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International Journal of Sexual Health
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/wijs20

Adolescents' Use of the Internet for Sex Education: A Thematic and Critical Review of the Literature

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Accepted author version posted online: 02 Aug 2013.Published online: 11 Oct 2013.

To cite this article: Laura Simon & Kristian Daneback (2013) Adolescents' Use of the Internet for Sex Education: A Thematic and Critical Review of the Literature, International Journal of Sexual Health, 25:4, 305-319, DOI: 10.1080/19317611.2013.823899

To link to this article: http://dx.doi.org/10.1080/19317611.2013.823899

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International Journal of Sexual Health, 25:305–319, 2013
Copyright © Taylor & Francis Group, LLC
ISSN: 1931-7611 print / 1931-762X online
DOI: 10.1080/19317611.2013.823899

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ADOLESCENTS' USE OF THE INTERNET FOR SEX EDUCATION: A THEMATIC AND CRITICAL REVIEW OF THE LITERATURE

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ABSTRACT. A thematic and critical literature review was conducted to determine what is known about adolescents' experiences with online sex education. Four major themes could be discerned from the literature, revealing that: (a) adolescents report engaging with sex information online; (b) adolescents are interested in a number of topics, including sexually transmitted infections and pregnancy; (c) the quality of adolescent-targeted sex information online can be lacking, but adolescents can evaluate these sources; and (d) Internet-based interventions can increase adolescents' sexual health knowledge. Inconsistencies in the literature are discussed and suggestions are made for future research.

KEYWORDS. Sex education, sex, adolescents, Internet, digital

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INTRODUCTION

Adolescence is a period of development associated with sexual discovery, exploration, and risk taking (Abma, Martinez, Mosher, & Dawson, 2004; Forhan et al., 2009; Moore & Rosenthal, 2006). This development does not begin from a blank slate; adolescents use cues from their previous experiences to create sexual scripts as guideposts for future behavior (Gagnon & Simon, 2005). Sex education can provide these points of reference for adolescents exploring their sexuality; when young people are exposed to information about contraceptives and sexually transmitted infections (STIs), they may be more likely to protect themselves when engaging in sexual behavior (e.g., Dawson, 1986; Kirby, 2002). Yet not all adolescents receive comprehensive high-quality sex education. Scholars have criticized school-based sex education (SBSE) curricula, especially in the United States, for being sex-negative and dismissive of nonheterosexual experiences (e.g., Elia, 2000; Lindberg, Santelli, & Singh, 2006; Powell, 2010; Schalet, 2011). A lack of available or high-quality SBSE may open the door for emerging technologies to serve as resources for sexual script building.

Today young people are known for their early and fervent adoption of the Internet and its associated mobile technologies, such as cell phones and tablet computers (Fox & Jones, 2009; Lenhart, Purcell, Smith, & Zickhur, 2010; Rideout, Foehr, & Roberts, 2010). Unlike their parents, adolescents in the digital age accept the Internet as playing an important role in their everyday lives. It is well documented that the Internet is used to view sexually explicit material (SEM), in addition to nonsexual entertainment and information (Fox & Jones, 2009; Peter & Valkenburg, 2006). In medical and health information-seeking research, adolescents report using the Internet to get information about health, dieting, or physical fitness (Fox & Jones, 2009; Lenhart, Madden, Macgill, & Smith, 2007). In focus groups, adolescents have also expressed their reliance on the Internet as a resource for health information (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005).

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Sexual health is a component of an adolescent's overall health, but it is also uniquely contextualized. Discussing sex with teachers, parents, or even friends is considered embarrassing and shameful in a society that problematizes teenage sexuality (Kendall, 2012; Moran, 2000). In contrast, the Internet is perceived as a more private and anonymous place, where young people can view SEM, try on new identities, and practice coming out as gay (Barak & Fisher, 2001; Bond, Hefner, & Drogos, 2009; Cooper, 1998; Peter & Valkenburg, 2006; Valkenburg & Peter, 2008). The Internet's appeal as a sex education resource may therefore be based on more than just the quality of an adolescent's available offline sex education; the Internet's ease of use, its availability to increasingly large numbers of adolescents, and its perceived anonymity regarding sensitive topics are unique in the delivery of sexual information in the digital age.

