reinvention may also reduce program effectiveness.

Sustainability. A final stage of program diffusion has been described as institutionalization: incorporating a program into organizational routines so that it survives in the long run (24). Rogers (21) describes institutionalization as routinization, the progression of an innovation to an indistinguishable part of the individual or organizational routines. Program sustainability may include three goals: 1) maintenance of the program’s health benefits, 2) institutionalization of a program within organizational routines, and 3) capacity building in the recipient organization or community (4,26).

Many health promotion innovations fail to have an impact because of the gap between program development and implementation, on the one hand, and lack of planning of diffusion, adoption and implementation, on the other (27). To bridge this gap, Orlandi and colleagues stressed the need for a ‘linkage system’ between the people who develop an intervention (for example, a research team or health education authority), the users who are expected to adopt and implement the program (e.g. youth
organizations, schools), and recipients or clients (e.g., young people attending school). Orlandi and colleagues suggest that this linkage system should be formed at the beginning of program development, and should include representatives of the development team, potential users and policy makers. A linkage system has two important benefits. First, interventions are developed so that they are readily replicable and sustainable within the organizational and cultural contexts within which they are to be used (10,27). Second, plans for diffusion and adoption are well advanced when trials demonstrate the effectiveness of interventions. Linkage is a central tenet of health promotion since it contributes to a full participation of target populations and organizations in program planning.

The diffusion of health promotion programs has been – and still is – regarded as an automatic process, and health promotion planners did – and still do – not actively interfere with the adoption and implementation of their program. It is only since recently that health promoters acknowledge that program adoption usually needs agenda setting and active persuasion, and that program implementation needs active support, encouragement and reinforcement. Program planning should include theory- and evidence-based strategies to facilitate that target populations and organizations adopt and implement the program (4).

**Sexual Health Promotion: Diffusion Obstacles**

Despite the evident desirability of sexual health promotion targeting youth and despite our capability to design programs that do make a change, there are many obstacles for the widespread diffusion and adequate implementation of school-based sexual health promotion programs (1).

A first obstacle relates to program awareness. Many teachers at primary schools in villages such as M. may simply not be aware of the existence of effective Aids-prevention curricula. Frequently this has to do with the fact that Aids-prevention programs being designed for scientific trials were developed by organizations with a primary interest in scientific research, such as universities. Frequently scientists do not link up with health education practice organizations that take responsibility for the diffusion and maintenance of programs after the trials have been completed. But even in situations where an Aids-prevention program is adopted by a health education practice organization, this is by no means a guarantee that target teachers will become aware of the existence of the program. For example, in the early 1990s four national Aids-prevention programs were available in the Netherlands, and all programs were ‘owned’ by a health education practice organization responsible for program diffusion. Nevertheless, research revealed that only half of the Dutch teachers who were supposed to provide Aids education, were aware of the existence of at least one of the four programs (28). This implies that health promoters have to look for effective ways to raise program awareness among their target population. An information-based brochure or a letter may not be sufficient.

When schools are aware of Aids-prevention programs, they have to decide whether or not to adopt the program. Many of the barriers to adoption and implementation of effective Aids-prevention programs in the schools are related to the sensitivity of the content concerning sexual matters that needs to be addressed to provide the students with the behavioral skills necessary to engage in preventive behavior. In some countries and communities, teachers and school administrators are not comfortable with this content and therefore resist the adoption of Aids-prevention programs. Policy-makers, school administrators and teachers may object to Aids-prevention programs because they regard the topic as too sensitive for children or too controversial for society. Aids education may also conflict with their personal sexual moral and values. In addition, many may fear a negative impact on the relationship between the school and parents, since many parents are not comfortable with sex education, partly because they fear that such education may initiate sexual activity among their children. Moreover, many countries lack supportive policies on Aids prevention, have vague policies, or even have policies against sexual health promotion.

Other obstacles have to do with the anticipation of implementation. Teachers may regard Aids education as complex, and they may lack the experience, skills and confidence to organize classroom activities on sexual issues that go beyond the transfer of biomedical knowledge. A one-shot training or workshop may not be sufficient to take away these feelings.

Even when Aids-prevention programs are adopted and Aids education is provided, most schools seem to limit this education to a transfer of biomedical knowledge. Teachers’ views, values and morality are crucial determinants of the implementation of Aids education. Paulussen, Kok & Schaalma (28) found that the extent to which teachers used recommended Aids-education curricula, and the way in which they used them, were determined by teachers’ views of the feasibility of classroom procedures, their expectations of students’ responses to program activities (interest, enthusiasm), and their confidence in their ability to deliver the curriculum.

