



**ADDIS ABABA UNIVERSITY
FACULTY OF INFORMATICS
HEALTH INFORMATICS PROGRAMME**

**INTERNET-BASED TECHNOLOGIES AS SOURCE OF SEXUAL
AND HIV/AIDS RELATED HEALTH INFORMATION AMONG
ADDIS ABABA UNIVERSITY STUDENTS**

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Table of Contents

Contents	Page No
Acknowledgement.....	I
Table of Content.....	II
List of Tables.....	IV
List of Figures.....	V
List of Annexes.....	VI
Acronyms and Abbreviations.....	VII
Abstract.....	VIII
Chapter One: Introduction	
1.1. Background.....	1
1.2. Statement of the problem.....	2
1.3. Research Objectives.....	4
1.3.1. General Objectives.....	4
1.3.2. Specific Objectives.....	4
1.4. Hypothesis.....	5
1.5. Scope of the Research.....	6
1.6. Significance of the Study.....	7
1.7. Rationale for the study.....	7
1.8. Operational Definitions.....	8
Chapter Two: Literature Review	
2.1. Overview of HIV/AIDS prevalence and its impact on Ethiopia.....	10
2.2. Adolescence and sexual health situations in AAU.....	11
2.3. Sexual health and HIV/AIDS education for youth and students.....	13
2.4. General health information needs and sources for students.....	15
2.5. Internet-based sexual health information sources for students.....	16
2.6. Existing sexual health information provision in AAU.....	17
2.7. Internet infrastructure and service situation in AAU.....	19
2.7.1. AAU Internet infrastructure situations.....	19
2.7.2. AAU Network and internet Services.....	22
Chapter Three: Research Methodology	
3.1. Study Design.....	23
3.2. Study Area.....	23
3.3. Study Population.....	23
3.4. Sampling Procedures.....	24
3.5. Sample Size Determination.....	28
3.6. Data Collection Procedures.....	29
3.7. Data Analysis Procedures.....	30
3.8. Data Quality Management.....	31
3.9. Study Variables.....	32
3.10. Ethical Consideration.....	33
3.11. Dissemination of results.....	33

Chapter Four: Data Presentation and Results	
4.1. Socio-demographic characteristics of the respondents.....	34
4.2. Level of departmental computer and internet access of the respondents.....	36
4.3. Technical skill, interest and awareness level of the respondents	37
4.4. Internet usage experiences of the respondents.....	38
4.5. Internet usage purposes of the respondents.....	41
4.6. Internet as source of health, sexual health and HIV/AIDS information.....	42
4.7. Technical ways of accessing internet for sexual and HIV/AIDS information.....	43
4.8. Factors associated with utilization of internet-based sources for sexual and HIV/AIDS related health information.....	47
4.9. Comparison of level of significance of difference of access, skill and utilization level across streams.....	51
4.10. Challenges of using internet-based sources generally and specifically for sexual and HIV/AIDS information among respondents.....	52
4.11. Existing alternative sources of sexual and HIV/AIDS related information.....	55
4.12. Attitude of respondents towards internet-based sources for sexual and HIV/AIDS information.....	56
Chapter Five: Analysis and Discussion.....	57
▪ Strengths and Limitations of the study	
○ Strengths.....	63
○ Limitations.....	63
Chapter Six: Conclusion and Recommendation	
6.1. Conclusion.....	64
6.2. Recommendations.....	66
References.....	68
Annexes.....	71

List of Tables

	Tables	Page No
Table 1:	Internet backbone infrastructure of faculties/colleges of Addis Ababa University	21
Table 2:	List of sampled AAU undergraduate departments where questionnaires are distributed and collected, June 2009	27
Table 3:	Socio-demographic characteristics of undergraduate students of AAU, n=774, June 2009	35
Table 4:	Level of departmental computer and internet access among undergraduate students of AAU, n=774, June 2009.	36
Table 5:	Knowledge, demand and awareness level of computer and internet applications for sexual health information among undergraduate students of AAU, n=774, June 2009.	38
Table 6:	Internet usage experiences among undergraduate students of AAU, n=774, June 2009.	39
Table 7:	Internet users for general health, sexual and HIV/AIDS related information among undergraduate students of AAU, June, 2009	43
Table 8:	Comparison of utilization of internet for sexual and HIV/AIDS related information by different factors among undergraduate students of AAU, June, 2009	48
Table 9:	Comparison of awareness level of students about internet-based sources for sexual health information by different factors among undergraduate students of AAU, June, 2009	50
Table 10:	Comparison and Chi-Square test of variables across streams among undergraduate students of AAU, June, 2009	52

List of Figures

	Figures	Page No
Figure 1:	Sampling frame of study subjects of regular undergraduate students of AAU	26
Figure 2:	Internet access facility by stream among undergraduate students of AAU, n=774, June 2009.	37
Figure 3:	Internet usage experiences among undergraduate students of AAU by stream, June 2009	39
Figure 4:	Frequency of internet usage among internet users of undergraduate students of AAU, June 2009	40
Figure 5:	Source of internet access among internet users of undergraduate students of AAU, June 2009	41
Figure 6:	Purposes of internet usage among undergraduate students of AAU, June 2009	42
Figure 7:	General health information usage areas among internet users of undergraduate students of AAU, June 2009	43
Figure 8:	Potential reasons of using internet for sexual and HIV/AIDS related health information among undergraduate students of AAU, June 2009	44
Figure 9:	Technical ways of accessing internet for sexual and HIV/AIDS related health information among internet users of undergraduate students of AAU, June 2009	45
Figure 10:	The reasons why sexual information users use internet as source of their information among undergraduate students of AAU, June 2009	46
Figure 11:	Potential challenges in using internet for sexual and HIV/AIDS related information among undergraduate students of AAU, June 2009	54
Figure 12:	Existing alternative sources of sexual and HIV/AIDS related information among undergraduate students of AAU, June 2009	55
Figure 13:	Attitude of students towards internet-based sources for sexual and HIV/AIDS related health information among undergraduate students of AAU, June 2009	56

List of Annexes

	Annexes	Page No
Annex 1:	Questionnaire for AAU undergraduate students	71
Annex 2:	Interview guide questions	76
Annex 3:	Addis Ababa University Faculty/College and Internet Access Backbone infrastructure	77
Annex 4:	List of Streams, departments and Faculty/College of the Undergraduate Programme, AAU	78
Annex 5:	Enrollment of regular undergraduate students, 2008/09 Academic year	80

List of Acronyms and Abbreviations

AAU:	Addis Ababa University
AIDS:	Acquired Immuno-Deficiency Syndrome
CI:	Confidence Interval
ERP:	Enterprise Resource Planning
ETC:	Ethiopian Telecommunications Corporation
FBE:	Faculty of Business and Economics
FJC:	Faculty of Journalism and Communication
FTP:	File Transfer Protocol
HIV:	Human Immunodeficiency virus
HRM:	Human Resource Management
HTTP:	Hyper Text Transfer Protocol
ICT:	Information and Communication Technology
ICTDO:	ICT Development Office of AAU
ILS:	Institute of Language Studies
MARCH:	Modeling and Reinforcement to Combat HIV/AIDS
MPLS:	Multi Protocol Label Switching
NGO:	Non-Governmental Organization
OR:	Odds Ratio
UNAIDS:	United Nations AIDS
UNICEF:	United Nations Children's Fund
URL:	Uniform Resource Locator
USAID:	United States Agency for International Development
UTP:	Unshielded Twisted Pair
VPN:	Virtual Private Network
WHO:	World Health Organization
WWW:	World Wide Web
SPSS:	Statistical Package software for Social Sciences
STD:	Sexually Transmitted Diseases

ABSTRACT

Background: Internet-based sources are gaining recognition as a powerful and low cost method to deliver health related intervention information. In AAU, there is an increasing trend of network and internet services expansion to both students and staff, which greatly fosters the access to any kind of information including sexually and HIV/AIDS related health information within the university. In order to plan for internet-based health information intervention and allocate the resources efficiently in the university, assessment of its level of availability, patterns and utilization is preliminarily required.

Methods: A Cross-sectional survey study method was used to determine the utilization level among undergraduate students of AAU. Self-administered questionnaire was used to collect quantitative data from 929 randomly selected eligible students. Moreover, in-depth interview was conducted to 25 selected students to support the quantitative results. On site observation was also used. Cross tabulation, Logistic regression and Chi Square tools were used for quantitative analysis. And categorization and interpretation of interviewed data were applied to support the quantitative data.