Indeed, this use of the Internet was predicted by researchers more than 10 years ago (Barak & Fisher, 2001; Cooper, 1998; Goldman & Bradley, 2001). However, to date, this field of study is under-researched compared with other online sexual activities (Döring, 2009). What then is known about adolescents' potential use of the Internet for education in sexual matters? The aim of this literature review is to provide insight into the prevalence and viability of the Internet as a source of information about sexuality for adolescents. To comment on this topic with breadth and depth, we have developed the following objectives: (a) to discover the major and emerging themes of research in the field, (b) to summarize the major findings and their significance, (c) to critically analyze the current state of the literature for gaps in knowledge and methodology, and lastly (d) to provide suggestions for future research.

To the best of our knowledge, this is the first literature review to focus on adolescents' use of the Internet for sex education. Our findings are useful to the research community, to practitioners looking to modernize their sex education programs and lesson plans, and to parents wishing to broaden their understanding of their adolescents' sex information seeking.

METHODS

Procedure

To first obtain relevant literature in the field, a systematic database search was conducted. To increase the probability of retrieving the maximum number of relevant articles, a "high-recall" search strategy was chosen. Based on discussions with colleagues, PsycINFO, ERIC, and Sociological Abstracts were determined to be relevant databases and were subsequently searched using various combinations of keywords with Boolean operators relating to the topic, including: *sex, education, adolescents, teenagers, high school, Internet, media, online,* and *digital*. More than 500 articles were retrieved and read to determine their relevance based on the inclusion criteria. We also used Internet searches, engaged in discussions with colleagues, and evaluated references to gain a comprehensive understanding of knowledge in the field.

Inclusion criteria for review were: (a) a primary or substantial focus on adolescents, (b) a primary or substantial focus on sex education, not just general health education, (c) a primary or substantial focus on the Internet or media associated with the Internet (such as mobile phones), and (d) text written in English. To assess the literature for the first criterion, we defined adolescents as teenagers (aged 13 to 19 years old). We followed Caldwell, Caldwell, Caldwell, and Pieris's (1998) definition of adolescence as being a "postpubertal population younger than 20 years of age" (p. 137). This age range also aligns with the markers of adolescence according to Gagnon and Simon (2005): the beginning of puberty and the ending of childhood/beginning of adulthood. To determine if recalled studies fit this age range, we focused on the abstract and Methods section to ascertain the participants' ages; if a study included a wider range of age than was appropriate for this review but provided data on just adolescents, we used this information to fit the criterion. Similarly, to determine whether the literature fit the second and third criteria, we focused on the abstract, Methods section, and Results section of each study to determine whether

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it commented on the review topic. Studies fit the criteria when we found data about adolescents learning sexual information (not just information about general health) while using the Internet or its associated digital media (not just information about media in general or traditionally offline media, like television or radio). Text not written in English could be filtered out through the database search or assessed by reviewing the study. We also did not encounter any material that fit the review criteria but was not written in English. The final sample of relevant studies comprised a total of only 36 articles focusing on adolescents and online sex education, indicating an under-researched field.

These 36 articles were then read in their entirety for theme emergence. Methods and results were compared between papers using the constant comparison grounded theory method (Glaser & Strauss, 1967), where findings were read multiple times and compared to others in order to develop open codes. Once all of the studies had been read, compared, and coded for major findings, codes were reexamined for specificity. Additional rounds of read-throughs and comparisons occurred until it was determined that the codes best reflected the themes of the literature.

RESULTS

We found four distinct themes present in the existing research literature: (a) the prevalence of adolescents' engagement with sex information online, (b) what sex-related topics adolescents are interested in learning about online, (c) quality assessment of adolescent-targeted online sex information, and (d) interventions to increase sexual health knowledge via digital media. A summary of the findings and their significance in each theme are described hereafter.

Prevalence of Adolescents' Engagement With Sex Information Online

Quantitative studies examining the prevalence of adolescents' engagement with sex information online confirm the existence of this activity. Adolescents consistently engage with sex information online, with a range of 20% to 76.5% of samples using the Internet for sex education.