Teachers tend to deliver the activities they are comfortable with – that are compatible with their current teaching practice, usually knowledge transfer – and tend to skip more difficult activities, such as value development, social skills training and condom demonstrations (28). Cultural and moral influences on the acceptability of young people as sexual beings, sexual desires and sexual behaviors means that facilitating the development of values and social skills prerequisite to safer sexual practice is more challenging than value and skill development work in most other areas of teaching. Teachers’ sexual experience or moral views about teenage sexuality may make it difficult for them to facilitate the development of skills relevant to safer sex negotiation. They may also need to be sensitive to different: (i) levels of experience, (ii) values, and (iii) sexualities amongst their students if they are to avoid alienating members of the class. Consequently, those who deliver safer sex programs do require special training, coaching and support.

Aids and sex education in classrooms depends upon the establishment of a ‘safe’ classroom atmosphere. Young people should feel free to discuss intimate issues because discussing sexual behavior may break taboos concerning the public discussion of sexuality, promotes
the acknowledgment and respect for differences in values among young people, and sets the stage of making individual decisions for the long term instead of taking over teachers’ views for the short term. This open atmosphere may lead to uncertainty, anxiety and embarrassment among teachers and students that, in turn, disrupt communication and exercises crucial to social skills development. AIDS education can address this issue by including confidentiality ground rules, feelings-and-values exercises in which embarrassment and its effects and the limits of acceptable disclosure are discussed, as well as group work as dominating didactical method, allowing the presentation of opinions and values on behalf of the group instead of the individual student.

Evidence from studies on the implementation of sex education programs highlights the need to provide teachers with clearly documented exercises that have been piloted and found to work well in classrooms, as well as, the confidence and skills to deliver exercises as they were designed (26, 28).

Program users have their own reasons for implementing or not implementing a program. A study among Dutch secondary school teachers revealed that teachers’ decisions to adopt and implement an AIDS-prevention program were strongly related to their self-efficacy regarding program implementation and their anticipation of the effort involved, their colleagues’ approval and their students’ response (28-29). Teachers’ beliefs about program effectiveness were not associated with their intentions to provide AIDS education or adopt a particular AIDS-prevention program. Thus attempts to promote adoption among Dutch teachers by emphasizing program effectiveness are unlikely to be successful. Teachers are more likely to adopt a program that is presented as easy to use, having ready-made lesson plans and materials, approved of by other teachers and having had positive evaluations by previous recipients. Future research on adoption needs to identify users’ reasons for adoption and then make recommendations for interventions designed to effectively increase adoption (30).

Health promoters do not always acknowledge that the diffusion of an intervention, such as an AIDS-prevention program, involves managerial decision-making and frequently implies organizational change (21,24). This is especially important for program sustainability, since to sustain programs they need to be incorporated in organizational routines, such as job descriptions, budgets, performance evaluations and school policy. Changing organizations depends upon an understanding of decision-making and organizational functioning. Decision-makers have their own goals and agendas. They may strive for organizational stability and often for individual and/or organizational power. Bureaucratic and political considerations may conflict with health promotion priorities and innovation may be viewed as risky.

Moreover, the specific behavior change goals of effective AIDS-prevention programs (30) may conflict with educational aspirations to empower students to make their own decisions, rather than prescribing particular lifestyles (27). AIDS-preventive interventions should be compatible with organizational priorities. Alternatively, program developers should seek alliances and strategies to change target organizations through political action, for example by influencing educational policy and national legislation. Decision-makers in the linkage group can anticipate potential conflicts with organizational and educational priorities, and can facilitate attempts to promote organizational change.

**Intervention Mapping**

Health promotion planners should anticipate the adoption, implementation and maintenance of their program right from the start of program planning and design. This implies that program planning and diffusion are integrated components of the development process. How then should researchers or health promoters develop theory- and evidence-based interventions that are likely to be effective and widely adopted?

