CHALMERS

Exploring the potential of mobile phone and web based technology to promote the Sexual & Reproductive Health of high school aged youths in Zimbabwe

Master of Science Thesis in the Master Degree Programme, Biomedical Engineering

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Department of Signals and Systems

CHALMERS UNIVERSITY OF TECHNOLOGY

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To Eli…

Loving you still bubu!

Abstract

Telemedicine, or eHealth, by definition encompasses the communication of health practices via technology, and the advent of the internet and mobile phone technology brought seemingly endless possibilities for telemedicine. Such technologies may be an instrumental tool to promote health in hard to engage groups, especially young people, as interventions that make use of the internet tend to influence young people since they frequently use the internet to find information pertaining to their health. Generally, youths are put off by more traditional means of engaging with health care services, and this applies more so to accessing Sexual and Reproductive Health (SRH) services. The general consensus is that most youths appreciate the anonymity, confidentiality and convenience factors associated with accessing SRH information from the internet.

The thesis work undertaken and documented in this report is aimed at systematically exploring the potential that is offered by web-based and mobile phone technology in the promotion of Sexual & Reproductive Health of high school aged youths in Zimbabwe. Youth SRH services are sparsely available in Zimbabwe and the exploitation of available and future technologies in youth SRH services has not been widely explored.

The use of mobile phones in Zimbabwe is on the rise and broadband internet is becoming widely available, thus this technology can be utilized efficiently to offer services that are aimed at accurately informing the young people of Zimbabwe about their sexual and reproductive health. From the research carried out, only 10% of youths have accessed available SRH services, but given that 97% and 86% of survey participants have access to a mobile phone and the internet respectively, it would suggest that employing an SRH intervention that exploits this readily available media would be more effective.

Taking into account perspective user requirements and the technological environment in Zimbabwe, the ***Youth Sex Health Online*** (***YSHO***) web-based SRH clinic and the complimentary Just Ask! Text messaging services were designed. YSHO is aimed at being a non-commercial one-stop shop for all adolescent SRH needs that meets identified needs in a relevant, efficient and effective manner. Feedback on the mock-up of the proposed service suggests that the proposed service is effective and of particular benefit to its intended users.

Keywords: *Sexual & Reproductive Health, technology in youth SRH services, eHealth in developing countries, web-based clinic, text messaging service, mobile phone application.*

Table of Contents

List of Tables and Figures

List of Abbreviations and assumed Meanings

Forms 1 to 6 – High School grades representative of school Years 8 to 13

HPA – Health Professions Authority

ICT – Information and Communications Technology

ITU - International Telecommunication Union

MoESC - Ministry of Education, Sport and Culture

MoHCW – The Ministry of Health and Child Welfare

PORTAZ – Postal and Telecommunications Regulatory Authority of Zimbabwe

SRH – Sexual and Reproductive Health

WHO – World Health Organisation

Youth – Zimbabwean adolescents aged 13 to 20 years

ZNFPC – Zimbabwe National Family Planning Council

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The author would like to extend the utmost gratitude to all who made this work possible.

Thank You God for all You do for me, Your unconditional favour and love, the peace and grace that has seen me through thus far and especially through the last year. May all I do be for Your glory always. I love You.

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My Dad and Mom, if everyone was as blessed as I am to have parents like you, the world would be perfect. I love you all more than words could ever express, thank you for who you both are and the blessing you are to me.

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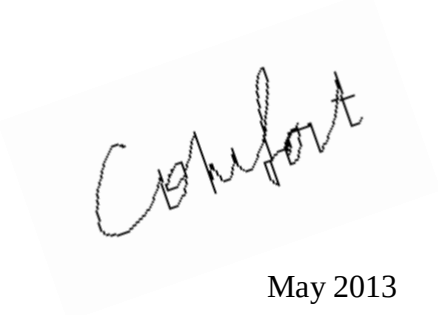
To all the youth that took part in the surveys and focus groups, your contribution is much appreciated.

Thank you to all who have been key to the realization of this thesis. All those who took time out to meet with me or provide vital information, I will forever be grateful.



May 2013

Introduction and Background

As a nation, Zimbabwe has a young population, with reports showing that at least 62% of people in the country are aged 24 and below [(Central Census Office, 2009)]. Of these, the population aged 13-20 account for approximately 38% [(Central Census Office, 2009)]. In addition to the normal 'growing pains' that teenagers worldwide face, teenagers in Zimbabwe face unparalleled challenges that may be accredited to a lack of information pertaining to their Sexual & Reproductive Health (SRH).

Throughout history, the youth have been regarded as the healthier portion of the population. This for Zimbabwean youth has meant that their sexual health needs have been largely overlooked by existing SRH services (United Nations Population Fund, 1994). The International Conference on Population and Development (ICPD) outlined in their 1994, 20 year program of action the need for information and services to be made available to young people so as to improve their understanding of sexuality and thus protect them from avoidable incidents of sexually transmitted infections, unwanted pregnancies and uninformed practices that could have detrimental consequences [(United Nations Population Fund, 1994)].

Youth SRH services are sparsely available in Zimbabwe and tend to rely on face to face interaction and or posting information in schools and other public areas. The exploitation of available and future technologies in youth services has not been widely explored. The use of mobile phones in Zimbabwe is on the rise and more advanced phones, for example smartphones and broadband internet are becoming widely available (POTRAZ , 2012). This technology can be utilized efficiently to offer services that are aimed at accurately informing the young people of Zimbabwe about their sexual and reproductive health. A needs assessment carried out by Knowledge for Health identified that the use of mobile phones and the internet offers immense potential in the enhancement of accessing, sharing and use of health information in Zimbabwe (Knowledge for Health, 2009).

In light of this, the report that follows aims to outline the thesis work undertaken to systematically explore the potential that is offered by web-based and mobile phone technology in the promotion of Sexual & Reproductive Health of high school aged youths in Zimbabwe. The chapters in the report will introduce and expand on issues pertaining to the need for SRH promotion in the identified population of 13 to 20 year old Zimbabweans; ascertaining user requirements; and the technical environment in Zimbabwe as well as the procedural requirements for such a health promotion endeavour.

Included in the report are comments and discussions on findings from surveys and focus groups carried out in the Harare province. The report also comprises a demonstration of a

proposed service which includes a mobile phone based text messaging service and a mock-up of the web based application. Conclusions are drawn concerning the sustainability of such a service and possible improvements that take into account future technological advancements.

Literature Review

Since the advent of the term and notion of eHealth, considerable amount of resources worldwide have been invested into research pertaining to the use of technology to promote health and support healthcare systems (Ahern, 2006). The research work that is outlined in this report helps to accentuate the use of technology in health promotion, particularly SRH promotion in adolescents in a developing nation. eHealth by definition encompasses the communication of health practices via technology, to that end, a number of studies have been conducted and published on how this technology can be used in the promotion of SRH in adolescents, not only in developing nations, but worldwide. This literary review will evaluate some of these studies and highlight their relevance to this study including points of differences.

Methodology

Consideration was given to scholarly articles published relating to the use of technology in health promotion, the use of technology in health promotion in developing nations, the use of technology in SRH promotion in youths, and inclusion of youths in the design of eHealth applications. Articles were primarily sought from electronic databases available via the internet. Articles were evaluated using the following criteria:

- Objectives of the study
- Research orientation and theoretical framework
- Relevance to general and SRH promotion
- Relevance to study being conducted

Articles from the last ten years were considered in this review so as to take into account technological advances of the last decade and their application in health promotion.

Results

A total of 20 articles were considered but only 16 were further reviewed and evaluated. The dates of publication ranged from 2003-2012 inclusively. Two articles dealt with the use of technology in health promotion; eight articles focused on the use of technology in SRH promotion in youths; three articles considered the use of technology in health promotion in developing nations; and five articles covered the inclusion of youths in eHealth application designing.

Discussion

The use of technology in the promotion of health is the fundamental adapted definition of eHealth. The study conducted by Lintonen, T. P *et al* highlights the development of the use of information technology (IT) in the promotion of health (Lintonen, Konu, & Seedhouse,

2008). Their study is aimed at reviewing uses of information technology in health promotion and the authors state that IT holds extensive potential for information delivery thereby making the promotion of health more clear.

The study identifies that there is a growing tendency for the public to consult the internet for health information which is a notion supported by Baker L *et al* in their study (Baker, Wagner, & Singer, 2003). The growth of information available on the internet has been exponential and as outlined in both studies, there is also a growing concern about the quality of information that is available.

This can be said to present somewhat of a limitation to making use of the internet for health promotional purposes. It may be up to the users searching for health information on the internet to discern accuracy. However, it can be suggested that for a website to be considered as a source of health information, efforts should be made to ensure that evidence-based material is used and medically credible references included thereby maintaining transparency and promoting accuracy.

The internet may be an instrumental tool to promote health in hard to engage groups, this particularly holds true for reaching young people. According to the qualitative study conducted by Skinner *et al*, interventions via the internet is one of the major ways to influence young people since they frequently use the internet to find information pertaining to their health (Skinner, Biscope, Poland, & Goldberg, 2003). This was also maintained in the study by Gray and Klein in 2006 (Gray & Klein, 2006). Skinner's study identify that youths are the population group that adopts new technologies early and this can be said to give the use of eHealth applications for health promotions in youths an upper hand.

Through facilitated focus groups, Skinner *et al* identified that to youths, the 24 hour availability of information via the internet was a major attraction as accessibility of health professionals is traditionally restricted by service opening times and appointment. It is noted by authors that youths are put off by more traditional means of engaging with health care services, and this applies more so to accessing sexual and reproductive health services (Gray & Klein, 2006). The general consensus is that most youths appreciate the anonymity, confidentiality and convenience factors associated with accessing SRH information from the internet (McCarthy, 2012), (Kanuga & Rosenfeld, 2004).

Granted that most of the documented studies pertaining to youth SRH and technology are conducted in more developed nations, the same principles and trends have been noted in developing countries. Skinner *et al* conducted their study in Canada and surmise that internet interventions are particularly beneficial for youths in rural settings (Skinner, Biscope, Poland, & Goldberg, 2003). This may be the exact opposite in rural settings in developing nations. Internet technology generally starts off in the major cities then expands out to the more rural areas and in developing nations the rate at which this expansion happens differs greatly compared to the more developed nations. The lack of electricity in rural areas and possible high expenses associated with network expansion means that there tends to be a gap in the technological advances that are taken for granted in major cities in developing nations (Meyers, 2008).

Studies on the promotion of SRH of youths in a developing nation, catering for both those in an urban and rural setting are few. However, having identified the challenges that can be faced by services in meeting the SRH needs of youths, Mitchell K *et al* in their 2011 study imply that although internet accessibility is limited in developing nations, the use of mobile phones is increasing (Mitchell, Bull, Kiwanuka, & Ybarra, 2011). This and a number of other

studies infer that mobile phones offer a unique and exceptional mode of making health care accessible. Text messaging has been identified as an advantageous method of promoting SRH in youths as it is a fast and inexpensive means of communication. In their 2011 study, Gottheil and Kudlow express that using text messaging as a means of promoting SRH in youths has been relatively widely used with encouraging outcomes (Gottheil & Kudlow, 2011) with Gold J et al. showing in their 2010 study that text messaging is an efficient way to promote SRH in youths (Gold, et al., 2011).

Gottheil and Kudlow convey concerns pertaining to a decrease in face time between youths and health professionals as a result of successful health promotion interventions that make use of technology as in the 2010 study in London (Menon-Johansson, et al., 2010). This study concludes that as a result of delivering STI test results via text messaging there was an evident reduction in follow-up appointments for patients. It should be noted, and Gottheil and Kudlow acknowledge that a decrease in face time does not necessarily mean an ineffective service, rather using technology, in this case text messaging, increases accessibility of such services and is appropriate for the target service users. The authors go on to express that by making users feel that a service is appropriate, through making using media that is comfortable to them, then service users are more likely to access and seek health services where required.

Studies into the relevance of SRH promotion initiatives in youths have been carried out that all conclude that youths need to feel a sense of inclusion in the designing and implementation of such initiatives and services (McCarthy, 2012). Findings in other studies concur that to fully meet the SRH needs of youths, their input in designing the service is paramount (Bruce, MacLeod, Schechtel, & Stremel, 2003), (Quine, et al., 2003), (Selkie, Benson, & Moreno, 2011).

McCarthy *et al*. in 2012 found that generally youths appreciate being involved and are more than willing to share their views on how a web-based service aimed at them should be designed (McCarthy, 2012). The study shows how youths prefer to have a website that contains honest and straightforward information that is in keeping with real life issues. It has been noted that most SRH websites concentrate on STI's and contraception and less on sexuality and body image (Gerressu & French, 2005) which can be said to be contrary to the main SRH needs of youths. In keeping with other findings (Forrest, Strange, & Oakley, 2004), McCarthy *et al* found that youths are more concerned in knowing about sexuality as well as feelings and emotions associated with sex.

Conclusion

It is evident that studies in the field of eHealth applications in the promotion of health are numerous. However when it comes to the use of technology to promote the SRH of youths particularly in developing nations, research into this area is limited. The reviewed studies offer insight into the current assessments of youth SRH promotion including usefulness of technology in such initiatives together with the most effective means of designing and implementing such. This review of studies is key to the work undertaken in this project. Not only does it give a basis for the thesis and formulation of the research question, but it also offers guidance as to what elements to prioritise in terms of consultation of prospective users to better meet their SRH needs.

Comparable to these reviewed studies, is the fact that this study assesses the potential of making use of web-based and mobile technology to promote SRH in youths. The difference that this thesis offers is that the eHealth application that will be proposed and designed will

be uniquely aimed at 13 to 20 year old Zimbabwean youths in both urban and rural settings of the country.

Chapter 1

The Sexual and Reproductive Health Survey

In order to ascertain the use of mobile technology and web based applications for SRH promotion among high school aged youths in Zimbabwe, the Sexual and Reproductive Health Questionnaire was developed. Information was gathered using a common methodology and core questionnaire (Appendix 1).

Objectives of the questionnaire:

- Ascertain the prevalence of access to mobile and smart phones in the sample population i.e. Zimbabwean high school youths of ages 13 to 20 years.
- Ascertain access to the internet via either PC or smart phone by the population.
- Determine the primary source of SRH information and the perceived reliability of information given at these sources.
- Ascertain awareness of existing services.
- Establish deterrents to using offered SRH services.
- Gauge attitude towards the introduction of web and text messaging based SRH service.
- Establish a database of frequently asked SRH questions.
- Ascertain user requirements for the web-based SRH information service.

The Sexual and Reproductive Health Questionnaire was a school-based survey conducted among high school youths aged 13 to 20 years. It consisted of six (6) modules which covered:

1. Mobile and smart phone access and use.
2. Source of SRH information
3. Knowledge and use of local SRH services.
4. Preferences of how to engage SRH services.
5. Web-based SRH service user requirements.
6. FAQs.

Methodology

From the ten administrative provinces as per the Zimbabwean Ministry of Education, Sport and Culture (MoESC) structure; the Harare school province was selected for the study. The province predominantly has an urban population and is representative of a predominantly Shona population which is the biggest ethic group in the country. Classes selected were Forms 1 to 6 which correspond to youths in the age group 13to 20 years of age.

The province of Harare was chosen as it represents the biggest ethnic group and has the largest population in terms of youths in the chosen sample group. Expanding the number of school provinces would have been more archetypical of the sample population, however the combination of permission constraints from the MoESC, financial and time restraints restricted the selection to just the one province.

Sampling and Design

Representative schools were chosen to take part in the survey with Forms 1to 6 being included in the sampling frame. Students who took part in the survey were from both public and private schools. Included were a co-ed government school in a high density area; a co-ed private school in a low density area; an all-boys school in a medium density community; and a private all-girls school. Public schools are under the administration of the MoESC and appropriate consent to undertake the survey was sought. Permission from private schools was sought from the appropriate school representative with backing of the MoESC. To produce a representative sample of youths, schools that have a probability proportional to school enrolment size i.e. schools with large enrolments were selected. Of the selected schools, all students were eligible to partake in the survey.

Questionnaire Design

The questionnaire was completely anonymous and administered by the participant. It explicitly averted any information that would facilitate the identification of any of the participants. The questionnaire consisted of a total of 24 obligatory questions including closed and open ended questions. Questionnaires were in English which is one of the official languages in Zimbabwe and since all school syllabi is delivered in English; questions were comprehended with relative ease.

The design of the questionnaire included open and closed ended questions. Open formats allowed for further evaluation of themes that arose from issues and offered a platform for alternatives from participants separate to those compiled by designer. The majority of questions were of a closed format which limited choice making for simple and quick filling. It also minimised the isolation of those whose literacy skills may not have been up to par.

