

What makes sex education interventions effective: needs and expectations?

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Abstract. Evidence indicates that people not only mistakenly believe they are able to recognise risky situations in their everyday lives and avoid Sexually Transmitted Infections (STIs), but also that they hold stereotypical beliefs about who is most likely to contract an STI. In particular, if the image of a sexual partner is not consistent with the stereotypical image of someone who is infected with an STI, the possibility that the partner could be infected may be underestimated. Digital interventions offer enormous potential for young people's sex education. This paper focuses on designing and developing interventions that could give people the potential to engage with the world and their sexual interactions on a different layer within which they can come to better understand the ramifications of the risk taking involved in their sexual behavior, via a safer setting. But what makes an effective sex education program? As early literature evidence suggests, a two-way, interactive, secure and tailored form of education is more promising than a traditional one-way passive form of education. A survey was conducted and the collected data was analysed to further elicit the user requirements of innovative digital sex education interventions.

Keywords: sex education, digital interventions, sexual health, innovation.

1. Introduction

Evidence (Agocha VB, 1999) suggests that people not only mistakenly believe they are able to recognise risky situations in their everyday lives and avoid Sexually Transmitted Infections (STIs), but also that they hold stereotypical beliefs about who is most likely to be infected with STIs. More precisely, people tend to underestimate the probability of an individual being infected with an STI if their appearance does not match the typical image of a person infected with an STI (Epstein, 2007). Implicit personality theories suggest that people's judgement, about whether a person is infected with an STI, is heavily dependent upon an already established set of assumptions or beliefs; more interestingly, people tend to rely on those beliefs to evaluate the risks. For example, an individual met at a club is perceived as more likely to be infected with an STI than someone met at a family dinner. Also, people misjudge a partner's risk level for STI contraction based on their partner's visible or inferred characteristics, such as appearance, education, and occupation, or the type of relationship that they have with that partner, such as short/long term, hooking-up, exclusive and open (Eleftheriou A B. S., 2016) (Eleftheriou A B. S.-S., 2019).

More than one million STIs are acquired every day worldwide (WHO, 2020). The best method for preventing the spread of these infections is the correct use of a condom (Holmes, 2004). However, people, especially youth (Chanakira, 2014), are engaging in 'risky sexual behaviours' such as having sex with multiple partners without the use of a condom or using condoms incorrectly (Baxter, 2011). For this reason, there are several strategies and intervention programs in place to encourage consistent condom use and safer sexual behaviour.

Digital interventions offer enormous potential for sex education as they can give young people the opportunity to engage with the world and their sexual interactions on a different layer (i.e., a digital representation) within which they can come to better understand the ramifications of their risk-taking sexual behaviour via a safer setting. This two-way, interactive and tailored education is a more promising form of education compared to traditional one-way passive education, as early literature evidence suggests (DeSmet A, 2015) (D'Cruz J, 2015).

Adding to the above, condom use decisions are often affected by the "heat of the moment" (Ariely, 2006), making it difficult for people to use logical and critical thinking. Evaluating the infection risk in a real-life scenario is highly subjective, thus hard to rationalise and predict, even when you acquire the basic knowledge about sexual health issues. The use of a digital platform could rectify this situation.

This paper aims to answer the question: "*What makes an effective sex education program?*", based on data collected from a relevant survey. According to Kirby et. al (Kirby D. S., 1994), ineffective sex education programs are generally too broad and they have no focus. On the other hand, effective programs focus on a few main points such as contraception, information on risks and how to avoid them through experimental activities, acknowledge the social and media influences and practiced negotiation skills. Kirby et al. (Kirby D. R., 2007) added that it is important for the sex education program to meet the needs of the audience by taking into account the different backgrounds and community values. The researchers also highlighted the importance of presenting the user with topics in a logical order, through engaging and interactive activities.

This following section presents the methodology and the results of the user survey.

2. Methods

Participants

Data was collected by advertising the survey on social media (LinkedIn, Facebook and twitter). The inclusion criterion was the following: individuals over 18 years old. Potential participants were informed that the data collected would be used for the purpose of the study on sex education and were asked to give electronic consent.

Measures

An electronic questionnaire was employed to collect participants' data. The questionnaire consisted of five sections: (1) Demographics e.g. country of residence, gender identification and relationship status, (2) Sex life e.g. first sexual experience, condom use and partner age (3) STI-related information e.g. frequency of checkups and sexual history, (4) Sex education at school and (5) Digital Literacy and Sex Education.

Demographics

Participants were asked about their age, ethnicity, country of residence, occupation, religion, level of education, gender identification and relationship status.

