Sexual and Relationship Therapy
Vol 18, No. 3, August 2003

BrunnerRoutledge Taylor & Francis healthsciences

Experience with an Internet-based, theoretically grounded educational resource for the promotion of sexual and reproductive health

AZY BARAK[1] & WILLIAM A. FISHER[2]
[1]*University of Haifa, Israel &* [2]*University of Western Ontario, Canada*

ABSTRACT *The current article reports on the development and utilization of an Internet-based, theoretically-grounded educational resource for the promotion of sexual and reproductive health. Based on the Information-Motivation-Behavioural Skills (IMB) model of health behaviour change (J. Fisher & Fisher, 1992; W. Fisher & Fisher, 1993), and exploiting characteristics of the Internet that are uniquely suited to sexual and reproductive health promotion communication, a comprehensive, content-rich, dual-language website (www.sexualityandu.ca – www.masexualite.ca) was launched on 1 November, 2001. Follow-up data, collected six to eight months after website launch, showed that the site was widely and intensively used by Internet surfers worldwide. Over 1000 visitors per day took advantage of a variety of website sections and functions dealing with sexual and reproductive health issues and remained on the site for an average of 11 minutes. Surfers' use of three interactive quizzes, that provided immediate educational feedback, was also extensive. These experiences provide a basis for further development of sexual and reproductive health promotion resources which are theoretically guided and which exploit characteristics of the Internet uniquely suited to this objective.*

Introduction

Sexual and reproductive health concerns as diverse and significant as sexual dysfunction (e.g., Heiman & Meston, 1997; Wincze & Carey, 1991), HIV prevention (e.g., W. Fisher & Fisher, 1998; Wasserheit *et al.*, 1991), contraceptive choice (e.g., Byrne *et al.*, 1993; W. Fisher, 1990), pregnancy and menopause (e.g., Basson, 1997; Fisher & Gray, 1988), and sexual coercion and partner violence (e.g., Muehlenhard *et al.*, 1992) have prompted continuing health promotion efforts over recent years. Sexual and reproductive health promotion interventions have been variably successful, however (e.g., DeCenso *et al.*, 2002; Franklin & Corcoran, 2000), and relatively few have been based upon sophisticated behavioural science theory (J. Fisher & Fisher, 1992, 1999; W. Fisher & Fisher, 2003) or have exploited unique

Correspondence to: Azy Barak, Department of Psychology, University of Haifa, Mount Carmel, Haifa 31905, Israel; E-mail: azy@construct.haifa.ac.il

ISSN 1468–1994 print/ISSN 1468-1479 online/03/030293-16
© British Association for Sexual and Relationship Therapy
DOI: 10.1080/1468199031000153928

attributes of the Internet (Barak & Fisher, 2001) to reach a wide public with content that is relevant to individual health promotion needs.

Motivated by concern about sexual and reproductive health challenges faced by Canadians, the Society of Obstetricians and Gynaecologists of Canada (SOGC), together with representatives of additional organizations committed to sexual and reproductive health, marshalled resources and personnel in 1999 to mount a sexual and reproductive health promotion campaign. In an effort to maximize the reach of the health promotion effort envisioned, the SOGC working group decided to exploit the Internet as a delivery vehicle that has uniquely suitable communication characteristics and outstanding ability to reach large numbers of persons with high quality sexual and reproductive health promotion content. At the same time, in an effort to maximize impact, the SOGC working group committed itself to applying well-validated health behaviour change theory as a basis for constructing its sexual and reproductive health promotion website. This article relates the conceptual approach and experiences of the SOGC working group with the development and implementation of an Internet based, theoretically grounded, sexual and reproductive health education resource that has reached hundreds of thousands of individuals since its inception with content that is relevant to averting sexual and reproductive health distress and enhancing sexual and reproductive health function.

Exploiting unique characteristics of the Internet for sexual and reproductive health education

It has been noted that the Internet possesses a number of characteristics that are uniquely suited to the task of sexual and reproductive health education and that Internet-based resources might be effectively exploited to achieve sexual and reproductive health promotion objectives (Barak & Fisher, 2001). Cooper and colleagues (Cooper, 1998; Cooper *et al.*, 2000; Cooper & Sportolari, 1997), for example, have emphasized that the Internet is *affordable*, for many if not most individuals in our society; it is *available* for use at any time of night or day and in many locations; and its users are *anonymous* or apparently so when accessing information on the Web. King (1999) has added to this roster of Internet characteristics the concept of *acceptability*, connoting the credibility and legitimacy of information retrieval via the Internet, and Barak and Fisher (2001; see also Barak & Fisher, 2002) have added the notion of *aloneness*, underscoring the fact that utilization of the Web to access sensitive information can be accomplished unobserved by others. Other aspects of the Internet that are especially well-suited to sexual and reproductive health education include the fact that utilization of the Web eliminates factors of physical appearance and limits potential embarrassment (McKenna & Bargh, 2000), especially in relation to sexuality (Flowers-Coulson *et al.*, 2000; Hagley *et al.*, 2002). The Web also provides for individual control over the occurrence, extent, and intensity of accessing of sensitive information (Young *et al.*, 2000). Moreover, in addition to these attributes, at its best, the Internet can provide individualized, interactive, instantaneous, audio-, visual-, and text-rich, expert, and

updated content to users, at exceedingly low cost per user. Taken together, these characteristics can be seen to uniquely favour self-directed, individually relevant, unembarrassing, and cost-effective utilization of the Internet as a source of credible, expert, and up-to-date sexual and reproductive health content. These features of the Internet have been exploited in a number of psychological, educational, and health promotion domains (Barak, 1999; Borzekowski & Rickert, 2001; Cline & Haynes, 2001; Spranca, 2001), and Internet sexual and reproductive health applications have been reviewed and conceptualized by Barak and Fisher (2001), as others have acknowledged the great impact of the Internet in relation to sexuality (e.g., Barak & King, 2000; Cooper & Griffin-Shelley, 2002).