Results: Of the total 929 students selected, 86% (803) of them responded and 774 were analyzed. Of the total respondents, 86% (666) of them had ever used internet recently at least once, 39% (300) of them using it for general health information and only 22% (169) of them used it to access sexual and HIV/AIDS related health information. However, only 5% of them used digital technologies like compact disk to access sexually related health information. As their awareness, internet skill and access increased, so did their relative odds of utilization of the technologies for sexual and HIV/AIDS information, which is also significantly associated with their stream and interest to use the technologies.

Conclusion: Although the actual utilization of internet-based and digital sources for sexual and an HIV/AIDS purpose is low, it can be a promising strategy to use it in delivering such contents of information effectively and efficiently by expanding its access. Moreover, most students are quite aware and interested to use it for accessing sexually and HIV/AIDS related health information.

Keywords: Internet-based sources, Sexual health information, HIV/AIDS information

CHAPTER ONE

INTRODUCTION

1.1 Background

One of the severe epidemic health problems killing millions of productive young generation in Ethiopia and most Sub-Saharan Africa is HIV/AIDS disease. It is a major and serious health problem in Ethiopia, perhaps following only the leading health crisis, which is the threat of famine (Abdulhamid, 2008). There is currently an estimated 2.2 million people living with HIV/AIDS virus in Ethiopia with the highest prevalence rates attributed to youth between 15 to 24 years of age (UNAIDS 2008). HIV/AIDS is affecting young societies especially adolescents between the age of 15 to 24 who are vulnerable and at risk of the disease. A huge proportion of world's population, which is more than 1.5 billion, is young aged between 10 and 24 years, that is in their adolescence age level (ibid). Young people aged 15 to 24 accounted for an estimated 45% of new HIV/AIDS infections world wide in 2007 and they need to know how to protect themselves and the prevention mechanisms (WHO, 2008). It is also estimated that most regular undergraduate university students lie within the age range of 18 to 24. Moreover, the extent of susceptibility of this age group tends to increase because they leave their homes and parents for university life at that sensitive and crucial age (UNICEF, 2008). In order to reduce its prevalence, one of the actions set and designed by UNICEF Ethiopia is through using intensive engagement of university students in HIV/AIDS prevention and peer education (ibid).

University students are also part of a group of this young population who are going to be involved in different job sectors. It is this age group that is also highly vulnerable and at risk of sexuality and HIV/AIDS diseases. And researches show that prevention mechanisms through education, training and awareness creation are the most effective and efficient ways of alleviating the problem. So the availability of proper literacy and adequate training regarding sexual and HIV/AIDS related health information issues is unquestionable. Irrespective of the mechanism and means of the medium, access to relevant sexual and HIV/AIDS related information is a critical issue among young

population of any country. There are different kinds of medium and channels to disseminate such content of information for the users. Printed materials, broadcast media and internet based sources are among the major sources by which any kind of information is delivered. Each of these medium has their own merit and demerit depending on the need, access and convenience for the user. However, though its limitations, internet-based and digital sources of information are getting great interest among young users due to its versatile form, easy adoption and accessibility (Ybarra et al., 2006).

1.2 Statement of the problem

According to findings of Avert organization (2008), one of the factors that contribute for the prevalence of HIV/AIDS disease in the young age group is the lack of behavioral change. A method for effective behavioral change among this age group includes persistent sexual health education and adequate knowledge on the issue. And most of the sources of information in the university, with the exception of medical profession, as far as HIV/AIDS is concerned, is the media like radio, TV, newspapers and other persons (Abebe, 2008). The existing information medium that are utilized to educate and aware students about sexual and HIV/AIDS related information in AAU is by using books from libraries, booklets, posters, magazines notice boards, pamphlets, and public announcement. These sources are expensive to scale up, and it doesn't allow users to identify a stigma-free, anonymous atmosphere in which to receive individually tailored information (Ybarra *et al.*, 2006). Despite the fact that it can communicate the message, it has also its own limitations. For instance most of the published books available in libraries are out of date and are centrally located. So that it is difficult to be accessed by anyone at any time. The access to international broadcast media sources is also very expensive and is not convenient to access as needed even for an ordinary people in developing countries like Ethiopia. In addition, the information delivery using these methods is not in a proactive, demand-based and private manner. There are versatile student issues which they want to access it securely and timely in a specific period of time. In a country like Ethiopia, the concern to access an up-to-date, reliable and with quick access to information is at its infancy period due to unavailability of adequate and accessible information sources.

Most regular undergraduate students of Addis Ababa University are estimated to be within the age of 18 to 25 and it is within this age group that the prevalence of living with HIV/AIDS disease becomes so high. Nowadays, internet technologies are gaining fast recognition as a powerful and low cost method to deliver health intervention and prevention programs to large numbers of young people across diverse geographic regions (Michele, 2006). In relation with this, according to preliminary assessment of internet infrastructure of the university, though the access to computers and internet is not adequately proportional to the total number of students, there is an established internet access facility to undergraduate students through their libraries or computer laboratories besides outside internet access like internet cafés. And as a result of this access, there is a high opportunity and potential of using these technologies for general purposes as well as for sexually and HIV/AIDS related health information. However, there is a gap and lack of adequate researches done about the level of utilization, demand and access of these technologies for sexually and HIV/AIDS related health information purposes.

Lack of resources like financial, skilled manpower and well equipped technologies are parts of constraints for achieving full internet access in the university. To determine the utility of developing technology-based interventions in this resource-limited settings, availability and patterns of usage of the internet is first need to be assessed (*ibid*, 2006). This is to mean ICT resources like technically skilled manpower, finance and related equipments which are scarce and limited which needs efficient allocation. Considering the internet as an efficient alternative source of information, exploring and understanding its existing situation is a basic issue before designing or implementing it for any kind of information provision including sexual and HIV/AIDS related information. Therefore, an empirically tested and research proven assessment needs to be undertaken preliminarily in order to determine whether these technologies are utilized or not generally and specifically for sexual and HIV/AIDS related health purposes. Moreover, bridging the knowledge gap is crucial in planning for demand based and technology based alternative source of sexual and HIV/AIDS related health information delivery and appropriate distribution of resources like internet access within the university community.

1.3 Research Objectives

1.3.1 General Objective:

The general objective of this research is to assess the utilization of internet-based technologies as source of sexual and HIV/AIDS related health information as well as the factors associated with utilization of internet-based technologies among undergraduate students of Addis Ababa University.

1.3.2 Specific Objectives:

The specific objectives of this research study are:

- To identify the factors which associate with utilization of internet-based sources for sexual and HIV/AIDS related health information among the students;
- To assess the general purposes of utilization of internet-based technologies and technical ways of access for sexual and HIV/AIDS related health information;
- To identify whether there is a significant difference of utilization of internet-based technologies for sexual and HIV/AIDS related health information and the factors associated with it between streams;
- To identify the major challenges that students are currently facing in using these technologies generally and specifically for sexual and HIV/AIDS related health information as well as to identify the existing alternative sources of information;
- To assess student's attitude, perception and knowledge about these sources and raise potential points in order to efficiently utilize these technologies for sexual and HIV/AIDS related health information purposes.

1.4 Hypothesis

In line with the general and specific objectives of the research, review of related literature in the area having similar ICT infrastructure like Uganda (Ybarra, et.al, 2006), Nigeria (William, 2007) and Tanzania (Ireneus, 2004), and from previous observation, the following are some of the assumptions and suppositions identified and hypothesized by the research investigator. These hypotheses are preliminary assumptions of the research investigator which needs and is going to be proved and tested through out the process of this research endeavor in order to assure its validity.

Hypothesis 1: The utilization of internet-based and digital technologies for sexual and HIV/AIDS related health information is assumed to be very low among the students;

Hypothesis 2: The reason for its low utilization is assumed to be due to lack of internet access and awareness to utilize the technologies;

Hypothesis 3: There exists a significant difference of utilization of these technologies for sexual and HIV/AIDS related information between streams or field of studies;

Hypothesis 4: Most students highly depend and use the existing alternative sources of sexual and HIV/AIDS related health information like printed and public health campaigns better than internet-based and digital sources of information due to the above problems indicated in hypothesis 2.

