Sexuality Research & Social Policy
Journal of NSRC http://nsrc.sfsu.edu

June 2006 Vol. 3, No. 2

The Gay Cruise: Developing a Theory- and Evidence-Based Internet HIV-Prevention Intervention

Gerjo Kok, Paul Harterink, Pjer Vriens, Onno de Zwart, Harm J. Hospers

Abstract: This article presents the development of a theory- and evidence-based Internet HIV-prevention program for Dutch men who have sex with men (MSM) they have met on the Internet. The program is based on a protocol called Intervention Mapping (IM), which includes six steps. In Step 1 of IM, we conducted a needs assessment. In Step 2 we established program objectives to get e-dating MSM to use condoms consistently. In Step 3 we translated theoretical methods into practical strategies. In Step 4 we integrated the strategies into an intervention called Gay Cruise in which virtual pursers introduced participants to the strategies. In Step 5 we discussed large-scale implementation. And in Step 6 we discussed process and effect evaluation. We conclude that IM can be a helpful tool for developing and improving Internet HIV-prevention interventions.

Key words: Intervention Mapping; program development; Internet-based; men who have sex with men (MSM); HIV risk

The Internet has become an increasingly popular venue for seeking sex partners (*e-dating*), especially among men who have sex with men (MSM) (Hospers, Harterink, Kok, & de Zwart, 2005). Because this population has high rates of unprotected anal sex (Hospers et al., 2005), interventions that target it are important and necessary. So far, though, only a limited number of effect studies of Internet interventions targeting MSM have been reported (Bull, Lloyd, Rietmeijer, & McFarlane, 2004; Davidovich, De Wit, & Stroebe, 2004), and they have shown mixed effects on sexual behavior and determinants of behavior in intervention groups compared with control groups. The current challenge is to use the continuously advancing technological possibilities of the Internet for effective HIV prevention.

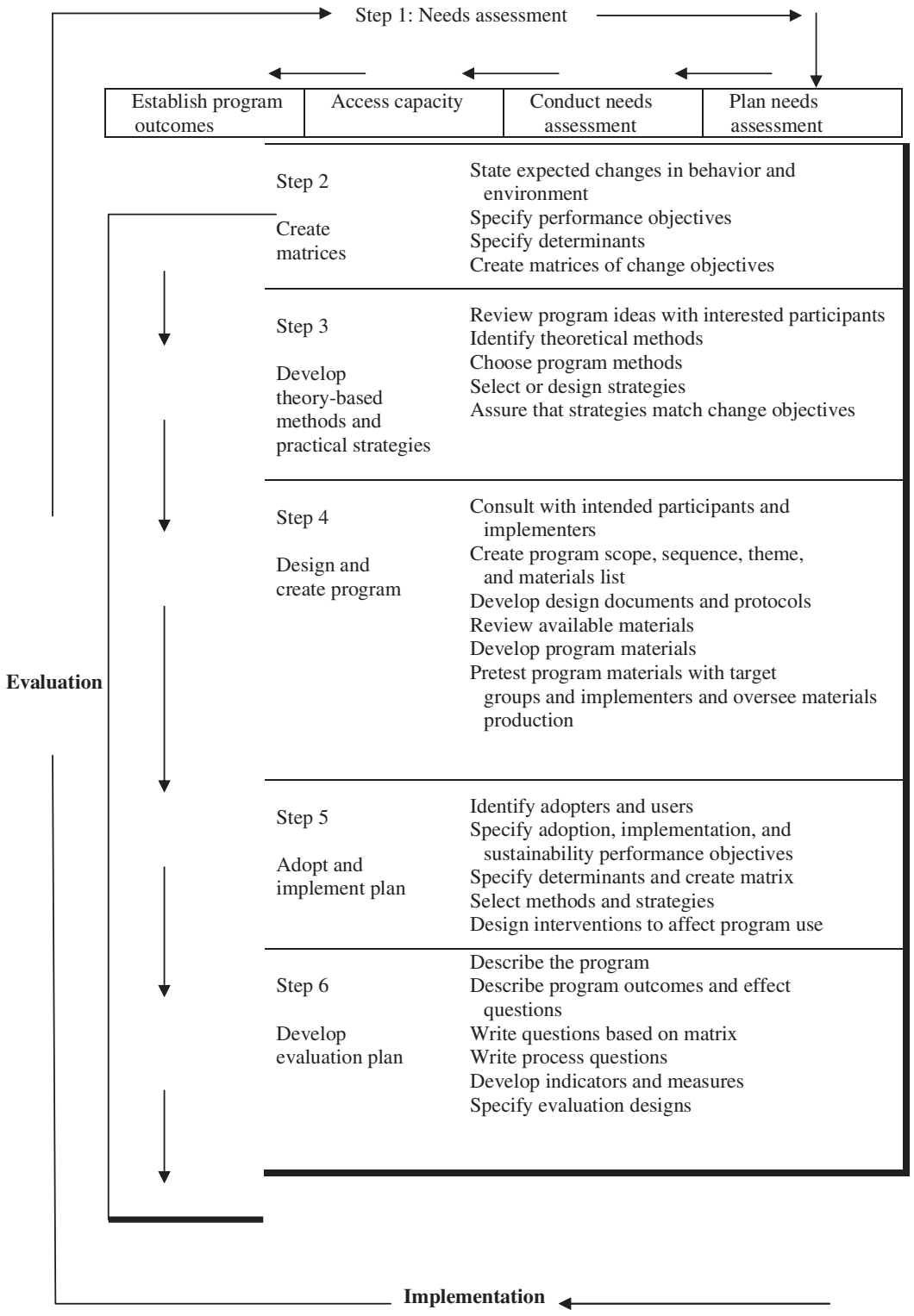
In this article, we present the development of a theory- and evidence-based Internet HIV-prevention program for Dutch men who meet men on the Internet. The development of the program is based on Intervention Mapping (IM) (Bartholomew, Parcel, Kok, & Gottlieb, 2001, 2006), a systematic process to develop health promotion programs based on theory, empirical evidence, and additional research (see Figure 1). IM is composed of six steps, each step providing a foundation for the next. Each step comprises several tasks that result in a clear end product. IM enables program planners to make decisions based on data and theory that have been shown to be most effective (e.g., Mullen, Green, & Persinger, 1985; Kelly & Kalichman, 2002).

We do not present the results of the evaluation of the intervention effects in this article but rather focus on a description of the program development. The health promotion literature has traditionally consisted largely of descriptive studies on the psychosocial determinants of behavior and of evaluation studies on the effectiveness of programs (with insufficient information on the content

Correspondence concerning this article should be addressed to Gerjo Kok, Department of Experimental Psychology, Maastricht University, P.O. Box 616, 6200 MD Maastricht, the Netherlands. E-mail: g.kok@psychology.unimaas.nl; Paul Harterink, Municipal Health Service Rotterdam and Environs, P.O. Box 70032, 3000 LP Rotterdam, the Netherlands. E-mail: harterinkp@ggdrotterdam.nl; Pjer Vriens, Municipal Health Service Rotterdam and Environs, P.O. Box 70032, 3000 LP Rotterdam, the Netherlands. E-mail: vriensp@ggdrotterdam.nl; Onno de Zwart, Municipal Health Service Rotterdam and Environs, P.O. Box 70032, 3000 LP Rotterdam, the Netherlands. E-mail: dezwarto@ggdrotterdam.nl; Harm J. Hospers, Department of Experimental Psychology, Maastricht University, P.O. Box 616, 6200 MD Maastricht, the Netherlands. E-mail: h.hospers@psychology.unimaas.nl

Sexuality Research and Social Policy: Journal of NSRC, Vol. 3, Issue 2, pp. 52-67 online ISSN 1553-6610.