In general, the process of health promotion program development is not well documented (27). However, Bartholomew et al. (4) have presented a protocol for developing theory- and evidence-based health promotion interventions. This protocol, entitled Intervention Mapping (IM), can guide health promoters through program development, demystifying the process and eliminating mistakes identified by previous teams (see Figure 1). It also provides a common creative framework facilitating collaboration between researchers, health promoters and linkage system members from different backgrounds, and facilitating target group participation. The protocol challenges health promoters 1) to formulate and specify program objectives that have an empirical base in needs assessments and situational analyses, 2) to design theory-based health promotion strategies to accomplish these objectives in such a way that they are compatible with the target population, intermediaries and intervention context, 3) to design a theory-based strategy facilitating program adoption and implementation, and 4) to plan process and effect evaluation. IM incorporates the collaborative linkage system outlined by Orlandi and colleagues (26) and is based on the philosophy of self-determination and community empowerment (31). IM recommends local, collaborative development that is responsive to the particular needs of a population in a specified geographical, economic, political and cultural context. As such, the protocol provides a framework for a continuous collaboration between program developers, researchers, target population, intermediates, and stakeholders.
IM is not a new theory or model; it is a tool for the planning and development of health promotion programs, integrating program development and diffusion. It maps the path from recognition of a need or problem to the identification of a solution. Although IM is presented as a series of steps, Bartholomew and colleagues (4) see the planning process as iterative rather than linear. Program planners move back and forth between tasks and steps. The process is also cumulative: Each step is based on previous steps, and inattention to a particular step may lead to mistakes and inadequate decisions.

It is important to note that IM is not limited to the adaptation of programs to a specific target population or intervention context. The protocol can guide health promotion planners to intervention strategies that are focused on changing the intervention context. The issue of program diffusion and implementation is dealt with in IM in several ways: 1) the protocol requires full participation of target group and intermediaries in program planning and design, 2) the protocol incorporates the principle of ‘linkage’, the formation of a liaison group comprising researchers, health promoters, representatives from the target group, intermediaries and stakeholders, and 3) the protocol includes the design of a theory-based strategy to facilitate program adoption, implementation and sustainability. As such, IM not only requires that health promotion planners anticipate program diffusion (e.g. by looking for the optimal fit between theory and practice) but also requires that health promoters set objectives for adoption and implementation, look for theory-based methods to accomplish these objectives, and design a strategy to facilitate and support program adoption and implementation.

The implication of the IM approach to AIDS prevention is that health promotion planners do not de facto limit themselves to the design of an AIDS-prevention program targeting youth, but may also design intervention strategies to persuade school administrators to adopt the program, to support teachers with program implementation, to support schools with organizational changes regarding program maintenance, and – if necessary – to change AIDS-prevention policies. IM describes how program developers can set objectives for program adoption, implementation and maintenance and link these objectives to theoretical methods and practical strategies for promoting adoption and implementation. Thus interventions are required, not only to change...
individual behavior of students, but also to facilitate program adoption, implementation and sustainability.

What then is the role of health promoters when policy or legislative constraints prohibit evidence-based practice? A social ecological approach to health promotion, such as that inherent in IM (4), implies that health promoters should seek alliances and strategies to change such policies or legislation. This implication politicizes health promotion, but this is not unique to sexual health promotion. For instance, health promotion has a rich history in media and policy advocacy campaigns to promote anti-smoking policy (32).

**Research on program adoption and implementation**

IM is a protocol for the theory- and evidence-based development of health promotion programs. The theory- and evidence-based approach also holds for attempts that are undertaken to facilitate program diffusion. This implies that IM requires that health promoters not only have an understanding of the behavior of their target population (such as, youth), but also insight in the behavior of key decision-makers (such as, school principals, policy makers), intermediates (such as, teachers), and stakeholders (including parents and community leaders). When community leaders and parents are opposing Aids education, we need to know why. When teachers feel uncomfortable with teaching Aids education, we need to know why. When school administrators are refusing to create commitment and a supportive school policy, we need to know why. When policy-makers are reluctant to enforce policies favoring Aids education, we need to know why. Only then can we start thinking about the design of a theory-based strategy to facilitate the diffusion of Aids education.

Achieving satisfactory diffusion of an innovation to prevent Aids and to promote safer sexual practice involves a complex, multilevel change process (22). At the school level, successful uptake of an innovation may require changes in school policy and changes in the role of teachers. At a broader communitywide or even societal level the diffusion process can involve highly valued experts or supportive key figures in the community, the use of media, support from government policies and legislation, and coordination of a variety of other initiatives for individuals and groups. Therefore, health promotion planners have to identify policies, resources, and circumstances prevailing in the program’s organizational and political context that could facilitate or hinder program implementation (2). Planners must assess the availability of available resources (time, people, funding). Barriers to implementation, such as staff commitment or lack of space in the school curriculum, should be assessed, and plans to address them put in place. Also access to youth-friendly health services in and around schools, and any other societal and organizational policies or regulations that could affect program implementation should be considered and planned for accordingly.