In the United States, Borzekowski and Rickert (2001) reported that 31.6% of participants, drawn from a sample at a New York suburban high school, had used the Internet for birth control and safer-sex information. Sex (sexual activity, contraception, pregnancy) was also the most popular informational health topic accessed through the Internet for those adolescents who reported using health information for personal use. A Kaiser Family Foundation/*Seventeen Magazine* (2004) online survey, with a nationally representative U.S. sample, found a similar level of support for sex information seeking among adolescents. Their findings suggest that 39% of participants have received "a lot" or "some" information about birth control and protection options from the Internet. Bess, Doe, Green, and Terry (2009) reported that 41% of their participants, drawn from a sample of Washington, DC, district youth, had sought sexual health information online. Buhi, Daley, Fuhrmann, and Smith (2009) found that an elevated 76.5% of 1st-year college students had ever sought out information about sexual health on the Internet. More recently, Ralph, Berglas, Schwartz, and Brindis (2011) found that 40% of their sample of low-income California-based teens had used the Internet to look for sexual health information.

A few non-U.S. quantitative studies based in Uganda, Ghana, and Nigeria report similar findings to those studies based in the United States. Ybarra, Kiwanuka, Emenyonu, and Bangsberg (2006) gathered data from a school-based sample of all African adolescents in Uganda; they found that 35% of participants had sought HIV/AIDS information online, while 20% had sought general sexual health information online. In Ghana, 34.3% of adolescents had used the Internet as a source for sexual health information (Borzekowski, Fobil, & Asante, 2006). Nwagwu (2007) found that an elevated 45% of female adolescents in Nigeria, drawn from a convenience sample including both

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in-school and out-of-school girls, have used the Internet as a source of reproductive health information.

The studies in this theme confirm Cooper's (1998) prediction and that of others that adolescents use the Internet for sex education. This activity has been reported in diverse samples drawn from North America and Africa.

What Sex-Related Topics Are Adolescents Interested in Learning About Online?

A number of studies have addressed what sex-related topics adolescents seek or engage with online. Data are mainly based on two different methodologies: (a) content analysis of adolescents' questions and discussions on sexual health Web sites, and (b) surveys or interviews with adolescents about their interests and retrospective activities online. Thus, some researchers formulated topics out of the adolescents' own words while others provided prewritten surveys from which adolescents were asked to make choices. Samples also varied widely, with differences notably based on location, sexual orientation, and racial/ethnic composition. Yet all studies that addressed this theme confirm similar topics of interest for adolescents.

The most commonly cited online sex education topics of interest were information about: HIV/AIDS/STIs (eight studies cited this topic), pregnancy/childbirth (eight studies), sex acts/behavior (seven studies), contraception/protection (seven studies), information about the body (six studies), relationships/social issues (five studies), and sexual identity/orientation (three studies; Table 1).

In content analyses, code formation seemed consistent across studies. Adolescents who demonstrated interest in HIV/AIDS/STIs

TABLE 1. Topics of Interest for Adolescents Engaging With Sex Information Online and Associated Studies

Topic	Associated Study
HIV/STIs	Borzekowski, Fobil, & Asante (2006); Buhi, Daley, Fuhrmann, & Smith (2009); Gilbert, Temby, & Rogers (2005); Hooper et al. (2008); Jones & Biddlecom (2011); Levine, McCright, Dobkin, Woodruff, & Klausner (2008); Nwagwu (2007); Vickberg, Kohn, Franco, & Criniti (2003)
Pregnancy/childbirth	Borzekowski, Fobil, & Asante (2006); Buhi, Daley, Fuhrmann, & Smith (2009); Flowers-Coulson, Kushner, & Bankowski (2000); Jones & Biddlecom (2011); Levine, McCright, Dobkin, Woodruff, & Klausner (2008); Nwagwu (2007); Suzuki & Calzo (2004); Vickberg, Kohn, Franco, & Criniti (2003)
Sex acts/behavior	Borzekowski, Fobil, & Asante (2006); Flowers-Coulson, Kushner, & Bankowski (2000); Gilbert, Temby, & Rogers (2005); Hooper et al. (2008); Nwagwu (2007); Suzuki & Calzo (2004); Vickberg, Kohn, Franco, & Criniti (2003)
Contraception/protection	Buhi, Daley, Fuhrmann, & Smith (2009); Flowers-Coulson, Kushner, & Bankowski (2000); Gilbert, Temby, & Rogers (2005); Hooper et al. (2008); Levine, McCright, Dobkin, Woodruff, & Klausner (2008); Suzuki & Calzo (2004); Vickberg, Kohn, Franco, & Criniti (2003)
Body	Buhi, Daley, Fuhrmann, & Smith (2009); Flowers-Coulson, Kushner, & Bankowski (2000); Harvey, Brown, Crawford, Macfarlane, & McPherson (2007); Jones & Biddlecom (2011); Suzuki & Calzo (2004); Vickberg, Kohn, Franco, & Criniti (2003)
Relationships/social issues	Flowers-Coulson, Kushner, & Bankowski (2000); Gilbert, Temby, & Rogers (2005); Hooper et al. (2008); Suzuki & Calzo (2004); Vickberg, Kohn, Franco, & Criniti (2003)
Sexual identity/orientation	Hooper et al. (2008); Levine, McCright, Dobkin, Woodruff, & Klausner (2008); Vickberg, Kohn, Franco, & Criniti (2003)
Sexual abuse	Borzekowski, Fobil, & Asante (2006); Nwagwu (2007); Suzuki & Calzo (2004)
Services/research information	Flowers-Coulson, Kushner, & Bankowski (2000); Vickberg, Kohn, Franco, & Criniti (2003)
Sexual pleasure	Jones & Biddlecom (2011)
Sexual terminology	Jones & Biddlecom (2011)
Reproductive cancers	Jones & Biddlecom (2011)
Personal/being normal	Harvey, Brown, Crawford, Macfarlane, & McPherson (2007)
Teen sexuality/virginity	Gilbert, Temby, & Rogers (2005)