Figure 1. The Intervention Mapping Process



Note: From Bartholomew, L. K., Parcel, G. S., Kok, G., & Gottlieb, N. H. (2006). *Planning health promotion programs; an Intervention Mapping approach*. San Francisco: Jossey-Bass.

of the program). What was missing were descriptions of how determinants were translated into programs, guided by theory and evidence. Recently, more articles have described program development (see Bartholomew et al., 2006). This article is another example of such descriptions.

In Step 1 of the IM we conducted a needs assessment to determine whether a need existed for a program and, if so, what the program should address (based on Green & Kreuter, 2005). In Step 2 we looked at desired behaviors and environmental conditions that would reduce the health problem. The results of Step 2 are matrices of change objectives, the foundation that identifies what should change and who should change as a result of the intervention. The result of IM Step 3 links these change objectives to practical strategies via theoretical methods. The result of Step 4 is the prevention program itself. In Steps 5 and 6 we prepared a large-scale implementation and planned the process and effect evaluation of the program. Throughout the IM process, we systematically searched for empirical and theoretical evidence for all decisions (Bartholomew et al., 2006, chap. 2).

IM Step 1: Needs Assessment

HIV prevention is crucial for the public's health. Within HIV prevention, MSM are a key target population (Centers for Disease Control and Prevention [CDC], 2003). Currently, the Internet has become a crucial setting for reaching MSM who, in our first study, showed a high percentage practicing unsafe sex (Hospers et al., 2005; see also Bolding, Davis, Hart, Sherr, & Elford, 2005). The relevant risk behavior was unprotected anal intercourse (UAI). Relevant environmental conditions that form a barrier for condom use are as yet unclear and may appear as external determinants of the behavior (see Step 2).

IM Step 2: Matrices of Change Objectives

In this research, the desired behavior of MSM was to consistently and correctly use condoms for anal sex with e-dates. To make the behavior more specific, we identified performance objectives, or preparatory behaviors (Van Empelen & Kok, 2006) (see Table 1). To determine performance objectives, planners asked: What do the participants of this program need to do to perform the behavior (condom use) or to change their environment? From performance objectives, planners are able to define, from the behavior, a detailed description of its components. The performance objectives in Table 1 are based on earlier research data (Kok, Hospers, Harterink, & De Zwart, 2006) showing both that substantial percentages of chatters did not engage in the desired behavior (i.e., communicate about condom use while chatting with their last e-date about sex) and that the performance objectives are preparatory behaviors for actual condom use (i.e., one third of men who had anal sex with their last dates did not have condoms available). The decision to use condoms is a mix of a behavioral objective and a cognitive objective. However, we decided to treat it as a preparatory behavior, a prerequisite for the following performance objectives.

Table 1. Performance Objectives for E-Dating MSM

1. E-dating MSM consistently and correctly use condoms for anal sex with e-date
2. Make a decision to use condoms on e-date
3. Purchase comfortable quality condoms and water- or silicone-based lube
4. Negotiate condom use during chatting, by phone, or at location of date
5. Express wish to use condoms in chat profile
6. Carry enough condoms and lube when having a date
7. Correctly use condoms and lube
8. Use condoms consistently on all e-dates, even in difficult situations

The next task in Step 2 was to specify the determinants of condom use. Determinants are factors found to be associated with the performance of the behavior and that are assumed to mediate the behavior. The selection of relevant and changeable determinants of the performance objectives was based on our earlier studies among e-dating MSM (Hospers, Harterink, Van den Hoek, & Veenstra, 2002; Hospers et al., 2005; Kok et al., 2006) and the current scientific state of the art with respect to determinants of behavior (Bartholomew et al., 2006) (see Table 2). Importance is defined as the strength of the evidence for the causal relationship between the determinant and the behavior we want to change, while changeability is defined as the strength of the evidence that the proposed change can be realized by an intervention. The scores are based on consensus judgments by all the researchers and professionals involved in the IM.

Personal determinants are factors within the individual; external determinants exist in the environment. The first personal determinant, knowledge, although not sufficient in itself, is a precondition for any change. Perception of personal risk is another precondition for change and is relevant for making the decision to use condoms. Existing negative attitudes about condoms must be eliminated and existing positive attitudes must be reinforced. Personal norms, anticipated regret, subjective norms, and self-efficacy have all been shown to influence the intention to use condoms. Improving self-efficacy must run parallel to increasing skills. Condom use should become an automatic behavior that happens with little or no decision making. External determinants are under the control of an environmental decision maker. The

Table 2. Determinants of Performance Objectives

Determinants	Importance	Changeability	Evidence for Importance
Personal:			
Knowledge	+	+++	Precondition for positive attitude
Risk perception	+	+	Precondition for personal relevance
Attitude	++	+	$r = .52$, $p < .01$ (with intention to always use condoms)
Anticipated regret	++	+	$r = .70$, $p < .01$
Personal norm	+++	+	$r = .78$, $p < .01$
Subjective norm	+	+	$r = .29$, $p < .01$
Self-efficacy	+++	+	$r = .71$, $p < .012$
Skills	++	+	Precondition for self-efficacy improvement
Habit	++	+	Making the healthy behavior automatic behavior
External:			
Social norm: Other chatters	+	+	Most e-daters favor condom use
Cues: Chat room operators	+++	+	Most direct environmental influence
Access: Health services	+++	+	Making healthy behavior easier

Note: Importance = the strength of the evidence for the causal relationship between the determinant and the behavior we want to change; changeability = the strength of the evidence that the proposed change can be realized by a program; + means: not very important, not easy to change; ++ means: important, changeable; +++ means: very important, easy to change. Correlations and significance levels are based on results from a report by Kok and colleagues (2006).

expectations and behavior of other people, friends, and other chatters influence the e-daters' behaviors. Chat room operators can provide environmental cues for condom use, and health services can make healthy condom use easier by providing or making accessible condoms and lubrication.

The matrix of change objectives is created by crossing each performance objective with each determinant. Change objectives consider the population, the performance objective, and the determinant in a measurable statement. For example, e-daters (population) express confidence (determinant: self-efficacy) in always having condoms and lube available (performance objective). Table 3 provides examples of the matrix of change objectives relevant to condom use by e-daters.

One or more change objectives can be defined per cell. Some cells are irrelevant because determinants may be important for some performance objectives but not for others. Note that some objectives are rather general for condom use, while others are specific for an Internet setting, such as the importance of recognizing the risks of fantasy and unrealistic expectations about the e-date that might lead to situations that are less under control and thereby lead to unsafe sex practices.

When the external determinants have a substantial influence, they are moved out of this matrix to become an environmental factor, and a separate matrix is developed in which the environmental decision maker becomes the target population. For instance, to stimulate health services to provide easy access for chatters to the right condoms, we may need to specify performance objectives for the health service decision makers, to select personal and external determinants for them, and to delineate change objectives in a matrix.

IM Step 3: Theory-Based Methods and Practical Strategies

After we identified our change objectives, we moved to Step 3 of IM to develop a theory- and evidence-based strategy map. We had already created collaborations with persons and organizations that might help us with the development of the intervention by contributing expertise regarding MSM, chatting, e-dating, and the Internet. This input helped us with decisions about appropriate methods and strategies. A theoretical method is a general technique or process for influencing changes in the determinants of behaviors and environmental conditions. A practical strategy is a specific technique for the application of theoretical methods in ways that fit the intervention population and the context in which the intervention will be conducted. We started by searching in the empirical literature for possible methods of behavioral change for these objectives (Johnson, Hedges, & Diaz, 2002; Stout, Villegas, & Kim, 2001; Strecher, Wang, Derry, Wildenhaus, & Johnson, 2002; Weerakon, 2003). Next, theory provided us with many possible methods; we ordered the change objectives by determinant and then selected methods for each determinant (Bartholomew et al., 2006, chap. 7).