Sex Life

Before proceeding to the questions of this section, the participants were asked about their sexual attraction, and whether they had ever engaged in any sexual activity. If they had, they continued with the normal flow of the questionnaire, otherwise they were asked to skip to section (3) about the participant's STI checkup history.

The sex life section began with questions about the participant's first sexual experience, including age, sexual activities, type of the relationship, age difference with partner, and condom use.

Then moving on to their sex life in general, participants were asked about the number of sexual partners they have had in their lifetime and in the past six months. They were asked about casual and same sex relationships, largest age difference with partner, and condom use.

Sexually Transmitted Infections (STIs)

Participants were asked if they ever had an STI checkup, and if they had one in the past six months. They were then asked if they ever had an STI, and if so, which one.

Sex Education

Participants were asked at which age they believed sex education should start at school. Next, they were asked and whether they received any sex education classes themselves and at which age sex education started. They were also asked how satisfied they were with the education they received, whether they wished there was more material on STIs and whether sex education affected their decisions on condom use. They had the option to provide examples of what they felt was missing from the class. Finally, they were asked if they believed in

the benefits of a digital platform (the platform would integrate personalization, gamification and interaction features into lectures, games, simulations and quizzes).

Digital Literacy

Participants were asked to select the types of devices they use and how comfortable they would feel sharing sensitive data on a digital sex education platform. Participants were then asked to choose the most desirable set of requirements for such a platform and to list their concerns regarding its usage.

3. Results

Sixty-eight participants attempted the questionnaire and 51 of them gave consent and completed it. Hence, the results below present the analysis of 51 samples.

Demographics

The average age of the participants was 30.18 years (std = 4.50). Thirty-five percent of the participants identified as Male and 65% as Female. The percentage of participants by country of residence is depicted in figure 1.

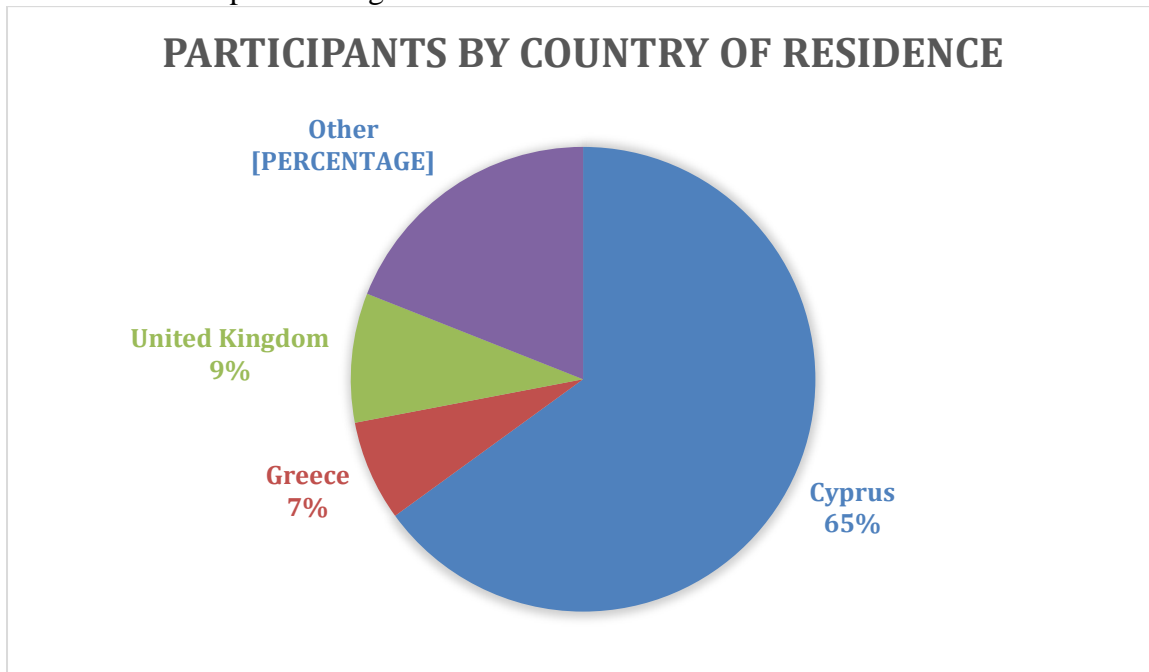


Figure 1 Percentage of participants by country of residence

Eighty-eight percent of participants identified as white and the rest identified as 'other' or preferred not to answer. Approximately 59% of participants reported practising Christianity as a religion, 8% reported being agnostic, 20% reported being atheist and 13% reported practising other religions. The majority of participants (67%) held an advanced degree (MSc, PhD or M.D), 19.6% held a bachelor's degree, 3.9% held an associate degree and the rest had either graduated from high school or a technical school. Twenty-one participants reported being single, 20 being in an exclusive relationship, 5 being engaged and 5 being married. Almost half of the participants were working in architecture, education or in a science/technology-related field. The percentage of participants by occupation is depicted in figure 2.