Note. Some topics were recoded into more general variables. For example, in Hooper et al. (2008), interest in "how to have anal sex without pain" was recoded as "sex acts/behavior."

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were concerned with how sexual infections might be transmitted (Vickberg, Kohn, Franco, & Criniti, 2003). An interest in pregnancy/childbirth included queries about whether one could get pregnant in different situations, like if a condom broke or if an adolescent pulled out during sexual intercourse (Suzuki & Calzo, 2004; Vickberg et al., 2003). Adolescents' interest in sex acts/behaviors often included questions about how to have sex in certain ways, like anal or oral sex (Gilbert, Temby, & Rogers, 2005; Hooper et al., 2008). They also asked questions pertaining to contraception/protection and specifically expressed interest in videos that clarified condom usage, like how to put a condom on correctly (Hooper et al., 2008) or what to do if a condom breaks (Gilbert et al., 2005; Levine, McCright, Dobkin, Woodruff, & Klausner, 2008). Young people were interested in learning about their bodies, including information about penis size, genital hair grooming, or bodily functioning during sexual activities, like pain during or after sex (Buhi et al., 2009; Gilbert et al., 2005; Suzuki & Calzo, 2004). An interest in relationship and social issues was based on questions about how to discuss sexual issues with a partner (Flowers-Coulson, Kushner, & Bankowski, 2000) or information about what to do if a partner is cheating on you (Levine et al., 2008). Regarding identity/orientation, adolescents reported wanting to know about how to "come out" and about aging as a gay man (Hooper et al., 2008).

These studies provide insight into adolescents' topics of interest when engaging in online sex education. However, it is not clear from the literature if interest in these topics motivates the adolescent to seek out information and/or if these are simply the topics most easily accessed online. However, it is valuable for researchers, clinicians, educators, and other interested parties to note that adolescents are popularly engaging with information about pleasure-based and experiential sex, as well as sexual positions and behaviors. This could be due to a lack of qualitative sex information in traditional offline sex education, where sexual positions are not usually considered a part of a curriculum focused on sexual health. Also of note, it is also unclear from the literature what role pornographic videos or photos (SEM) may play in online education on sex acts and behaviors, if any. However, there is some evidence from studies on young adults older than 19 years of age that SEM is used as a source of information about those sexual positions not discussed in school or among friends (Kubicek, Beyer, Weiss, Iverson, & Kipke, 2010; Löfgren-Mårtenson & Månsson, 2010).

Quality Assessment of Adolescent-Targeted Online Sex Information

A subset of the literature field directly addresses the quality of adolescent-targeted sex education. The methodology behind this inquiry tends to be based on content analyses of relevant Web sites or qualitative interviews with adolescents.