For these reasons, when the SOGC decided to commit itself to a sexual and reproductive health promotion campaign, investment in an Internet-based approach, compared to more traditional health promotion efforts, such as the distribution of written materials, public service announcements, and the like, emerged as the most attractive option. Given the Internet's unique characteristics and ability to convey credible, expert, and individually relevant health promotion content to a wide public in cost effective fashion (cf. Millner & Kiser, 2002; Mustanski, 2001), and given that Internet-based materials can endure and be updated over time, the logical choice for delivery vehicle of SOCG's sexual and reproductive health promotion campaign was an Internet website.

A theory-grounded approach to Internet-based sexual and reproductive health education

A basic premise of the SOGC working group's approach to sexual and reproductive health promotion was the view that health promotion efforts can be facilitated by the application of well-articulated and well-validated health behaviour models. Accordingly, the SOGC working group decided to develop its sexual and reproductive health promotion website on the basis of the Information–Motivation–Behavioural Skills (IMB) model of health behaviour change (J. Fisher & Fisher, 1992; W. Fisher & Fisher, 1993). The IMB model is grounded in an analysis and integration of theory and research in the social psychology and health psychology literatures, and it focuses comprehensively on information, motivation, and behavioural skills factors that are conceptually and empirically related to performance of sexual and reproductive health promotion behaviour (W. Fisher & Fisher, 1998). According to the IMB model, sexual and reproductive health information, motivation to act on this information, and behavioural skills for acting on it effectively, are fundamental determinants of the performance of sexual and reproductive health promoting behaviours. To the extent that the individual is well-informed, well-motivated, and possess relevant behavioural skills, he or she is expected to initiate and maintain patterns of reproductive health promotion behaviour. To the extent that the individual is ill-informed, unmotivated, and lacks necessary behavioural skills, he or she is expected to engage in sexual and reproductive health risk behaviours and in consequence to experience negative health outcomes.

From the perspective of the IMB model, sexual and reproductive health information that is script-like in nature and easily deployed by the individual in his or her social ecology is an essential prerequisite for the performance of sexual and reproductive health promotion behaviours. For example, knowing that condoms can prevent HIV, knowing where to get condoms at any hour of the day or night, and knowing how to use a condom comfortably are all script-like and easy to employ information elements that are expected to facilitate condom use. Individual ignorance of such information, and institutional unwillingness to supply it, are associated with sexual and reproductive health neglect (W. Fisher & Fisher, 1998).

According to the IMB model, motivation to act on sexual and reproductive health information is a second prerequisite for health promotion behaviour performance. Motivation to engage in sexual and reproductive health practices involves personal motivation (attitudes towards specific health promotion acts; Fishbein & Ajzen, 1975) and social motivation (social norms that are perceived to favour performance of specific health promotion acts; Fishbein & Ajzen, 1975). In many cases, personal and social motivation to engage in sexual activity are stronger than personal and social motivation to engage in sexual and reproductive health promoting behaviour, and sexual and reproductive risk results (W. Fisher & Fisher, 1998).

The IMB model asserts that behavioural skills for performing a sequence of sexual and reproductive health promotion acts are a third prerequisite that determines whether even well-informed and well-motivated individuals will be capable of enacting reproductive health behaviours effectively. Behavioural skills involve both objective skills for the performance of sexual and reproductive health promotion acts, such as those depicted in Fig. 1, and a sense of self-efficacy or belief that one can enact these behaviours effectively.

The IMB model specifies that sexual and reproductive health information and motivation work primarily through behavioural skills to influence sexual and reproductive health related behaviours (J. Fisher & Fisher, 1992; W. Fisher & Fisher, 1993). Sexual and reproductive health information and motivation are seen to stimulate the development and application of behavioural skills that are applied to initiate and maintain sexual and reproductive health promotion behaviour over time (see Fig. 2) The IMB model also specifies that when complicated or novel behavioural enactments are not required to implement health promotion behaviours, direct links between sexual and reproductive health information, motivation, and behaviour skills will be observed.

The IMB model's assertions concerning the relationships of sexual and reproductive health information, motivation, behavioural skills, and behaviour have been empirically validated in research focusing on the prediction of diverse sex-related preventive practices across varied populations at risk (see, for example, J. Fisher *et al.*, 1996; W. Fisher *et al.*, 1999; see J. Fisher & Fisher, 1999, for a review of this literature). Moreover, IMB model-based interventions have resulted in significant and sustained reductions in sex-related risk behaviours over time and across populations (see, for example, J. Fisher & Fisher, 2000; J. Fisher *et al.*, 1996; see J. Fisher & Fisher, 1999, for a review of model-based intervention research).