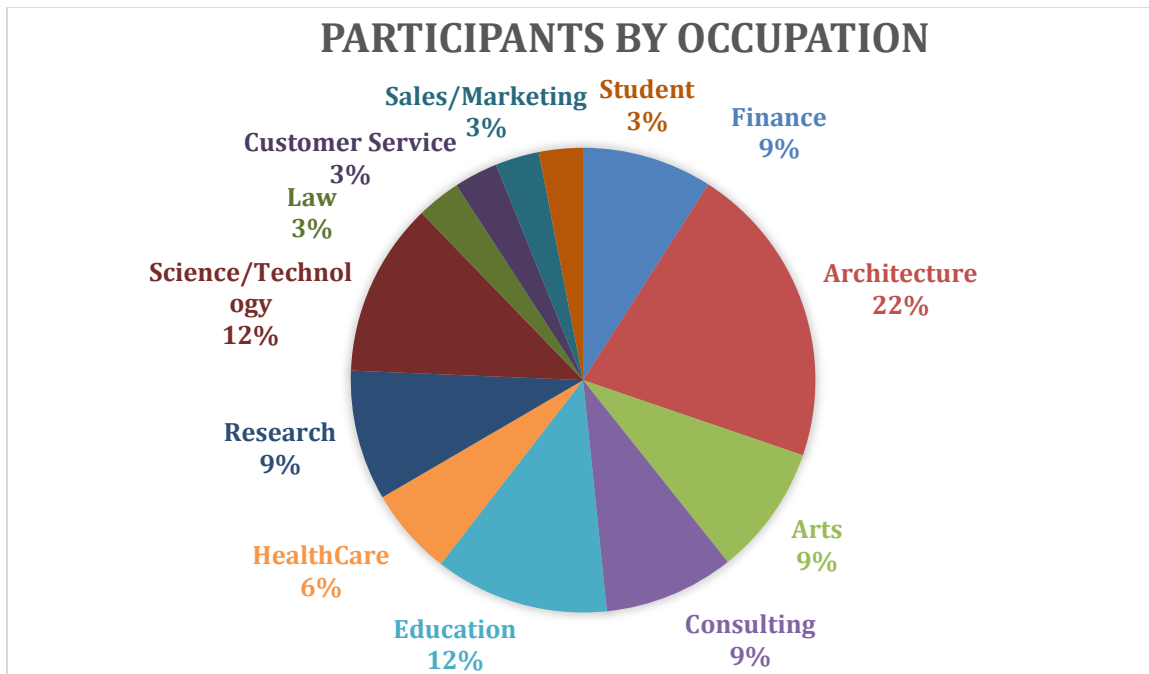


Figure 2 Percentage of participants by occupation

Sex Life

Forty-nine participants reported having engaged in sexual activities in the past, whilst two of them reported no previous sexual activity. The majority of participants (82%) identified as heterosexual. The average age of first sexual interaction was 18.82 years old (std = 3.55). The majority of participants (64.7%) reported having their first sexual experience in a long term relationship, whilst the rest (35.3%) reported having it in a casual relationship. In the question “What was your age difference with your first sexual partner?” the average was calculated as 2.45 years (std = 2.7). Eighty percent of participants reported having used a condom during their first sexual interaction. Figure 3 presents the sexual activities that participants’ first