Data Collection

The researcher acted as the survey facilitator and was wholly responsible for the distribution and collection of all questionnaires in all schools. Support was offered by all schools in terms of a member of staff taking the researcher to the appropriate classes. The collection of data was conducted from the 12th to the 30th of November 2012. At all schools and to all participants, the project was outlined in brief and the intended aims of the questionnaires were summarized. All participants were informed of the voluntary nature of taking part in the survey. On average, participants required 20 - 30 minutes to complete the questionnaire with only a minority requiring more time. The facilitator was present in each participating class and was supported by a member of the school staff during the conduct of the survey. The school member of staff only participated in handing out the questionnaires and the collection was done by the facilitator.

Ethical Considerations

Permission was sought from the MoESC to conduct the survey in the schools. The approval to visit the separate schools was sought and acquired from the Regional Director of Education for the Harare province. This documentation was used to attain permission from the selected schools to administer the questionnaires. There were no intrusive procedures that were

carried out on the participants as part of the survey and thus parental consent was not pursued.

Participant discretion was maintained by virtue of the design of the questionnaire. No personal information that facilitated for the identification of the participants was required and participation was voluntary. On introducing the questionnaire to the participants, emphasis was put on preserving anonymity by not writing their names on the questionnaires and confidentiality was further guaranteed by having only the facilitator collect the completed questionnaires from participants.

Data Analysis

Collected data was analysed using Microsoft Excel

Survey Results

Participation in Survey

Total Participants	Female Participants	Male Participants
260	112	148

Table 1: Number of participants in the SRH Survey

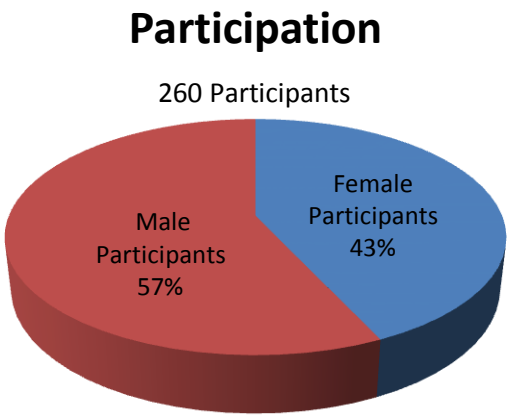


Figure 1: Participant representation in the SRH Survey

A total of 260 youths aged between thirteen (13) and twenty (20) years took part in the SRH Survey. An overall total of 280 surveys were distributed across the schools of which 260 were collected and available for analysis giving a response rate of 93%. There was an approximately even representation with 57% and 43% of participants being male and females respectively (Figure 1). The ages of the participants are shown in Figure 2, with a mean age of 16.5 years and a modal age of 15 years.

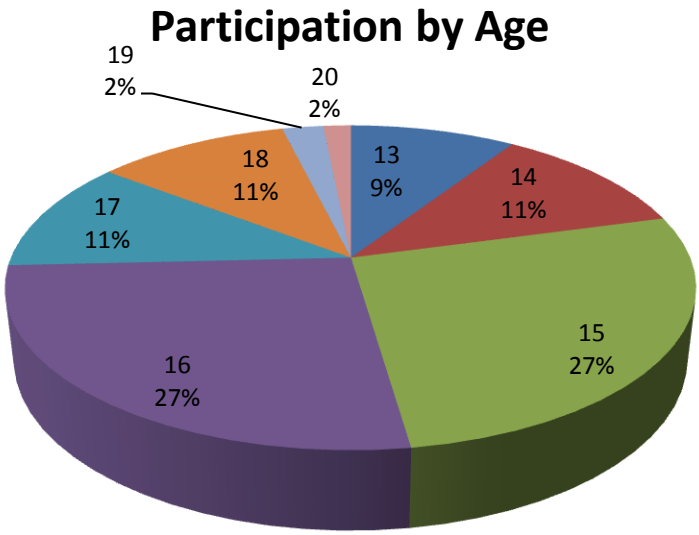


Figure 2: Participation by age, Mode and Mean of 15 years and 16.5 years respectively.

Language

Amongst the participants, the language of choice was English, with 92% of youth identifying it as the one they are most comfortable with and 5% identified Shona (Table 2; Figure 2).

Preferred Language	English	Shona	Other
	238	14	8
	92%	5%	3%

Table 2: Language preference in survey takers

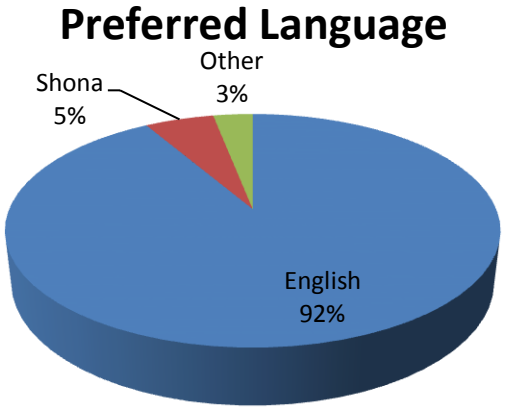


Figure 3: Preferred language. English identified as the language of choice by 92% of participants

Access to technology

Participant access to technology was measured under three categories which are, access to Cell phone; access to Smartphone; and access to the internet (via either smartphone or PC). The results are listed and shown in Table 3 and Figure 4, with 95% identifying that they have access to at least one of the listed technologies.

Access to Cell Phone	Access to Smartphone	Access to internet
252	198	232
97%	76%	89%

Table 3: Access to technology by participants grouped under 3 headings

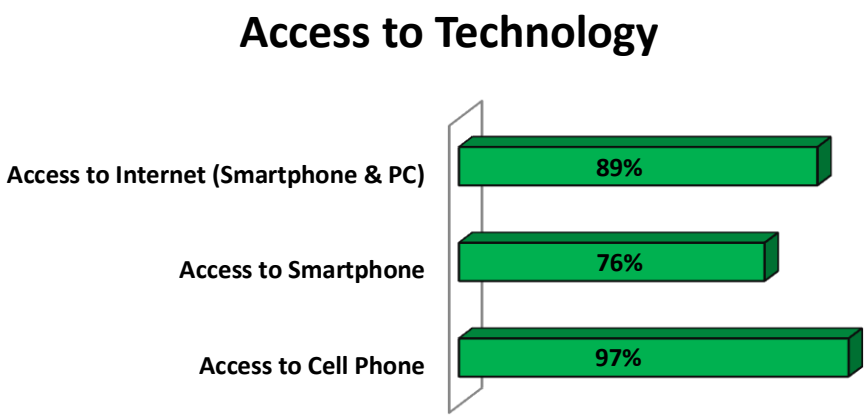


Figure 4: Percentage of participants that have access to mobile phone and internet technology

Sources of SRH information

Participants in the survey were asked how often they got information from the list of sources as in Table 4 and also specify comfort and reliability associated with each source.

	Home	Friends	School	Health Clinic	Internet	TV
Frequency		Most frequently accessed WEEKLY 35%	Most frequently accessed MONTHLY 20%	Identified as the source NOT USED 49%		
Comfort	42%	86%	58%	58%	59%	44%
Reliability	72%	45%	79%	80%	37%	43%

Table 4: Most accessed sources and frequency of accessing SRH information and education from Home, Friends, School, Health Clinics, the Internet and TV

Results show that the most accessed source were friends, with 35% of participants identifying that they got their SRH information from friends weekly; and 20% of participants got SRH information from school monthly. 49% identified that they had never accessed health clinics for SRH information and education.

Friends were recognized as the most comfortable source by 86% of participants and Home identified as the least comfortable source.

The health clinics and schools were identified as the most reliable sources of information by 80% and 79% of the participants respectively. The internet was identified as the least reliable source of information. Figure 5 compares the comfort and reliability of each source.

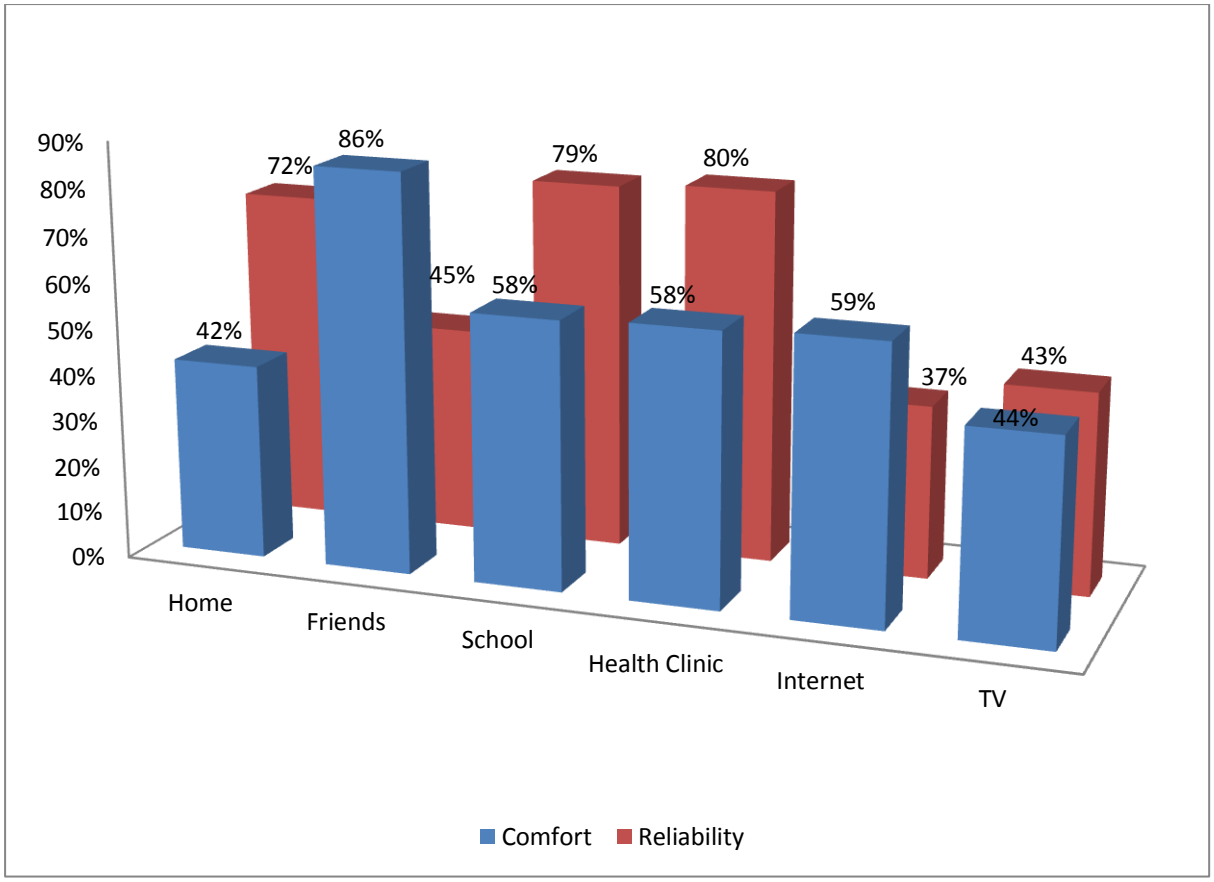


Figure 5: Comfort and Reliability of sources of SRH information. Friends deemed as the most comfortable source and health clinics the most reliable.

Awareness of existing services

The questionnaire asked participants to identify local services that they had "*Used*", "*Heard of*" or "*Never heard of*." As shown in Table 5, higher percentages of participants had either "*Heard of*" or "*Never heard of*" identified services. The most known service was the New Start Centres with 20% having used one of the centres and 59% having heard of the service.

Q8 Awareness of existing services	Used	Heard of	Never heard of
Straight Talk	24%	24%	45%
5 Ave Clinic	6%	46%	43%
Spilhaus Centre	2%	13%	76%
New Start Centres	20%	59%	17%
Restless Development	2%	31%	58%
Aunty Stella	4%	20%	69%

Table 5: Participant awareness of locally available services

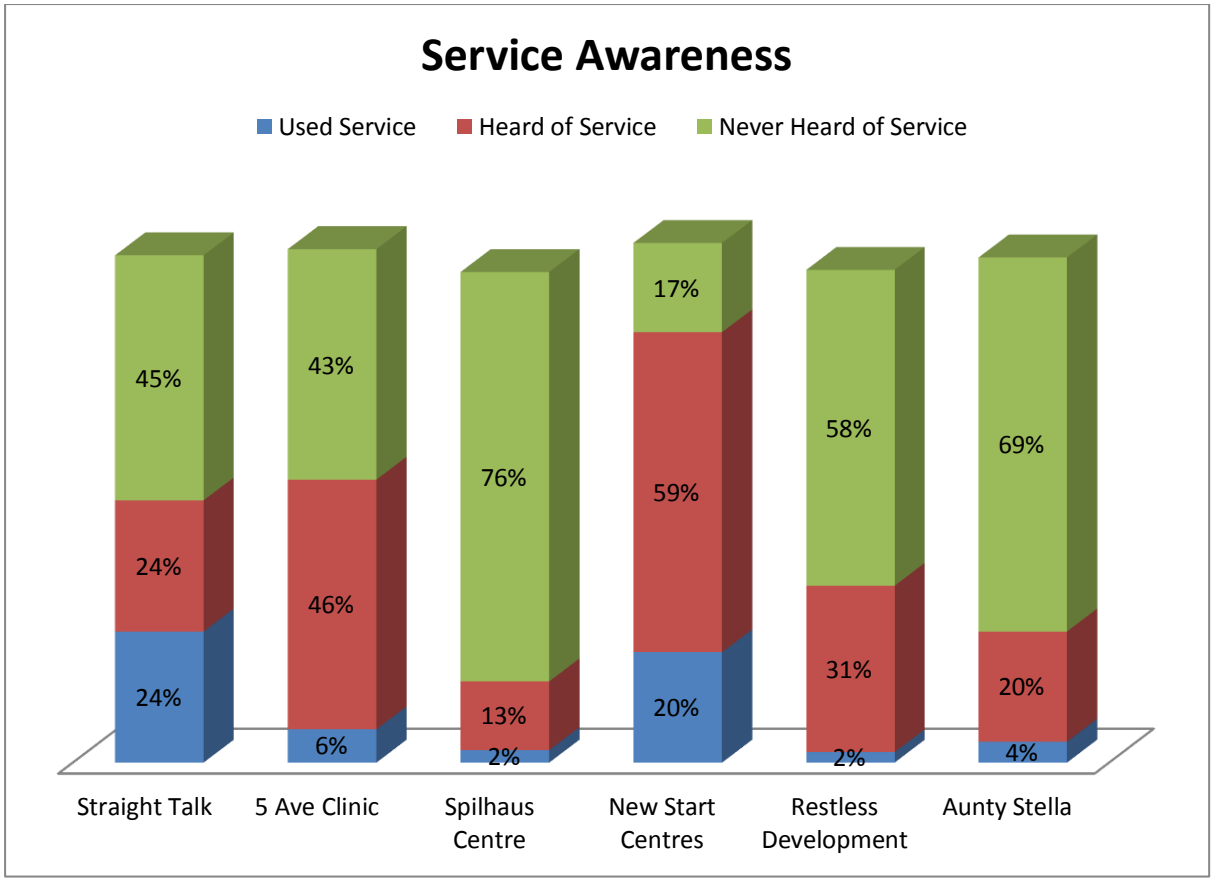


Figure 6: Graphical representation of awareness of local SRH services by participants

Deterrents to accessing SRH services

Participants were asked to list 3 deterrents to accessing SRH services. Figure 7 depicts all deterrents listed in order of commonly identified. The most common hindrances were lack of time and inaccessibility of services.