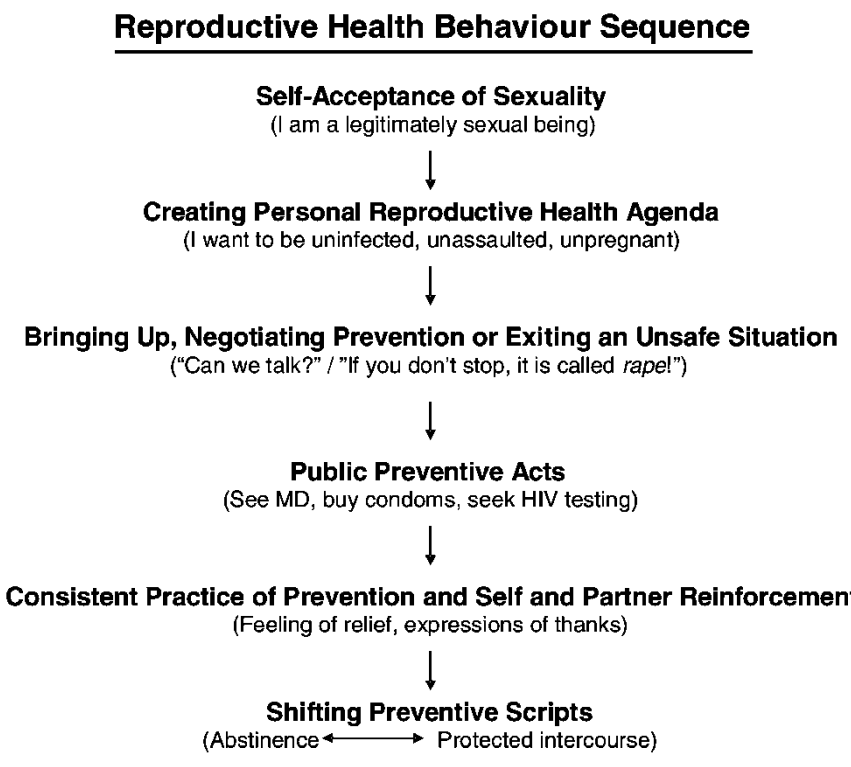

FIG. 1. A sexual and reproductive health promotion behaviour sequence.

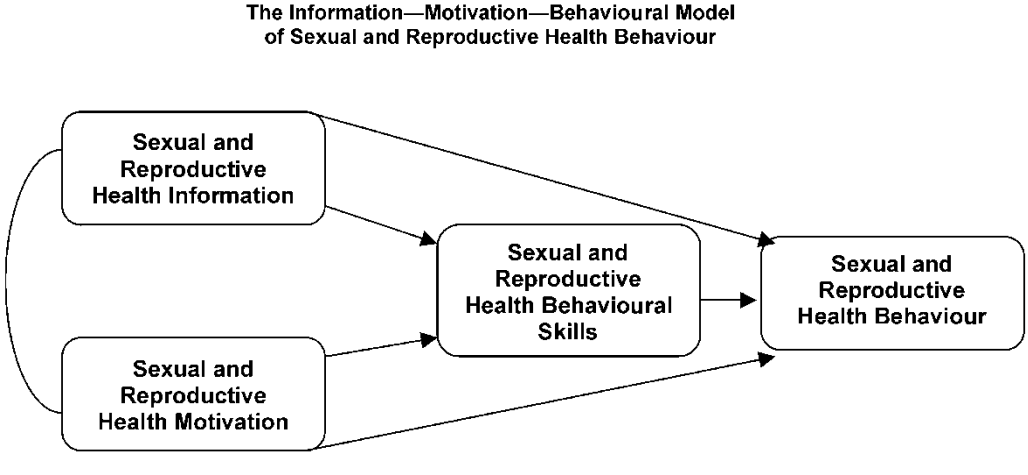

FIG. 2. The Information—Motivation—Behavioural Skills model of sexual and reproductive health behaviour (J. Fisher & Fisher, 1992; W. Fisher & Fisher, 1993, 1998).

Creation of an Internet-based, theoretically grounded sexual and reproductive health promotion website

After committing to create a theoretically grounded sexual and reproductive health promotion website, the SOCG and other concerned organizations convened a working group of experts in obstetrics and gynaecology, family medicine, health psychology, and sexuality education. This working group contracted a website developer to craft an Internet site that was attractive, accessible, functional, interactive, and capable of conveying content to five target groups deemed of critical sexual and reproductive health importance: adolescents; adults; parents; teachers; and health care professionals. The SOGC team and others worked at the same time to create expert and up-to-date sexual and reproductive health content, in text and graphic form, and with as much interactivity as possible. Guided by the IMB model, the SOGC working group sought to create sexual and reproductive health information that was script-like in nature and that could easily be deployed by website users in their adolescent, adult, parent, teacher, or health care provider context. Also in accord with the IMB model, the SOGC working groups sought to embed motivational elements in website content to promote positive attitudes towards personal performance of specific sexual and reproductive health behaviours and to strengthen perceptions that such actions were socially acceptable and even expected. Draft versions of the website were reviewed and the site—exploiting one of the virtues of the Internet—has been continuously revised and upgraded. The website was named sexualityandu.ca and produced in an English version, and a parallel French version, masexualite.ca, was prepared as well. A very popular and engaging website logo was commissioned (see Fig. 3), and website launch was heavily promoted via public relations placements in major Canadian newspapers, magazines, and television and radio channels, and paid promotion in movie theatre and bus shelter posters and other advertising media.

Method and Findings

The sexualityandu.ca – masexualite.ca website was launched on 1 November, 2001. The data that were used for the current analyses were sampled during various time periods extending from website launch until 20 June, 2002. Table I shows general utilization statistics of the two sites. During the first five months of website operation, an average of 1100 and 900 unique visitors per day accessed the English and the French sites, respectively. Visitors spent approximately 11 minutes at the site and entered seven documents (Web pages or files) on average.

In terms of visits to the sites across time, there was an accelerating trend of use: For the English site number of visitors grew from 8000 a month in the first two months to over 20 000 per month in the last two months surveyed. An equivalent trend was found for the French site, where number of visitors grew from approximately 8000 a month to over 15 000 a month during this time period.