Table 4 provides examples of theoretical methods (second column) for the earlier identified determinants (first column). For every determinant, various methods were available which could be judged on their changeability, or their potential to influence the chosen change

Table 3. Selected Examples of Matrix of Program Objectives for E-Daters

Performance Objectives	Determinants				
	Attitude	**Personal Norm**	**Self-Efficacy**	**Skills**	**Access**
Make a decision to use condoms on e-date	Anticipate negative consequences of UAI in e-dates (tailored to inexperienced daters) Anticipate the disadvantages of condom use (tailored to daters who are negative about condoms)	Explain that it is a matter of principle to practice safe sex	Express confidence in using condoms during all anal sex with e-dates		
Purchase comfortable quality condoms and water- or silicone-based lube			Express confidence in buying appropriate condoms and lube	Describe how to choose the right condom size and brand and type of lube in e-shops	Health Services provide tool for choosing right condom size, information about brands, and places to buy
Negotiate condom use during chatting, on phone, or at location of date	Recognize the advantages of communication to achieve safe sex practices Acknowledge that chatting may not be a reliable type of communication	Acknowledge that the personal choice to practice safe sex is linked to the choice to express this to others	Express confidence in negotiating date and safe sex intentions Express confidence in asking potential partner's safe sex intention	Says is able to negotiate online, in phone conversations, and before sex, and to assume nothing Says is able to find out partner's safe sex intention and to assume nothing	
Carry enough condoms and lube when having a date		Feel responsible for carrying condoms and lube on an e-date	Express confidence in always having condoms and lube available	Demonstrate efficient ways to carry condoms and lube when having an e-date	
Use condoms consistently in all e-dates, even in difficult situations	Recognize disadvantages of fantasy and unrealistic expectations in dating Recognize the advantages of practicing safe sex consistently	Express the awareness that anal sex with e-dates and condom use are inseparable	Express confidence in saying no to sex or to UAI Express confidence in staying in control in the process of dating	Demonstrate how to resist a partner's wish to have sex or UAI Says is able to estimate if the potential partner is in correspondence with own feelings and expectations	

objectives. Methods were derived from theories (indicated in the second column) and from evidence in the empirical literature that they might have the desired effect. However, for each method there were also parameters (indicated in the third column), or conditions, under which the method had been shown to be effective or not. For instance, *role-modeling* is a very popular and potentially effective method, but role-modeling will only influence behavior when the target individuals can identify with the model, when they possess the necessary skills, when the model is being reinforced for the desired behavior, and when the model is perceived as a coping model instead of a mastery model (Kok, Schaalma, Ruiter, Brug, & Van Empelen, 2004). Another effective method, *tailoring*, is the adaptation of the program to (previously measured) characteristics of the individual target person, such as sexual behavior and social-cognitive factors. The Internet is a very efficient way to apply tailoring.

Determining the parameters for methods was essential for the next task in IM Step 3, the translation of theoretical methods into practical strategies that were appropriate for the population, the setting, and the program implementers. In this case, the Internet setting gave us the chance to apply effective strategies in an innovative

Table 4. Selected Examples of Personal Determinants, Theoretical Methods, Theoretical Parameters, and Strategies

Personal Determinant	Theoretical Method	Parameter	Strategy
Knowledge	Active learning Elaboration likelihood	Requires time, information, and skills	Statistics and Sex Quiz 1 and 2 on dating, sex, and safe sex
Risk perception	Consciousness raising Transtheoretical model	Can use feedback and confrontation, but must be quickly followed by increase in problem-solving ability and self-efficacy	Mind Reading: Assume nothing, confrontation with discrepancies in perceptions of couples
Attitude	Shifting perspective Protection-motivation	Must begin with the perspective of the learner	What's your opinion on risk behavior, safe sex, HIV status, and HIV treatment?
Self-efficacy	Modeling Social cognitive theory	Requires identification, skills, reinforcement, and coping model	Date Movies 1 and 2 and Date Training on finding out partner's intention
Skills	Instruction Information Processing	Must include subskills	Condom Instruction Video with explicit modeling
	Guided practice Social cognitive theory	Must include subskill demonstration, instruction, and enactment with feedback	Tailored Condom Advice on condom size, brands,places to buy, and sample package
Access (Health Services)	Advocacy (information, persuasion, negotiation) Community organization; organizational development	Characteristics of effective policy advocates; timing and resources; advocacy coalitions	Negotiation between health authority, gay and lesbian health foundation, and commercial partner

way, using computer tailoring, interactions with virtual relational agents, video shows, photo-scenarios, e-mail feedback, and a personal webpage. We placed all the identified change objectives within these strategies. Moreover, we linked all strategies to one or more theoretical methods. In Figure 12 below, for example, the change objective in Table 3, "E-daters express confidence in negotiating date and safe sex intentions," was given form in a photo-series with text balloons where the partner can react positively to the model questioning him about safe sex intentions. One of the theoretical methods here was modeling, and in the strategy, the theoretical parameters were very carefully translated: identification with the model, instruction about subskills, reinforcement of the desired behavior, and a coping model that works very hard at negotiating in a subtle and effective manner. Table 4 lists more examples of the practical strategies and the underlying theoretical methods and parameters as they were applied in this case.

At the end of IM Step 3, we had a list of the strategies we wanted in the program, all based on theoretical methods and covering all change objectives that we had identified in Step 2.

IM Step 4: Program Planning

In Step 4, we again started with setting up consultations with relevant people—potential participants; Internet experts; and the intended program implementers, in this case, among others, the operators of the chat room where the enrollment of the participants was going to take place—who might help us with the tasks in this step. We then developed program scope, sequence, theme, and a material list. As an integrating theme for the intervention, the title "The Gay Cruise: Dating and Sex Without Worries? Come Aboard Now!" was chosen, which was thought to be fitting for the gay subculture and gave us the possibility to distinguish various trips, starting with a boarding, with pursers as relational agents, the ship's doctor as investigator, and other daters as passengers, and with an acceptable alternative intervention for a control group (see discussion of IM Step 6 below). Table 5 presents an overview of the scope and sequence of the program and lists the various strategies and materials that were developed.

An essential element in the intervention is the purser, a personal relational agent, who is selected by the visitors from four different attractive pursers, as portrayed in Figure 2. Relational agents are computational artifacts designed to build and maintain social-emotional relationships with their users. They are designed to remember past history and manage future expectations in their interactions with humans (Bickmore, 2003; Cassel & Bickmore, 2003; Cassel, Bickmore, Campbell, Vilhjalmsson, & Yan, 2001). In the Gay Cruise, the relational agent is an animated, embodied conversational agent that uses speech, gaze, and intonation to emulate the experience of human face-to-face conversation. The purser makes an attractive, friendly, and intelligent impression,

Table 5. Program Scope and Sequence

Trips and Objectives	Strategies and Materials
Enrollment	Virtual pursers are listed as users on http://chatboy.nl and invite visitors to the Gay Cruise: Dating and Sex Without Worries? Come Aboard Now!*
Trip 1: Introduction, questionnaire, risk perception	Explanation by cruise captain.* Selecting own purser to guide participants through the cruise.* Registration with e-mail address,* informed consent,* questionnaire on dating and sex in the cruise doctor's office.* Mind Reading: Assume Nothing (photo-text tailored to experience). Introduction of personal webpage.* Decision to continue now or later.
Trip 2: Knowledge, attitude, subjective norm	Stats and Sex Quiz 1 by purser, on dating, sex, and safe sex knowledge. Administer What's Your Opinion? on beliefs about risk behavior, safe sex, HIV treatment, and HIV status (photo-text tailored to experience, sexual preference, and HIV status). Opinions and behaviors of other chatters. Decision to continue now or later. Set up personal webpage.
Trip 3: Self-efficacy, skills, anticipated regret, risk perception	Date Movie 1 with some negative experiences (photo-text tailored to experience and steady partner: hot- or love-movie). Date training by purser to find out intentions of partner. Date Movie 2 with positive experience. Download Dick-o-meter for condom advice in trip 4. Decision to continue now or later. Personal webpage.
Trip 4: Self-efficacy, skills, access	Date Game to find fakers (interactive game).* Condom Instruction Movie (photo-text). Tailored Condom Advice on right condom size, brands, places to buy, and offer for sample package. Personal webpage. End of trip.
Follow-up: Relapse prevention, feedback, posttest questionnaire	Reminders by e-mail (tailored to intervention/control group).* Snooze reminder by purser* and Stats & Sex Quiz 2 (adapted for control group*). Posttest questionnaire 3 months after finishing cruise.*

Note: An * indicates an activity also offered to the control group.