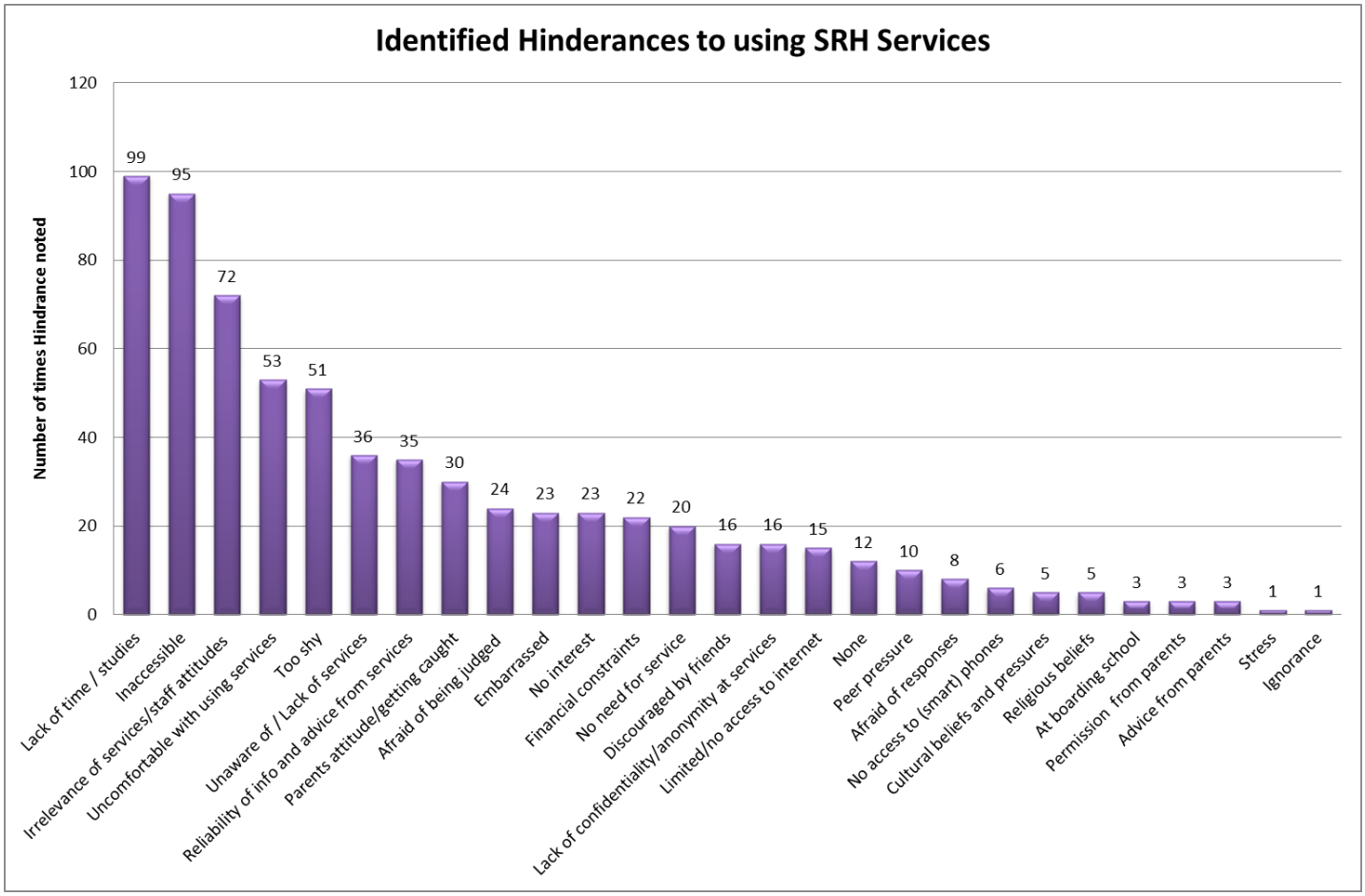


Figure 7: Deterrents to accessing SRH services. Hindrance most identified was a lack of time.

Opinions towards proposed services

Participants were asked if they would make use of services listed in Table 6. On average, over 50% of participants said they would use proposed services as shown in Figure 8, with the Q&A via Text messaging service being the only one that the majority of participants said they would not use.

Use of proposed SRH Services	Yes	No
SRH Information via Smartphone	65%	33%
SRH Information via website on PC	52%	44%
SRH Q&A via Text messaging Service	35%	63%
SRH Q&A via Website	62%	36%

Table 6: Response to possible use of proposed services with 63% saying that would not use an SRH Q&A via Text messaging service

Using 2 different methods of analysis, the method of choice to get SRH information was Q&A via website service, followed by information via a website and Q&A via a text messaging service as shown in Figure 9.

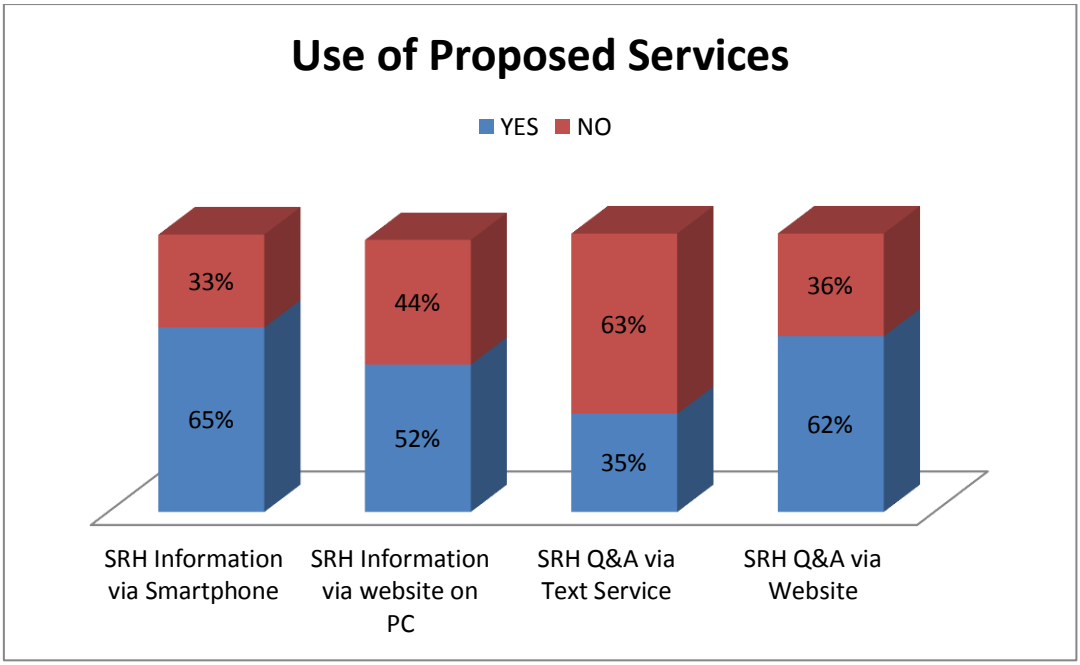


Figure 8: Survey participant's response on likely usage of proposed services.

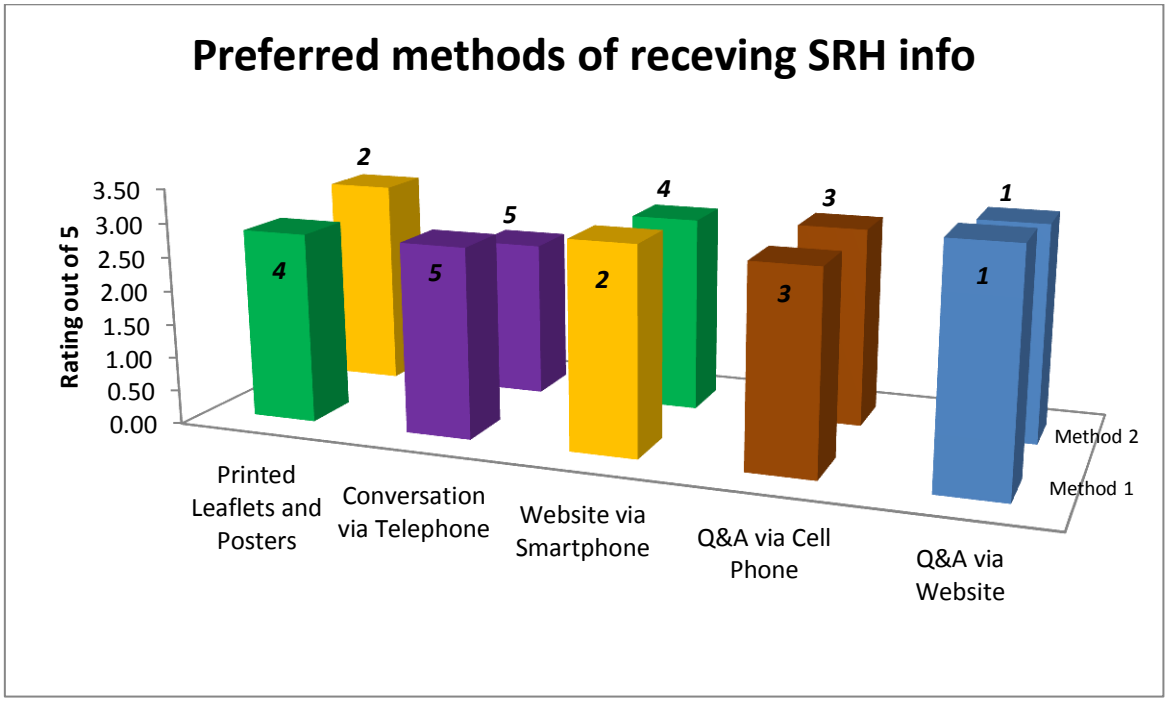


Figure 9: Preference for receiving SRH information. Using both methods, Q&A via website was identified as the method of choice.

When asked on what timeframe would be appropriate for a response for a question asked either via a website or a text messaging service, 60% of participants identified 1 day as an appropriate response time as shown in Figure 10.

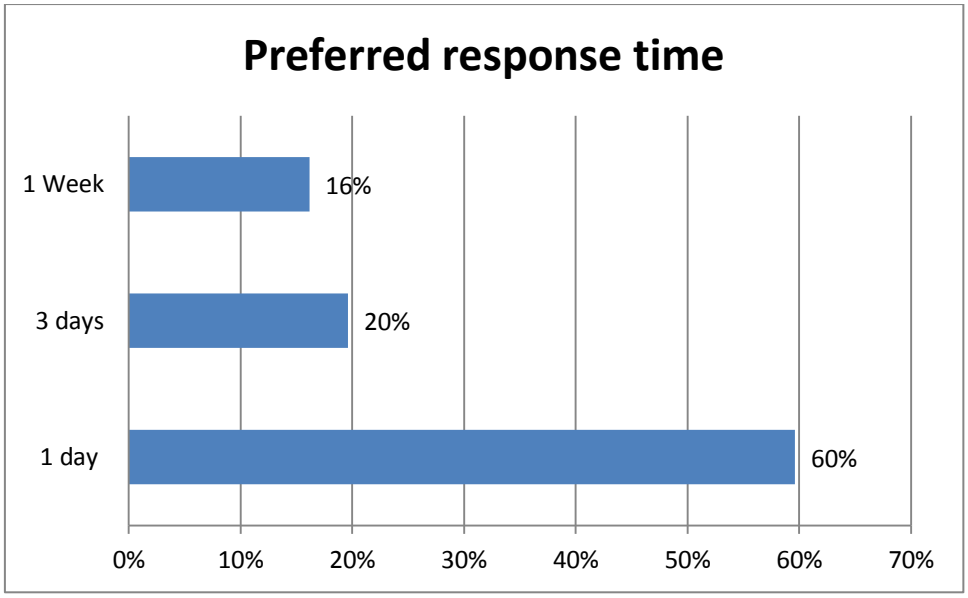


Figure 10: 1 day was chosen as the appropriate response time by participants.

Appendix 2 lists the FAQ identified on the questionnaires as participants were asked to list 3 questions that they would ask an SRH service.

Discussion

The questionnaire was designed so as to meet objectives listed in the Introduction. The actual results from the survey were more or less in line with expected results. For example participants were most comfortable with accessing SRH information from friends than any other sources as expected. It was evident that open ended questions were the ones most likely to be missed by participants. Close ended questions that were missed were to a certain degree indicative of SRH services not heard of or SRH sources that had never been used in the cases of question 8, "*Which of the following Sexual and Reproductive Health services have you used or heard of?*" and question 3.3, "*How often do you get Sexual and Reproductive Health education and information from these sources?*" respectively.

Question 5 read "*Which of the following methods would you feel most comfortable with to get information on sexual health issues? (Rate each method 1, 2, 3, 4 or 5: with 5 being the most comfortable and 1 the least comfortable method)*"
This question was unintentionally open to interpretation which made quantitative analysis challenging. However, two methods were used to analyse responses to this question with results shown in Figure 9. To reduce bias, questions were designed in such a manner as to minimise the risk of participants giving responses that would be perceived as correct or more socially acceptable (Leung, 2001).

From the results, it is evident that although services are available that address the SRH needs of the Zimbabwean youths, there is an inauspicious issue pertaining to accessibility. The survey highlighted that on average, 32% of participants have heard of the different SRH services but only 10% have made use of these services. Emphasis on inaccessibility is evident in the list of deterrents to using SRH services as shown in Figure 7. The opening times of services was the most reported cause of inaccessibility with participants reporting that the services that they were aware of are only open during the hours of 8am to 5pm and are hardly ever open over weekends. This was also confirmed by the Zimbabwe National Family Planning Council (ZNFPC), a parastatal department that oversees the national adolescent sexual and reproductive health. This in its self is a distinct flaw in the designing and planning

of a service that is aimed at adolescents. By law (Education Act, 2004), every Zimbabwean child (anyone under 16 years of age) has to go to school, and as such the opening of youth SRH services during conventional office hours is fundamentally counterproductive. A study in Tanzania identified that although an overwhelmingly apparent need to improve youth SRH existed, youths faced varied difficulties in accessing SRH care. These difficulties included service establishment timing, attitudes of service providers and diminished privacy in the service facilities (JSI Research & Training Institute, Inc, 2007).

Location of SRH services was another identified cause of inaccessibility. Participants outlined that services were usually located too far from their homes i.e. more centralized or in hospitals. Ironically, according to ZNFPC, most of their health clinics are usually located in the city centres so as to maximise accessibility. ZNFPC also have 'Youth Corners' in most of the major hospitals in Zimbabwe that are meant to increase accessibility by youth especially if visiting the hospital. From results, it can thus be suggested that decentralisation of services may meet the needs of the intended users more effectively by increasing accessibility.

There were a lot of negative connotations attached with accessing SRH services that were evident when analysing results. A considerable number of participants indicated the "fear of getting caught" as a hindrance to accessing services as if they would be engaging in a morally unacceptable activity. This way of thinking may be attributed to the cultural sensitivity of sex and sexuality as a topic of discussion. As indicated by the results in Figure 5, even though 72% of participants identified home as a reliable source for SRH information, only 42% said they would be comfortable enough to get SRH information from home. This suggests a culture where youths do not feel confident or happy to approach their most handy resource. The Ministry of Health and Child Welfare (MoHCW) carried out an assessment in 2008 that showed how diminutive parents or guardians involvement was in providing SRH information to young people (Biriwasha, 2012).

According to a review of services by Williams, for youths to access SRH services, there has to be an element of trust and openness that facilitates for better interaction (Williams H, 2004). Results were expected to indicate that a lack of anonymity would be a great deterrent to accessing services, however actual results suggests otherwise. 58% of participants said that lack of anonymity is not a hindrance, but were more likely to be put off by the attitudes of health professionals and a lack of confidentiality at these services. ZNFPC indicated that this problem of staff attitudes had been highlighted and as a result a significant amount of resources had gone into addressing this issue by training health workers in their clinics to be more youth friendly and offer services that are relevant to their clientele.

Another trend that is apparent in the results is the need to make SRH services readily available to youths. The school environment can facilitate school based interventions that have the advantage of the ready-made audience i.e. its pupils. Studies have demonstrated evidence of the benefits associated with using approaches that make use of SRH promotion methodologies with curriculum-based participatory and life skills (Senderowitz & Kirby, 2006). From results however, there is varied accessibility of such approaches within the Harare schools that participated in the survey even though school was identified as the second most reliable source of SRH information.

A lack of time due to studies and other scholarly activities suggests that conventional approaches to offering SRH services are not meeting the needs of adolescents. It seems apparent that convenience should be an approach taken by service providers when implementing services. This notion is upheld as 60% of participants choose 1 day as the

acceptable response time for a question asked to a SRH service over either 3 days or a week. Further reinforcement of the need for convenience is in the preferred method of receiving SRH information and advice selected by participants. Using two methods of analysis to suit the way the question was approached by participants, Q&A via a website was the preferred mode of getting SRH information. This underlines the need for convenience and a need for a move to make use of technology to address SRH needs.

The results also accentuate the need for a SRH service that makes use of methods that are in keeping with societal advances. The majority of participants identified that they would make use of proposed services, with the highest percentage of 65% being receptive to the idea of accessing SRH information via their smartphones and 62% saying that they would ask SRH related questions via a website. This is in keeping with the need for service to be pliable and meet the needs of its target audience using the most appropriate means of service delivery. Even with only 35% of participants saying that they would use a Q&A text messaging service, they still preferred this method of receiving SRH information and advice to printed literature and telephone conversations which are the methods that are commonly offered by service providers.

The widespread availability and access to technology in Zimbabwean youths is patent. It is estimated that out of a population of about 13 million, 10.91 million people have a mobile phone and 3.2 million are accessing the internet through mobile devices (POTRAZ , 2012). From the SRH survey, this availability of technology to youths is prevalent with 97% of participants saying that they have access to a cell phone. Advances in mobile phone technologies open viable options to deliver SRH services to youths, as 76% of participants already have access to a smartphone. This accompanied by the statistic that 86% have access to the internet either via PC or smartphone, means that SRH services can be made conveniently available to youths by making use of technology that is accessible to them.