As can be see in Table II, most visitors came from North America: 82% of the users of the English site, and 72% of the users of the French site came from this continent. While the visitors to the English website from outside of North America came from

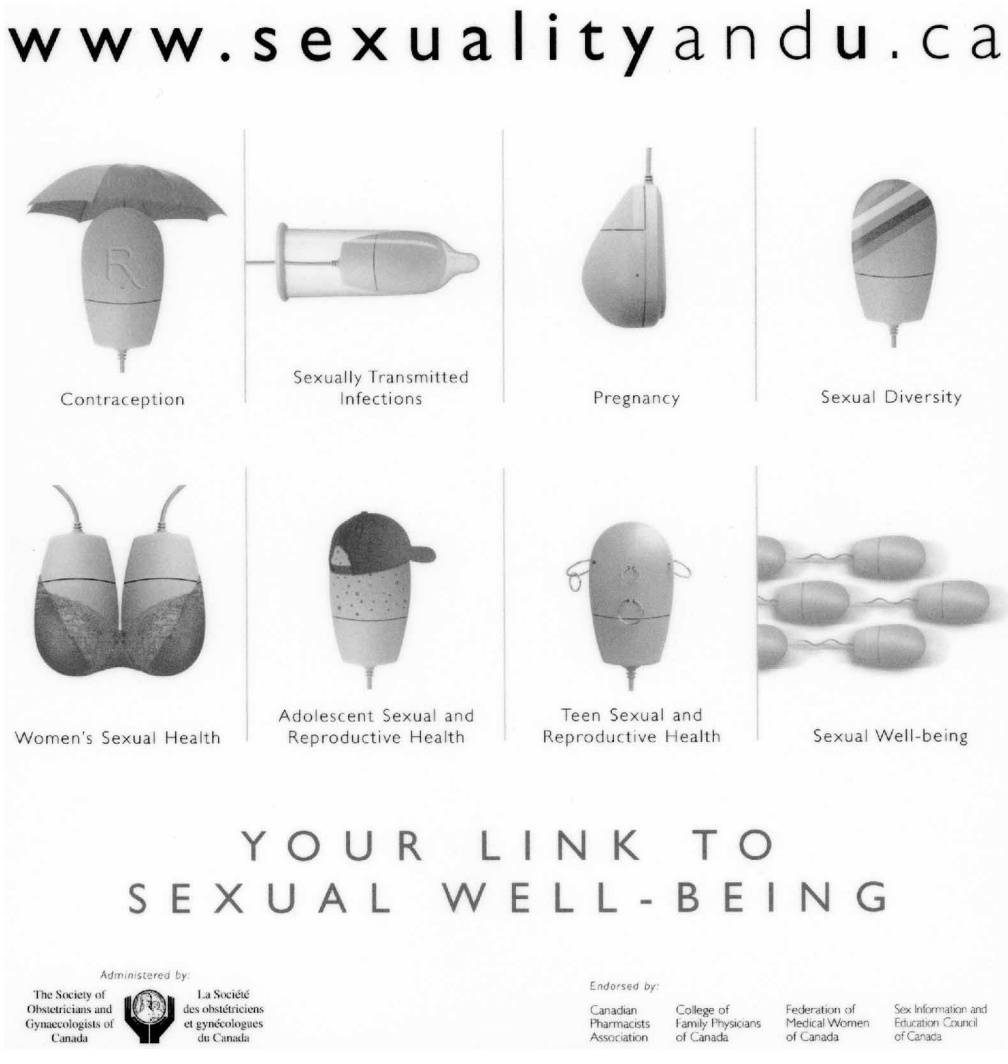

FIG. 3. Logo of sexualityandu.ca – masexualite.ca.

many geographical regions, most of the visitors to the French website from outside of North America (12.5% of total number of visitors) came from Western Europe. This difference is expected because of the use of English and French in different parts of the world.

The websites were active throughout the week and at almost all hours of the day. However, as may be observed in Table III, for both the English and the French sites, visitors prefer to access the site on weekdays, and the most popular times for visiting the site are in the evening hours for the English site and the afternoon hours for the French site. The number of visitors during weekends, however, and at other hours of the day, was not small. In terms of use of the sites on particular days, as shown in Table IV, for both the English and the French sites, the total number of hits, as well as visits, for each

TABLE I. Statistical parameters of website use from 1 November, 2001 to 20 April, 2002.

Statistics	Website language	
	English	French
Unique visitors[1]	75 869	79 888
Visited once	66 048	68 701
Visited more than once	9821	11 187
Visits[2]	175 080	146 352
Average per day	1080	909
Average time (minutes)	11:53	10:23
Page views[3]	1 124 072	945 457
Average page views per day	6938	5872
Document views[4]	795 227	676 876
Hits[5]	8 859 029	8 335 909
Average hits per day	54 685	51 775

Notes: [1]*Unique visitors*: Individuals who visited the site during the report period. If someone visits more than once during the report period, they are counted only once. [2]*Visits*: Number of times a visitor came to the site. [3]*Page views*: Hits to files designated as pages. [4]*Document views*: Hits to pages that were defined as 'documents', such as glossary and articles. [5]*Hit*: Any single action of a user on the Web server.

TABLE II. Visitors to the websites by their geographic region from 1 November, 2001 to 20 April, 2002.

Geographic region	English		French	
	n	%	*n*	%
North America	143 145	81.76	106 019	72.45
Western Europe	2397	1.37	18 659	12.75
Asia	1912	1.09	100	0.07
Middle East	1876	1.07	1328	0.91
Australia	890	0.51	37	0.03
Eastern Europe	364	0.21	88	0.06
Pacific Islands	267	0.15	50	0.03
Northern Europe	183	0.10	76	0.05
South America	104	0.06	74	0.05
Other regions	164	0.09	141	0.10
Region unspecified or not found	23 772	13.58	19 756	13.50
Total	175 074	100.00	146 328	100.00

weekday is higher than the parallel numbers for either Saturday or Sunday. For both sites, the day that is least preferred is Saturday. However, even on Saturdays website traffic is still quite high.