Figure 2. The Gay Cruise Captain and the Virtual Pursers

has small talk (real voice in mp3 format), asks questions about personal data, gives tailored feedback, discusses the various cruise activities, asks about continuing to the next trip, and sends e-mails as reminders. The virtual pursers are also listed on http://www.chatboy.nl (a popular Dutch e-dating site for MSM) as users where they invite visitors to the Gay Cruise.

The various strategies in Table 5 cover all relevant change objectives of Step 2. They also were carefully developed in line with the parameters of the underlying methods in Step 3. Most of the strategies are tailored to characteristics of the participant. For example, we created two versions of the date movies, one for men who have a romantic interest in a new partner, the *love movie*, and one for men who are interested in casual sex, the *hot movie*. The movies have negative role models that are not reinforced and positive role models that are reinforced; this is in line with the parameters of role-modeling. In Figure 3 an example is given of a tailored dialogue between the visitor and his purser as part of What's Your Opinion?, a strategy for increasing personal risk perception and safe sex attitude. The written text is also tailored to the chosen nickname of the participant. Figures 4–7 show the page setup of this dialogue.

Figures 8–12 provide examples of possible dialogue and photos that can be used as part of the Date Training. All dialogue with the participant consists of simultaneous on-screen and audio text.

A control group participates in the Gay Cruise but is only exposed to intervention elements that have no effect on safe sexual behavior, such as the date game (see Table 5). All strategies and materials were pilot-tested by 15 chatters and 15 professionals. Based on their comments, activities were adapted. The most important change involved the points at which participants could stop and start again later at the same point in the cruise. Originally, there were four trips and after every trip participants could continue 1 day later. However, because we lost half of the pilot participants after the first trip, we decided to make it possible for the participants to continue as long as they wished and to stop whenever they wished. Now, after they stop, they may log in anytime and continue

Figure 3. What's Your Opinion?: Tailored Dialogue With Guide on Risk Perception

<table>
<tr><td colspan="2">Other chatter in dialogue on cruise deck: If a date looks really great, he won't have HIV. So, we can have sex without a condom . . .</td><td>On screen and audio:
Do you agree with him?
o I agree
o I don't agree</td></tr>
<tr><td>[I don't agree]</td><td colspan="2">Purser: Right! Through this kind of mistake a lot of guys run a risk for HIV!</td></tr>
<tr><td rowspan="3">[I agree]</td><td>Purser: I don't agree with you, [Nickname]. Through this kind of mistake a lot of guys run a risk for HIV!</td><td>On screen and audio:
o OK, I'll have safe sex
o I'll take the risk</td></tr>
<tr><td>[OK, I'll have safe sex]</td><td>Purser: Smart move, mate! Just use a condom . . .</td></tr>
<tr><td>[I'll take the risk]</td><td>Purser: So, you are willing to take the risk. I will tell you more about HIV infection and treatment in a moment.</td></tr>
</table>

Figure 4. What's Your Opinion?: Starting the Dialogue

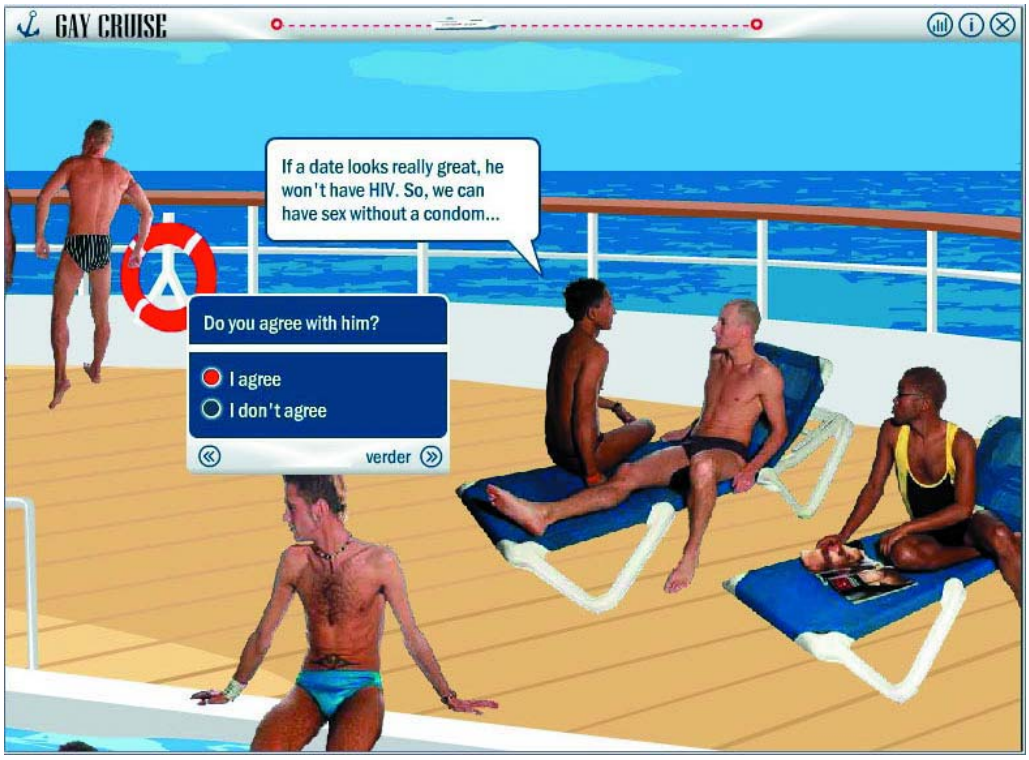


Figure 5. What's Your Opinion?: Tailored Response to "I Agree"