1.5 Scope of the Research

This research is specifically limited to study the level of demand, access and utilization of internet-based technologies as source of sexual and HIV/AIDS related health information purposes among undergraduate senior students of AAU. Moreover, though it will generally assess the utilization of digital technologies like compact disk technologies on a higher level, it will highly focus to assess the utilization of internet-based technologies and their factors due to better exposure and access to these technologies among students. This research will focus mainly on the regular undergraduate students of AAU because as indicated in the introduction part, it is during this age group (18 -24) that the both the incidence and susceptibility of HIV/AIDS disease is higher and the development of sexual health behavior start to develops. Moreover, the study will particularly focus on senior batch class of students due to the reason that they have a better duration of experience and exposure to the university community and the available sources of sexual and HIV/AIDS related health information in the university. It excludes extension, postgraduate and first year or preparatory regular students who stay in the university for less than a year. It also excludes blind students who can't read the questionnaire. The other thing that needs to be emphasized in this research is that this research is not intended to evaluate the reliability and credibility of sexual health information sources especially sources which are located outside Ethiopia. However, it focuses on the general application of any sources of internet-based and digital technologies as source of sexual and HIV/AIDS related information including local sources like AAU-MARCH and AIDS Resource Center, or other international sources like WHO, UNICEF and UNAIDS where the authorship and the publishing body is recognized and the information is reliable, valid and credible for the user.

1.6 Significance of the study

The potential role of the national ICT capacity building initiative and the fundamental role that universities could play in effectively utilizing it should be improved in order to educate and advance the HIV/AIDS prevention (Abebe, 2008). This research is meant to have a couple of significances pertaining not only for AAU community but also for young students involved in other higher learning institutions at nationwide level, which have similar circumstances and scenarios. Initially by identifying and analyzing the level of utilization, awareness and demand for internet-based technologies as source of sexual information, it triggers information providers either within the university or outside to think and look differently for alternative sources and new ways of providing sexually and HIV/AIDS related information as well as it helps the university decision body to examine the needs in allocating and provision of resources. Secondly, the study will have an ultimate significance for students to know the availability of these technologies as source of sexual health information and to aware them about what is expected from them to utilize the technology. It is also the researchers strong believe that the research by providing a basis in the area of internet-based interventions, could invite other individuals, government organizations and NGOs to play their role.

1.7 Rationale for the study

It is shown that HIV/AIDS is highly epidemic among youngsters in their adolescent period between the ages of 15 to 24, which most university student's age lays. And it is this age group who will takeover the country and be involved in different production sectors. So protecting the health of this age group is unquestionable in order sustain the productive manpower for future. It is also believed that access to education, training and awareness creation are effective and efficient means of prevention mechanisms to alleviate the problem. Among the many and widely available sources of sexual and HIV/AIDS related health information, internet-based sources are also gaining recognition by the young age group and students, who are relatively the early adopters of new technologies than the elders (William, 2007).

The major rationale for undertaking this research among undergraduate senior students of AAU is to take advantage of and efficiently utilize the current access of internet services as an alternative source of sexual and HIV/AIDS related health information besides the existing available information sources like billboard, posters, notice boards, pamphlets, and public announcement. The internet, in particular, provides innovative opportunities for engaging youths, including hard-to-reach populations and those turned off by traditional health-education approaches (Harvey, 2003). The technology opens immense advantages for reaching out to wider and larger audiences through distance modes of delivery like using online learning resources (Abebe, 2008). Moreover, during their stay in the university, students besides their educational academic work and assignments, seek different kind of information regarding political, economical, social, cultural, entertainment and personal information. Health issues are also gaining an important aspect of information need among students. Therefore there is a significant potential of using internet based and digital technologies for general health purposes including sexually and HIV/AIDS related health information.

1.8 Operational Definitions

The following are list of operational definitions which have a direct semantic relation with the study or technical terms used throughout this study.

- **Internet or Internet-based technology:** is a technology with "network of networks" that consists of millions of private and public, academic, business, and government networks of local to global scope that are linked by copper wires, fiber-optic cables, wireless connections, and other technologies. The Internet carries various information resources and services, such as electronic mail, online chat, file transfer and file sharing, online gaming, and the inter-linked hypertext documents and other resources of the World Wide Web (W/W/W) (Wikipedia, 2008).
- **Stream:** refers to the general category of field of studies or departments into social science, natural science, health science or technology and informatics streams.

- **Information and Communication Technology (ICT):** is an umbrella term that includes all technologies for the manipulation and communication of information. The term is sometimes used in preference to Information Technology (IT), particularly in two communities: education and government (Wikipedia , 2008).

- **Technical Skill:** refers to the experience, know how and skill of operating of computers and internet applications among students.

- **Senior Class students:** these are students who are enrolled in the regular undergraduate programme of AAU and stayed in the university for more than a year.

- **Digital Technology:** is a modern technology, unlike the analog one, which keeps data into bits of data or binary form by using the numbers 0 and 1 in a specific sequence. Digitalization allows any variety of information, whether it is text, graphics, sound or video, to be delivered at high speeds in the same basic format. Digital production improves quality, enables copies to be made without deterioration and gives faster transfer speeds of increased amounts of information over networks (Simon, 1997). Digital technologies in this study involve compact disk technologies like CD-ROM (Compact Disk Read Only Memory) and DVD (Digital Versatile Disk).

- **Fiber Optics Cable:** An optical fiber (or fibre) is a glass or plastic fiber that carries light along its length. It has large bandwidth compared with UTP and other copper wires.

- **Search Engine:** A program that searches documents for specified keywords and returns a list of the documents where the keywords were found. Although search engine is really a general class of programs, the term is often used to specifically describe systems like Google, Alta Vista and Excite that enable users to search for documents on the World Wide Web and USENET newsgroups (Webopedia, 2008).

CHAPTER TWO

LITERATURE REVIEW

In this chapter, different studies pertaining to this research topic and related in some way are reviewed. It will first provide an overview of the prevalence of HIV/AIDS in general and specifically to Ethiopian context. And the second topic will discuss about adolescence and the sexual health situations of AAU students. In relation with this, it will examine the issues of general health information needs and information sources including sexual health education and its relationship with students and youngsters. The Internet-based information sources and its availability in the university will also will be discussed in the next topic. And finally attempts were made to explore the availability and current existence of network and internet services in AAU which is the basics and has an impact on assessing utilization of internet generally and specifically for sexually and HIV/AIDS related health information delivery.

2.1 Overview of HIV/AIDS Prevalence and its impact on Ethiopia

According to report from UNAIDS (2008), the number of people living with HIV was estimated to be 980,000 in 2007 and out of it the adult (aged 15 to 49) HIV prevalence was forecasted to be 91% (890, 000) with a 2% prevalence rate. HIV/AIDS prevalence rate is 2.6% among women and 1.7% among men (ibid). The adult HIV prevalence rate in urban areas is estimated at 7.7% compared to 0.9% in rural areas (ibid). The regions with the highest prevalence rate include Gambela with 8.3% and Addis Ababa with 7.5%. Both facility based antenatal clinic data and population-based survey data indicate that HIV prevalence rate is at least five times higher in urban than in rural areas (FMOH, CSA, 2006). This high prevalence rate has many impacts on the young society of the country. Schools are heavily affected by HIV/AIDS which is a major concern because schools can play a vital role in reducing the impact of the epidemic, through education and support (Avert, 2008). HIV/AIDS dramatically affects labor, setting back economic activity and social progress (ibid). The vast majority of people living with HIV/AIDS in Ethiopia and

most African countries are between the ages of 15 and 49, in the prime of their working lives and at the production stage. Employers, schools, factories and hospitals have to train other staff to replace those at the workplace who become too ill to work (ibid).

Although there is lack of study done on the prevalence of HIV/AIDS in many of the higher education institutions, it is possible to estimate its prevalence from the national statistical data (Abebe, 2008). The relationship between HIV/AIDS and the education sector is circular in that as the epidemic worsens, so does the education sector, which in turn is likely to increase the incidence of HIV/AIDS transmission (Avert, 2008). There are numerous ways in which HIV/AIDS can affect education, but equally there are many ways in which education can help the fight against AIDS (ibid). The extent to which schools and other education institutions are able to continue functioning will influence how well societies eventually recover from the epidemic (ibid). Data gathered in recent years suggests that the epidemic in Ethiopia has stabilized (UNAIDS, 2008), which is thought to be largely due to intensive HIV/AIDS prevention advocacy and campaign programme.

2.2 Adolescence and sexual health situations in AAU

The sexual health and adolescence situations are inter-related issues of young age group. Most of the sexual needs of young age groups are higher during their adolescent period (Bruk, 1995). According to Williams *et al.* (2007), adolescence is quoted as:

“Adolescence is a critical period of human development often characterized by confusion, mixed interpretation and understanding of adult behavior and environment, exuberance and a penchant for experimentation, especially with drugs, alcohol and sex. This stage of development is accompanied by an upsurge of sex drives, the development of sexual values, and the initiation of sexual behavior. The key concern about the health of young people is the extent to which they have access to resources that promote their development. Access to Information and communication services is now seen as a universal right, and the United Nations is advocating for a global initiative for such access within this decade.”