Visitors to the sites accessed various pages and documents. Tables V and VI show the top page access statistics to the English and the French sites, respectively. For the English visitors, other than the site or the sections homepages, the most frequently

TABLE III. Website activity by day and hour from 1 November, 2001 to 20 April, 2002.

Activity	Website language	
	English	French
Average number of visits per day on weekdays	1120	933
Average number of hits per day on weekdays	58 958	53 665
Average number of visits per weekend (Saturday + Sunday)	1959	1696
Average number of hits per weekend (Saturday + Sunday)	87 820	94 105
Most active hour of the day	21:00 – 21:59	15:00 – 15:59
Least active hour of the day	05:00 – 05:59	03:00 – 03:59

TABLE IV. Use of the English and French sites by day of the week from 1 November 2001 to 20 April, 2002.

Day	Website language					
	English (percent of total)			French (percent of total)		
	Hits	(Hits)	Visits	Hits	(Hits)	Visits
Sunday	1 064 808	12.01	23 809	1 116 928	13.39	20 132
Monday	1 342 522	15.15	26 568	1 270 679	15.24	22 035
Tuesday	1 441 345	16.26	26 063	1 258 868	15.10	21 829
Wednesday	1 346 271	15.19	25 642	1 092 349	13.10	19 852
Thursday	1 417 608	16.00	26 612	1 224 274	14.68	20 708
Friday	1 291 408	14.57	25 122	1 325 310	15.89	22 900
Saturday	955 067	10.78	21 264	1 047 501	12.56	18 896
Total weekdays	6 839 154	77.19	130 007	6 171 480	74.03	107 324
Total weekends	2 019 875	22.80	45 073	2 164 429	25.96	39 028

accessed pages addressed sexual relations (over 24 000 visits, average time of 34 seconds), male and female anatomy (each approximately 18 600 visits, 1.5 minutes, on the average, for male anatomy and 45 seconds for female anatomy). Interestingly, the page on masturbation attracted visitors for the longest time of all of the content pages of the site (1 minute and 47 seconds, on the average). Also of interest is the fact that the two pages that provided access to quizzes and polls (Cool Tools, and Fun and Games) attracted many visitors, apparently because of their interactive nature. The findings for the French visitors were very similar to those of the English visitors: sexual relations and male and female anatomy—all in the Adult section—were the most popular pages. Also for the French users masturbation was a frequently visited page and for the longest duration. The interactive parts of the French site were very popular as well.

A relatively large number of documents were downloaded from the site, totaling in 37 000 downloads from the English site (see Table VII for top 10 English

TABLE V. Top page views at the English website from 1 November, 2001 to 20 April, 2002.

Page	Views	Percent of total views	Visits	Average time viewed
Index	175 040	15.57	68 062	2:00
Home—adults	55 195	4.91	47 715	0:31
Home—teens	37 073	3.29	28 909	0:36
Sex—adults	29 013	2.58	24 616	0:34
Female anatomy (picture)	21 818	1.94	18 610	0:45
Male anatomy (picture)	21 727	1.93	18 626	1:30
Cool tools—Adults	20 830	1.85	18 029	0:30
Fun and games—Adults	20 348	1.81	17 461	0:27
The good. . .—adults	13 271	1.18	12 235	1:08
Quiz	21 541	1.91	12 131	0:06
Masturbation—adults	11 906	1.05	11 295	1:47

TABLE VI. Top page views at the French website from 1 November, 2001 to 20 April, 2002.

Page	Views	Percent of total views	Visits	Average time viewed
Index	169 365	25.02	72 014	1:50
Home—adults	53 588	6.23	47 437	0:33
Home—teens	27 556	2.91	22 276	0:34
Sex—adults	20 648	2.18	18 075	0:38
Fun and games—adults	19 277	2.03	17 220	0:29
Cool tools—adults	15 776	1.66	13 787	0:30
Female anatomy (picture)	12 367	1.30	10 711	0:38
Male anatomy (picture)	11 834	1.25	10 682	1:28
Quiz	17 538	1.85	10 042	0:30
Fun and games—teens	11 034	1.19	9713	0:31
Masturbation—adults	9307	0.98	8848	1:49

downloads) and 32 000 downloads from the French site (see Table VIII for top 10 French downloads) during the overall eight to 10 month study interval. All the articles downloaded deal with significant sex education subjects that attracted visitors' interest.

The sexualityandu.ca website contains three online quizzes that can be responded to directly by website visitors. During the overall evaluation period, approximately 5500, 2800, and 7200 visitors, respectively, responded to the three quizzes ('Pregnancy Quiz,' 'STI Quiz,' and 'STI/AIDS Risk Quiz') on the English site, and 2300, 2000, and 7300 visitors, respectively, responded to these three quizzes on the French site. The Pregnancy Quiz is made up of 15 statements. Respondents are asked to indicate whether a given statement is true or false. Table IX provides typical response distribution to an item of the Pregnancy Quiz. As can be seen in the table, considerable ignorance of the

TABLE VII. Documents visits and downloads at the English website from 1 November 2001 to 20 April, 2002.

Article	No. of downloads	Percent of downloads	Visits only
Boys and puberty	3348	9.03	1807
Male sexual dysfunction	2836	7.65	1159
STD prevention and management	2512	6.78	740
Girls and puberty	2407	6.49	1266
Dealing with sexual issues in women	2254	6.08	997
How to choose the right contraception	2010	5.42	811
One's hot one's not	1975	5.33	981
Introduction to puberty	980	2.64	453
Pregnancy and birth	596	1.60	300
Menstruation and sperm production	576	1.55	378
Total for the documents above	19 494	52.57	8892

TABLE VIII. Top ten French site downloads from 1 November, 2001 to 20 April, 2002.