Using content analysis, Bay-Cheng (2005) compared two adolescent-targeted sex education bulletin board system message boards, one that was moderated by adults and another that had no official moderation. Bay-Cheng (2005) concluded that the adult-moderated Web site stifled some of the youth community spirit and advice-giving among peers. Without adult moderation, young people were freer to create bonds, and they often unofficially helped moderate each other's comments to maintain the quality and accuracy of advice. Both Bay-Cheng (2001) and Keller, LaBelle, Karimi, and Gupta (2002, 2004) also conducted more large-scale online searches for available sex education Web sites aimed at adolescents. The former concluded that Web sources tend to present more negative or narrow-minded viewpoints, often employing a "sex as victimization" message instead of promoting the positive aspects of sexual exploration. Keller et al. (2002, 2004) similarly found a lack of negotiation messages online, which when present may help young people navigate sexual conflicts. Together, these studies suggest that positive and more user-driven messages may be lacking from online sex education resources. Isaacson (2006) similarly identified that sexual

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health information Web sites aimed at adolescents tend to lack information about certain marginalized topics, like sexual orientation and identity. Information about masturbation and abortion were also less popular topics. Buhi et al. (2010) found that sexual health Web sites visited by young people tended to lack indicators of quality, such as displays of authorship and references. However, the authors did not find frequent inaccuracies in information available online. Buhi et al. (2009) additionally conducted analyses of participants' use of the Internet to seek answers to specific sex education questions. Although participants were able to find accurate answers, information could be inaccurate, unhelpful, or frustrating to find.

Additional studies have reported on the experience of navigating sexual health Web sites through the words of the adolescents themselves. Jones, Biddlecom, Herbert, and Mellor (2011) and Jones and Biddlecom (2011) interviewed U.S. high school juniors and seniors about their opinions on sexual health information online. Participants said that they tended to trust qualified Web sources that were well known or held a good reputation. Information that could be confirmed through other sources increased the trustworthiness of the Web source. Many participants also expressed distrust with user-generated content online (that anyone could simply make up) and sexual advertising that could hold a noneducational agenda. Adolescents expressed frustration with the amount of contradictory information online and the time it takes to search through potential sources. However, they would crosscheck information for accuracy.

These studies suggest that although online information can be difficult to find and can lack indicators of quality, adolescents are savvy users capable of determining what makes an online resource trustworthy. However, it is unclear from the literature how and where adolescents have been taught to be critical of Web sources or if they have been taught any Web-based skills at all. They may instead adapt strategies learned in school for critically evaluating books or other media to the Internet.

Internet-Based Interventions to Increase Sexual Health Knowledge

Few studies have aimed to change adolescents' sexual health knowledge or behaviors through Internet-associated technology. However, those studies that address this topic provide valuable information about how online content can be harnessed to provide effective sex education. Initial conclusions from the literature suggest that Web-based interventions can significantly alter the sexual health attitudes, knowledge, or behavior of adolescents.

Howard, Davis, and Mitchell (2011) conducted a randomized intervention with African American females at a teen health clinic in the United States. Half of the participants were instructed to view a sexual health promotion PowerPoint presentation that guided them to online sources. When teens returned to the clinic 3 to 6 months later, those who had received the Web presentation condition were significantly more likely to regard the Internet as a source of sexual health information. The authors concluded that guided intervention, in which Web content is qualified, provides an effective format for adolescent-targeted sex education. Halpern, Mitchell, Farhat, and Bardsley (2008) also provided guided Web-based education to Kenyan and Brazilian school students. Students were compared to a control group of peers who did not receive Internet instruction. The intervention revealed some main effects. For example, condom use in some situations (e.g., with many partners, when trust exists with a partner) was endorsed more by students who received the Web instruction. Roberto, Zimmerman, Carlyle, and Abner (2007) and Roberto, Zimmerman, Carlyle, Abner, Cupp, et al. (2007) additionally conducted a computer and Internet-based sex education intervention with rural U.S. high school students. The treatment condition involved students participating in online decision-making activities. Follow-up assessment revealed that they had greater knowledge than did those in the control group as related to condom self-efficacy.

Notably, a small subset of studies has utilized new digital media in their interventions.