Addis Ababa University, which is the oldest and pioneer academic institution in Ethiopia, enrolls thousands of students from all regions of the country. And most of them from the regular undergraduate programme are estimated to be within the age group of 18 to 24, when their sexual health needs starts to develop. According to the definition of WHO (1975), sexual health is stated as:

“Sexual health is a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence.”

The sexual and reproductive health needs of adolescents differ from those of adults, and remain poorly understood and inadequately served in many parts of the world (William, 2007). They often want to discuss topics, such as, physical fitness, stress, nutrition, STDs, HIV/AIDS, alcohol, good eating behaviors, and contraception with their councilors. And younger adolescents are embarrassed, afraid or uncomfortable of discussing certain private health issues like sexuality and contraception (ibid). They have specific health and development needs, and many face challenges that hinder their well being, including poverty, a lack of access to health information and services and unsafe environments (ibid). Interventions that address their needs can save lives and foster a new generation of productive adults who can help their communities progress (WHO, 2008).

In AAU, it is estimated that there are more than 60% of undergraduate regular students who have an experience of sexual engagement at least once during their stay in the university (Getinet, 2008). The major factors which strongly contribute for this high prevalence of the situation include peer or partner pressure, normative pressure of the university, lack of money and initial student’s expectations (ibid). In addition, most of them have multiple sexual partnerships either within the university or outside the university experiencing double dating with multiple partners (ibid, 2008). Moreover, the study shows that most of them don’t have enough knowledge and awareness about the cause of transmission of HIV/AIDS disease as well as its prevention mechanisms.

For instance, some of them tend not to use condom during their sexual intercourse and don't have the regular tendency for HIV/AIDS counseling and testing (ibid). Addressing the needs of young people, and promoting healthy sexual and reproductive development, maturation and behavior, undoubtedly represent a considerable challenge for many countries (UNICEF, 2008).

2.3 Sexual Health and HIV/AIDS Education for youth and students

One of the most economical and effective means of HIV/AIDS prevention is education, involving young people themselves in the HIV/AIDS prevention effort (Avert, 2008). Sexual health and HIV/AIDS education to young students is crucial in that it prevents them from becoming infected from the disease as well as to reduce behavior of stigma and discrimination (ibid). Bruk (1995) defines health education as:

“Health Education is concerned with the health –related behaviors of people. Therefore, it must take into account the forces that affect those behaviors, and the role of human behavior in the promotion of health and the prevention of disease. As a profession, it uses educational processes to effect change or to reinforce health practices of individuals, families, groups, organizations, communities, and larger social systems. Its intent is the generation of health knowledge, the exploration of options for behavior and change and their consequences, and the choices of the action courses open and acceptable to those affected.”

Sexual health education, which is the right of every individual, is also one key part of general health education especially for youngsters in order to make and decide informed choices (WHO, 2008). It is further described as:

“.....For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled. It includes the right of all persons, free of coercion, discrimination and violence, to sexual education. In order to make informed sexual health care choices, clients must make decisions about sexuality and sexual practices. For example, people's attitudes toward sexuality influence their contraceptive choice, how effectively the method is used, and their satisfaction with the method.”

Adolescents struggle with lack of knowledge about reproductive health and healthy sexual relationships (Williams, 2007). The main aim of sexual health education is to reduce the risks of potentially negative outcomes from sexual behavior, like unwanted or unplanned pregnancies and infection with sexually transmitted diseases, and to enhance the quality of relationships. Among young people, two in five have changed their behavior because of information they found online (Kaiser, 2002). It is also about developing young people's ability to make decisions over their lifetime and it is important not to delay providing information to young people but to begin when they are young (Avert, 2008).

Most countries in the world offer teens some sort of sexual health and HIV/AIDS education in their schools at some stage (Avert, 2008). These educations can also be targeted at young people in non-school environments through their peers, through the media, and through doctors or their parents. In some countries, individual schools are allowed to determine what AIDS education they will offer. In other countries, this is determined by legislation passed by central government (ibid). And in the context of developing or poor countries like Ethiopia that are severely affected by HIV/AIDS, sexual health and HIV/AIDS education is imported by foreign governments, charities and NGOs that come in to the country and deliver the education as part of a larger package of HIV/AIDS prevention work (Irenus, 2004). Many countries have tried some form of HIV/AIDS education advertisements, films, or announcements. There are, however, problems with media-based campaigns. Although the debate continues about how much, if any, the young people should receive about HIV/AIDS education, studies continue to show that being informed about the facts and the dangers of HIV/AIDS enables young people to protect themselves and is a crucial tool in the battle against the disease (Avert, 2008). There is no cure or vaccine for HIV/AIDS, so prevention is the only way in which we can place any limits on the epidemic. Providing information through sex education is therefore about finding out what young people already know and adding to their existing knowledge and correcting any misinformation they may have (ibid). Therefore with the support of relevant sources of information, it is believed that the sexual health right of individuals will be supported practically.

2.4 General Health Information needs and sources for students

Patients and the general public have become increasingly interested and want more information about health and illness (William, 2007). People want to access different health information sources for versatile reasons. The reasons to access information sources for health purposes include current health news, sexual health issues, HIV/AIDS, issues about general disease and medicine, physical fitness, family planning, psychological information and information about diet or nutrition (ibid). Different health related organizations provide information in a variety of ways for the users. Although such information is available from a variety of sources such as the media, books, leaflets and videos, there is a steady stream of new material on compact discs (such as CD-ROM and DVD) and on the internet. Although the internet and particularly the web have rapidly become a major source of information about health and illness, the quality of information varies (Simon, 1997).

There are different mechanisms and medium to disseminate any kind of information for the users. Printed materials, broadcast media and internet-based sources are the major forms of information provision currently used worldwide (ibid). There are diverse published books and journals available in different information sources like libraries and information centers. There are also different sources of information available in audio-visual forms too, like Television and radio. Young people get information about sexuality, sexual health and HIV/AIDS related health information from a wide range of sources including each other, through the media including advertising, television and magazines, as well as leaflets, books and websites which are intended to be sources of information about sex and sexuality (ibid, 1997). However, in the context of the user, each of the medium has their own merit and demerit depending on the interest and ability of the user. Some of these may be appropriate and some of them may be inappropriate. The perceptive way forward is to develop multimedia and internet-based health information materials to meet the needs of target groups within a population. This doesn't imply that traditional resources such as leaflets, booklets, posters and videos should be abandoned (ibid).

2.5 Internet-Based Sexual Health Information Sources for students

Internet-based technologies are used as source of information which carries various information resources and services, such as electronic mail, online chat, file transfer and file sharing, online gaming, and the inter-linked hypertext documents and other resources of the world wide web (Wikipedia, 2008).

It is recognized that young people and students have difficulties of accessing traditional health information sources whereas the internet offers them confidential and convenient access to an unprecedented level of information about a diverse range of subjects (Nicola, 2004). Youths' and students' traditional sources of health information are no longer satisfying their needs, and they are increasingly using the internet for health related information (Harvey, 2003). Given its reach and its potential to deliver both global connections and locally-tailored materials, the internet represents a major opportunity for health improvement, which has a potential to equip people with information about their health, allowing them to take greater responsibility for it, challenging traditional relationships and influencing professionals to offer new types of services (Kassirer, 2000). As the technology becomes increasingly integrated into daily life, the concept of electronically accessed health information will become more acceptable to both health professionals and the public (Simon, 1997). Internet resources such as web pages, bulletin boards, newsgroups, listservs, and chatrooms found on the internet contain health information for a potentially large number of participants world wide (William, 2007).

Internet-based technologies are getting great interest among students and young users due to many advantages like its versatility, interactivity, easy to use and keeping privacy even if there exists some misunderstanding (Ybarra, et.al, 2006). Considering the attributes of cheapness, availability, ease of use and confidentiality of online resources, young's information needs may better be served by the internet, which allows them to explore sensitive topics which they may want to reveal parents, relatives, friends and health professionals (William, 2007). One of the advantages of internet-based sources for sexual and HIV/AIDS related health information than traditional ones is its privilege on

anonymity where the public can research sexual health concerns without having to be identified and youngsters are the early adopters of new technologies (ibid). Another distinct advantage of these sources is their potential for enhanced outreach in providing electronic health services to the community (Harvey, 2003). Other benefits include its low cost of dissemination of information, inexpensive color publishing, easy to update, relevancy, interactivity, customization of information, real-time communication with geographically remote individuals (chat) and linking to other resources of interest (Chris, 2007). In relation to this, the importance of internet-based sources is very important for the young society including students, who are highly in need of and easily adaptable to the technology.