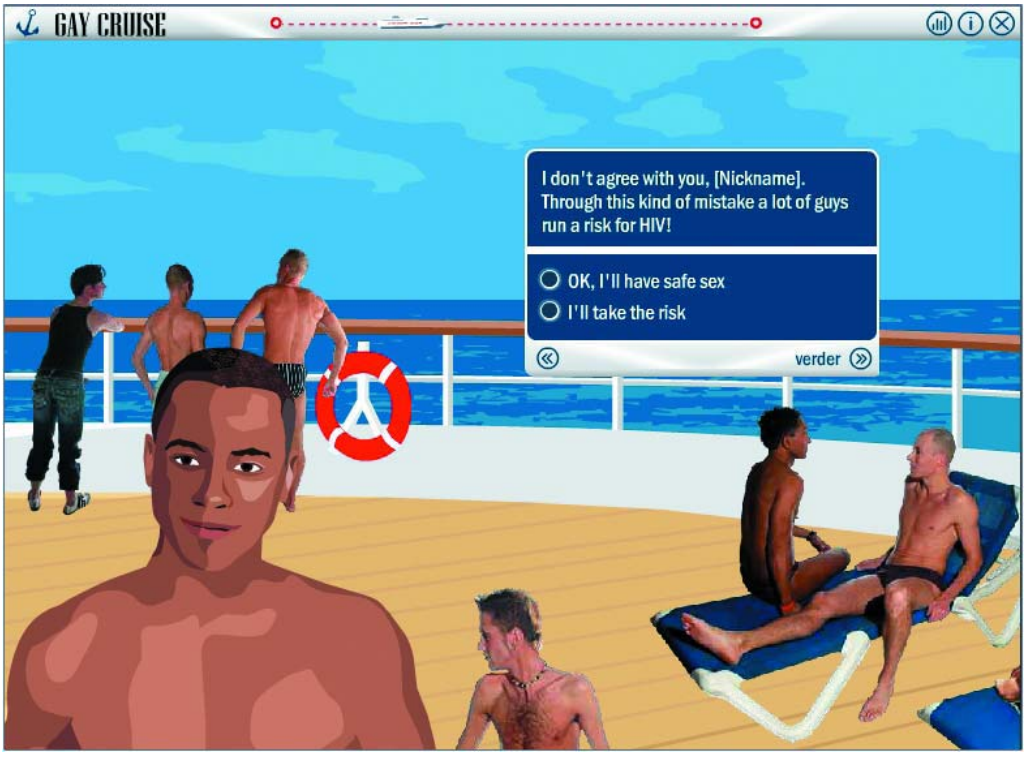


Figure 6. What's Your Opinion?: Following Tailored Response to "OK, I'll Have Safe Sex"

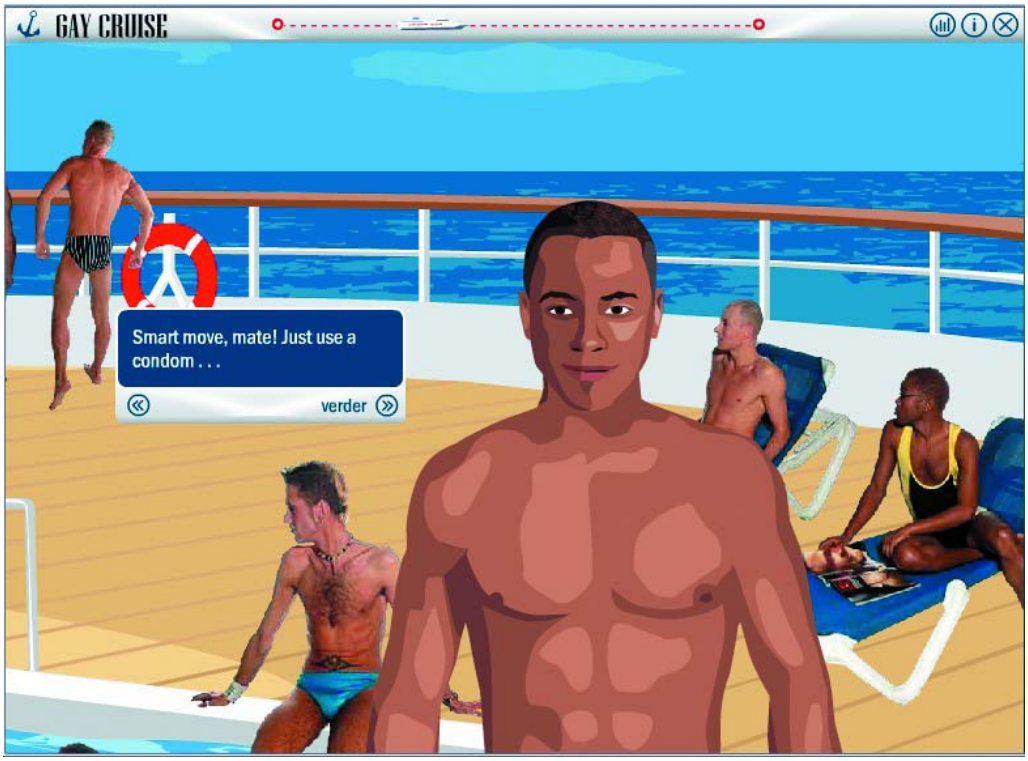


Figure 7. What's Your Opinion?: Following Tailored Response to "I'll Take the Risk"

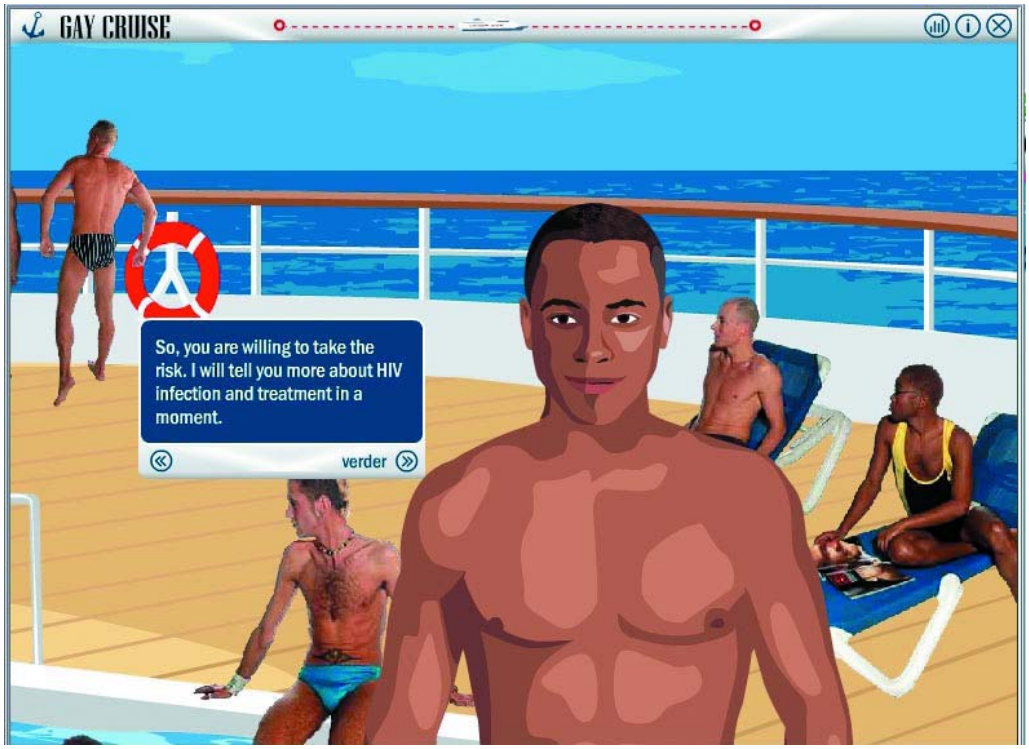


Figure 8. Date Training: Modeling and Feedback in Date Movies Plus Tailored Dialogue With Purser