A noted point of interest from the survey contrary to expected results is the reluctance of participants to trust SRH information sourced from the internet. This may be attributed to a number of factors which include the relative unfamiliarity of using the internet for research purposes by youths in Zimbabwe. Research and learning in Zimbabwean schools places emphasis on printed materials in terms of text books since internet is not widely available in schools. Thus youths are more inclined to printed material as information references.

The other reason may be the lack of appropriate referencing available on websites containing SRH information, as a number of participants highlighted the questionable reliability of the sources of information and advice as a hindrance to accessing SRH services. This deterrence may be rectified by including reference sources in all information and advice from SRH services.

Conclusion

Examining the results of the SRH survey highlights a number of issues. Firstly, there is a recognisable need to bridge the gap between SRH services and users. Secondly, the obstacles to accessing SRH services identified by participants are relatively straightforward to rectify as most of them deal with the design and implementation of the services. Thirdly and most important for the premise of this thesis, is that mobile phone technology and the internet are widely available and accessible to Zimbabwean youths aged 13 to 20 years and can be duly exploited for the purposes of SRH promotion.

In order to exploit technology to offer a SRH service that is centred on the target population, i.e. 13 to 20 year olds in Zimbabwe, their specific requirements have to be taken into account in order to fully appreciate the extent to which technology may be used effectively to achieve a sustainable and fully functional service. Chapter 2 explores the user requirements for such a service.

Chapter 2

User Requirements

The need for a SRH service that is relevant and easily accessible to youths via mobile phone and web based technology was identified in Chapter 1. In order to design such a service, the needs of the proposed users should be ascertained and due consideration given to these requirements in the design and implementation of the service. This chapter aims as outlining user requirements as identified by participants in the SRH survey and a facilitated focus group.

Youth involvement was one of the key characteristics noted by the WHO in the implementation of a youth friendly service (WHO, 1999). Design and implementation of programs that involve the youth have been seen to increase demand for the service (WHO, 2004), thus taking into account service user requirements makes for a more effective and prevailing service.

Methodology

Ascertaining user requirements was achieved by inclusion of an open ended question on the SRH survey. The question asked participants to identify what information a SRH service should provide. As mentioned in Chapter 1, the survey was completely anonymous and administered by participants.

A focus group was also held with a group of 10 youths selected at random and facilitated by the researcher. The objective of this focus group was to establish the requirements for a proposed web based and text messaging SRH service. This included finding out what information was important, what would make the service appealing to the youths and the format that the service should follow. This information was then to be compared against collected information from the SRH surveys.

Participants in the focus group were all in the 13 to 20 age group and were all from the Harare province. Permission was sought from the youths who in turn got permission from their parents/guardians to partake in the focus group.

Data Collection

The focus group was held on the 4th of January 2013 and lasted for an hour. The session included a Q & A period when participants were asked a series of questions pertaining to the proposed services including layout and content of website. All of the 10 youths were

encouraged to participate in terms of giving opinions on issues raised and sincere answers to questions asked. Minutes were taken for the session by the facilitator and data was analysed.

Results

The outline of the focus group is depicted in Appendix 3. Participants gave their opinion on the need for an alternative SRH service. The general consensus was that available services are not meeting the needs of the youth and that integrating available technology would significantly improve SRH service delivery.

On asking what would make a web based service appealing, participants of the focus group highlighted the following:

- A website should be colourful
- It should contain both text and illustrations
- Illustrations should be interactive
- The information contained should be relevant and make use of language that is age appropriate

In reference to the content on the webpage, participants identified the following:

- Information should be reliable and referenced where possible
- Information should not be biased and be presented in a form that if free from political or religious partiality.
- A Christian standpoint should be included
- Information should be up to date and reflect changes in society

Collective results from participants of both the survey and focus group identified the topics to be covered on the website and these are depicted in Figure 11.

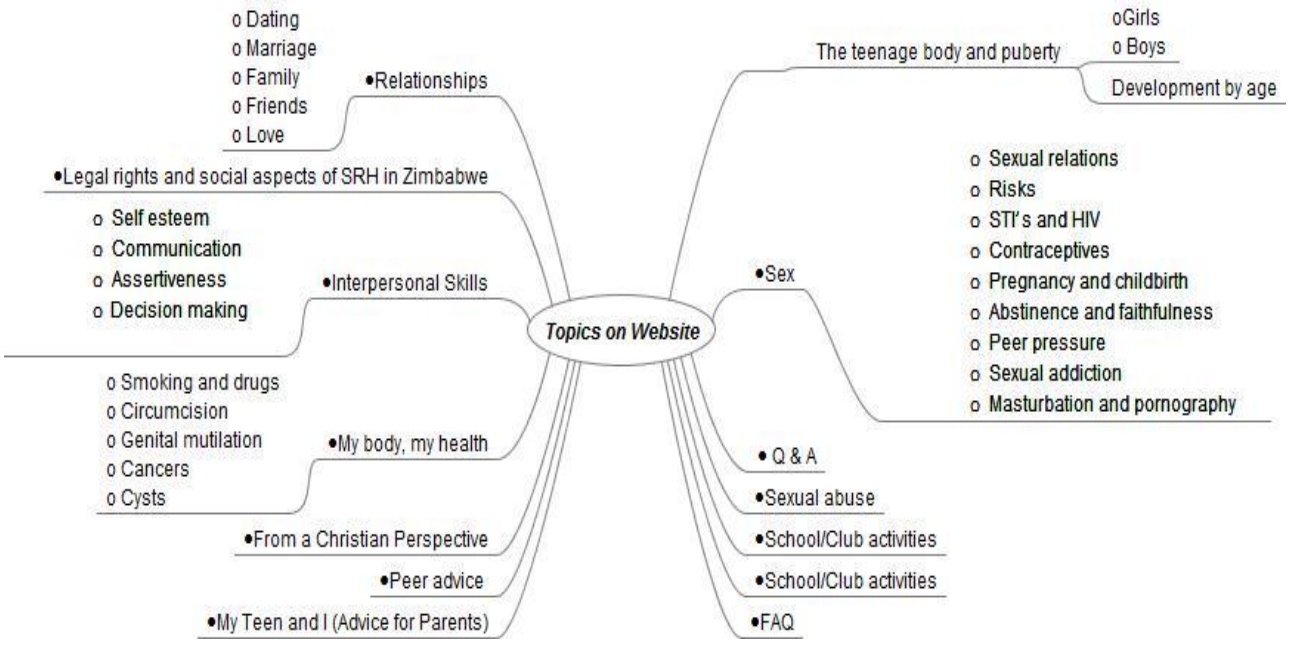


Figure 11 Topics that participants said should be covered on the website

With reference to the text messaging service, participants expressed that just as with the web based application, the advice and information provided should be from a reliable source and should provide prompt responses for questions asked.

Discussion

In order to fully meet the requirements of the potential service users and effectively meet their needs, it is essential to appreciate the laws and policies that dictate provision of such services. There are a number of laws that aim to protect the sexual and reproductive rights of adolescents in Zimbabwe these include The Children's Act 2001; The Legal Age of Majority Act; The Sexual Offences Act 2003; The Domestic Violence Act; and The Termination of Pregnancy Act. There also exist complementary policies and guidelines that effectively facilitate the application of these laws.

To establish the relevance of the laws in relation to the SRH needs of youths, there are regular reviews and the last one was held in 2007. This review highlighted a number of key points which include the need for policies to be more preventative rather than curative and the need to recognise the vital role that male adolescents and parents need to play in SRH decision making (Khan, 2007).

The actual results attained from both the focus group and surveys were consistent with expected results. The target service users identified that the information provided by the service needs to be relevant and reliable. This is in keeping with identified hindrances in Chapter 1. In a study conducted for the design and development of the youth sexual health website Sexunzipped, McCarthy et al identified that adolescents wanted information that is candid and represented what happened in real life (McCarthy, 2012).

The MoHCW mandates that any health or medical information, advice, diagnosis or treatment can only be given by a qualified person who is registered with the Health Professions Authority (HPA) of Zimbabwe and persons are thus under the regulatory laws of this body. It can thus be said that engaging health professionals in providing SRH services ensures that any health advice and information provided by such a service will be from a reliable and sufficiently qualified source.

ZNFPC conveyed that they periodically sought out the requirements of their service users and they reported that being an extension of the ministry of health they carry out needs assessment on a national level and respond to the identified needs.

Conclusion

Useful involvement of service users makes for more effective services as ownership and sustainability is promoted. The National Adolescent SRH Strategy outlines that to facilitate meaningful participation by service users, structures should be put in place (MOHCW, 2009). These structures could take the form of needs assessments that ZNFPC reportedly undertake on a regular basis or facilitated focus groups as the one undertaken in this study. Such involvement minimises the risk of an irrelevant service and addresses identified hindrances to making use of SRH services.

The requirements identified by the participants of the focus group are in keeping with the information collected from the SRH survey. The need for a service to be reliable and representative of its users appears to be the common theme and thus due consideration was given to these subjects in the designing of the proposed service.

Chapter 3

The Proposed Service

A suggested service must surely be only as good as the research and proposal it is based on. The initial research detailed in Chapter 1 offers immense insight into the growing potential that mobile and web based technology has to offer in enhancing SRH in Zimbabwean youths. This Chapter aims at detailing the proposed service taking into account the technological aspects to be discussed in Chapter 4 and target user group requirements identified in chapters1 and 2. Mock-ups of the web based service will be shown including the rationale behind choices made in terms of information contained on the website, headings and the style of the web page. A brief discussion on feedback from potential service users will be outlined. The Chapter will also examine the proposed concomitant mobile phone text messaging service including analysis and feedback from the prototype service that was run in Zimbabwe for just under two months.

Methodology

Information used to design the proposed interactive web based and text messaging SRH service was collected from the survey questionnaires and the facilitated focus group. Participants outlined their preferences pertaining to what an SRH service should comprise, including information and general layout of the service. Also taken into account when designing the proposed service was the noted hindrances, as noted by participants, to accessing SRH services already offered in Zimbabwe.

Results and Discussion

The Web-based Service

The objective of the web-based service is to offer an online SRH advice and information clinic that exploits the readily available internet accessing technology available to 89%[1] of Zimbabwean youths. This access, as outlined in Chapter 1 is via either mobile devices or PC's and therefore the web based service has to be accessible by means of both media. Taking into account the perspective user requirements, the ***Youth Sex Health Online*** (***YSHO***) web-based SRH clinic and advice centre was designed. YSHO is aimed at being a non-commercial one-stop shop for all adolescent SRH needs that meets identified needs in a relevant, efficient and effective manner.

[1] 89% of 260 participants in the SRH survey conducted in the Harare district

Web-based Service v Hindrances

As mentioned in Chapter 1, survey participants listed what deterred them from making use of SRH services offered. Thus in order to offer a service that is specifically aimed at the target users, the web based YSHO service has to eradicate as many of these hindrances as possible. Figure 12 portrays the characteristics that the proposed service possesses and the hindrances that these same characteristics will overcome. It is evident that the most frequently mentioned hindrances as identified in Figure 7, are overcome by the physiognomies of the proposed service.

The majority of deterrents that were identified by the survey and focus group participants consisted of nuances of presenting themselves in person to local SRH clinics. As evidenced in Figure 12, by virtue of the proposed service being completely web-based, it eliminates the need for face to face interactions that were deemed as undesirable, thereby alleviating any anxieties surrounding accessing much needed SRH information.

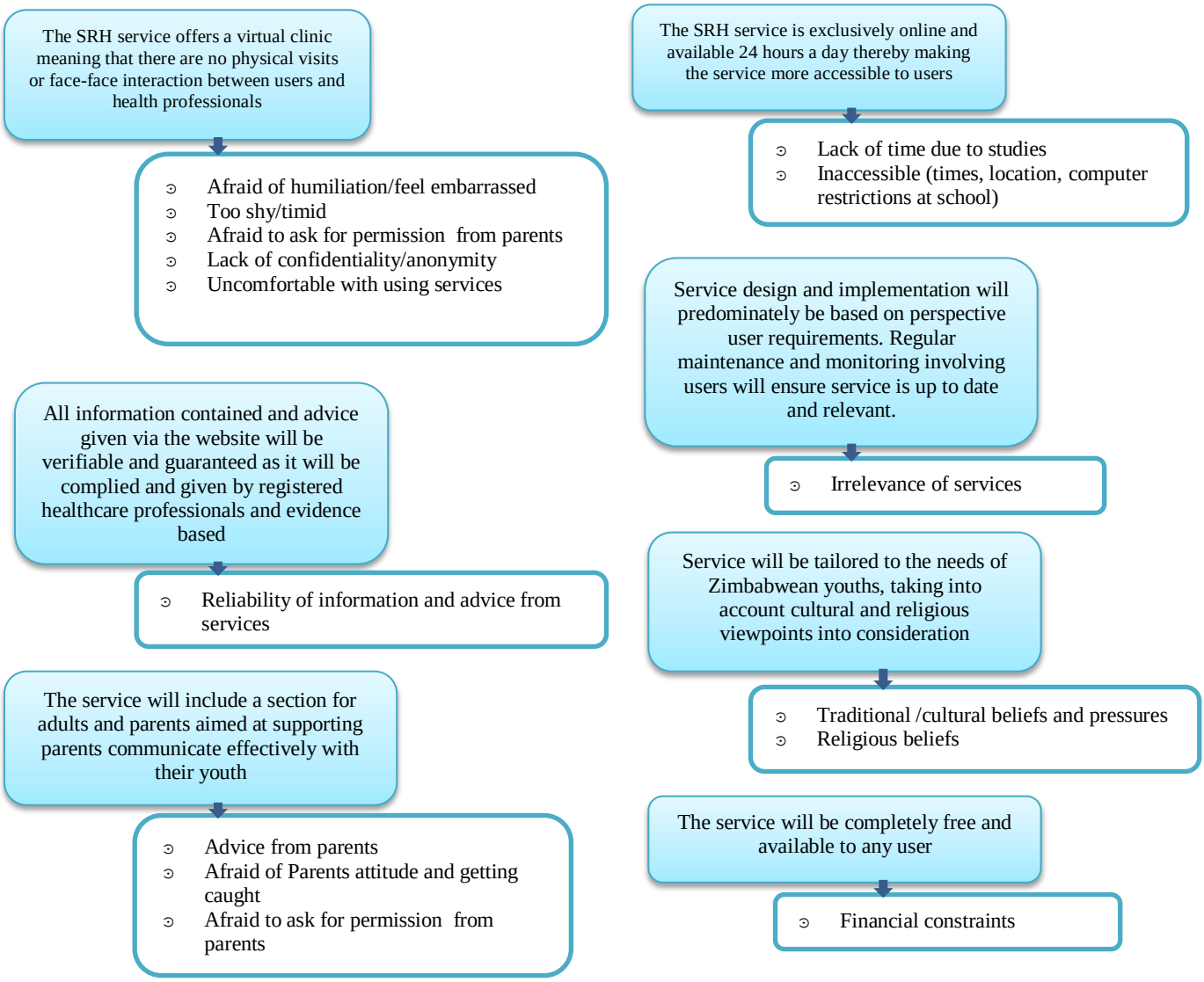


Figure 12 Characteristics of the proposed SRH web-based service and the hindrances as highlighted by survey participants they will overcome

YSHO Design

For a health information website to be effective, it has to be deigned in a manner that promotes transparency, honesty and accountability. It should be presented in such a way that makes it easy to identify who is responsible for the site and the contents therein (The National Center for Complementary and Alternative Medicine (NCCAM), 2006). To this end, all pages on the proposed website contain the YSHO name and logo, any external sources of funding that the service may use in the running of the website will be made known to its users so that vested interests by such sources is evident.

The YSHO website includes an index page as shown in Figure 13. This index page has the function of a '*cover page*' and entry portal into the site. It gives the potential user of the site a clear indication of what the site is about in an age appropriate friendly and fun manner as epitomised by the bright colouring of the page, font used, animations and music in the background. To make the site more relevant and appealing to the target users, a flag of the country is present on the index page and throughout the site. This may have the desired effect of promoting a sense of belonging in the prospective users which according to an adaptation of Pittman 1991 (Almquist, 2005) is one of the key attributes in any youth development approach.

The Index facilitates a visitor counter which will make for a simple but indicative measure of the number of people making use of the website. Since the service promotes anonymity and confidentiality, such a counter would be the most effective way of monitoring traffic on the website without requiring users to subscribe to the site.