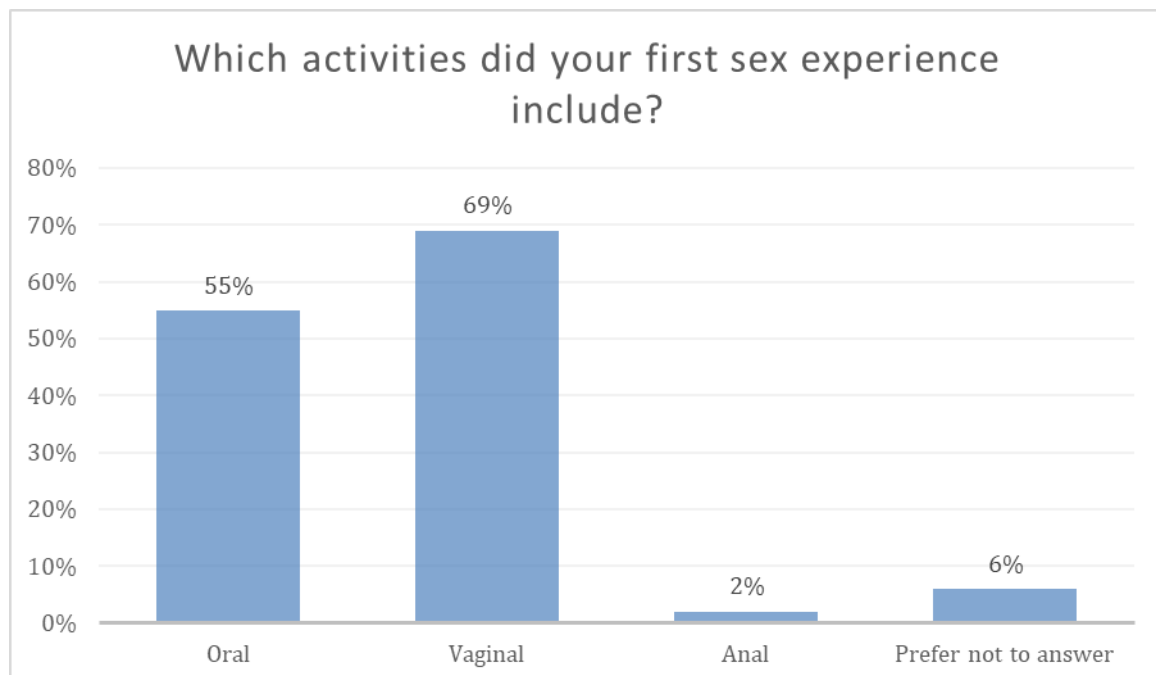


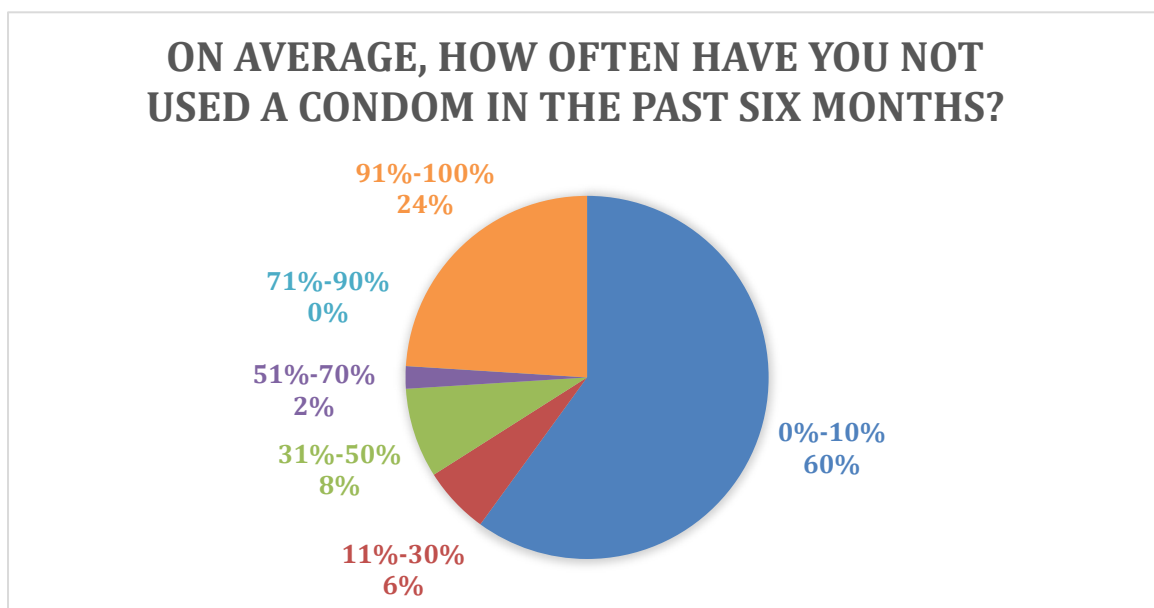
Figure 3 The percentage of participants that engaged in each sexual activity in their first experience

experience included.