Article	No. of downloads	Percent of downloads	Visits
Les troubles de la sexualité chez l'homme	3272	10.08	1317
Les troubles de la sexualité chez la femme	3014	9.28	1285
Les garçons et la puberté	2355	7.25	1101
Envi... pas envi... qui et alors?	2149	6.62	956
Comment choisir la bonne méthode de contraception pour vos patientes	1887	5.80	420
Les filles et la puberté	1785	5.50	867
Grossesse et naissance	1181	3.64	568
Prévention et traitement des MTS	1141	3.51	441
Introduction à la puberté	999	3.08	444
Questionnaire sur les MTS	719	2.21	333
Total for the documents above	18 502	56.97	7732

time frame for utilization of emergency contraception was in evidence, and for this particular item there were no significant differences in correct responses between teenage and adult respondents, and there was no difference between English and French visitors. In total, across all the Pregnancy Quiz items, teens had somewhat fewer correct responses than adults (78.2% vs. 81.7%), and English respondents had a little advantage over French respondents (80.3% vs. 78.9%, respectively).

The STI Quiz is made up of 13 statements. Here, too, respondents are asked to indicate whether a given statement is true or false. Table X shows the responses to a typical item of the STI Quiz, concerning whether or not the birth control pill protects an individual from sexually transmitted infections. As may be observed in the table, most respondents knew that the correct answer to this item, although

TABLE IX. Response distribution to the item: 'Emergency contraception (the Morning After Pill) can be taken up to 3 days after unprotected vaginal intercourse' by site language and age group, from 1 November, 2001 to 20 June, 2002.

	English site				French site				Total			
	Teens		Adults		Teens		Adults		Teens		Adults	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
True[1]	1596	67	1545	70	717	66	591	65	2313	67	2136	68
False	788	33	676	30	375	34	318	35	1163	33	994	32
Total	2384	100	2221	100	1092	100	909	100	3476	100	3130	100

[1]Correct response.

TABLE X. Response distribution to the item: 'Birth controls pills offer excellent protection from STIs' from the STI Quiz, by site language and age group, from 1 November, 2001 to 20 June, 2002.

	English site				French site				Total			
	Teens		Adults		Teens		Adults		Teens		Adults	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
True	93	7	39	3	86	11	38	4	179	9	77	3
False[1]	1220	93	1360	97	699	89	1029	96	1919	91	2389	97
Total	1313	100	1399	100	785	100	1067	100	2098	100	2466	100

[1]Correct response.

considerably more adults knew the correct response than teens, and the same trend of responses emerged for English and French respondents. In total across all items, 90.4% of the teens and 93.2% of adults gave correct responses, as well as 92.1% and 91.6% of the English and the French respondents, respectively. Response statistics for another item on the STI Quiz, concerning the normality of women having some degree of vaginal discharge, are presented in Table XI. As can be seen in the table, French teens, as well as adults, were less likely than their English counterparts (teens: 91% vs. 79%; adults: 92% vs. 77%) to know that some vaginal discharge for women is normal.

The STI/AIDS/HIV Risk Quiz is made up of 10 survey items. Each item pertains to a specific behaviour or attitude that can be associated with risk of contracting an STI. The main purpose of this quiz is to direct users' attention to important issues related to STI that are conveyed by immediate feedback which a respondent receives after answering each item in relation to STI risk. Table XII shows the distribution of responses to a representative item of this quiz. As can be seen in the table, the data show that most respondents have not been tested for STIs, with fewer teens tested than adults, and

TABLE XI. Response distribution to the item: 'It is normal for women to have some vaginal discharge' from the STI Quiz, by site language and age group, from 1 November, 2001 to 20 June, 2002.

	English site				French site				Total			
	Teens		Adults		Teens		Adults		Teens		Adults	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
True[1]	1315	91	1340	92	715	79	866	77	2030	86	2206	86
False	132	9	110	8	186	21	260	23	318	14	370	14
Total	1447	100	1450	100	901	100	1126	100	2348	100	2576	100

[1]Correct response.

TABLE XII. Response distribution to an item from the STI/AIDS/HIV Quiz: 'Have you been tested for STIs?' by age group and site language, from 1 November, 2001 to 20 June, 2002.

	English site				French site				Total			
	Teens		Adults		Teens		Adults		Teens		Adults	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Never	2267	77	2032	53	2713	81	1716	53	4980	79	3748	53
Yes, negative	578	20	1697	44	567	17	1433	44	1145	18	3130	44
Yes, positive	83	3	132	3	88	2	87	3	171	3	219	3
Total	2928	100	3861	100	3368	100	3236	100	6296	100	7097	100

fewer French than English visitors tested. Immediate feedback provided to respondents of this item brought to their attention the importance of STI tests for those at risk of infection.

Discussion

Sexualityandu.ca—in both its English and its French versions—is an exceptionally well utilized sexual and reproductive health education website. During its first six months of operation, sexualityandu.ca – masexualite.ca was visited by approximately 155 000 unique visitors and was accessed in over 320 000 visits. Website users stayed on the sexual and reproductive health promotion content of the sites for an average of approximately 11 minutes; accessed a significant number of website pages (over 2 million page views); and downloaded a considerable number of documents for further use (close to 70 000 downloads). The SOGC's vision of sexualityandu.ca—involving creation of an easily and anonymously accessible signature address for sexual and reproductive health information—is well on its way to being realized. We also note that the comparative success of the Web-based strategy vs. conventional strategies (e.g.,

poster, theme weeks, brochures) seems to be exceptional in terms of extraordinary reach, time and involvement of users, and cost-effectiveness per user.