Clicking anywhere on the index page directs the user to the '*Home*' page which consists of all the main headings and is the main root of all information and contents of the YSHO SRH website, as shown in Figure 14. The Home page was designed with a view to maximize attractiveness without bombarding the user with too much information. According to the requirements from the focus group, a website should have an ideal balance between illustrations and text. The Home page takes this into consideration and those elements that would offer better visual representation as illustrations are thus implemented. Important features of the site are slightly more emphasised without looking out of place. These include the detailing of the services provided by the site, the characteristics of the site and any additional features for example the chat facility and question submission function.

Figure 13: Index page of the YSHO website acts as a gateway to the main Home page.

Figure 14: Proposed YSHO website Home page

Contents of the Website

To truly embody a user orientated service, the contents of the YSHO website are based on topics highlighted in Figure 11 and associated subject matters. Figure 15 shows the menu headings included on the website. Supplementary headings facilitate further categorization of presented information.

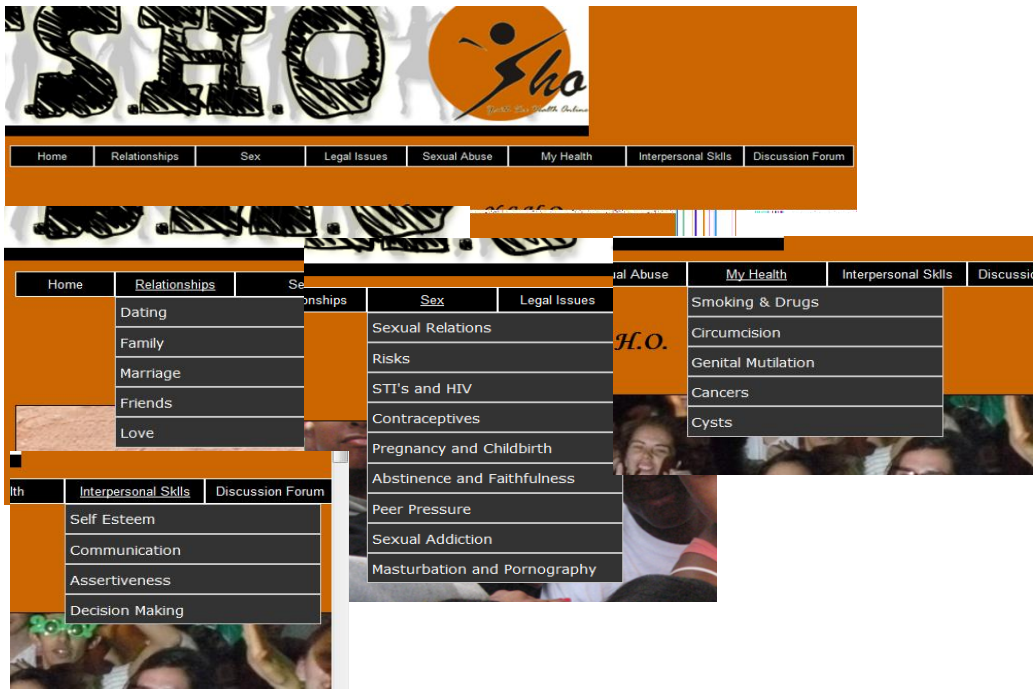


Figure 15: Menu headings on the Home page, sub-menus indicative of information presented on the website

The website, in response to the need for relevant information pertaining to the adolescent body and puberty, contains the *My Body* section (Figure 16a). This section is designed to be

an interactive medium for service users to learn more about their growing bodies. Users can specify their sex and age (Figure 16b) to benefit from a more accurate depiction of their body at the identified stage. The aim of the section is not to depict the 'normal' or 'perfect' body thereby running the very high risk of alienate users whose bodies may differ. Rather, the section will offer users biological traits and characteristics that the human body exhibits at different developmental stages.

Due to the nature of the section, illustrations will be included in the My Body section. Such illustrations will be inclusive in terms of body shape, ethnicity and functionality. Images may depict the human body in a possibly sexual manner and therefore to avoid offending users of the site, such illustrations will be empathetic and respectful of users. National policies regarding the use of sexual and reproductive illustrations to educate minors should be considered and consultations arranged where necessary.

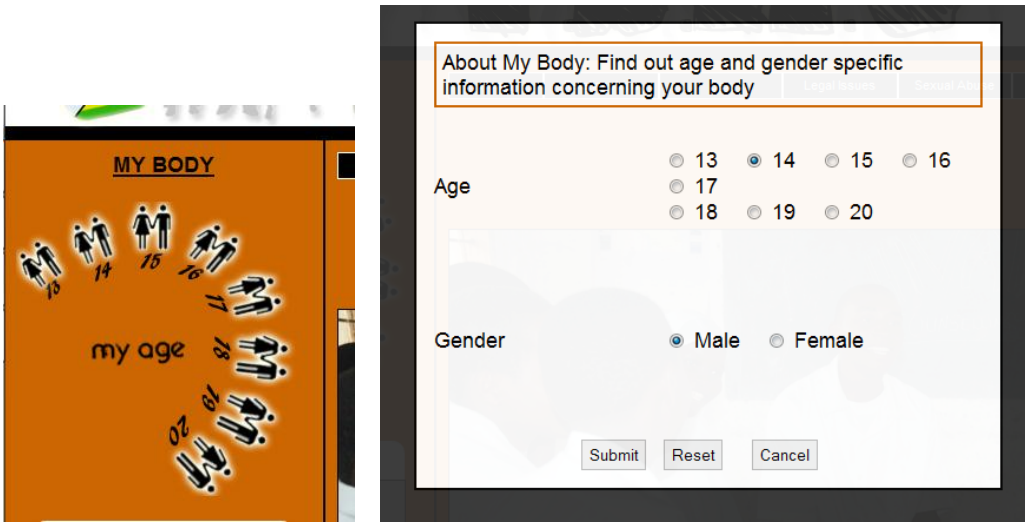


Figure 16: The 'My Body' section of the website (a) where users can access information pertaining to developmental stages of their bodies that are particular to their age and gender (b).

Included on the homepage of the YSHO website is the FAQ section (Figure 17). This links to a page of questions compiled from the SRH questionnaires (Figure 18) answers to which will be provided by relevantly qualified health professionals. On the homepage, a list of the four most frequently asked questions will be highlighted that offer direct link to a response so as to forego looking through the list of FAQ.

Figure 17: FAQ section showing the 4 most common questions on the homepage

Questionable sources of information were identified by survey participants as a hindrance to making use of SRH services. For a service to be effective, there needs to exist a withstanding

respect and trust between users and service providers. This in part may be achieved by ensuring that information and advice imparted to service users is accurate, evidence based and presented in a format that is appropriate.

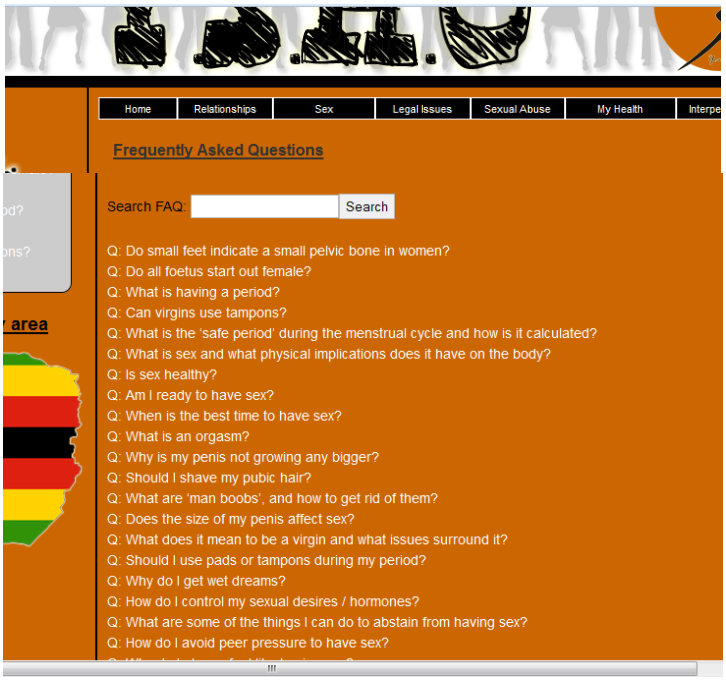


Figure 18: FAQ Page with questions collected from survey.

All information that will be contained on the proposed website will be duly centred on evidence based health practices with applicable referencing included. In Zimbabwe, all health information and advice can only be provided to the public by suitably qualified persons who hold professional registration with the Health Professions Authority (HPA) of Zimbabwe. Thus to comply with this mandate, the proposed YSHO service will sought the services from such health professionals to be involved in giving advice via the online chat facility and respond to the questions presented to the service by users. Included on the site will be an explicit listing of sources of information that will be available to all users via the link shown in Figure 19. This will promote service transparency and establish a rapport with potential users based on trust and openness. To be effective, the service will strive to ensure that offering up-to-date information that reflects changes in legislation, society and service user needs is its priority.

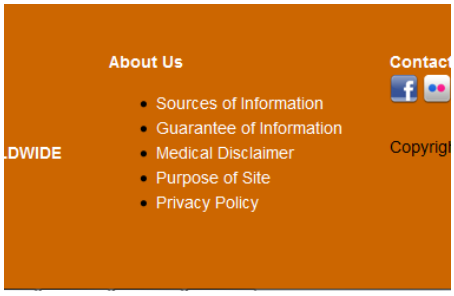


Figure 19: Links to sources of information contained on the website.

The website also incorporates a Discussion Forum (Figure 20). This forum is to encourage users to interact with each other in an environment that is free from the common pressures of face to face discussions. It is also aimed at being a platform for youths to give each other

moderated advice and support based on possible life experiences. The forum participation will be anonymous thereby maintaining user confidentiality and effecting security. Since the forum will be moderated, abusive comments can be abated, maximizing the safety of the forum space.

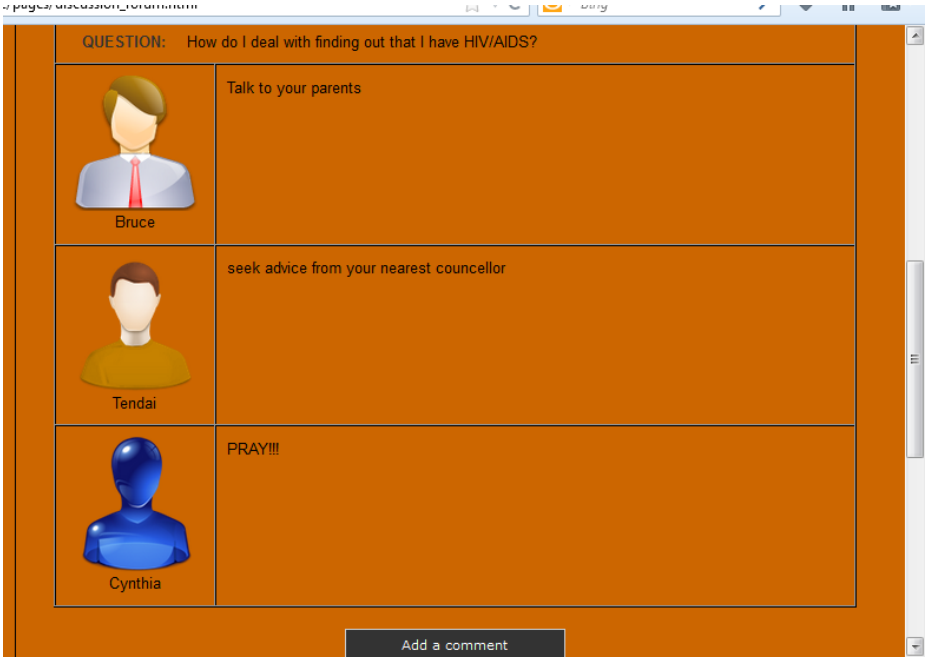


Figure 20: Discussion Forum platform, service users can post themes for discussion and take part in discussions and offer peer support and advice

The webpage contains various links as shown in Figure 21. Included is the link to a Christian perspective to SRH. This was a recurring theme in the responses on the SRH questionnaire and the focus group. It is important to relate to the target service users as is practically possible in order to be an effective service, thus since Zimbabwe is predominantly a Christian nation, it only serves the target population better to address SRH in respect to Christian values as part of the YSHO website.

The website also includes a page that offers youth SRH information for parents and guardians. It was identified through general discussions with teachers at survey participatory schools that in as much as youths require a SRH service that fulfils their needs, parents and guardians need educating and support when it comes to dealing with the SRH needs to their youths. Studies have shown that successful youth SRH interventions consist of supportive parents and guardians (Gavin, Catalano, David-Ferdon, Gloppen, & Markham, 2010). Results from the survey identified that parents and schools were the sources of the most accurate SRH information. However, even with this and other documented evidence, it appears very uncommon for a web-based youth SRH service to promote this parental involvement (Delgado & Austin, 2007). Thus by virtue of including SRH information for parents and guardians, the YSHO website will strive to support parental involvement.

From the SRH questionnaires, it was also evident that participants did not feel comfortable to approach their parents for advice and information for fear of possible reprimand. This may stem from the parents inability to effectively communicate with their children concerning SRH or a lack of relevant knowledge on their part. To tackle this, the My Teen and I page on the YSHO website is designed to afford parents the necessary support in terms of information and relevant skills sets they may require to interact effectively with their teenagers.

Another internal link on the website include Activities for Schools and Clubs which is designed to offer SRH related activity guidelines and ideas that schools and clubs could use and also serve as a platform for the same schools and clubs to advertise what their own or local activities for the good of service users. External links to other relevant sites are included on the website that will enable service users to keep up to date with not only national, but global SRH news and issues.

Figure 21: Internal and external links available on the YSHO website

In light of the 'fear of being caught' conundrum that the survey participants implied, on every page of the YSHO website is a conspicuous red Panic button (Figure 22a). Service users can click on this button any time they feel uncomfortable, possibly due to the sudden presence of other people or content on the site and the page is redirected to the Google search website (Figure 22b). It is important to highlight that the redirecting of the page is only as fast as the internet connection that the user has.

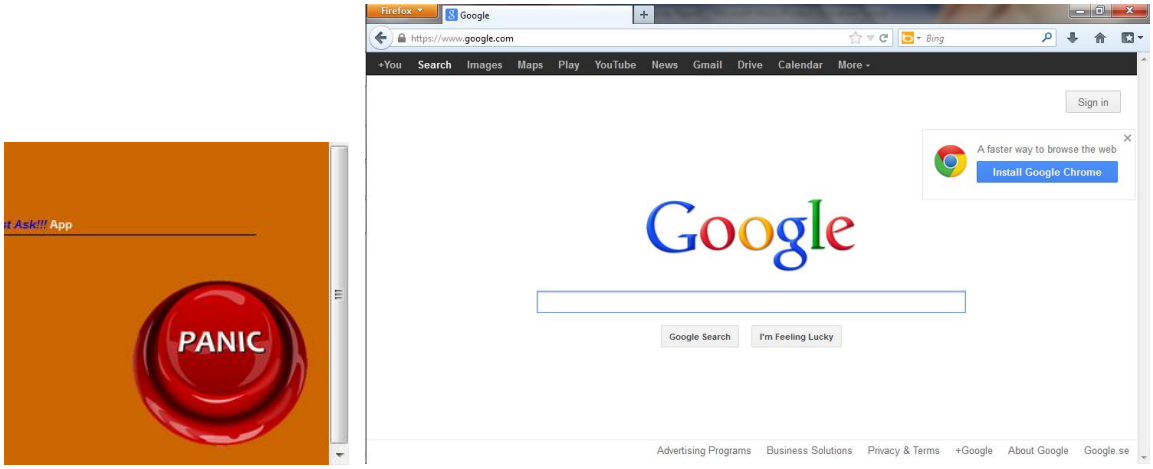


Figure 22: The Panic button (a) that redirects users to the Google search website (b).

Services on the YSHO Website

The proposed website will contain inherent services that enhance the YSHO experience. These services include:

The Live Chat

This service is designed to be online during traditional office hours and allows a user to chat with a health profession and discuss any SRH issue that they may have. Figure 23 illustrates the mock-up of the chat. When the service is offline, users are able to leave a message and contact details which can then be responded to appropriately.