On average, the average number of total sexual partners for the participants was 17.02 (std = 64.43) and the average number of sexual partners during the past 6 months was 1.68 (std = 4.18). The average largest age difference between the participants and their sexual partners was 9.52 (std = 8.49). Forty-two percent of the participants had never had an STI checkup and eighty-two percent of the participants had not had an STI checkup in the past six months. Surprisingly though, 17.65% of the participants reported having had an STI in the past, such as herpes, hpv, chlamydia, etc. In the 6-month-window before the date of the survey, the majority of participants (60%) reported not using a condom in less than 10% of the times they had sex, see figure 4.

Sex education

Only 49% of the participants reported having received a form of sex education at school and only 19.6% were satisfied with the resources provided and the knowledge they acquired. Nevertheless, 41.2% of the participants remember having an interest in sex education whilst at school. Figure 5 shows the age at which participants started receiving sex education. It is surprising that one in five participants does not remember the age at which sex education began at school. Figure 6 indicates that the overwhelming majority of participants wished there was more material related to STIs in the curriculum. More precisely, only 3% thought that the resources provided on STIs were sufficient. Figure 7 shows that 92% of the participants believed that sex education should start before the age of 15. Overall, figures 5, 6 and 7 indicate that sex education currently offered at school is inadequate and does not meet students' expectations as far as starting age and resources provided are considered. Figure 8 shows the strong effect that sex education had on participants' condom use decisions, thus provides evidence on the benefits that sex education can have on students' health choices. Figure 9 reveals that more than half the participants were willing to anonymously share sensitive data on a digital platform. To capture the market segment of hesitant users with mistrust in digital interventions, focus on security and confidentiality, will be placed. Finally,



findings presented in figure 10 show that nearly all participants believe on the possible
Figure 4 Sixty percent of the participants reported not using condoms less than 10% of the times in the past six months

benefits that a digital sex education intervention with emphasis on STIs can bring. Most importantly, none of the participants preferred the currently established traditional teaching methods to a digital sex education intervention.

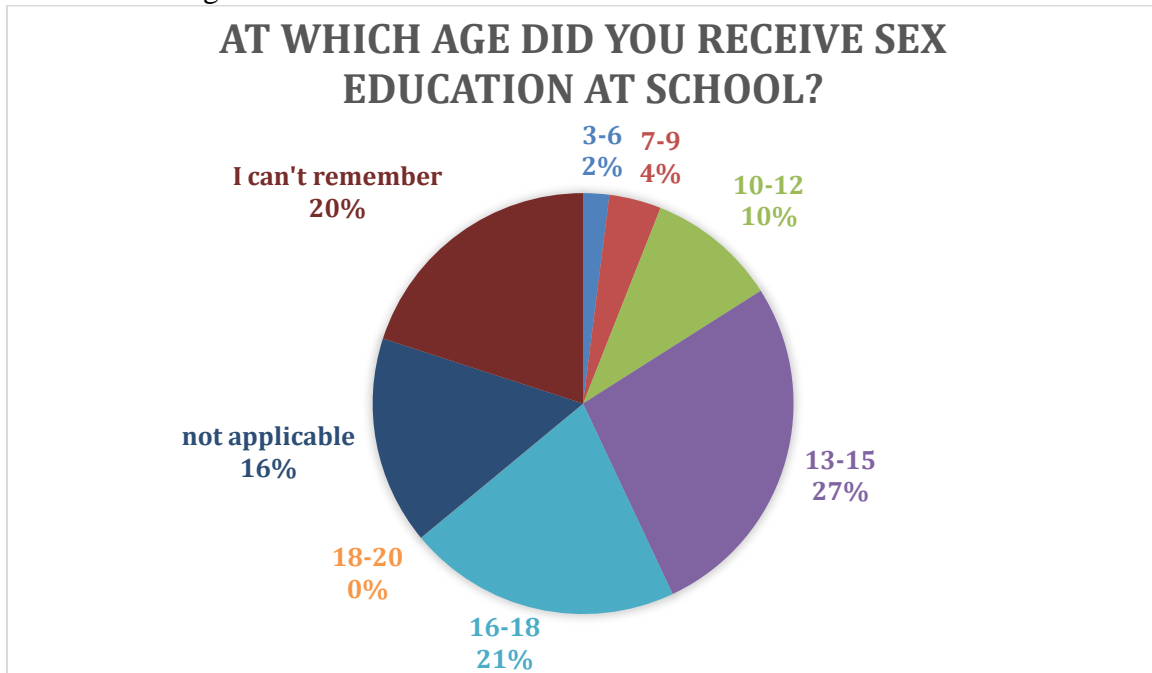


Figure 5 Percentage of participants by age at which their sex education began at school.