2.6 Existing Sexual Health Information Provision in AAU

According to the discussion made by Abebe (2008), there are a number of opportunities that higher education institutions must seize for an effective response to HIV and AIDS. Moreover, it requires higher institutions to be more relevant and proactive in content and approach as well as more efficient and responsive in their operations. Although there is lack of coordinated and centralized direction from the university administration body, there are different efforts done from the university side to educate and develop the awareness of students about sexual and HIV/AIDS related health information in cooperation with other non-governmental organizations and charity organizations. For instance, one of the university affiliated project, AAU-MARCH, funded by PERFAR from USA through USAID, is working to encourage desirable behavioral change among the university community especially among students. The goals of this project are to promote behavioral changes that reduce the risk of HIV/AIDS infection and transmission and to create normative environments in which behavioral changes can be sustained (AAUMARCH, 2008).

Behavioral change goals appropriate to the target population in each country are identified and include abstinence, delay initiation of sex, mutual monogamy, condom and contraceptive use, use of HIV counseling and testing, use of prevention of mother to child

transmission and treatment services, adherence to recommended treatments, and care and support for infected and affected families. The MARCH strategy is built on two fundamental principles of behavior change, modeling by showing people how to change and reinforcement, supporting them in their efforts to change. Building on theory and past research, the MARCH strategy combines key aspects of individual behavior change with efforts to change social norms using two main program components: 1) entertainment (e.g., serial drama) as a vehicle for education using broadcast media, and 2) interpersonal reinforcement and mobilization at the community level. Although formal evaluation assessment is not conducted on the programme's effectiveness of behavioral change, there are wide indications of its utilization and optimistic attitude among the students.

According the dean's office of AAU, the other means of information provision related with sexual and HIV/AIDS health information is through AAU student dean's office in collaboration with other local and international NGO's. It is also observed that the office prepares an awareness creation and orientation programme in the form of public health campaigns especially for new intake of undergraduate students who come join the university from different regions. Moreover, it has the potential of reaching other senior students where it creates an atmosphere where all students from different regions, field of study and batches can meet and discuss about the situation so that more students can participate in the programmes.

Generally, the above available sources and other existing traditional information sources like libraries, books, booklets, billboard, posters, notice boards, pamphlets, and public announcement are currently serving as source of information for sexual and HIV/AIDS related health information within and outside of the university. However, even though there is lack of knowledge how far internet-based technologies are utilized in the university, which this study will answer it in future, there are some indications of utilization of these technologies as source of sexual and HIV/AIDS related health information in addition to other educational and academic purposes.

2.7 Internet Infrastructure and Service situations in AAU

2.7.1 AAU Internet Infrastructure situations

Strengthening capacity building of system development and human resources are indicated as one of the major areas for effective response including the national ICT network infrastructure expansion (Abebe, 2008). Although the introduction of internet services in Ethiopia is a recent phenomenon, which is first established in 1996, it is showing a steady advancement in the expansion of telecommunication and ICT infrastructure especially in urban areas both in terms of users and availability of services. Inline with the national ICT infrastructure expansion of the country, AAU is also broadening its network expansion project (both wired and wireless network) through out its campuses so as to improve its internet service access and services to the university community.

AAU has become to be one of the first and largest internet users in the country, and hosts the country's first internet hub connecting academicians, students and scholars. According to ICTDO of AAU (2008), internet access was first established in 2002 on the main campus. The overall ICT infrastructure development was carried out on a phase by phase basis. As part of the first phase project, four campuses (Main campus, FBE campus, Technology north campus and Science campus) have had network infrastructure installed that provides a limited service to staff and students. The installed network was designed for interconnecting laboratories, computer rooms, libraries and some offices within buildings of the four campuses. The link to the internet was provided by the ETC through a leased line or dedicated connection with an access router installed at the central ICT office. The speed of this link during that time was 1 Mbps.

The second phase of the project was dealt with infrastructure expansion to cover three more campuses (Faculty of Medicine, Technology south, and Faculty of Veterinary Medicine). The project mainly had used UTP and Fiber optics cable for the interconnection. And the final project deals with infrastructure expansion to cover all the remaining campuses creating the ground for new and state of the art services to the

university community. At the end of the third phase infrastructure project, the various campuses of the AAU will be connected through ETC VPN service. The 14 campuses of AAU, with a wide geographic distribution in and around Addis Ababa, at which the ICT services are and will be centralized include:

- **Main Campus:** hosts College of Social Science, College of Education, Faculty of Law, Institute of Language Studies, the Main (Kennedy) Library;
- **FBE Campus:** hosts Faculty of Business and Economics and Faculty of Informatics;
- **Technology North Campus:** hosts Faculty of Technology, School of Pharmacy , and Continuing and Distance Education Division;
- **Science Campus:** This hosts Faculty of Science, Geophysical Observatory, and the National Herbarium, School of Fine Arts and Design;
- **Tikur Anbessa Campus:** hosts the Faculty of Medicine, Nursing, School of Radiography, and medial laboratory;
- **Commerce campus:** hosts the college of commerce;
- **Zewditu Campus:** hosts school of Public health and school of Anesthesia;
- **Paulos Campus:** hosts nursing school ;
- **Dental Campus:** hosts the Dental health center under the Faculty of medicine;
- **Abune Petros:** hosts departments in the Faculty of Journalism and Communication;
- **Yared school of Music:** hosts music school;
- **Lideta Campus:** it hosts Faculty of Technology South (Building College) and the Institute of Pathobiology;
- **Debrezeit Campus:** hosts Faculty of Veterinary Medicine;
- **Akaki Campus:** hosts school of social work and some PhD programmes

These different campuses are interconnected to each other and to the internet using the universities network infrastructure. As shown in table 1 below and Annex 3 (attached), all the AAU campuses are connected through either fiber optics cable or wireless VPN in order to get these basic services. All but the recently acquired Akaki campus have had inter-

campus connection in the form of a hybrid wired and wireless connection for at least three years. There is a current effort underway, in collaboration with ETC, to convert the somewhat limited wireless connections to fiber. The main campuses (Main campus, Technology north campus, and Science campus) serve as the core of the network with redundant high speed connectivity. The connectivity devices (routers, switches, etc.) which were predominantly CISCO devices in the past were upgraded and converted a year ago to more capable, predominantly Huawei (a Chinese brand) devices through a donation from the Chinese company.

Table 1: Internet backbone infrastructure of faculties/colleges of Addis Ababa University

No	College/Faculty	Programme		Internet Access Backbone	Internet Access (UG)		Computer to Student ratio (UG)
		PG	UG		Library Access	Comp. Lab Access	
1	Social Sciences	X	X	Fiber Optics	X		1: 24
2	Business and Economics	X	X	>>>	X	X	1: 21
3	Science	X	X	>>>	X	X	1: 19
4	Technology	X	X	>>>	X	X	1: 3
5	Education	X	X	>>>	X		1: 26
6	Law	X	X	>>>	X		1: 5
7	Medicine	X	X	>>>	X	X	1: 3
8	Pharmacy	X	X	>>>	X	X	1: 3
9	ILS	X	X	>>>	X	X	1: 25
10	Informatics	X	X	>>>	X	X	1: 3
11	Veterinary Medicine	X	X	Copper wire	X	X	NA
12	Yared Music School		X	Wireless-F	X		NA
13	Fine Arts and design		X	Wireless-F	X	X	NA
14	SIST		X	Fiber Optics	X	X	1: 3
15	Commerce	X	X	Wireless	X	X	1: 15
16	RLDS	X		Fiber Optics	X	X	NA
17	Journalism and Commn.	X	X	Wireless-F	X	X	1: 16
18	Development Research	X		Fiber Optics	X	X	NA
19	Social Work	X	X	Fiber Optics	X	X	NA
20	CERTWID	X		Fiber Optics	X	X	NA
21	Educational Research	X		Fiber Optics	X	X	NA
22	IES	X		Fiber Optics	X	X	NA

UG: Undergraduate Programme

Key: PG: Postgraduate Programme

NA: Not applicable/available

X: Internet backbone available

Wireless-F: Upgrading from Wireless to fiber

The current internal network is connected to the internet via a 6Mbps link to the ETC exchange. The connection is managed internally through a gateway and protected from intrusion and virus and other attack by two firewalls. Within the various campuses there are numerous existing and new buildings that do not yet have access to the network. Connecting more and more buildings (and rooms within the buildings) is an ongoing process. Today there are about 6,000 nodes connecting end-users to the network.