Date movie 1: Harold is looking for a romantic date on the chat site. They meet at e-date's home. His partner starts making love right away and suggests having (unsafe) sex. When Harold hesitates, the partner says to hurry up because he has another date later. Harold decides to leave but is very disappointed. End of movie.		
Next follows a dialogue with the purser. Here is an example of Anticipated Regret as an intervention method:		
Dialogue with purser: That date was a disaster! Cool that Harold just left that guy. He could have ended up having unsafe sex. Imagine, [Nickname], that you have unsafe sex at your next sex date.		**On screen and audio:** How scared would you feel afterwards? [very, rather, a little, not scared] **On screen and audio:** How guilty would you feel afterwards? [very, rather, a little, not guilty]
[Two times "not"]	**Purser:** So you don't feel scared or guilty after unsafe sex? You don't care? I would feel pretty bad if I did not keep my own safe sex deal.	
[All other answers]	**Purser:** I think that Harold feels bad too. And that is just what he doesn't want to happen. If you give him the right hints, you could help Harold with that. For a start you can tell Harold what you think are the reasons that men have disappointing dates. Your answers are going to help Harold to have better dates, [Nickname]. After the break we will see if they worked. I will keep these answers on your personal webpage.	
Later, an example of skills training by Instruction, Feedback, and Reinforcement:		
Purser: Harold did meet his date at his date's house. What do you think is the best place to meet for the first date?		**On screen:** o your own home o his home o some other place, a bar or pub
[Answer: his home]	**Purser:** You would meet at his place, just like Harold? Then you're probably as assertive as Harold was and you'll leave if the date is a disaster . . . ☺	
[Answer: your home]	**Purser:** Nice and easy to meet at your place. But what are you going to do when the date is a disappointment or even a freak? I myself never meet the first time in my own cabin. I want to get to know my date better, so I meet in the bar first.	
[Answer: other place]	**Purser:** Smart move, [Nickname]. If you meet in a bar, you have some time to get to know each other better. And you can leave if you don't like him. ☺	
Dialogue continues. Purser thanks the participant for his input and announces the second movie.		
Date Movie 2: Harold is meeting with his date in a bar. While chatting, he found out that the date also wants to be safe (see Figure 10). They go to the date's home. Harold brought condoms but tells the date that he doesn't want to "do it" on the first date. The date is supportive and tells Harold that he has a lot of other things to offer. The movie ends with both of them closing the bedroom door while smiling at the camera.		

Figure 9. Date Training: Starting the Dialogue After the First Movie

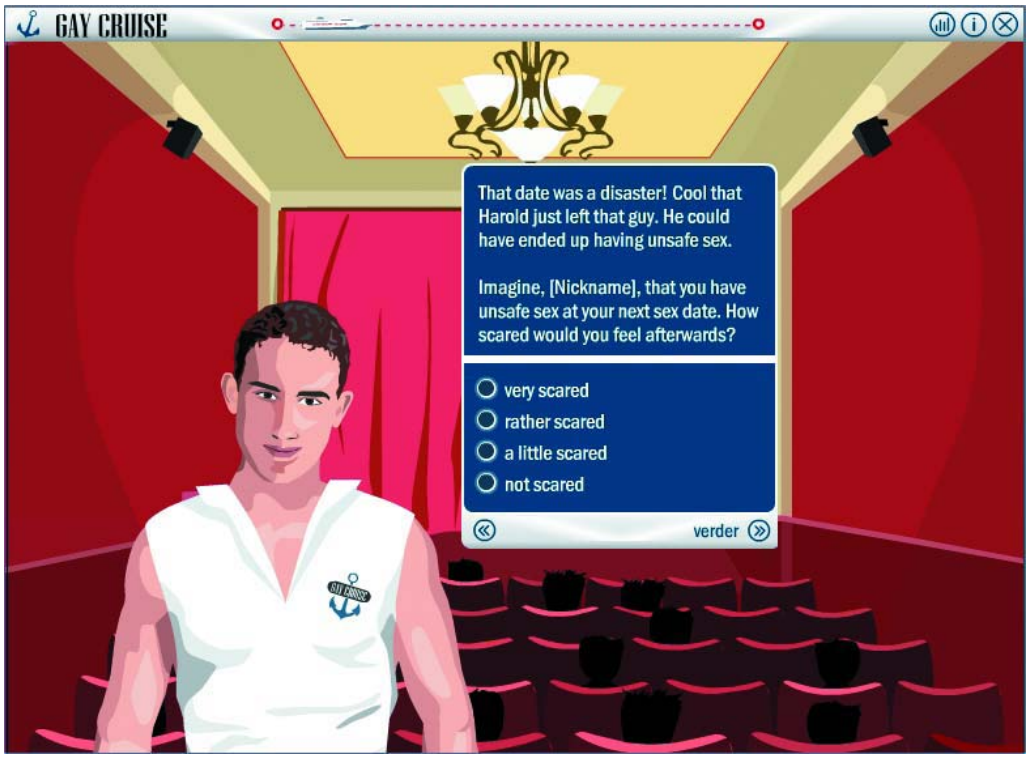


Figure 10. Date Training: Tailored Response to "Not Scared"

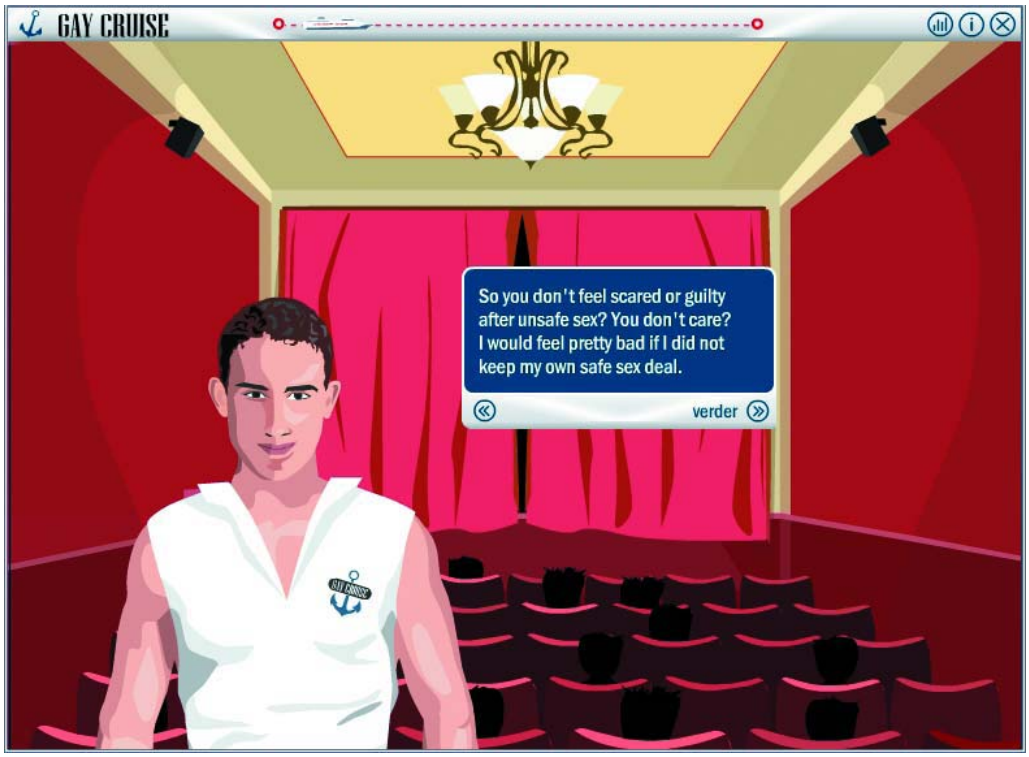


Figure 11. Date Training: Tailored Response to "Little/Rather/Very Scared"