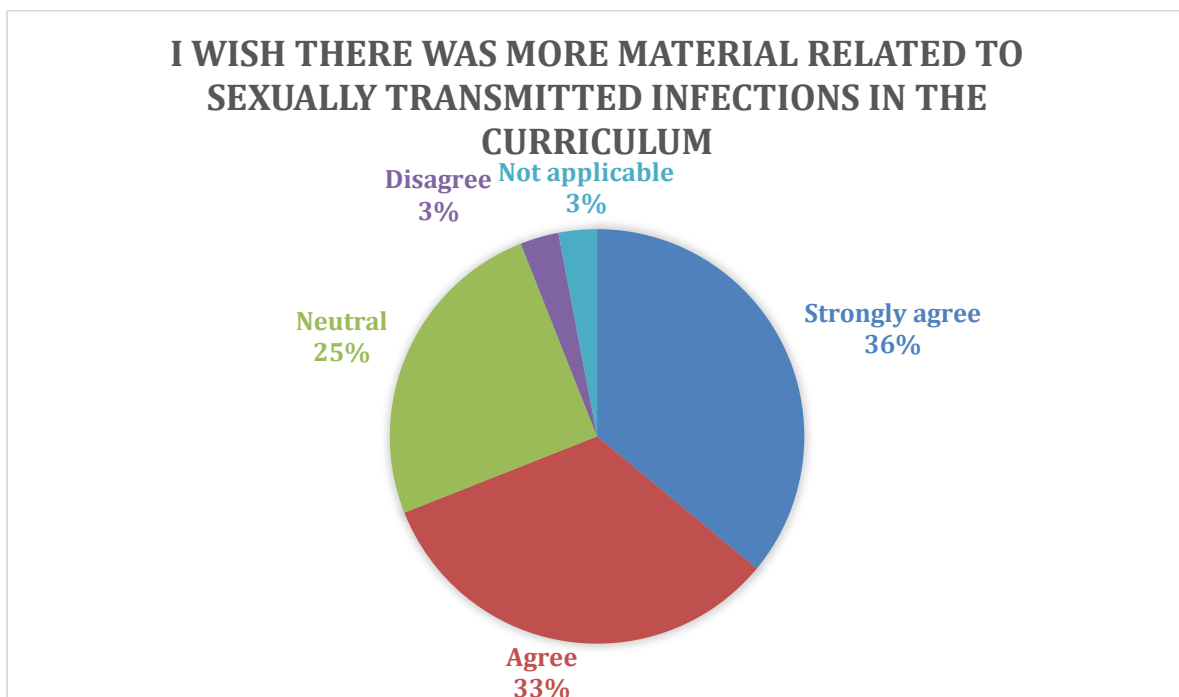


Figure 6 Participants' opinion on whether there should be more material on STIs taught in sex education cases at school.

AT WHICH AGE DO YOU WISH SEX EDUCATION STARTED AT SCHOOL?

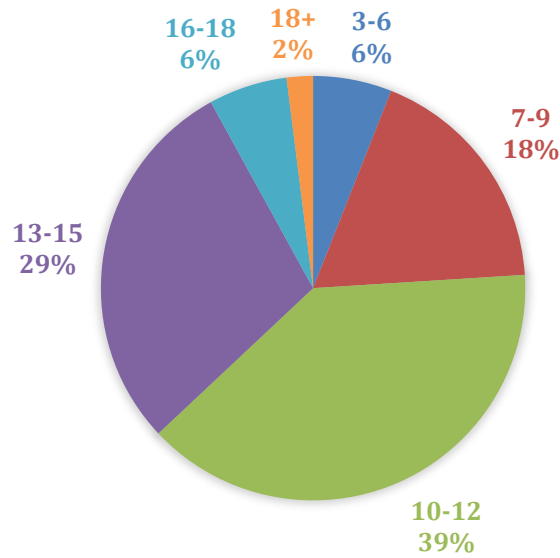


Figure 7 Participants' opinion on the optimal age at which sex education should start at school.

If you agreed with the previous statement, can you think of some examples you wished were in the sex education class curriculum?



Figure 8 Effect of sex education on condom use decisions later in life

Platform features

Participants were asked to select from a list of devices, the ones that they use: 94.1% reported using a smartphone, 31.4% a mobile phone with internet access, 76.5% a laptop, 27.5% a desktop machine, 25.5% a tablet device, 5.9% a Netbook and 5.9% an eReader. Only 3.9% of the participants said they were using a mobile phone without internet access. Figure 11 shows the percentage of participants thinking that each individual feature should be incorporated into the platform. The most desirable trait was security and confidentiality, followed by interactiveness, personalisation and storytelling. Figure 12 shows that the majority of participants thought they would benefit from a digital platform at the time of the survey (even though the average age of participants was above 18 years of age). This result provides strong evidence on the need for a digital platform on sex education both among children and adults.