As indicated in our utilization statistics, there are some topics that seem to be of more interest to visitors than others. This might reflect real and unmet needs that are uniquely easy to address through this anonymous sexuality and reproductive health education resource. The significant interest reflected in visitors' surfing behaviour, in 'Boys and Puberty' and 'Girls and Puberty,' for example, and in 'masturbation,' may mean that visitors feel a need to know more about these still somewhat taboo subjects. Moreover, website visitor responses to the three quizzes offered at the site also emphasize the need for development of targeted content that focuses on specific information gaps that have been identified. In this sense, quiz responses provide diagnostic information that permit sexualityandu.ca – masexualite.-ca to provide timely, targeted, and behaviourally relevant reproductive health information to its users.

It is clear that sexualityandu.ca does not serve only Canadians but also provides sexual and reproductive health information to a wide international community, as befits an Internet site with global reach. As sexuality is a cross-cultural, basic human subject of concern and interest, this is expected and in some sense represents an additional success of the website. The fact that sexualityandu.ca – masexualite.ca is provided in full in two widely used languages contributes no doubt to its international usage.

Sexualityandu.ca – masexualite.ca remain, in the best sense, works in progress. Soon to be launched website developments include, in the teacher's section, webquest homework assignments, which will guide students to locate critical reproductive health information on the site and to integrate it to answer questions to be turned in and discussed in health education classes. This development complements the sexual and reproductive health lesson bank that is already an integral part of the teacher section of the website. In addition, audiovisual role-modeling sections concerning negotiation of safer sex is planned for the teen section of the website, audiovisual role modeling of parent-child communication about sex is planned for the parent section, and a master lecture on the acute care of victims of sexual assault is planned for the health care professional section of the site. Considerably increased individualized interactivity is also planned as a much needed addition to the teen and adult sites.

Conclusion

Unique aspects of the Internet—such as it's accessibility, anonymity, interactivity, audiovisual richness, and ability to convey expert and updated content—have been successfully mobilized to provide an example of cost-effective sexual and reproductive health communication. Moreover, reliance upon a well-validated theoretical model has provided guidance for the creation of content that attempts to address the information, motivation, and behavioural skills requirements of sexual and reproductive health promotion behaviour performance. The reader is invited to surf sexualityandu.ca or masexuality.ca to become better acquainted with this Internet-based, theoretically guided approach to sexual and reproductive health promotion, and to track this website as it evolves and is improved over time.

Acknowledgements

The authors wish to thank the Society of Obstetricians and Gynaecologists of Canada and the Foundation for the Promotion of Sexual and Reproductive Health for assistance with the preparation of this manuscript.

References

BARAK, A. (1999). Psychological applications on the Internet: A discipline on the threshold of a new millennium. *Applied and Preventive Psychology*, *8*, 231–246.

BARAK, A. & FISHER, W.A. (2001). Toward an Internet-driven, theoretically-based, innovative approach to sex education. *Journal of Sex Research*, *38*, 324–332.

BARAK, A. & FISHER, W.A. (2002). The future of Internet sexuality. In A. COOPER (Ed.), *Sex and the Internet: A guidebook for clinicians* (pp. 263–280). New York: Brunner-Routledge.

BARAK, A. & KING, S.A. (2000). Editorial: The two faces of the Internet: Introduction to the Special Issue on the Internet and sexuality. *CyberPsychology and Behavior*, *3*, 517–520.

BASSON, R. (1997). Sexual dysfunction and the perimenopause. *Journal of the Society of Obstetricians and Gynaecologists of Canada*, *19*, (Supplement), 1–7.

BORZEKOWSKI, D.L.G. & RICKERT, V.I. (2001). Adolescent cybersurfing for health information: A new resource that crosses barriers. *Archives of Pediatrics & Adolescence Medicine*, *155*, 813–817.

BYRNE, D., KELLEY, K. & FISHER, W.A. (1993). Unwanted teenage pregnancies: Incidence, interpretation, intervention. *Applied and Preventive Psychology*, *2*, 101–113.

CLINE, R.J.W. & HAYNES, K.M. (2001). Consumer health information seeking on the Internet: The state of art. *Health Education Research*, *16*, 671–692.

COOPER, A. (1998). Sexuality and the Internet: Surfing into the new millennium. *CyberPsychology & Behavior*, *1*, 187–193.

COOPER, A. & GRIFFIN-SHELLEY, E. (2002). Introduction. The Internet: The next sexual revolution. In A. COOPER (Ed.), *Sex and the Internet: A guidebook for clinicians* (pp. 1–15). New York: Brunner-Routledge.

COOPER, A., MCLOUGHLIN, I.P. & CAMPBELL, K.M. (2000). Sexuality in cyberspace: Update for the 21st century. *CyberPsychology & Behavior*, *3*, 521–536.

COOPER, A. & SPORTOLARI, L. (1997). Romance and cyberspace: Understanding online attraction. *Journal of Sex Education and Therapy*, *22*, 7–14.

DECENSO, A., GUYATT, G., WILLAN, L. & GRIFFITH, L. (2002). Intervention to reduce unintended pregnancies among adolescents: Systematic review of randomized controlled trials. *British Medical Journal*, *324*, 1426–1434.

FISHBEIN, M. & AJZEN, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

FISHER, J.D. & FISHER, W.A. (1992). Changing AIDS risk behavior. *Psychological Bulletin*, *111*, 455–474.

FISHER, J.D. & FISHER, W.A. (1999). Understanding and promoting sexual and reproductive health behavior: Theory and method. In R. ROSEN, C. DAVIS & H. RUPPEL (Eds). *Annual Review of Sex Research*, *Volume IX* (pp. 39–76). Mason city, IA: Society for the Scientific Study of Sex.