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New digital media, or "Web 2.0," refers to interactive online content, such as social networking Web sites or interactive blog communities (Gilliam et al., 2011; O'Reilly, 2005). Today the majority (73%) of online teenagers in the United States use social networking sites (Lenhart et al., 2007, 2010; Rideout et al., 2010). Considering this widespread adoption of new digital media by adolescents, it is increasingly important that sex educators and researchers alike consider this content when designing programs and studying adolescents' activities online. However, there have been few published studies to date examining new digital media in particular (Daneback & Ross, 2011; Gold et al., 2011). However, Levine et al. (2008) incorporated text (sms) messaging in their study, and Moreno et al. (2009) and Lou, Zhao, Gao, and Shah (2006) used social networking Web sites and interactive message boards in their research, respectively. Levine et al. (2008) utilized a text messaging service to provide sexual health information to young people. The San Francisco-based youth who text messaged the researchers' service were able to choose what sexual health topic, out of a set of options, they wanted to access. The authors did not assess follow-up knowledge or behavior, but they reported that usage of the service was greater than expected.

Moreno et al. (2009) identified users of the social networking Web site MySpace.com who described or displayed risky sexual or drug and alcohol-related behavior on their profiles. Those randomly selected to the experimental group received an e-mail encouraging them to reconsider the content on their profiles. There was a significant reduction of displayed sexual activity on their profiles at follow-up. Additionally, Lou et al. (2006) studied the effect of a new sex education Web site for young Chinese students. At baseline, there were no differences among the students in their reproductive health knowledge. However, those randomly selected to the experimental group were exposed to a sex education Web site, where there existed more than 200 Web pages designed by a sexual health expert, 10 educational videos, an "Ask the Expert" feature, and a message board. After 10 months, a follow-up study showed the experimental group had significantly higher overall sexual health knowledge. The authors concluded that sex education could be effectively administered online for adolescents. Indeed, they reported that the Web site flourished after the study had concluded.

These studies provide some insight into the design, use, and effectiveness of online sex education interventions for adolescents. The results are promising for researchers looking to combine sex education with interactive digital media. Yet they likely represent only a small subset of the programs that currently exist and continue to be developed. For example, sex education podcasts and social networking groups are not often evaluated in peer-reviewed publications. However, some examples of available programs are outlined in Levine (2009, 2011).

DISCUSSION

Sample Variation: Implications From Demographic Differences

Variations between sample populations complicate synthesizing results in the field. Although all studies in this review were chosen because they included a focus on adolescents aged 13 to 19 years old, age ranges within this 7-year gap sometimes varied between studies. Adolescents were also recruited from high schools, health clinics, Web sites, and college campuses. Studies were based in multiple countries, with samples representing different racial and ethnic backgrounds and varied reported levels of access to the Internet. These differences between sample populations have implications for our general understanding of adolescents' online sex education. Some noteworthy sources of variation and their potential effects are discussed.

Whether a sample was recruited from a high school, college, or other location likely played an important role in determining the age range and mean age of the participants included in each study. Yet adolescents at

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different ages may experience very different life circumstances, as those living away from parents while in college may develop different skills than those of adolescents still living at home. Additionally, there is evidence that a person's sexual experience typically begins before age 18, suggesting that age may be an important indicator of an adolescent's familiarity with sex (Abma et al., 2004; Mosher, Chandra, & Jones, 2005). Age may also be related to an adolescent's exposure to sex education resources. As SBSE is typically taught at the high school level, formal sex education commonly ends by the time an adolescent finishes basic schooling. This may prompt adolescents of younger or older age, without immediate access to formal sex education, to seek information elsewhere.

The literature also suggests that age may relate to adolescents' sex education topics of interest. Younger adolescents (aged 13 to 14 years old) seek out more information about puberty than do their older peers (aged 15 to 17 years old), who express more interest in information about contraception, STIs, and pregnancy (Gilbert et al., 2005). Yet age can also be an indicator of what sex information is prioritized to a fault; as Vickberg et al. (2003) note, "Of possible concern ... were the findings that teens asked very few questions about sexually transmitted infections ... and teens were asking about sex behaviors at significantly younger ages than they were asking about services, pregnancy, or contraception/protection" (p. 258). Although age-based differences were difficult to compare between studies, these preliminary findings are valuable to educators interested in targeting online sex education to adolescents at different life stages.