Figure 9 Participants' willingness to anonymously share sensitive data on a digital sex education platform

Figure 10 Participants' opinion on the possible benefits arising from a digital sex education platform as opposed to traditional teaching methods

Lastly, in figure 13, participants were questioned upon their concerns about the use of a digital platform. Although the majority of participants did not express particular concerns, some people worried about privacy and anonymity.

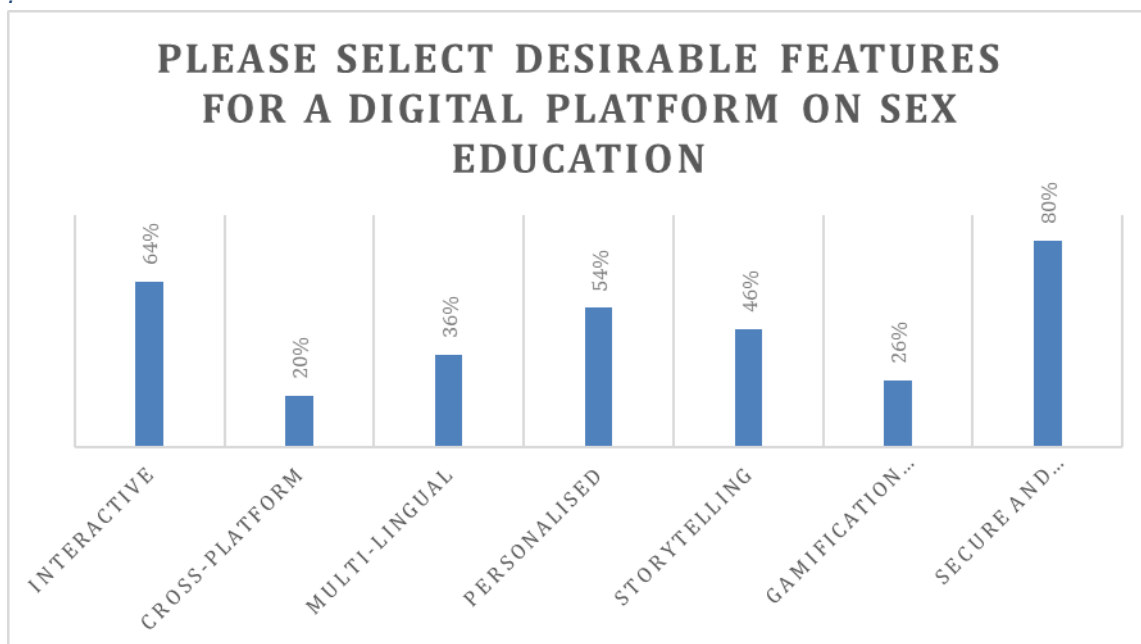


Figure 11 Most desirable platform features according to the participants

Figure 13 Participants' concerns on the use of a digital sex education platform.

Figure 12 Participants' opinion on the benefits of a digital sex education platform at the time of survey

Associations between variables

Table 1 examines the correlation between different sets of variables and the importance of such association to digital intervention design. Two variables are examined each time. Variables could either be participant profile characteristics or specific answers to questions in the survey. The correlation between each set of variables is measured using Pearson coefficient. The statistical significance of the association is found by calculating sigma (2-tailed). Lastly, variable associations are classified according to the degree at which they can help design the digital intervention. Unfolding patterns between variables can help optimise personalisation features of the platform by adapting content, delivery methods and activities to better match the user profile. For example, more content on STIs could be offered to users with a larger number of sexual partners (in their lifetime or in a 6-month-window prior to the survey). In addition, more activities focused on contraception and decision making could be offered to individuals with a larger number of sexual partners in a 6-month-window prior to the survey or individuals that were more interested in sexual education at school. Finally, individuals that believed on the positive impact of introducing a digital sex platform at school, would be keen on using such a platform even after they had graduated.