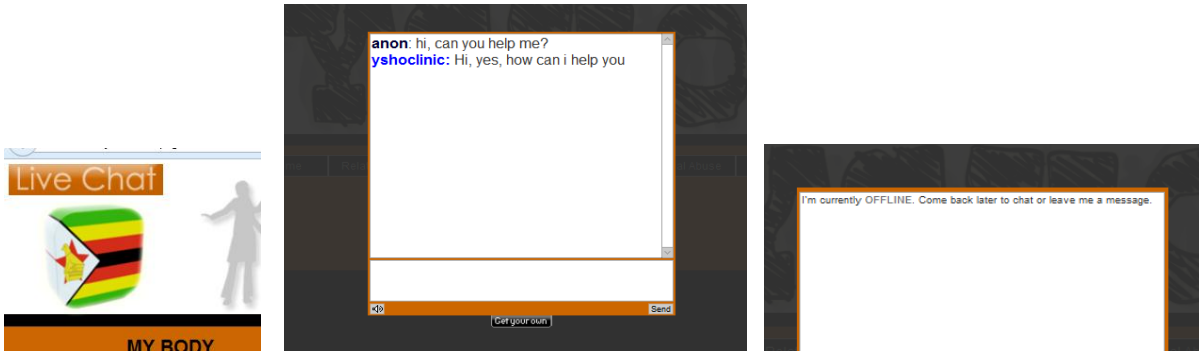


Figure 23: The Live Chat service. a- The gateway to access service. b- Health professional available to chat with users when service is online. c- When service is offline, users may leave message.

Health Facilities in my area

This service is designed to inform users of the health facilities that are available within their locale. Figure 24 shows the service gateway and the interactive map it leads to that will allow users to hover over their local area and get a list of health facilities that are geographically close to them. Facility details to be included are GP information, Health clinics, Testing and counselling centres and Pharmacies.

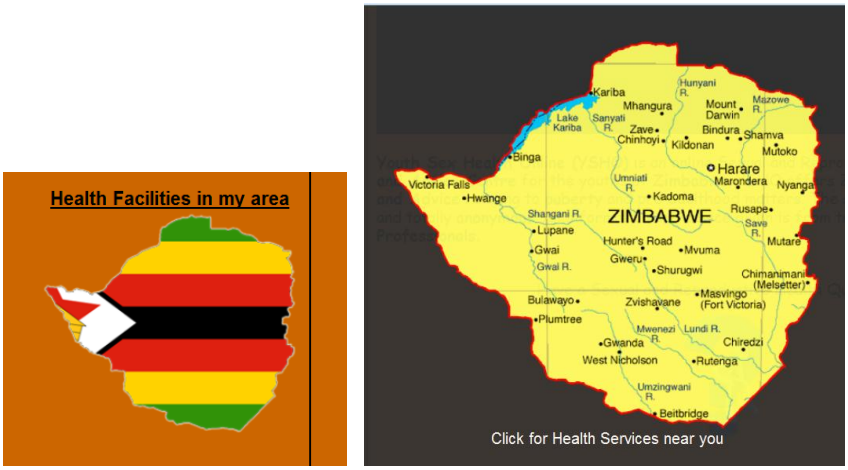


Figure 24: Health Facilities in my area service. a- gateway to service. b- interactive map allowing users to click their own locale.

The Just Ask! Web-based Service

This is the question and answer service on the website which allows the user to ask a SRH related question that will be answered by health professions. This service fulfils the user requirements pertaining to the need to have a platform where users can ask questions in confidence and get relevant and accurate responses from qualified professionals. On accessing the service, the user may choose whether to enter their name or not, but need to include an email address, where the response can be sent, and their questions. Figure 25 shows the service and the form users can complete to submit their question.

When the question is submitted, the website administrator is notified via email, who in turn will distribute the question to the appropriate health professional for a more accurate and relevant response. To increase confidentiality, the service will be such that, only the website administrator has access to the service users contact details. This means that the health professionals that will be involved in answering questions will be in contact with just the administrator and not the service users.

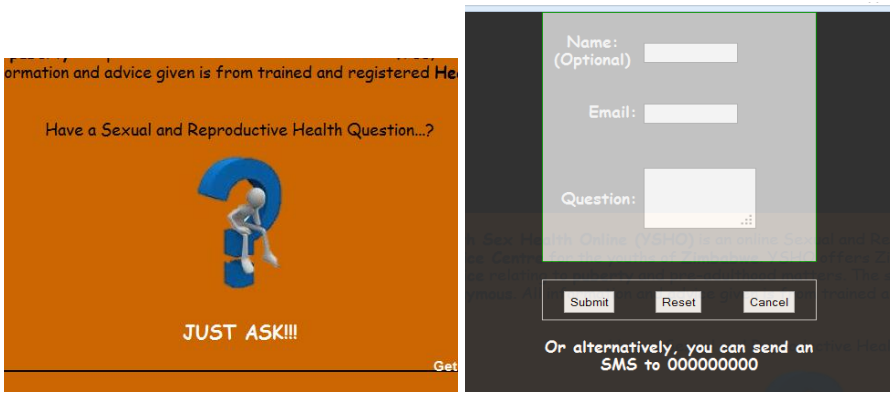


Figure 25: The Just Ask! Text messaging Service. a- gateway to the service. b- users can fill in the form and submit their question and get a response sent to their submitted contact details

From Chapter 1, participants identified that a 24 hour turnaround time for a response is desirable. Therefore the service will aim to respond as such. All questions submitted and answers provided will be stored. This will facilitate internal and external evaluation of the service in terms of the type of questions that the service is receiving and the quality of the responses that the service is providing. Common and reoccurring questions will be listed under the FAQ category.

Service users can also download the Just Ask! application onto any mobile telephone device that enables them to ask questions the same way they would do on the YSHO website without the need access the entire site (Figure 26). This would mean reduced costs for users as making use of the mobile telephone application would be considerably less expensive than accessing the YSHO site in its entirety on the same mobile telephone device. On asking a question via the application (Figure 27), the question will be received by the system's administrator who will then handle it in the same way that questions received via the webpage are handled.

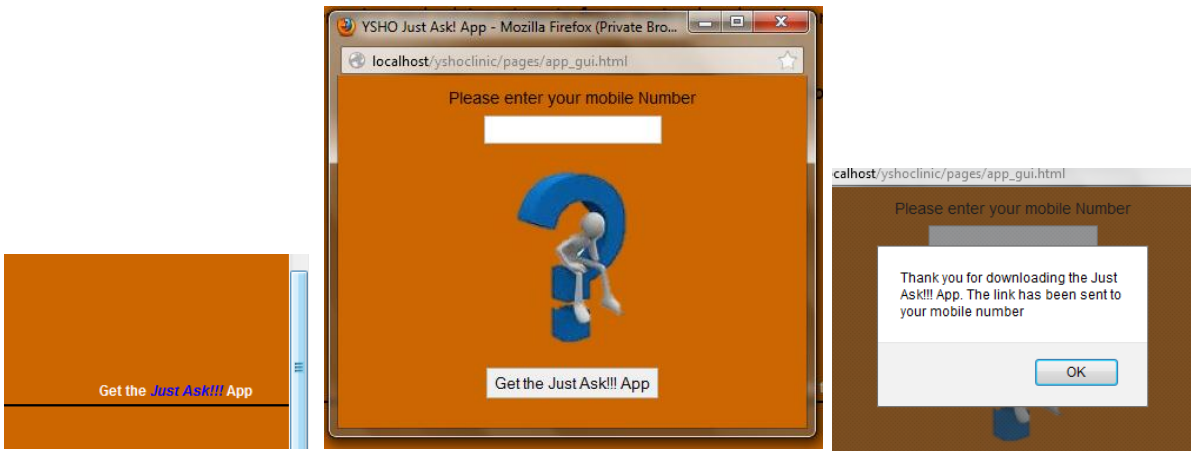
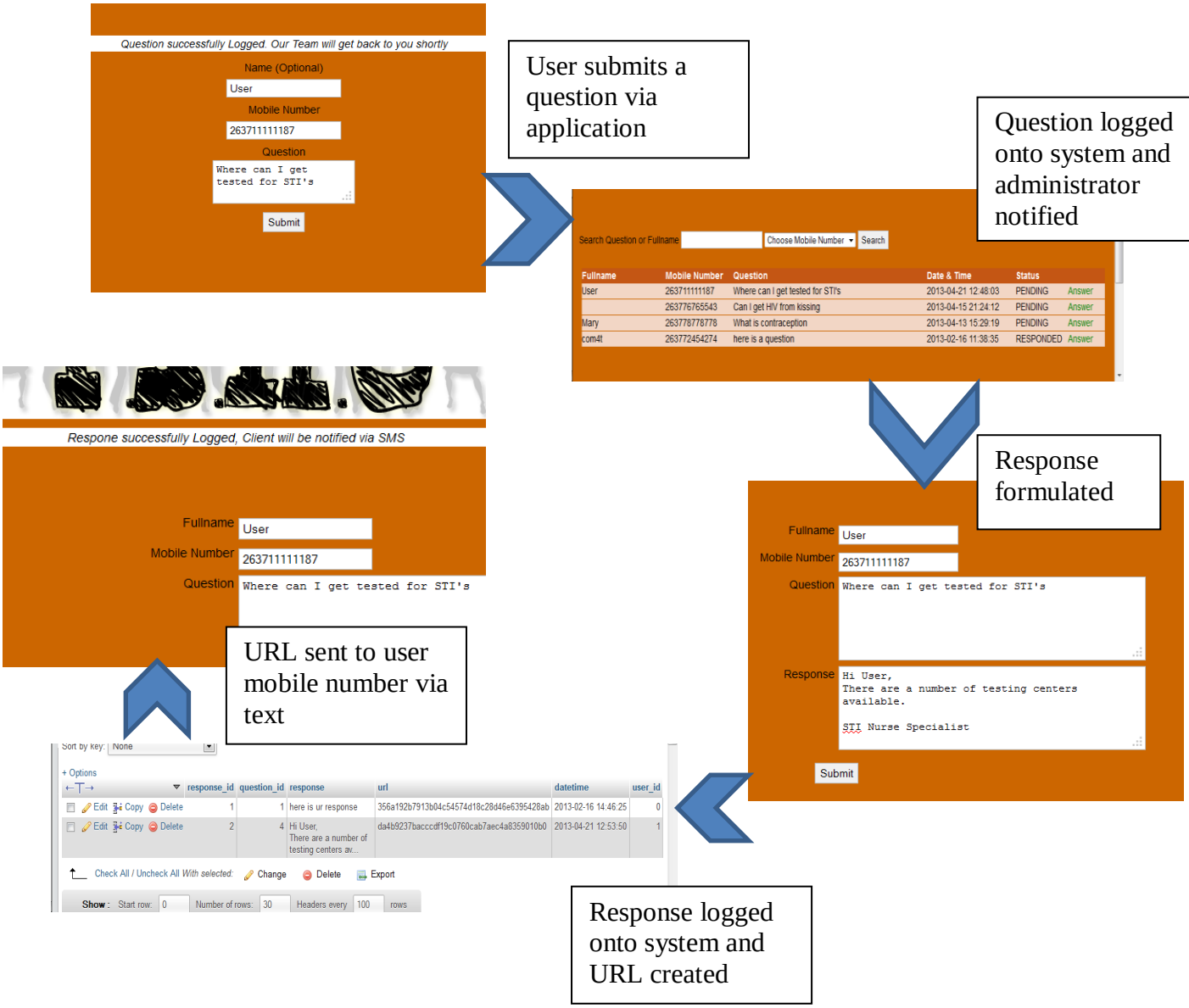


Figure 26: The Just Ask! application that users can download off the YSHO website onto their mobile telephone device.

The difference will be in the means of response. When the response is formulated, a uniform resource locator (URL) will be sent to the mobile number whence the question came in the form of a text message. The user can then access the response to their question via the supplied link. Sending the response as a URL has the advantage that the health professionals dealing with service user questions are not restricted by the costs associated with the length of text messages. Thus if a question warrants a lengthy response, then the health professionals are free to do so without incurring any extra costs.



Health tip of the day

This service offers the users a daily health tip. To encourage inclusion and ownership of the website, users have the opportunity to submit their own health tip that can be used on the service after moderation and credit given to the service user who would have submitted it. Figure 28 depicts the service as it appears on the YSHO website and the interface for users to submit their own health tip. An archive containing past health tips will be included on the website allowing users to revisit any tips at any time.

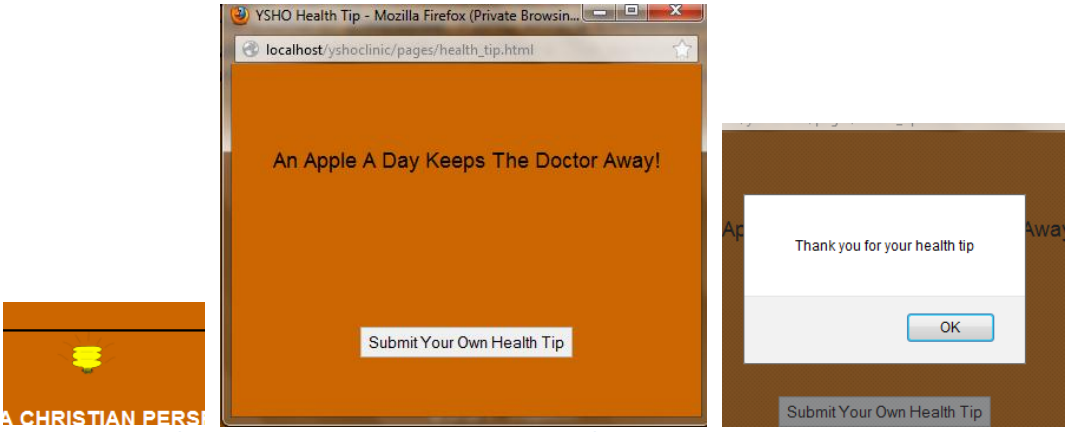


Figure 28: Health Tip of the Day service. a- icon on Homepage of YSHO website that allows access to service. b- Displayed health tip that will be changed daily. Users can submit their own tip to be used on the website (c).

Safety and Security Considerations

As with any e-health application, guaranteeing the safety and security of service users and any of their data that they may share whilst on the YSHO website is paramount. Having service user anonymity as one of its main attributes gives this proposed eHealth service the advantage of not having to store confidential information pertaining to its users. Any information that service users may provide during interactions with health professionals via either the Online Chat facility or the Just Ask! service will be deleted following the end of the session. No records of email addresses or mobile telephone numbers will be kept by the service.

However, to ensure that national data protection mandates are adhered to, policies and guidelines on handling of service user data need to be drawn up and made available to all health professionals and other staff associated with the service. In a bid to encourage openness, the same policies would be available to all service users under the Privacy Policy link on the YSHO website.

Although service user data is usually the focal point of security considerations, it is also vital that a web based service takes appropriate steps to secure the application itself (Maji, 2008). For the proposed application, it is vital that secure and reliable servers are used to host the website to ensure firstly that the service is available 24 hours a day and throughout the year; and secondly that only authorised personnel may maintain and make alterations to the web based service.

Maintenance and Evaluation of the YSHO Website

It is vital that any web based health resource is regularly maintained (The National Center for Complementary and Alternative Medicine (NCCAM), 2006) and the same holds true for the proposed website. This eHealth application will need to be updated so as to continue being relevant and in keeping with its intended goals. Information appearing on the website will need to be reviewed and where necessary renewed so as to reflect changes in SRH practices, legislation, technology and the society. The website will require a key contact person who will ultimately be responsible for the information on the website and ensure that all content is appropriate and accurate. Any noted discrepancies on the site can then be highlighted and directed to the appropriate person and action taken to rectify the fault accordingly.

Given that medical information will be contained on the website, it is paramount that information is current as obsolete information may be misleading to users and even pose

some danger (The National Center for Complementary and Alternative Medicine (NCCAM), 2006). As good practice, dates will be included on all updates and reviews on the website.

Undertaking external audits of the database of questions and responses that the service gives to users will aid in the evaluation of the service. Performance rating based on such audits will be indicative of the quality of the service. Consultants can be engaged to periodically evaluate the information available to service users via the site, ensuring that the information and also the sources of information are correct and based on best practice. A suggested means of maintaining the website's relevance would be to facilitate regular consultations and focus groups with volunteer service users so as to ascertain their needs in relation to what the website is offering. As times change, this should be reflected in the proposed website and the service.

Compatibility with Mobile Devices and Future Technology

As technology advances at an increasing rate, it is important that the proposed service be accessible to users via as many media as is possible. The YSHO website aims to be accessible via both PC and mobile devices. Since over 70% of the surveyed population highlighted that they had access to smartphones, it logically follows that a service should be available via this means to influence this mobile audience.

There are an increasing number of mobile devices available on the market and each uses different mobile platforms which would all require unique programming efforts to make the proposed eHealth application compatible with them all. A more cost effective way of reaching mobile users would be to provide an alternative YSHO website layout for mobile devices (Michigan State University, 2013). This would entail restricting and resizing website elements so as to fit smaller screens. This would mean that the same information that is available on the PC version of the proposed website is available to current and future mobile device users.