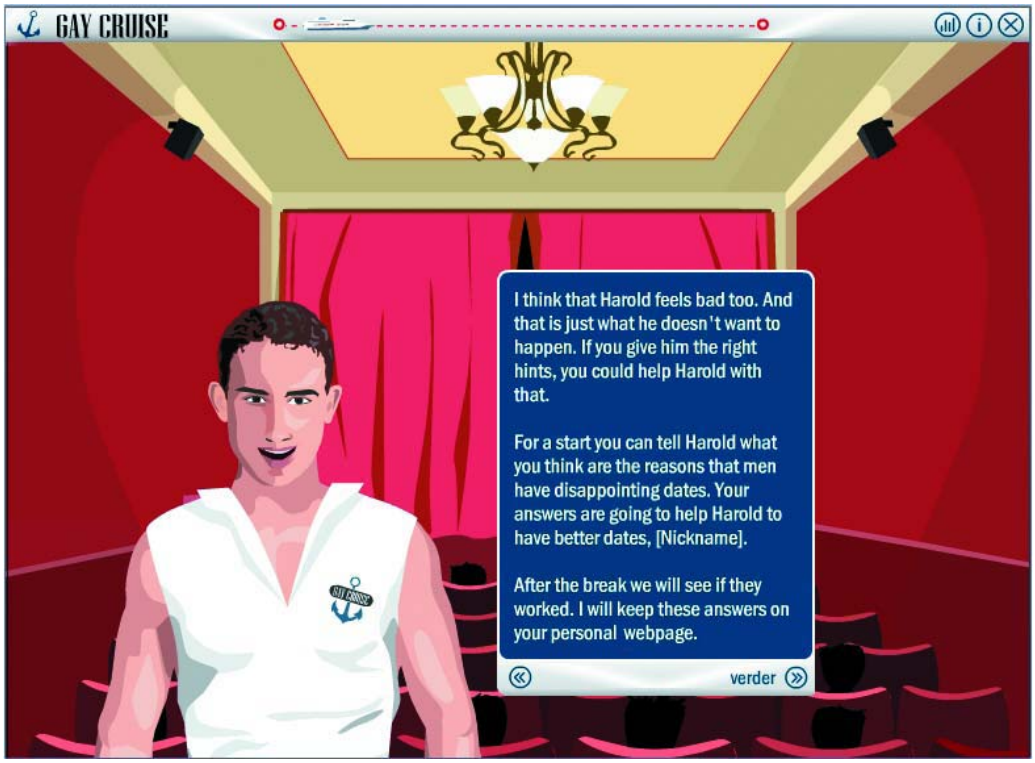
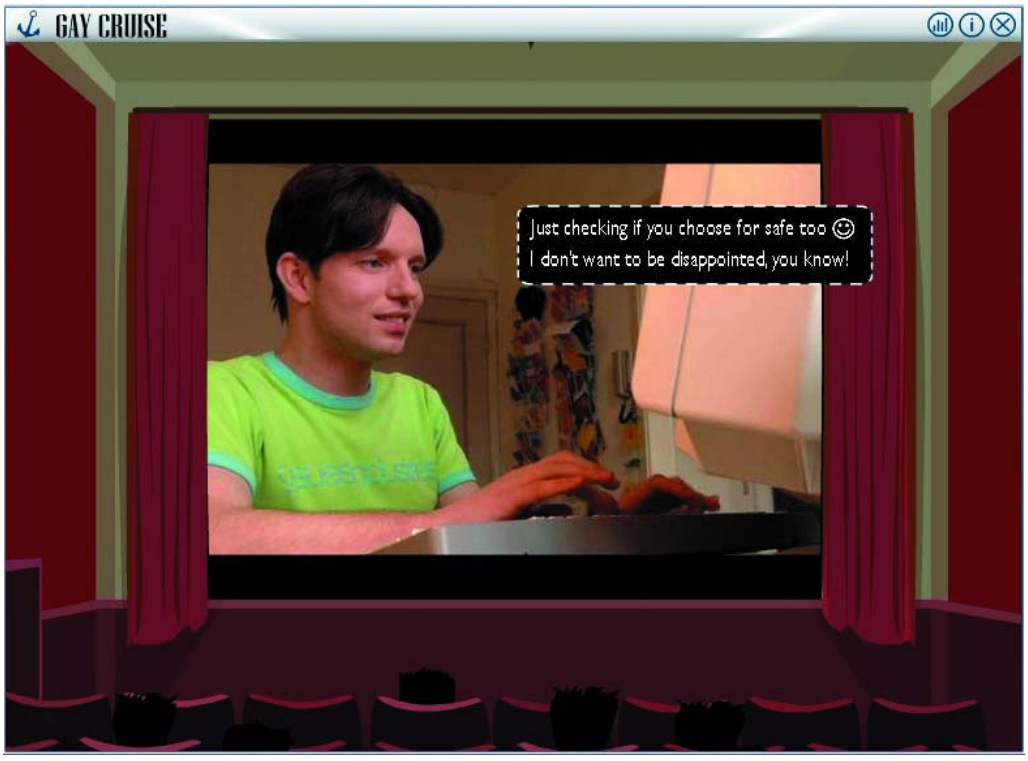


Figure 12. Date Training: Webpage Setup for Movie; Scene From the Second Movie With Role Model Showing Desired Behavior



the cruise. If they do not return after a few days, we send them an e-mail inviting them to log in again.

IM Step 5: Adoption and Implementation Plan

When developing an intervention, implementation of that intervention has to be anticipated. In this case, implementation had two relevant decision makers: the health service, Schorer—Gay and Lesbian Health Foundation Amsterdam, which will operate the intervention website after the program development phase, and the chat room operators, who will provide a link to the intervention website, http://www.chatboy.nl. As mentioned earlier, from the start of the project, the program planners formed a linkage group with relevant others, including both of these organizations. A linkage group connects program developers with program implementers, enabling collaboratively developed, user-relevant interventions, thereby increasing the chances for implementation.

IM Step 6: Evaluation Plan

The Gay Cruise planners identified prevention of HIV infections in e-daters as their final goal. However, that outcome was not a feasible effect evaluation outcome, which is one based on changes in behavior or in determinants of behavior. Earlier in the IM process we had carefully identified behavioral outcomes, or measurable performance objectives for e-daters, and determinant outcomes, or measurable change objectives. For evaluation purposes, the matrices of change objectives and performance objectives became the basis for effect evaluation questions. The decisions and assumptions throughout the program planning formed the basis for the process evaluation, for example, the successful implementation of the various program parts (see Table 6).

The process questions can only be asked of program participants; the effect evaluation questions are asked of both program and control group participants. The Gay Cruise is evaluated in an experimental design with a control group that receives a limited intervention, focusing only on dating and avoiding the topic of safe sex (see Table 5). The decision to randomize visitors into participant and control groups after they logged in on the Gay Cruise, which is an ideal experimental setup, does imply that the intervention and the control groups were enrolled in the same way. A disadvantage of this decision is that the information posted on the chat room to stimulate e-daters to visit the Gay Cruise website has to be somewhat restricted because the control group will not encounter any safe sex messages. On the other hand, as mentioned in Step 4, the chosen subtitle—"Dating and Sex Without Worries"—does not anticipate interactions about safe sex; consequently, it may have the advantage of attracting visitors who would have avoided a website on safe sex. Also, we could not intervene on the chat site with cues for condom use and testing; that will be done after the evaluation is completed.

Table 6. Selected Examples of Objectives and of Effect and Process Evaluation Questions Derived From the Intervention Map

Objective	Evaluation Question
Behaviors/performance objectives:	
Use condoms consistently on all e-dates, even in difficult situations.	How often did you have anal sex with e-dates in the last 3 months? (number) How often did you use condoms? (never - seldom - sometimes - often - always)
Negotiate condom use during chatting, by phone, or on date.	How often did you find out in advance if your partner wanted to use condoms? (never - seldom - sometimes - often - always)
Carry enough condoms and lube when having a date.	How often did you bring condoms and lube along on the e-date? (never - seldom - sometimes - often - always)
Determinants/change objectives:	
Recognize the advantage of communication for safe sex.	For me, communicating with an e-date about safe sex in advance makes . . . sense. (no - little - some - much - very much)
Express confidence to negotiate date and safe sex intentions.	Do you think you are able to negotiate with your e-date about safe sex? (certainly not - probably not - maybe - probably - certainly)
Says is able to find out partner's safe sex intentions and to assume nothing.	Do you think you are able to find out your partner's safe sex intentions in advance? (certainly not - probably not - maybe - probably - certainly)
Implementation:	
All sessions completed	Automatically registered
Facultative elements completed	Automatically registered
Appreciation of each intervention element	Asked after each element and automatically registered
Visits to personal website	Automatically registered

A serious potential threat for the effect evaluation is dropout of participants, especially in the control condition, during the time between intervention and posttest (Bull et al., 2004). We arranged a number of incentives (five iPods could be won in a raffle) and reminders for participants in both the experimental and control group to stay in the study: commitment at the start of the study, follow-up reminders by e-mail with new messages on personal webpages, snooze reminders by the purser with new questions, and, finally, having the posttest 3 months after the intervention instead of the 6 months that are common in most studies on safe sex.