Variable 1	Variable 2	Pearson coefficient	Sigma (2-tailed)	Significance to digital interventions
Age	Relationship status	0.64	<0.001	Low
Gender	Sexual Attraction	0.76	<0.001	Low
Lifetime Sexual partners	Largest age difference between partners	0.62	<0.001	Medium
Sexual partners in the last 6 months	Largest age difference between partners	0.55	<0.001	Medium
Lifetime Sexual partners	I wish there was more material related to Sexually Transmitted Infections (STIs) in sex education class at school.	-0.6	<0.001	High
Sexual partners in the last 6 months	I wish there was more material related to Sexually Transmitted Infections (STIs) in	-0.61	<0.001	High

	sex education class at school.			
Sexual partners in the last 6 months	Sex education at school affected my decisions on using a condom in my sexual relationships.	-0.51	0.003	High
I remember being interested during sex education class at school.	Sex education at school affected my decisions on using a condom in my sexual relationships.	0.66	<0.001	High
In school, I would have benefited from the introduction of a digital platform on sex education, particularly about STIs, as opposed to the traditional sex education class. (The platform would be personalized according to the current knowledge and data supplied by each student. It would also be interactive, including lectures, games, simulations and quizzes.)	I feel I would currently benefit from a digital platform on sex education, particularly about STIs. (The platform will be personalized according to the current knowledge and data supplied by you. It will also be interactive, including lectures, games, simulations and quizzes.)	0.68	<0.001	High

Table 1: Correlation coefficient for different sets of variables and its importance in digital intervention design

4. Discussion

Nowadays, computer games constitute an important part of our culture. A proof lies in the fact that young people are spending more and more of their leisure time in front of a screen. Although video games have been previously considered as a distraction from more ‘worthy’ activities such as homework and social interactions, researchers and teachers are now investigating how this powerful medium can be used to support the educational process across all levels and topics (Eleftheriou A B. S., 2017).

Findings from the survey agree with literature (Eleftheriou A B. S., 2017). Participants strongly believed on the positive impact of a digital sex education platform on the educational process. Their belief was independent of their country of residence, educational background, past experiences and sexual preferences (Services, 2020). Such a platform is currently being developed by the authoring team of the paper under the commercial name sGuide. Participants’ requirements for such a platform agreed with the initial priorities of security, interactiveness, personalisation, gamification and storytelling. Additionally, an interesting trend in participants’ responses was found; the more individuals were interested in sex education at school, the more it affected their decisions on condom use decision making. This

is an encouraging trend for sex educators: the more students engage with the material and delivery method, the stronger the impact on their behaviour. Hence, to optimize effectiveness of the sex education platform, focus should be placed on developing engaging activities.

As mentioned above, 42% of the participants never had an STI checkup and 82% of the participants had not had an STI checkup in the 6-month-window prior to the survey. At the same time, 17.65% of the participants reported having had an STI in the past, such as herpes, HPV and chlamydia. The majority did not use condoms in less than 10% of the times in the 6-month-window prior to the survey. This data clearly shows the urgent need to address the inconsistent and/or incorrect use of a condom, together with the lack of STI check-ups. Digital interventions can come to play a big part in this effort, by helping achieve a significant drop in the transmission of STIs.

Additionally, the results support the evidence that sex education at school is currently not fully adequate to cover all the needs of the participants, with respect to when it is being delivered to students and the material that is being delivered in class. According to the responses, the starting age of sex education, the material taught in class and the delivery method should change. For this reason, the majority of participants reported that a sex education intervention like sGuide (Services, 2020) would have been beneficial to them at the present moment, even though all of them are currently above 18 years old. This indicates that a digital sex education intervention should not limit its target audience to teenagers.

In brief, although the user survey had some limitations that we should acknowledge, such as limited number of participants, under-representation of minority groups and recruitment of mainly white well-educated people, it did reveal some interesting trends and patterns that will shed light during the definition of user requirements for sex education interventions that will be developed in the future. To the best of our knowledge, no similar surveys have been performed in the literature. Hence, this is the first step into collecting and analysing relevant information about this specific combination of variables that cover the user profile, background, sexual experiences and tendencies, previous sex education, current sex education needs and preferences for sex education interventions. Future work in this direction will enhance the personalization of sex education interventions, ameliorating the degree to which the user engages with the platform. High interest in the platform will in turn help achieve a positive behavior change and improved sexual health.

5. Conclusions

To conclude, in order to reach the final requirements, an end user survey was designed and disseminated to several potential users of sex education interventions, confirming our main initial hypothesis and observations:

- STI spread is a problem troubling people independent of their gender, age, background and sexual orientation.
- Traditional sex education methods and resources fail to meet students' demands.
- An interactive, personalised and engaging sex education intervention is preferred to traditional teaching methods.
- More engaged users are more likely to adopt good practices and shift towards safer health choices.
- Security and confidentiality are key factors to consider when designing sex education interventions.

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