Most of the theories that are usually used to understand and describe individual behavior change, such as Social Cognitive Theory (SCT (33) or the Theory of Planned Behavior (TPB) (34), are also applicable to explaining the change and diffusion process at an organizational level. Other theories and models, including more ecological models and community organization theory, can also be useful. For instance, SCT provides explanations for of the psychological mechanisms by which diffusion occurs (35). For potential program users to adopt, they must be aware of the innovation, hold positive outcome expectations and expectancies for it, have sufficient self-efficacy and behavioral capability, and expect sufficient support by colleagues and school administration for both adoption and implementation. Paulussen and colleagues (28,36) applied the TPB to the identification of determinants for adoption and implementation of Dutch Aids-prevention program. They hypothesized both endogenous and background variables to influence teacher’s adoption of an Aids-prevention program (see Figure 2). The background variables are thought to influence adoption and implementation through their effects on the TPB variables on the top half of Figure 2. Instrumentality refers to teachers’ perceptions of whether the program meets their planning concerns and includes clarity of instruction, anticipated student reactions, time required, and ease of teaching. Paulussen and colleagues (28, 36) found that subjective norms, instrumentality and descriptive norms (perceived behavior of colleagues) explained a considerable amount of the variability in teachers’ adoption of Aids-prevention programs. Community organization theories encourage planners to involve key community members. Organizational change theories inform planners about the processes and strategies for creating and sustaining changes in health policies and procedures that influence the success of health promotion programs.
Figure 2. Framework for research on the process of teachers’ innovation-decision making about HIV education programs (adapted from Paulussen, 1994)
Conclusions and future research agenda

Reviews of Aids-prevention programs, including school-based programs, show that theory and evidence-based interventions that take account of target population characteristics and political and cultural contexts can generate positive changes in adolescents' sexual-risk behavior. However, with a few exceptions, including European and African programs, most effective interventions are US-based. This is likely to create implementation problems elsewhere in the world (11,17,26). The US success in effective program development needs to be replicated in other cultural and economic contexts before research on Aids prevention can have a global impact. Local research initiatives that involve systematic program development, evaluation as well as interventions designed to promote widespread adoption and accurate implementation are required. Intervention Mapping provides one approach to achieving this (4). Much remains to be done. Below we highlight some suggestions for future work.

Health promotion should be theory- and evidence-based, needs-driven and ecological in its perspective. These tenets do also hold for the promotion of sexual health, in particular school-based Aids education. In order to enhance future diffusion of programs proven to be effective in reducing sexual risk taking within the school systems, we argued that 1) health promotion planning should incorporate program diffusion, 2) the Intervention Mapping protocol is a useful tool to facilitate this, 3) health promotion planners need to collaborate with representatives from the user-system and key decision-makers from the start of program planning, 4) health promotion planners should actively interfere with the diffusion process by developing theory- and evidence-based strategies to enhance program adoption, to support program implementation and to facilitate program sustainability. To be able to design such strategies, health promotion planners need insight into the diffusion decision-making processes of all relevant stakeholders. We conclude that evidence-based sexual health promotion in schools is only possible within certain political contexts and, where these do not exist, health promoters are faced with a choice of becoming political campaigners or renouncing evidence-based practice.

Dissemination of school-based AIDS education programs in Tanzania

In addition to the Ngao programs, other school-based initiatives have been launched in Tanzania, both through the Ministry of Education and Culture and through various non-governmental organizations (including the African Medical and Research Foundation, the Tanzanian Red Cross Society, and UNICEF). No nation-wide study has been conducted to assess the extent to which such programs are being disseminated and implemented throughout the country. However, a national workshop on AIDS Preventive Education in Schools in May 1997, provide an important overview. According the Ministry of Health and Culture, between 1993 and 1994, 18.000 out of 21.600 primary school teachers had attended in-service training seminars (supported by UNICEF), a teachers’ guide had been developed, and an AIDS component had been included in the syllabus for primary science. The details regarding the content of this in-service training, the syllabus or its use was not presented. A recent evaluation of the National School Health Program did, however, reveal that there were serious problems in implementing this program due to (among others and in addition to lack of funding):

- There was no established school health policy;
- Health education in school was deficient and disintegrated;
- There was no syllabus for health education;
- Provision of health services was inadequate;
- There was inadequate coordination of project activities by other agencies.

These findings are largely consistent with our findings from the Healthy Schools Project in Arusha and Kilimanjaro in 1997 and do, most likely, also reflect the situation with respect to AIDS education across the country.

Finally, according to the Ministry of Health and Culture, by May 1997, the instructional material to be used for secondary school students and for teachers at teacher training colleges was still in draft form.

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