Other demographic differences between samples remain largely unexplored in studies in the field, complicating the comparability and generalizability of data in the literature. For example, in a nationally representative U.S. sample, Black adolescents were significantly more likely to seek sexual health information online than were other races (Chisolm, 2010). Yet a study from Gilbert et al. (2005) revealed that there existed few differences in adolescents' experiences with online sex education in regard to race/ethnicity, though some specific topics seemed more interesting to participants of different racial groups. Further study is therefore needed to explore how race may predict interest in different types of online sex education. It would also be useful to determine whether socioeconomic status and access to high-speed Internet help explain differences in variable online sex education usage.

The literature also touched upon gender and sexual orientation as predictors for engagement with online sex education. For example, male Chinese college students in one study were more interested in online information about sex therapy and masturbation than were their female counterparts. The female students also preferred more private methods of obtaining sex information online, like reading, compared with their male counterparts (Li, Cottrell, Wagner, & Ban, 2004). However, as the authors note in their manuscript, these findings may also reflect differences in national or social culture. Sexual orientation was not discussed often in the literature, but sexual orientation may be an important factor to consider when synthesizing results in the field because data suggest that gay adolescents may have a unique connection online and may come out online before doing so in the "real world" (Bond et al., 2009; Mustanski, Lyons, & Garcia, 2011; Ross & Kauth, 2002). By gathering information about participants' sexual orientation, researchers may therefore be able to better explore nonheterosexual orientations as predictors for using the Internet for sex education.

Demographic differences, in addition to other sample characteristics, are valuable to consider when summarizing current studies and in designing future research. When sex education programs are well tailored to their audience, we may see more effective sex education interventions and programs.

Differences in Terminology

Analysis of the literature reveals a number of terminological differences, especially related to how many adolescents experience sex education online. This is not surprising as

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adolescents' use of online sex education is tied to the changing nature of the Internet, to activities that are generationally specific, and to sexuality, often encouraged—through media or other societal influence—to remain internalized and private. Sexual experiences can thus be characterized by poorly understood and inaccurate descriptors (Gagnon & Simon, 2005). Terms like "birth control," "sexual health," or simply "sex" may carry very different meanings to different adolescents, based on their own sexual experiences and education. Similarly, the Internet, as a novel and evolving piece of technology, often inspires new terminology. Therefore, researching the private online activities of young people may require researchers to examine their language choice closely in order to maximize validity and aid in reliability.

Four different ways were found in the current literature to ask adolescents how they experience online sexual material. Though it is not always discernable from each article exactly what questions the adolescents were asked, we were able to examine the phrasing used to report results in manuscripts, which is hopefully tied to the wording of the original questions. For example, Jones and Biddlecom (2011) reported that a minority of teens *was exposed* to contraceptive information. Contrastingly, five studies (Bess et al., 2009; Boies, 2002; Buhi et al., 2009; Ralph et al., 2011; Ybarra et al., 2006) reported that a percentage of young people *had sought* or *looked for* information related to sex education. One study also used the terminology *had used* (Borzekowski & Rickert, 2001) and one used the word *getting* (i.e., "teens who report getting 'a lot' or 'some' information about . . . ") (p. 4) in describing how many adolescents had engaged with relevant material (Kaiser Family Foundation/*Seventeen Magazine*, 2004). The aforementioned studies all address the question of how many adolescents experience online sex education, but it is likely that the results reflect slightly different interpretations of experiencing sex information online. For instance, *had sought* reflects a participant's sense of agency and motivation more so than *had used* or *was exposed to*. As *getting* may also be interpreted in any number of ways, such differences in digital terminology are important to consider when designing future research.

Researchers also asked about sex information in a number of ways. Some used the terminology *contraceptive information, sexually transmitted disease information, birth control information, or HIV/STI information*. Most researchers in the field were more general and used *sexual health information*, but even that phrase may inspire different interpretations. This review revealed that sex acts/behaviors were a commonly cited topic of sex information with which participants engaged online. Although information about sexual expression is clearly informative and may educate the young person about sex, he or she may not necessarily consider it to be related to sexual health if asked using that terminology. Furthermore, those studies that ask about birth control or contraceptive information may receive answers from young people who hold varied opinions on what these terms mean (i.e., the pill could be considered a contraceptive, but condoms may not). In this way, differences in sexual terminology may further complicate interpretations of results in the field.

Researchers should consider the importance of terminology in studying how adolescents engage with online sex education. It is recommended that pilot studies be used to qualitatively ask the adolescents what they think of when they hear certain terms, like "birth control," "the Internet," or "sexual health." Jones and Biddlecom (2011) reported testing some of their language in a smaller-scale study in this way.