2.7.2 AAU Network and Internet Services

According to ICT Development office (ICTDO) of AAU (2008), the basic network and internet services that the office provides include:

- Mail and Collaboration Services including Mail Relay
- Web and FTP Service (UNIX and Windows hosting)
- Managed Anti-virus Services
- File Print Services
- Library Automation Services
- ERP (Finance, HRM, Inventory and Procurement) Automation Services
- Registrar Automation Services
- Videoconferencing Services
- E-learning Services

All laboratories, computer rooms, libraries and almost all offices within buildings in the various AAU campuses are connected to the campus backbone and access the services provided by the central ICTDO of AAU. One of the major users and beneficiaries from these services are students. Although postgraduate students have better access to the service, there is an increasing trend of access to undergraduate students too through their libraries and computer laboratories. In addition to the free internet access, students can also get special assistance from attendants especially placed in the libraries, who give advice on how to surf and search for relevant material. It is being utilized for academic, research and personal purposes besides its potential use for sexual and HIV/AIDS purposes too.

CHAPTER THREE

RESEARCH METHODOLOGY

In this chapter attempts has been made to discuss about the general steps that were taken in the process of sampling procedures, sampling design, sampling frame, data collection tools, data quality management and data analysis methodologies that were used to find the results. The variables which were considered in the study are also depicted. Moreover, issues of ethical considerations and dissemination of the results will also be discussed in this chapter.

3.1 Study design

In this study triangulation of both quantitative and qualitative approaches were used. A cross-sectional survey study was used as part of the quantitative design to study this research problem in order to get multiple respondents' data at a time. Moreover, in-depth interview and on site observation methods were applied as qualitative data collection methods in order to support the quantitative data findings.

3.2 Study area

Addis Ababa University, consisting of 14 campuses, is running different programmes in both the undergraduate and postgraduate division. The study areas of this research mainly focus on students enrolled in different streams or field of study in the regular undergraduate programme. In doing so, the actual study touches different selected campuses like the Main campus, FBE campus, Technology north campus, Science campus, Tikur Anbesa campus, Zewditu campus and Paulos campuses of the University.

3.3 Study Population:

According to the main office of registrar of Addis Ababa University, there are currently 22,409 enrolled students in the regular undergraduate programme for the academic year of 2008/2009. These students were regarded as a reference population for the study. As described in the research scope in chapter 1, the actual study excluded all newly registered students who came from preparatory programme and blind students. The reason to exclude first year students is that they stayed in the university for less than a year and blind students can't read and answer the questionnaire by themselves.

3.4 Sampling procedures

A multistage sampling procedure was implemented in selecting representative sample for the study for the questionnaire part. In doing so, initially, all the list of undergraduate programmes, faculties and departments were identified from the main registrar office of the university. Then from the total population of the regular undergraduate programme, which is used as the reference population for the study, the sample size was determined by using the standard sample size determination techniques. Then the different departments and programmes became stratified and put into four homogenous streams based on their field of study or stream due to the assumption of similarity or homogeneous nature of the streams. Based on this the departments and programmes was grouped into 4 stratas of streams or field of study, which are social science, natural science, health science and technology and informatics. The total determined sample size was distributed equally to each strata or streams by using fixed allocation of sample size. Then from the stratified groups which consists of homogenous departments and programmes, simple random sampling was used to identify the departments and programmes to be included in the study design as long as the sample quota don't exceed. The departments were selected randomly according to the number of departments that exist within the streams. Based on this, five, seven, three and five departments were selected from natural science, social science, health science and technology and informatics streams respectively.

Then from the randomly selected departments or programmes, groups of senior batch sections of selected departments were identified. Then cluster sampling technique was used on these groups in order to select different sections of batches. These selected cluster groups was used as a study population for the research. The purpose of selecting senior batches class of students was due to their better duration of experience and exposure to the existing available sources of sexual and HIV/AIDS related health information within the university. This sampling procedure is diagrammatically shown in the figure 1 below.

The sampling procedures used to select study participants for the interview session were done purposively through identifying key student representatives from different faculties and colleges who have major role in providing more supporting information and who were not involved in the questionnaire data collection part. These interviewee samples were taken from the list of department and faculty student representatives through the office of student's union, which was used as a sample frame to select participants for interviewee. Based on this, about 25 study participants were involved for the interview data collection. They were primarily asked whether they were involved in the questionnaire data collection part or not before interviewees were conducted so as to eliminate and minimize the occurrence of duplication and repetition of data collection from same target sample population who were involved in the questionnaire part. Since the output of interview data was used as a support finding for the quantitative results, it has not a separate section for its data presentation and results, but it is described in the discussion and analysis part of this document by cross referencing, categorizing and integrating the related issues, findings and themes with the core themes and topics which were primarily identified in the quantitative data results and findings.

In order to get data from the on site observation, convenience sampling technique was used to observe internet access situations from department computer laboratories, libraries AIDS resource center, disability center and internet café. The data findings out of this observation were also discussed together with the outputs of the questionnaire and interview results in the discussion and analysis part of the document.

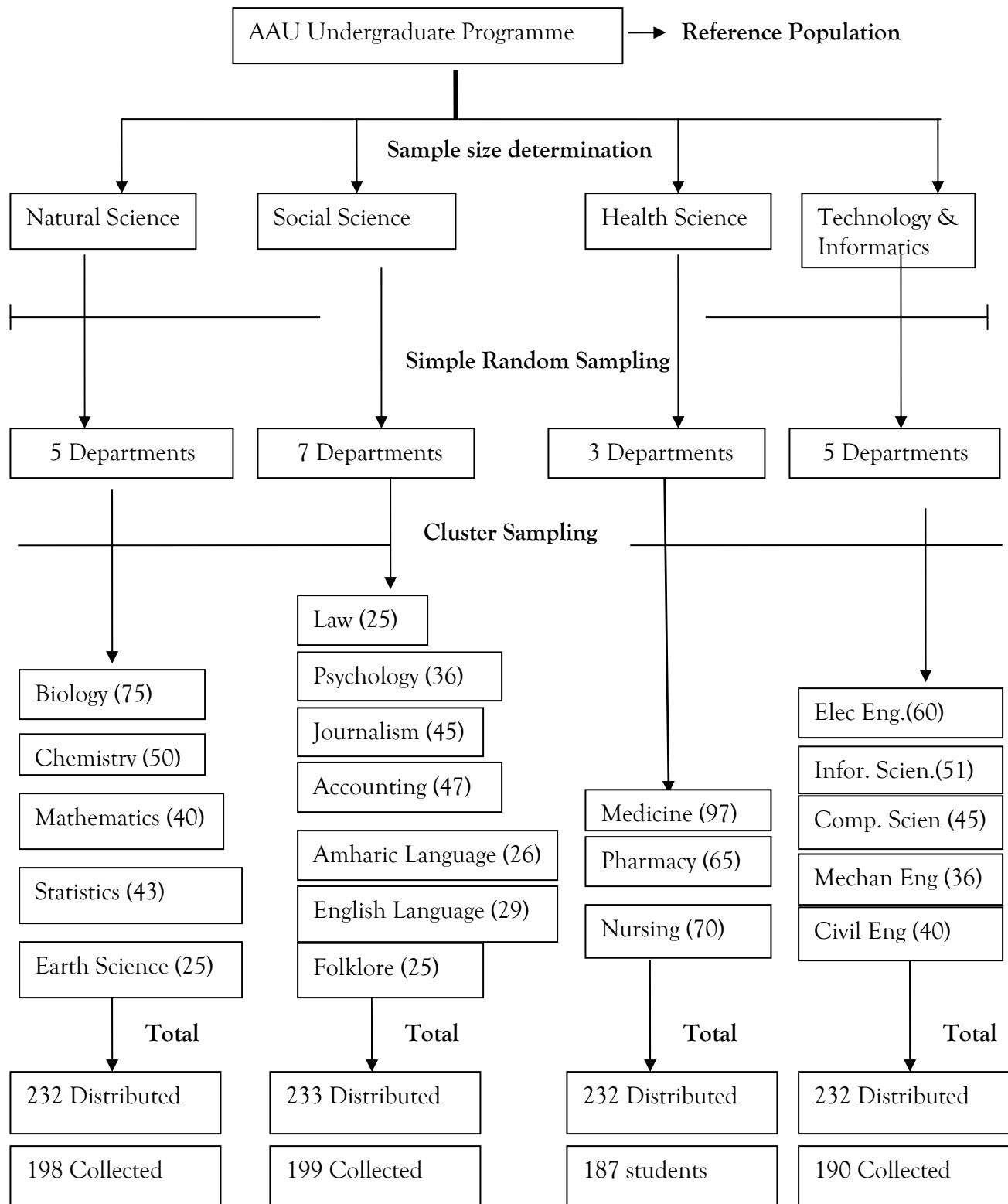


Figure 1: Sampling frame of study subjects of regular undergraduate students of AAU