Evaluation of the mock-up YSHO Web-based Service

Feedback was sought from potential users of the YSHO web based service in the form of an informal focus group of five youths aged between thirteen and nineteen years was facilitated, with the following outcome:

- The service as a whole looked inviting and appropriate
- Although the need for an index page was debated, participants agreed that the music made the site stand out and intriguing.
- Participants felt that they could identify with the images portraying youths on the homepage and liked the Zimbabwean flag depicted on the site.
- The different sections were discussed with participants commenting further on the information that should be made available in the different categories.
- The Live chat service was deemed as very useful with participants outlining its advantages.
- Participants appreciated the Q&A Just Ask! Web and Text based service and pointed out that it drew attention to itself making it hard to miss especially if needed.
- The Panic button was described as useful, especially when accessing service in public areas.
- Participants agreed that they would make use of the website.

From results, it is evident that the proposed website is appropriate to the target population, with potential users identifying that they would make use of the website for their SRH needs. It would have been advantageous to have had feedback from the same participants of the

User Requirements focus group as this would have given greater indication as to whether they felt that their stated requirements had been met.

Reaction to the My Body and Q&A sections of the website were as expected, with participants identifying that these sections were vital. It is interesting to note that even though sources of information were one of the user requirements as noted in Chapters 1 and 2, none of the participants in the group asked where the information to be contained on the site was coming from. One participant did however ask who would respond to the questions asked by service users on the website.

The JUST ASK! Text Messaging Service

A complimentary text messaging service was designed, whose objective is to offer a condensed SRH service for 9% of the adolescent population that has access to a cell phone but does not have access to the internet via PC or smartphone.

As with the web based service, the text messaging service overcomes most of the fundamental barriers to accessing SRH services as noted in Chapter 1. Service users can access the service at any time; there is no need for face to face interactions; and advice and information is from qualified health professionals.

JUST ASK! Text Messaging Service Design

The text messaging service is based on a straightforward question and answer format whereby a service user poses a question in the form of a text message to the service via a dedicated number. An appropriate response is sought from a health professional by the service administrator and the retort is sent back to the service user in the form of a text message.

Safety and Security Considerations

In keeping with advocating anonymity and confidentiality, service users do not need to provide any identifying information to make use of the service. Only the system administrator has access to the service user's mobile telephone number that they would have used to pose the question. After a posed question has been answered, the mobile number will be erased from the system.

Maintenance and Evaluation of the JUST ASK! Service

As with the YSHO web-based service, the text messaging service will require regular evaluation to monitor its effectiveness in meeting the aims of the service. In the same way that auditing will be carried out for the web-based service, questions and responses from the text messaging service will be appraised as such to ensure that a quality service is given.

The effectiveness of the service will be monitored by means of quantifying the number of service users accessing the service relative to the marketing of the same service. Thus the more the number of service users, comparative to the advertising, may be indicative to the efficacy of the service.

Compatibility with Mobile Devices and Future Technology

The short messaging service (SMS) option is versatile in terms of compatibility with existing and technological advances. All mobile phones have text messaging abilities and this appears to be a trend that will continue to be integrated into future technologies (Sherman, 2012).

Thus a SRH service based on text messaging will apparently be compatible with future technologies.

Evaluation of the JUST ASK! Text Messaging Service

The Just Ask! Text messaging service was demonstrated in Zimbabwe for one and a half months to coincide with school holidays. Posters advertising the service (Appendix 4) were put up at two shopping malls in the Highfields and Westgate neighbourhoods of Harare in areas where youths where likely to congregate. Information was provided on the service being offered, its aim, targeted users and the duration for which the service was being run. In the period covering 17 December 2012 to 10 February, 15 questions were received via text messaging from service users aged between 14 and 19 years. The services of a qualified health professional were utilized to respond to the questions posed within 24 hours. The responses were then audited by another health professional for validation. Two youths who had made use of the service remarked on its efficiency and usefulness, commenting on how the answers they had received were accurate and relevant.

Conclusion

A service that achieves its objectives by overcoming outlined hindrances and meeting the needs of the prospective users is the pinnacle of effectiveness. The proposed web-based YSHO and the complimentary JUST ASK! Text messaging services have been designed to realize this height. The requirements for an ideal SRH service outlined by survey participants in Chapter 2 have been principally met in the proposed service. Deterrents to accessing SRH services were considered in the design of the YSHO and JUST ASK! services and both services go a long way to eradicate any hindrances to accessing SRH information and advice. Feedback sought from potential service users indicates that not only is the proposed service inviting and user friendly, but it is also useful and efficient.

Chapter 4

The Technical Environment in Zimbabwe and Technical Requirements for the Proposed Service

Zimbabwe is a landlocked nation covering 390 590 square km, with a population of approximately 12.9 million people (Zimbabwe National Statistics Agency, 2012). As a nation Zimbabwe has experienced highs and lows in terms of economic, social and infrastructural development. It is universally understood that Information and Communications Technology (ICT) is instrumental in the development of a nation (Schaefer-Preuss, 2010), and the same holds true for Zimbabwe.

There has been a widely documented increase in internet and mobile phone access in developing nations. Mobile phone subscribers increased three fold in Zimbabwe from 2 million in 2008 to 6.9 million in 2010. 11.5% of Zimbabweans were identified as having access to the Internet in 2011. These figures alone are indicative of the growth of ICT within the country and the Zimbabwean government has put in place legislations and policies underlining the recognition of the role of ICT in the nation's development.

This Chapter is aimed at discussing the technological environment in Zimbabwe and the necessary technological requirements for the facilitation of an eHealth application conducive to the promotion of SRH in youths in Zimbabwe. Remarks will be made concerning the future of Zimbabwe's ICT developments and how the proposed youth SRH service can embrace these technological advancements.

ICT in Zimbabwe – Internet and Mobile phone Usage

Widely documented is the growth of internet and mobile phone usage in Zimbabwe. According to Frost and Sullivan, a growth partnership company, mobile phone subscribers increased three fold in Zimbabwe from 2 million in 2008 to 6.9 million in 2010 (Frost & Sullivan, 2011). The penetration rate is defined by the percentage of a population that has access to telecommunication. In Zimbabwe, the penetration rate of mobile phones continues to expand with a reported increase from 6.8% to 72.1% between 2006 and 2011 (International Telecommunication Union (ITU), 2011). With the inflow of cheaper imitation cellular phones from Asian countries, the increased accessibility of mobile phones is to be expected.

The increased access to internet-enabled mobile phone devices has also resulted in the increase of internet access in Zimbabwe. Table 7 shows the increase in internet use in Zimbabwe relative to the country's population. It is apparent that there has been a steady increase in the penetration rate and this is expected to exceed 30% in 2013 (Freedom House, 2012)

Year	Users	Population	Penetration %
2000	50 000	14 712 000	0.3
2002	500 000	13 874 610	3.6
2005	820 000	12 247 589	6.7
2008	1 351 000	12 382 920	10.9
2011	1 445 717	12 619 600	11.5
2012	3 266 411	12 973 808	25.9

Table 7: Depiction of Internet usage growth amongst the Zimbabwean population from 2000-2012. There has been a steady increase as shown by the penetration rate. Source ITU and POTRAZ

It has to be noted however, that in as much as reports indicate a growing trend in the access of internet and mobile phone technology, a number of factors make the statistics biased. Zimbabwe over the last decade has experienced deterioration in its infrastructural sturdiness. Energy supply in Zimbabwe is not robust. The country imports electricity from neighbouring South Africa, Mozambique and the Democratic Republic of Congo to support its own diminishing resources (MBendi, 2013). There are costs to home and business owners associated with connecting to the nation grid which leaves rural communities at a disadvantage given that these communities are characterised by lower incomes. It is vital that a dependable supply of electricity be available for any ICT development but Zimbabwean communities, rural and urban alike, in the last few years have had to cope with worsening power outages. Thus to avoid sporadic services, internet service providers (ISP) have had to invest in alternative power sources like generators with maintenance costs of these passed on to the customers.

Another limiting factor is the telecommunications infrastructure in Zimbabwe that is based on technologies that are out-dated. There is a limited use of emergent satellite, fibre optics and wireless technologies. The high costs associate with updating this infrastructure has meant that internet access is out of the reach of most of the Zimbabwean population. Most telecommunications infrastructure is concentrated in the urban areas of Zimbabwe accounting for the divide that exists between urban and rural communities in terms of internet and mobile phone penetration (Freedom House, 2012).

Where the infrastructure is available, the sheer cost of internet access can be exorbitant. Dial-up internet access ranges from US$5 to US$45 per month for 5 megabytes to 2500 megabytes. Home broadband charges are in the range of US$115 to US$265 per month for 4 gigabytes to 12 gigabytes with speeds of up to 3 megabits per second (Zimbabwe On-Line (ZOL), 2013). This makes it evident that the increase in internet access is due to Zimbabweans accessing the internet via their mobile phones.

There are three mobile service providers in Zimbabwe, NetOne, Telecel and Econet with all three offering 2G, GPRS, Enhanced Data rates for GSM Evolution (EDGE), and 3G services. Costs of accessing the internet via a mobile phone is in the form of data bundle purchasing which can cost anything from US$0.55 for 5 megabytes to US$20 for 200 megabytes (Econet, 2013). Econet is the biggest operator with network coverage of 74% in Zimbabwe

(Figure29a) with the telecommunications firm aiming at 100% coverage by 2015 (TeleGeography, 2012) . Along with other data carriers in the country, Econet has started establishing links to international undersea cables via countries including South Africa and Mozambique and offering fibre-optic networks in Zimbabwe (Freedom House, 2012) as shown in Table 8. Figure 29b shows the national telecommunications backbone based on current and future work undertaken by all the data carriers in Zimbabwe.

Operator	Backbone fibre Link	Capacity
Powertel	• Harare-BYO-Plumtree-Botswana • Harare-Mutare-Mozambique	• STM[2] 16 • STM 16
Econet/Liquid Telecom	• Harare-Masvingo-Beitbridge-South Africa • Harare-BYO-Beitbridge–South Africa	• STM 64 • STM 64
Tel One	• Harare-Mutare-Mozambique • Harare-Mazoe-Chinhoyi • Harare-Chinhoyi-Makuti-Chirundu-Zambia • Masvingo-Beitbridge-South Africa • Harare-Gweru- Bulawayo-Beitbridge	• STM 64 • STM 16 • STM 16 • STM 64 • STM 64
Africom	• Harare-Mutare-Mozambique	-

Table 8: Data carriers in Zimbabwe that are establishing links with undersea cables. Backbone links highlight the routes that cabling is taking, with all originating from Zimbabwe's capital Harare. Source: (Baxton, 2011)

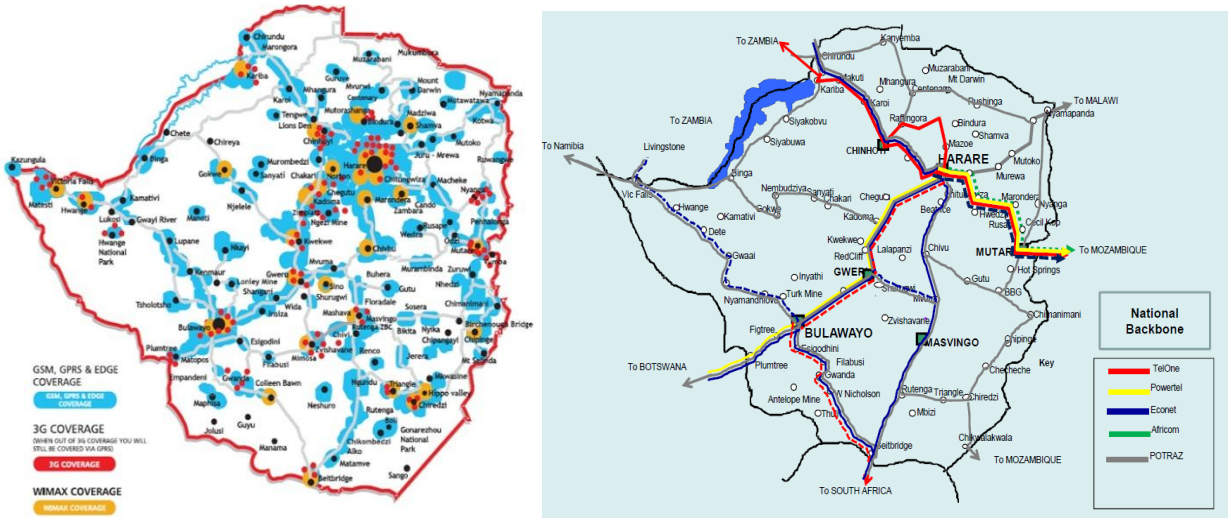


Figure 29: a- Mobile network coverage from the biggest mobile network provider in Zimbabwe, Econet. Currently Econet has 74% coverage and aims at 100% by 2015. Source: (Econet, 2013) b- Zimbabwe's telecommunications backbone based on work done and being undertake. Source: (Baxton, 2011)

Zimbabwe is no exception to the fundamental need to embrace technology so as to facilitate development. This need and identified role of ICT in the nation's development has been acknowledged by the government of Zimbabwe through initiatives such as the e-Readiness Survey of 2004 (Ministry of Science and Technology Development, 2005) that assessed the readiness of the country to become a knowledge and information based society, and the National ICT Policy Framework of 2005 (Ministry of Information Communication

[2] STM - Synchronous Transport Module a Synchronous Digital Hierarchy fibre-optic network transmission standard based on multiples of 155.52 Mbit/s.

Technology Zimbabwe, 2005). These along with other measures make for the provision of an ICT enabled environment for the Zimbabwean people.

Technological Requirements for the Proposed Web-based and Mobile Text Messaging Service

For the YSHO SRH service proposed in Chapter 3 to be realised, technological aspects for effective functionality have to be considered. These aspects can be divided into three sections;

1- Technology required to start up YSHO
2- Technology required to run and maintain YSHO and
3- Technology required by prospective service users

1- Technology required to start-up YSHO

YSHO is comprised of the web-based service together with the complementary text messaging service. For the web-based service to function at its optimum, i.e. offer a 24 hour a day service, reliable internet hosting services have to be procured. Internet hosting is the running of internet servers thereby permitting organizations and indeed individuals to contribute content to the internet (Wikipedia, 2013). Essential to the offering of YSHO is the most common form of internet hosting which is web hosting. This allows for users to avail their website to the public via the World Wide Web (Wikipedia, 2013). In essence, companies that facilitate web hosting afford their clients with space on servers and provide internet connectivity.

Options that exist, are finding a web host for the YSHO website internationally or locally in Zimbabwe. Table 9 outlines the pros and cons of hosting the YSHO website locally and internationally. In principal the YSHO website could be hosted from anywhere in the world as long as the hosting server is secure and efficient, guaranteeing server down times are kept to a reasonable minimum. Therefore based on reliability and cost implications indicated in Table 9, it may be more appropriate for YSHO to make use of international web hosting services. For the text messaging service, the same technical setup as for the website is required as all text messages will be received and responded to via the website.

Along with the web hosting requirements, the typical hardware requirements are needed, including a central processing unit and associated peripherals. The service necessitates the expertise of a system's administrator who is the contact person for the service. To fulfil this role, the administrator requires uninterrupted access to the internet and thus investing in appropriate internet broadband services would be sagacious.

2- Technology required to run and maintain YSHO

In addition to the start-up technology requirements, maintenance of the YSHO web-based service requires servers that can deal with the traffic onto the site and facilitate for an increase in site visitors where necessary. Services that are available to prospective users on the website are also dependent on the efficient running of internet technology. The Live Chat functionality relies on the website's sustained connectivity to the internet. The health professional facilitating the chat also needs to be able to access the website wherever they

may be in the country, which means that they need access to reliable mobile internet be it via a PC, an internet enabled smartphone or another mobile device.

The Just Ask! web-based and text messaging service also requires that the facilitating server run efficiently. Failure in hosting services will result in the interruption of these vital services that are offered on the YSHO website.

Mobile phone accessibility is important for health professionals that will be associated with the YSHO service, be it for accessing the website to update information, or respond to questions from service users. The use of smartphones would thus be advocated. Given the increased ease of access to the internet via mobile phones, this would be the best way to ensure that health professionals are connected to the service when required.

	Pros	Cons
Local Web hosting	• Since YSHO is aimed at Zimbabwean users, locally hosting the website will probably mean faster connection times to the website and servers for users and YSHO administration respectively due to geographical positioning. • Web hosting providers based in Zimbabwe should be able to offer their clients Zimbabwean based support that is efficient and on a different level compared to email support from international hosts. • Local hosting increases search engine visibility as searchers will be directed to locally available and hosted services.	• The cost of bandwidth and dedicated servers is exorbitant in Zimbabwe. • Due to the state of infrastructure in Zimbabwe, server up-times cannot be guaranteed and compounded down-times would greatly impact YSHO as a service. • Some ISP's lack robust routing to the internet exchange resulting in slower connectivity for site users.
International Web hosting	• International web hosting may be cheaper given that bandwidth, server hardware and power are cheaper compared to Zimbabwe. • Due to the lower costs, larger amounts of disk space and bandwidth are available to YSHO from international host.	• Support from international hosts may not be as efficient as Zimbabwean based support due to a number of factors including support service working hours that are may be inaccessible due to time differences.