The first experiences with the Gay Cruise have been promising. The Gay Cruise was brought to the attention of chatters at http://www.chatboy.nl before log-in, and also after log-in by virtual chatters inviting them to the website. In 4 weeks' time, 12,081 people visited the Gay Cruise website, 9,508 people chose their personal guide, and 9,346 started the check-in after randomization (4,625 experimental and 4,721 control). The young blond purser (see Figure 2) was clearly the most popular (40%) but was also introduced first. The three other pursers were each chosen by about 20% of the participants. At check-in 7,803 people signed informed consent, 5,990 (3,025 experimental and 2,965 control) filled in their e-mail address and age, and 5,982 started the pretest. The rather long animated questionnaire with text and voice was completely finished by almost 94% of these visitors. Finally, 2,886 participants in the experimental group went through all seven relevant intervention elements: Mind Reading, Stats & Sex Quiz 1, What's Your Opinion, Date Movie & Training, Condom Movie, Condom Advice, and Stats & Sex Quiz 2 (see Table 5). In this group, participants' response to the Gay Cruise was very positive: 86% of the men in the experimental group said it was (very) enjoyable; 53% indicated it helped them to get to know more about their sex life; and 61% said they became more conscious about dating and sex.

Discussion: IM and Internet HIV Prevention

In this article we described an application of IM for the development of Internet HIV prevention for men who meet men on the Internet. Prevention of HIV infection among these men in this setting is important. We found IM to be a helpful and practical tool in planning the Internet intervention and guiding the planners in developing theory- and evidence-informed programs. Looking back, the planners realized that they had spent too much time on the second step, the matrices, because subsequently many preliminary decisions had to be reconsidered. We believe that it would have been more effective to utilize the iterative character of IM in a more flexible way. On the other hand, IM turned out to be very helpful in translating theoretical and empirical knowledge of effective health promotion planning to a completely new setting, the Internet.

The use of IM ensured that theoretical models and empirical evidence guided (a) the identification of the target behavior and the personal and external determinants related to that target health behavior; (b) the selection of the most appropriate methods and strategies to address the identified determinants; and (c) the translation of theoretical methods and parameters into practical program strategies and materials that fit with the Internet setting and the target population. Moreover, carefully mapping out the development process step-by-step made it possible to communicate within and outside the program development group about all relevant decisions and reasons for those decisions.

We do not know yet if the program will have the expected effects; what we do know is that we gave the program the best chance of having success. We took on the challenge of using the advanced technological possibilities of the Internet setting. Applying IM to this development process guarantees a program based on empirical evidence and theory. We believe that the framework of IM can help take future development of Internet HIV-prevention interventions to a higher level, thereby establishing better programs and ensuring more effective outcomes.

Acknowledgments

This study was financially supported by the Public Health Fund, The Netherlands. The authors would like to thank http://www.chatboy.nl, Schorer—Gay and Lesbian Health Foundation Amsterdam, Andy Tjin, and Michel van Berkel, Ph.D., for their cooperation.

References

Bartholomew, L. K., Parcel, G. S., Kok, G., & Gottlieb, N. H. (2001). *Intervention Mapping: Designing theory- and evidence-based health promotion programs*. Mountain View, CA: Mayfield.

Bartholomew, L. K., Parcel, G. S., Kok, G., & Gottlieb, N. H. (2006). *Planning health promotion programs; an Intervention Mapping approach*. San Francisco, CA: Jossey-Bass.

Bickmore, T. (2003). Relational agents: Effecting change through human-computer relationships (Doctoral dissertation, Massachusetts Institute of Technology, 2003). *Dissertation Abstracts International, 64*, 1327.

Bolding, G., Davis, M., Hart, G., Sherr, L., & Elford, J. (2005). Gay men who look for sex on the Internet: Is

there more HIV/STI risk with online partners? *AIDS, 19*, 961-968.

Bull, S. S., Lloyd, L., Rietmeijer, C., & McFarlane, M. (2004). Recruitment and retention of an online sample for an HIV-prevention intervention targeting men who have sex with men: The Smart Sex Quest Project. *AIDS Care, 16*, 931-943.

Cassel, J., & Bickmore, T. (2003). Negotiated collusion: Modeling social language and its relationship effects in intelligent agents. *User Modeling and User Interaction, 13*, 89-132.

Cassel, J., Bickmore, T., Campbell, L., Vilhjalmsson, H. Y., & Yan, H. (2001). More than just a pretty face: Conversational protocols and the affordances of embodiment. *Knowledge Based Systems, 14*, 55-64.

Centers for Disease Control and Prevention. (2003). Cases of HIV/AIDS and AIDS in the United States, 2003. *HIV/AIDS Surveillance Report* (Vol. 15). Atlanta: Author.

Davidovich, U., De Wit, J. B. F., & Stroebe, W. (2004, July 11-16). *The effect of an Internet intervention for promoting safe sex between steady male partners—Results and methodological implications of a longitudinal randomized control trial online*. Paper presented at the 15th International AIDS Conference, Bangkok, Thailand.

Green, L. W., & Kreuter, M. W. (2005). *Health program planning: An educational and ecological approach* (4th ed.). New York: McGraw-Hill.

Hospers, H. J., Harterink, P., Kok, G., & de Zwart, O. (2005). A new meeting place: Chatting on the Internet, e-dating and sexual risk behavior among Dutch men who have sex with men. *AIDS, 19*, 1097-1101.

Hospers, H. J., Harterink, P., Van den Hoek, K., & Veenstra, J. (2002). Chatters on the Internet: A special group for HIV-prevention. *AIDS Care, 14*, 539-544.

Johnson, W. D., Hedges, L. V., & Diaz, R. M. (2002). Interventions to modify sexual risk behaviors for preventing HIV-infection in men who have sex with men. *The Cochrane Database of Systematic Reviews, 4*, Art. No. CD001230.

Kelly, J. A., & Kalichman, S. C. (2002). Behavioral research in HIV/AIDS primary and secondary prevention: Recent advances and future directions. *Journal of Consulting and Clinical Psychology, 70*, 626-639.

Kok, G., Hospers, H. J., Harterink, P., & De Zwart, O. (2006). *Social-cognitive determinants of HIV risk-taking intentions among men who date men through the Internet*. Unpublished manuscript, Maastricht University.

Kok, G., Schaalma, H. P., Ruiter, R. A. C., Brug, J., & Van Empelen, P. (2004). Intervention Mapping: A protocol for applying health psychology theory to prevention programmes. *Journal of Health Psychology, 9*, 85-98.

Mullen, P. D., Green, L. W., & Persinger, G. S. (1985). Clinical trials of patient education for chronic conditions: A comparative meta-analysis of intervention types. *Preventive Medicine, 14*, 753-781.

Stout, P. A., Villegas, J., & Kim, H. (2001). Enhancing learning through use of interactive tools on health-related websites. *Health Education Research, 16*, 721-733.

Strecher, V., Wang, C., Derry, H., Wildenhaus, K., & Johnson, C. (2002). Tailored interventions for multiple risk behaviors. *Health Education Research, 17*, 619-626.

Van Empelen, P., & Kok, G. (2006). Condom use in steady and casual sexual relationships: Planning, preparation, and willingness to take risks among adolescents. *Psychology & Health, 21*, 165-181.

Weerakon, P. (2003). E-learning in sexuality education. *Medical Teacher*, *25*, 13-17.