Table 2: List of sampled AAU undergraduate departments where questionnaires are distributed and collected, June 2009

No	Department	Steam	Faculty	Distributed Questionnaire	Collected Questionnaire
1	Law	Social Science	Law	25	20
2	Psychology	Social Science	Education	36	32
3	Journalism and Communication	Social Science	FJC	45	41
4	Accounting and Finance	Social Science	FBE	47	42
5	Ethiopian Language and Literature	Social Science	ILS	26	22
6	Foreign Language and Literature	Social Science	ILS	29	23
7	Folklore	Social Science	ILS	25	19
8	Biology	Natural Science	Science	75	67
9	Chemistry	Natural Science	Science	50	46
10	Mathematics	Natural Science	Science	40	35
11	Statistics	Natural Science	Science	43	37
12	Earth Science	Natural Science	Science	25	13
13	Medicine	Health Science	Medicine	97	82
14	Pharmacy	Health Science	Medicine	65	55
15	Nursing	Health Science	Medicine	70	50
16	Electrical and comp. Engineering	Techn.& Inform	Technology	60	52
17	Information Science	Techn.& Inform	Informatics	51	38
18	Computer Science	Techn.& Inform	Informatics	45	35
19	Civil Engineering	Techn.& Inform	Technology	36	30
20	Mechanical Engineering	Techn.& Inform	Technology	40	35
	Total			929	803

3.5 Sample size determination:

The sample size was calculated based on the standard sample size formula as:

$$S = \frac{(Z_{\alpha/2})^2 * (P) * (1-P)}{D^2}$$

Where: $Z_{\alpha/2} = 1.96$ for a 95% Confidence Level,

P = percentage of students using internet and digital technologies for sexual and HIV/AIDS related health information. Since there is no available previous study on it, p is unknown and is set to 0.5, and

D = the margin of error (tolerable error), which is 0.05 (5%),

Based on this,

$$S = \frac{(1.96)^2 * (0.5) * (0.5)}{(0.05)^2}$$
$$S = 384.16$$

And since the reference population is more than 10, 000, it doesn't need to make correction factor on the sample size.

However, the sampling procedure as it is shown in figure 1 above, involves a multistage process which takes more than two steps to reach the study population. Therefore, the sample size was multiplied by 2. Accordingly, the sample size **S becomes 387 X 2= 774.**

It is expected that some students may not respond at all due to different reasons. And the research investigator, based on previous experiences, estimates the non-respondent rate to be 20%. And 20% of 774 will be 155. So adding this value to the sample size, which is 774, will give 929 (which is 774+155).

Thus, S= 929

Therefore, the total sample size, S consists of 929 regular undergraduate students of university, which will be allocated to each of the streams equally.

3.6 Data collection procedures:

The data collection procedure involves well structured self administered questionnaires along with an in-depth interview and onsite observation techniques. The questionnaire was consisting of structured and semi-structured questions. Before the real data collection process was started, pilot test was conducted in one of the randomly selected department of AAU before a month in order to get feedback. And based on this pilot test, appropriate corrections and modifications were done on the questionnaire. Moreover, the respective department heads, chairpersons and deans of faculties were first approached through formal letter written from the department of Information Science. Then the questionnaires were distributed to all selected study participants with the support of the research assistant and data collectors who guides and assists the respondents. And the questionnaires were distributed to them in their class room before their class time starts in collaboration with their instructor, but they were initially notified about the purpose of the study before they start to fill on the questionnaires. The quality of the collected data was maximized as much as possible by introducing participants about the study as well as conducting independent supervision by the data collectors and the investigator.

With regard to the in-depth interview, few selected students were involved to get additional supporting information for the questionnaires who didn't participate in the questionnaire data collection procedure. Initial questions were designed for the participants and they were asked about the issue and further questions were also raised based on their initial answers. And the interviewing was conducted by the research investigator which was tape recorded.

Moreover, on site observation was also employed in order to get real situational data of student's internet access in the university. It includes libraries, computer laboratories and disability centers which are internet sources within the university as well as internet cafes and AIDS resource center which are used as an internet access point for students out of the university.

3.7 Data Analysis procedures:

The general data analysis was carried out after appropriate data entry task was completed. The analysis of qualitative data interviews were done after the quantitative or numerical data were analyzed. The collected quantitative data were generally analyzed by the use of statistical software called SPSS (version 15). And the statistical techniques that were applied on the quantitative or numerical types of data include simple frequency distribution, correlation, comparisons, association, and variance. Moreover, it also involves further statistical analysis tests like cross tabulation, chi square tests, binary regression and logistic regression, which were applied and used on appropriate data. In addition, both the crude and adjusted odds ratio (OR) and p-value (0.05) statistical measures were also taken in order to study the existence of level of association and significance of difference between the variables.

As a support analysis technique, the recoded interviews were also analyzed next, but since the original interview was done in Amharic language, it was first transcribed and translated into English for analysis. So categorization and interpretation of core facts and themes were used in order to analyze the interviewed data having a qualitative nature which have similar theme or topic with the quantitative data. The issues were categorized, cross referenced and cascaded with the quantitative data results and were presented and described in the discussion and analysis part of this document. Moreover, the data that is acquired by using on site observation was used by the research investigator as a support data in the interpretation of the data.

3.8 Data quality management

In conducting the questionnaire, the design of data collection instruments were adopted from similar researches conducted related to these areas like study conducted in Uganda by Ybarra, et.al, (2006) which was then customized according to this research study setting in order to ensure the validity and reliability of the data collection instruments. Regarding data collectors and supervisors, they have got an in-depth orientation and training about the study before they were practically assigned for the job. Since the data collection instruments were primarily applied to selected one department as a pilot test and appropriate feedback taken, the validity of the data and instruments were attempted to maximize.

The data that were collected both in the questionnaire and interview techniques were reviewed and checked for its appropriateness, validity and error free by the assistants and the research supervisor before it finally went for processing and analysis. The study participants were primarily informed and introduced about the research topic by data collectors, supervisors or research investigator as needed during the data collection process. Moreover, the study participants have got the required technical assistance in filling the questionnaire by the research supervisors or data collectors if they have questions or ideas that need to be cleared during the data collection process. The questionnaires before collected by data collectors were reviewed and checked for its accuracy and appropriateness. Moreover, regarding the interviewed data, verification of the accuracy of the transcriptions and translations was achieved by randomly cross-checking the transcripts against the tapes.

3.9 Study Variables

For the purpose of achieving the objectives of this research the following dependent and independent variables were identified.

Dependent Variable

The dependent variables for this study are:

- The level of utilization of internet-based technologies for sexual and HIV/AIDS related health information in the university and;
- The level of awareness of using internet-based technologies for sexual and HIV/AIDS related health information.

Independent Variables

The independent or study variables which have a potential effect on the dependent variable include:

- Sex,
- Age,
- Region of their high school background,
- Stream/field of study,
- Awareness of utilization of internet for sexual and HIV/AIDS information,
- Interest or demand to use internet for sexual and HIV/AIDS information,
- Internet skill,
- Internet access in the university

The level of awareness of using internet-based technologies for sexual and HIV/AIDS related health information, which is an independent variable is also considered as a dependent variable due to some related factors with it.

3.10 Ethical consideration

The study doesn't fully expose any individually identifying information to the public. The data were processed, analyzed, and summarized from what is gained in the data collection process without exposing any personal information. The data collection tools also don't have any room to collect personal information. For instance, in the questionnaire paper, there was no means of getting personally identifying information like their personal name or identification number. One of the advantages of avoiding personally identifying information is to maximize the chance of getting valid and reliable information among the respondents. In doing so, formal written consent statements were described clearly both in the questionnaire paper as well as orally for the interviews that were conducted with the study participants before any kind of data collection was initiated.

3.11 Dissemination of results

Being an academic paper, the output of this research study will be delivered to the Health Informatics programme. Although the primary and ultimate users of this research are university students, it has to pass through different channels or offices in order for it to be effective. The findings of this paper will be disseminated to the concerned bodies of Addis Ababa University like the Institute of Gender Studies, student's union and Dean Office of students, which have plans and programmes concerning these issues among undergraduate students of the university.