Table 9: Pros and cons for hosting the YSHO website locally and internationally. Costs, infrastructure and reliability are major factors to consider.

3- Technology required by prospective service users

To access the proposed YSHO service, prospective users require either access to the internet or a mobile phone. Access to the internet may be via the increasingly popular media of the smart phone or a PC or any mobile device that can connect to the internet. To make use of the Just Ask! Text messaging service, prospective users require a mobile phone with a sim card registered to one of the three network providers in Zimbabwe.

Conclusion

Considering the technological environment in Zimbabwe, the infrastructure exists to successfully offer the SRH service YSHO. Some contingency planning may need to be put in place if hosting of the website is to be in Zimbabwe to ensure that any down times experienced by hosting servers are not to the detriment of the proposed service.

As technology advances and the telecommunications infrastructure improve in Zimbabwe, YHSO as a service should be able to remain relevant and fully functional. Increased access to the internet by the Zimbabwean population will mean greater access to the proposed YSHO service. Increased robustness in internet and other telecommunications service provision in the county will only add value to Zimbabwe as a nation but also to any ICT applications including YSHO.

Conclusion

The Good, the Bad and What Happens Next

The aim of this thesis was to explore the potential that is offered by web-based and mobile phone technology in the promotion of Sexual & Reproductive Health of high school aged youths in Zimbabwe. In undertaking this work a number of challenges were encountered.

Access to vital national legislation pertaining to the governing of SRH was difficult. Zimbabwe is in a transitional period whereby policy and legislation are partially available on the internet. This meant that most of the legal information had to be sought from either government officials or documents that contained the legislations in part.

As yet, there is no national eHealth strategy. All legislation and policies are aimed at health information that is made available to the public via more traditional media for example posters, booklets, etc. but not on information available on the internet. Consideration was thus given to these existing guidelines when designing YSHO, but as Zimbabwe develops and outlines an eHealth framework, the designed service will need to conform to any rubrics that may be included. However, it can be suggested that YSHO may be instrumental in the drawing up of eHealth policies in Zimbabwe.

Conducting the surveys in schools presented a different challenge. All institutions selected were more than willing to cooperate and were very supporting. However, due to the time of year the survey was conducted, some age groups were not available. The survey coincided with national examinations for forms 4 and 6 which are predominantly ages 16 and 18 years respectively and thus these forms were not available at the schools at the time of the survey. Nonetheless, because the survey was open to any high school aged youths, the absence of the aforementioned was not a particularly limiting factor.

Meeting all the preferences of the prospective service users in the design of the service posed some challenges. Ideally, the perfect service would accommodate all preferences without technical and indeed budgetary limitations. Taking the Discussion Forum on the YSHO website as an example, the service requires moderation so as to curb untoward behaviour amongst users. This then gives rise to ethical issues pertaining to internet bullying and sharing of dangerous and even illegal activities.

The importance of including youths in the designing of a service aimed at them has been highlighted in this report. As outlined, this is particularly useful in designing a website that

will be judged on appearance and impression. With the rapid shift of what is and is not attractive in terms of teen culture and the internet, tailoring the web-based service to deal with this ever-changing scene would entail intensive use of resources. However, facts and evidence based practices are somewhat of a constant, meaning perhaps that only cosmetics of the website will be the only thing that needs such regular attention to keep it relevant to the target users. For the service to remain effective and relevant to the target users, regular consultations with service users will be essential.

A Different Approach

In undertaking the thesis work a number of variables existed which if handled differently could have added to the substance of the project.

Increasing survey participation would have given a wider representation of the target group. Survey participation in this project was limited to four high schools in the Harare province. Perhaps a wider demography could have been achieved by the participation of schools in the other 9 provinces of Zimbabwe. Also making the survey available to existing youth health services would have captured an alternative audience that may not be necessarily represented by the surveyed school participants.

Essential information was collected from both surveys and focus groups. Facilitating more focus groups may have added to this information base, especially in the evaluation of the mock-up of the YSHO website.

The Just Ask! Text messaging service was trialled in two neighbourhoods in Harare for a month and a half. Expanding the trial period and locale would have yielded more indicative results. Including an evaluation period in the trial would have made for essential feedback from users of the service.

The Next Steps

Based on the findings of this thesis work, the proposed service can be realised. In order to achieve this, Youth Sex Health Online (YSHO) needs to be registered as a non-profit organization in accordance to Zimbabwean law. This would enable access to vital services and provisions such as funding that can be sourced both locally and internationally.

As a registered body, YSHO can set up memorandums of understanding with key organizations and government ministries so as to make use of already existing facilities. These amenities include qualified and professionally registered health professionals that may already be employed by these organizations to respond to questions asked by YSHO service users.

The design for the web-based service will need to be finalised and information filled in on the website. Sourcing this information will be a vital and time consuming task as it will involve acquiring evidence based material and duly reference it. Included in this information will be pictorial representation of the human body at the different stages of puberty. The inclusion of such depictions will have to be done in accordance with the Zimbabwean Censorship and Entertainment Control Act which prohibits use of undesirable pictures and states that,

"A publication, picture, statue or record shall be deemed to be undesirable if it or any part thereof—
is indecent or obscene or is offensive or harmful to public morals; …
… (i) any matter which is indecent or obscene or is offensive or harmful to public morals or any indecent or obscene medical, surgical or physiological details

the disclosure of which is likely to be offensive or harmful to public morals;…" (Parliament of Zimbabwe, 1967).

Completion of the web-based service will connote much the same for the text messaging service. All hardware requirements will have to be assessed and met, including the equipping of health professionals with smartphones and computers as necessary. The service can then be marketed and advertised in preparation for its inauguration.

Final Remarks

This thesis and report has shown that eHealth applications can offer solutions to existing needs. The need for a relevant and effective youth SRH service was identified in Zimbabwe, with so many teens seemingly unsure about where to access vital information about their SRH needs. By making use of web-based and mobile phone technology that is readily available to these youths, YSHO as an eHealth application offers a solution to the apparent need. Even though the state of eHealth in Zimbabwe is in its infancy stage, it can be suggested that investing in a national eHealth strategy would invariably lead to a decrease in state spending in addressing some health issues.

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Appendices

Appendix 1: SRH Questionnaire

QUESTIONNAIRE ON SRH

The questionnaire below is designed as part of an MSc Biomedical Engineering Thesis and is the responsibility of the undertaking student Comfort Sithole of Chalmers University of Technology. It serves to acquire information in order to *explore the potential that is offered by mobile phone and web-based technology in the promotion of Sexual and Reproductive Health (SRH) in Zimbabwean youths.* Any information that you provide is anonymous and will not be analysed by your teachers or school. Your responses are vital, so please try to answer all the questions. If you are not sure about any of the questions, please ask the facilitator.

Q 1.1
Age: ☐

Q 1.2
Sex: ***Female*** ☐ ***Male*** ☐

Q 1.3
Which language are you most comfortable reading? .....

Q 2.1
Do you own a cell phone? ***YES*** ☐ ***NO*** ☐

Q 2.2
If not, do you have access to a cell phone? ***YES*** ☐ ***NO*** ☐

Q 2.3
Do you have access to a smartphone? ***YES*** ☐ ***NO*** ☐

Q 2.4
If yes, does the smartphone access the internet? ***YES*** ☐ ***NO*** ☐

Q 2.5
Do you have access to the internet via a PC? ***YES*** ☐ ***NO*** ☐

Sexual and reproductive health (SRH) refers to all aspects of sex, like sex education, sexual behaviour and sexual attitudes. It encompasses the physical, emotional and social wellbeing in all matters relating to the reproductive system at all stages of life. A person who is sexually healthy has a positive and respectful approach to sexuality and sexual relationships.

Q 3.1
Given the definition above, would you consider yourself as being sexually healthy?

YES ☐ ***NO*** ☐

Q 3.2
Do you feel comfortable to talk or ask Sexual and Reproductive Health (SRH) related questions at Home and/or with Friends? (*Tick boxes appropriate to you*)

I have talked about SRH at home ☐

I have talked about SRH with friends ☐

I have not talked about SRH at home or with friends ☐

Q 3.3
How often do you get Sexual and Reproductive Health education and information from these sources?

	Weekly	***Monthly***	***Not often***	***Never***
Home	☐	☐	☐	☐
Friends	☐	☐	☐	☐
School	☐	☐	☐	☐
Health Clinic	☐	☐	☐	☐
Internet	☐	☐	☐	☐
TV	☐	☐	☐	☐
Other:……..……...	☐	☐	☐	☐

Q 3.4
Do you feel comfortable to ask questions and access information on sexual and reproductive health matters at these sources?

	YES	***NO***
Home	☐	☐
Friends	☐	☐
School	☐	☐
Health Clinic	☐	☐
Internet	☐	☐
TV	☐	☐
Other:……...	☐	☐

Q 3.5
Do you feel the information and answers you get from these sources are reliable?

	YES	***NO***
Home	☐	☐
Friends	☐	☐
School	☐	☐
Health Clinic	☐	☐
Internet	☐	☐
TV	☐	☐
Other:……..….....	☐	☐

Q 4
What hinders you from using sexual and reproductive health services?
e.g. the services are only open during school hours

1…….

2…….

3……..

Q 5
Which of the following methods would you feel most comfortable with to get information on sexual health issues? (Rate each method 1, 2, 3, 4 or 5: with 5 being the most comfortable and 1 the least comfortable method)

Printed Leaflets and Posters ☐

Conversation via telephone ☐

Website via Cell phone ☐

Questions and Answers via Cell Phone ☐

Questions and Answers via Website ☐

Q 6.1
Does having to identify yourself discourage you from using sexual and reproductive health services?

YES ☐ ***NO*** ☐

Q 6.2
Would you use a sexual health information service that is available via your smart phone?

YES ☐ ***NO*** ☐

Q 6.3
Would you use a sexual health information service that is available via a website on a PC?

YES ☐ ***NO*** ☐

Q 6.4
Would you ask questions relating to your sexual and reproductive health via text messaging on your cell phone?

YES ☐ ***NO*** ☐

Q 6.5
Would you ask questions relating to your sexual and reproductive health via a website on a PC/smart phone?

YES ☐ ***NO*** ☐

Q 6.6
What would be an acceptable response time for your question(s)?

1day ☐ ***3days*** ☐ ***1week*** ☐

Q 7
List 3 sexual and reproductive health questions you are likely to ask such a service.

Question 1…….
Question 2…….
Question 3……..

Q 8
Which of the following Sexual and Reproductive Health services have you used or heard of?

	Used	***Heard of***	***Never heard of***
Straight Talk	☐	☐	☐
Five Avenue Clinic	☐	☐	☐
Spilhaus Centre	☐	☐	☐
New Start Centre	☐	☐	☐
Restless Development	☐	☐	☐
Aunty Stella	☐	☐	☐

Q 9
What information would you like a Sexual and Reproductive Health Service to provide?
e.g. address of Health Clinics in my area

Thank you for taking time to answer this questionnaire. Please hand it back to the facilitator.

For any further information and results of this study please email:

comfort@student.chalmers.se

Best of luck with your studies!

Appendix 2: FAQ's from Questionnaires

Q: Do small feet indicate a small pelvic bone in women?

Q: Do all foetus start out female?

Q: What is having a period?

Q: Can virgins use tampons?

Q: What is the 'safe period' during the menstrual cycle and how is it calculated?

Q: What is sex and what physical implications does it have on the body?

Q: Is sex healthy?

Q: Am I ready to have sex?

Q: When is the best time to have sex?

Q: What is an orgasm?

Q: Why is my penis not growing any bigger?

Q: Should I shave my pubic hair?

Q: What are 'man boobs', and how to get rid of them?

Q: Does the size of my penis affect sex?

Q: What does it mean to be a virgin and what issues surround it?

Q: Should I use pads or tampons during my period?

Q: Why do I get wet dreams?

Q: How do I control my sexual desires / hormones?

Q: What are some of the things I can do to abstain from having sex?

Q: How do I avoid peer pressure to have sex?

Q: Why do I always feel like having sex?

Q: How is a male sexually affected by a woman?

Q: Is it normal to have frequent erections?

Q: Is it good to have sex whilst still a teen?

Q: Does sex strengthen a relationship and love?

Q: Am I allowed to have sex before marriage?

Q: Can I have sex with a person who is older than me?

Q: What are the disadvantages of having sex?

Q: What is sexual immorality?

Q: Can a girl lose her virginity by having sex with another girl?

Q: Can a girl get pregnant the first time she has sex?

Q: Does kissing do any harm?

Q: Is fondling a good idea?

Q: Is it okay to engage the services of prostitutes?

Q: Is it health to masturbate?

Q: What are the side effects of masturbation?

Q: Is oral and anal sex healthy?

Q: Is it safe to watch pornography?

Q: From all the information that I get about SRH, how do I know what's true and what's not?

Q: Are people under 16 years allowed to visit SRH clinics for education?

Q: What are the benefits of engaging SRH services?

Q: Staff attitudes stop me from using SRH services, how do I overcome this?

Q: Is this service anonymous?

Q: How do I stay sexually and reproductively healthy?

Q: How do I maintain healthy reproductive organs?

Q: What is erectile dysfunction?

Q: How can I practice safe sex?

Q: What diseases can be transmitted during sex?

Q: Can you get STI's from kissing?

Q: What is HIV?

Q: How is HIV spread?

Q: What are the most common STI and their symptoms?

Q: Is it advisable for teens to go for STI testing?

Q: How can I get tested anonymously?

Q: Do all STI's have cures?

Q: What are the different types of contraceptives that are available?

Q: Do condoms help prevent infections?

Q: What is cervical cancer?

Q: How do I check myself for breast cancer?

Q: How do I prevent reproductive organ cancers?

Q: What are ovarian cysts, causes and symptoms?

Q: What are the causes and symptoms of breast cancer?

Q: What is a warty lesion?

Q: What is circumcision?

Q: What are the advantages of circumcision?

Q: Does circumcision affect ones sex life?

Q: What is an abortion and is it safe?

Q: How do I effectively communicate with my peers about SRH problems?

Q: How can I talk to my parents about my SRH?

Q: Is it advisable to have many sexual partners?

Q: How do I overcome shyness so as to talk to girls?

Q: Can I date at my age?

Q: Is it proper to have more than one boy/girlfriend?

Appendices

Q:
How do I know if I am in a good and healthy relationship?

Q:
How can I expose sexual abuse?

Q:
How can I aid in reducing prevalence of sexual abuse in my area?

Q:
Can a husband sexually abuse his wife?

Q:
How do I protect myself from sexually abuse?

Q:
What is homosexuality?

Q:
Is it appropriate to have a relationship with someone much older than me?

Appendix 3: Outline of the Survey Focus Group

Structure of Focus Group Session

Date: 4 January 2013

Participants: 10

Session time: 1 hour

Objectives:

- To ascertain the requirements for proposed SRH web based and text messaging service for 13 – 20 year old Zimbabwean youths

Agenda:

- Welcome (meet and greet)
- Review of goals of session
- Ground rules
- Introduction to proposed service
- Discussion on requirements
- Q and A's
- Conclusion

Questions to discuss:

- Do you think an alternative SRH service is required, and why?
- What is missing from services that are currently available?
- What makes a website appealing?
    - What should and should not be included?
    - How should it be presented in terms of layout, wording and appearance?
    - Should the website be interactive?
- What should be contained on the site?
- What content would be appropriate?
- Comments on:
    - FAQ section
    - Panic functionality
    - Quick question application

Appendix 4: Advertising Poster for the Just Ask! Text messaging service

Annexes

Annex 1: List of contacts

- Mr Tsoka: Health Promotion Director at MoHCW
- Mr Kadzere: Strategy and Policy Development Officer at MoHCW
- Ms Helen Machimbirike: Adolescent SRH Program Officer at ZNFPC
- Mr Ashton Dube: Web designer at 7G Media
- Mr Kinah Muzvidzwa: Programmer
- Dr Munhongo: Director of Technical Services at ZNFPC
- Mr Jonathan Muchuchu: Program Manager at Childline Zimbabwe
- Miss Shawatu: Head teacher at Arundel Girls High School
- Miss Maraire: Senior Teacher at Ellis Robins Boys High School
- Mr Chaongora: Deputy Headmaster at St Johns High School
- Miss Hobwani: Life Skills Facilitator at St Johns High School
- Ms Jemwa: Senior Mistress at Highfields High School 1
- Love Nordenmark: Situational and market analyst for UMO
- Jeffrey Allen: Programme Coordinator at OneWorld UK