Thematic Gaps in the Field

Although the aforementioned studies tend to fall into four research themes, there exist a number of gaps in the field. These are namely related to the qualitative experience of adolescents who engage with sex information online, from their initial interest in information to the effects such information could have on their lives. For example, what are their motivations for seeking sex information online? What life

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experiences or experiences with offline sex education may incline them to use the Internet to gain information? When online, how do they find the information they desire? When offline, how do they use information in their daily lives?

Although we have some insight into the topics adolescents are interested in, little data exist on why, when, or how they may pursue such information. Some initial insight into this knowledge gap can be seen in data from Harvey, Brown, Crawford, Macfarlane, and McPherson (2007), which suggest that adolescents often ask about the normality of sexual situations. They want to know if their behavior is commonplace or acceptable, perhaps in comparison to their peers or with society more generally. Some additional insight may come from studies on young adults up to 24 years of age: They cite curiosity and embarrassment as motivations to engage with sexual information online (Daneback, Månsson, Ross, & Markham, 2012). Even fear may motivate young adults to seek information about HIV/STIs and other sexual health information, for as Magee, Bigelow, Dehaan, and Mustanski (2012) report, lesbian, gay, bisexual, and/or transgender 16- to 24-year-olds expressed through qualitative interviews that they "felt a pressing need to know this information for their future" (p. 280). Further study could explore these motivations in greater depth, potentially connecting them with adolescents' topics of interest and demographics. A greater understanding of the user's experience online—from initial point of access to potential implementation—would allow educators, clinicians, and Web administrators to better tailor sex education to fit young people's needs today.

This field of research must also attempt to tackle the difficult problem of staying up to date with changes in the Internet and mobile technology. As the format of the Web has shifted in the last few years, so too have adolescents' online actions. Their experiences online are more interactive and social. However, few studies have specifically examined how and why young people use these new interactive resources (e.g., social networking, blogging) for sex education. Increased sociality online may affect adolescents' motivations for using the Web for sex education; it may also affect their evaluations of the trustworthiness of online information. Changing online trends provide a rich basis for further research.

CONCLUSIONS

Although literature reviews have been conducted before on related topics (e.g., Brown, Keller, & Stern, 2009; Collins, Martino, & Shaw, 2011; Delgado & Austin, 2007; Döring, 2009; Gray & Klein, 2006), this is the first review to date that exclusively examines adolescents' use of the Internet as a sex education resource. Evaluation of the four major themes in this review revealed that: (a) adolescents use the Internet for sex education; (b) adolescents are interested in various sex education topics, like STIs and pregnancy; (c) the information online is of varied quality, but adolescents can evaluate these sources and prefer information that is well qualified; and (d) the Internet and new digital media can be used to influence the sexual knowledge and behaviors of adolescents. Together, these findings suggest that online sex education plays a role in adolescents' lives, though their process of applying online information offline is generally unknown.

It is therefore unclear whether online sex education replaces or supplements traditional sources of sex education, like SBSE. If adolescents are motivated to go online because they do not have access to classroom-based sex education (either because their school does not offer it or because they do not have access right now), the Internet could serve as an important replacement resource. Yet the majority of adolescents review their SBSE, when available to them, as lacking excellent or very good quality (Byers et al., 2003a, 2003b). This may be in part because adolescents consider sex education to be of good quality when it also relates to their interests (Byers, Sears, & Foster, 2013). As this review suggests that adolescents want to learn about sexual experiences, not just sexual health, the Internet may cater better to adolescents' sex education interests, thus

serving as a replacement for topics lacking in SBSE. The interplay of these factors with the unique characteristics of the Internet—its availability, acceptability, affordability, anonymity, and aloneness—additionally point toward online sex education as providing an experience that is unique from SBSE (Barak & Fisher, 2002). This is a sex education that can be private and/or socially networked, text-based and/or visual, available on the go, and personally catered to the information an adolescent seeks in a specific moment. It can also be inaccurate, tied to unwanted SEM exposure, and subject to a digital divide (Kanuga & Rosenfeld, 2004). With further research into adolescents' online sex education and its social context, researchers, practitioners, educators, and parents will be able to gain a greater understanding of how online sex education could alter the sex education landscape going forward.

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