FISHER, J.D. & FISHER, W.A. (2000). Theoretical approaches to individual-level change in HIV risk behaviour. In J.L. PETERSON & R.J. DICLEMENTE (Eds), *Handbook of HIV prevention. AIDS prevention and mental health* (pp. 3–55). Dordrecht, Netherlands: Kluwer.

FISHER, J.D., FISHER, W.A., MISOVICH, S.J., KIMBLE, D.L. & MALLOY, T. (1996). Changing AIDS risk behavior: Effects of a conceptually based AIDS risk reduction intervention in a university student population. *Health Psychology*, *15*, 114–123.

FISHER, J.D., FISHER, W.A., WILLIAMS, S.S. & MALLOY, T.E. (1996). Empirical tests of an information-motivation-behavioral skills model of AIDS preventive behavior with gay men and heterosexual university students. *Health Psychology*, *13*, 238–250.

FISHER, W.A. (1990). Understanding and preventing adolescent pregnancy and STD/HIV. In J. EDWARDS, R.S. TINDALE, C. HEATH & E.J. POSAVAC (Eds), *Social influence processes and prevention* (pp. 71–101). Beverly Hills, CA: Plenum Press.

FISHER, W.A. & GRAY, J. (1988). Erotophobia-erotophilia and sexual behavior during pregnancy and postpartum. *The Journal of Sex Research*, *25*, 379–396.

FISHER, W.A. & FISHER, J.D. (1993). A general social psychological model for changing AIDS risk behavior. In J. PRYOR & G. REEDER (Eds), *The social psychology of HIV infection* (pp. 127–154). Hillsdale, NJ: Erlbaum.

FISHER, W.A. & FISHER, J.,D. (1998). Understanding and promoting sexual and reproductive health behavior. In R. ROSEN, C. DAVIS, & H. RUPPEL (Eds), *Annual Review of Sex Research*, *Volume IX* (pp. 39–76). Mason city, IA: Society for the Scientific Study of Sex.

FISHER, W.A. & FISHER, J.D. (2003). The Information-Motivation-Behavioral Skills Model: A General Social Psychological Approach to Understanding and Promoting Health Behavior. In J. SULS & K. WALLSTON (Eds), *Social psychological foundations of health*. London: Blackwell. In press.

FISHER, W.A., WILLIAMS, S.S., FISHER, J.D. & MALLOY, T.E. (1999). Understanding AIDS risk behavior among sexually active urban adolescents: An empirical test of the Information—Motivation—Behavioral Skills model. *AIDS and Behavior*, *3*, 13–23.

FLOWERS-COULSON, P.A., KUSHNER, M.A. & BANKOWSKI, S. (2000). The information is out there, but is anyone getting it? Adolescent misconceptions about sexuality education and reproductive health and the use of the Internet to get answers. *Journal of Sex Education & Therapy*, *25*, 178–188.

FRANKLIN, C. & CORCORAN, J. (2000). Preventing adolescent pregnancy: A review of programs and practices. *Social Work*, *45*, 40–52.

HAGLEY, M., PEARSON, H. & CARNE, C. (2002). Sexual health advice centre. *International Journal of Adolescent Medicine & Health*, *14*, 125–130.

HEIMAN, J.R. & MESTON, C.M. (1997). Empirically validated treatment for sexual dysfunction. *Annual Review of Sex Research*, *8*, 148–194.

KING, S.A. (1999). Internet gambling and pornography: Illustrative examples of the psychological consequences of communication anarchy. *CyberPsychology & Behavior*, *2*, 175–193.

MCKENNA, K.Y.A. & BARGH, J.A. (2000). Plan 9 from cyberspace: The implication of the Internet for personality and social psychology. *Personality and Social Psychology Review*, *4*, 57–75.

MILLNER, V.S. & KISER, J.D. (2002). Sexual information and Internet resources. *Family Journal: Counseling & Therapy for Couples & Families*, *10*, 234–239.

MUEHLENHARD, C.L., HARNEY, P.A. & JONES, J.M. (1992). From victim-precipitated rape to date rape: How far have we come? In. J. BANCROFT, C.M. DAVIS & H.J. RUPPEL JR, (Eds) *Annual Review of Sex Research. Vol. II* (pp. 219–253). Lake Mills, Iowa: Society for the Scientific Study of Sexuality.

MUSTANSKI, B.S. (2001). Getting wired: Exploiting the Internet for the collection of valid sexuality data. *Journal of Sex Research*, *38*, 292–302.

SPRANCA, M.D. (2001). Designing websites to empower health care consumers. In E.U. WEBER, J. BARON & G. LOOMES (Eds). *Conflict and tradeoffs in decision making* (pp. 300–322). Boston, MA: Cambridge University Press.

WINCZE, J.P. & CAREY, M.P. (1991). *Sexual dysfunction: A guide for assessment and treatment*. New York: Guilford.

WASSERHEIT, J.N., ARAL, S.O., HOLMES, K.K. & HITCHOCOCK, P.J. (Eds) (1991). *Research issues in human behavior and sexually transmitted diseases in the AIDS era*. Washington, DC: American Society for Microbiology.

YOUNG, K.S., GRIFFIN-SHELLEY, E., COOPER, A., O'MARA, J. & BUCHANAN, J. (2000). Online infidelity: A new dimension in couple relationships with implications for evaluation and treatment. *Sexual Addiction & Compulsivity*, *7*, 59–74.

Contributors

AZY BARAK, PhD, *Professor of Psychology, University of Haifa*

WILLIAM A. FISHER, *Professor of Psychology, Obstetrics and Gynaecology at the University of Western Ontario, London, Canada and Research Professor and Associate Director of the Center for Health/HIV Intervention and Prevention at the University of Connecticut, Storrs, USA*

Copyright © 2003 EBSCO Publishing