In addition this paper will potentially benefit other sexual and HIV/AIDS related health information providers like AAU-MARCH and AIDS Resource Center, which have related programmes and are concerned with provision of edutainment information regarding sexuality and HIV/AIDS issues for university students. Moreover, regarding the technical side, the ICTDOAAU (ICT Development office of Addis Ababa University) will use it in order to refine its requirements and allocate technical resources like network installation materials across departments and faculties.

CHAPTER FOUR

DATA PRESENTATION AND RESULTS

This chapter will depict the results and findings of the quantitative data results from the questionnaire with the support of some interpretation of results. However, the results of the qualitative data will be presented in the discussion and analysis part of the document, which is the next chapter. Based on the specific objectives of the research questions and core facts that the study should address, this chapter will summarize and discuss the results of findings of the study by categorizing it into 12 thematic issues. Each of the thematic issue is critically organized and analyzed in order to get the valid and appropriate results.

4.1 Socio-demographic characteristics of the respondents

A total of 929 self administered questionnaires were distributed to selected sample of senior regular undergraduate students of AAU by using fixed allocation of samples to four of the streams (Social science, Natural Science, Health Science and Technology and Informatics). Out of these, about 86% (803) of questionnaires were returned with 83% (774) which were usable and valid for analysis after clearing made on the raw data. This indicates that the non-respondent rate was 14% as a result of not returning of questionnaires by the study participants.

The overall mean age of respondents was 21.57 ± 1.9 . And 98% of them were both single and below the age of 27. Moreover, 62 % of the respondents were male in gender and 98% of the respondents were single in marital status. The study shows that 81% of the respondents were between the ages of 18 to 22 which shows that there is an existence of similarity of age groups among the respondents in this age range which is an age stage highly vulnerable and at risk of HIV/AIDS disease. Out of the total respondents, 69% of them completed their high school study from the region of Addis Ababa, the capital city of the country though significant relative to the general population. The detail of their demographic distribution is depicted in Table 3 below.

Table 3: Socio-demographic characteristics of undergraduate students of AAU, n=774, June 2009

No	Variable	Male	Female	Total	Percentage (%)
1	Age in Year (18 - 37)				
	18 - 22	351	272	623	80.5 %
	23 - 27	116	19	135	17.4 %
	28 - 32	14	0	14	1.8 %
	33 - 37	2	0	2	0.3 %
	Range	19 - 37	18 - 27	18 - 37	
	Mean + SD	21.96 ±2.2	20.91± 1.19	21.57 ± 1.9	
	Median	21	21	21	
3	Marital Status				
	Single	472	285	757	97.8 %
	Married	7	3	10	1.3 %
	Divorced	4	3	7	0.9 %
	Widowed	0	0	0	0 %
4	High School Background				
	Addis Ababa	305	231	536	69.3 %
	Amhara	39	14	53	6.8 %
	Benishangul Gumz	5	1	6	0.8 %
	Dire Dawa	1	0	1	0.1 %
	Gambela	3	0	3	0.4 %
	Harari	0	4	4	0.5 %
	Oromia	84	20	104	13.4 %
	SNNP	30	12	42	5.4 %
	Tigray	16	8	24	3.1 %
	Foreign	0	1	1	0.1 %
5	Stream (Field of Study)				
	Social Science	127	72	199	25.7 %
	Natural Science	121	77	198	25.6 %
	Health Science	111	76	187	24.2 %
	Technology and Informatics	124	66	190	24.5 %
	Total	483	291	774	100.0 %

4.2 Level of departmental computer and internet access of the respondents

The overall study in table 4 below shows that 60 % (467) of the respondents have computer access in their respective department or faculty which has a similar figure with internet access which is 59 %. However, the level of internet access across four of the streams is not similar as clearly depicted in table 4 and figure 2 below, where students from health, technology and informatics stream have relatively good access of computers and internet facilities compared with students from social sciences and natural sciences. However, students from social sciences and natural sciences have a relative less access to computer and internet facilities compared with technology, informatics and health science students.

Table 4: Level of departmental computer and internet access among undergraduate students of AAU, n=774, June 2009.

No	Variable	Stream					Percent (%)
		Social Science	Natural Science	Health Science	Techno & Informatics	Total	
1	Computer Access						
	Yes	51	39	187	190	467	60.3 %
	No	148	159	0	0	307	39.7 %
2	Internet Access						
	Yes	51	26	187	190	454	58.7 %
	No	148	172	0	0	320	41.3 %
	Total	199	198	187	190	774	100 %

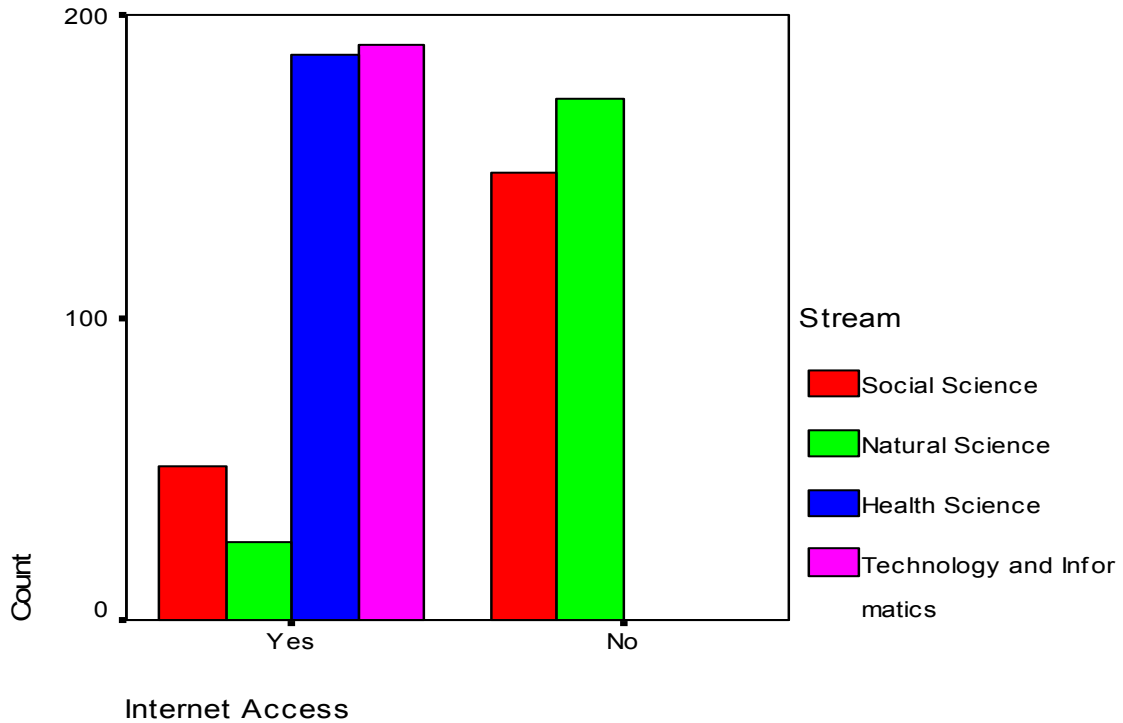


Figure 2: Internet access facility by stream among undergraduate students of AAU, n=774, June 2009.

4.3 Technical skill, interest and awareness level of the respondents

The study shows that 81 % (626) of the respondents are both aware of the potential of internet sources for sexual and HIV/AIDS related health information and had an experience of working on basic computer application software programmes. Moreover, it shows that 84 % (654) of the respondents have an experience of working and browsing internet applications and web pages. Some of them got the experience through formal training as part of their academic curriculum and some of them got it from their previous experience whereas the rest of them acquire it informally through their friends and by using trial and error. The experience of working on internet and email applications is higher than the experience of working on basic computer software applications among the respondents. In addition, about 61 % (468) of the respondents have the demand or interest of using these technologies for sexual and HIV/AIDS related health information. It is clearly depicted in table 5 below.

Table 5: knowledge, demand and awareness level of computer and internet applications for sexual health information among undergraduate students of AAU, n=774, June 2009.

Variable	Male	Female	Number	Percentage
1 Computer Experience				
Yes	373	253	626	80.9 %
No	110	38	148	19.1 %
2 Internet Experience				
Yes	404	250	654	84.5 %
No	79	41	120	15.5 %
3 Awareness of Sexual Health Information				
Yes	398	232	630	81.4 %
No	85	59	144	18.6 %
4 Interest usage for Sexual Health Information				
Yes	304	164	468	60.5 %
No	179	127	306	39.5 %
Total	483	291	774	100.0 %

4.4 Internet usage experiences of the respondents

As shown in table 6 below, among the total respondents, 86 % (666) of them had ever used internet recently at least once and only 14 % (108) of them had never used internet at least once. Out of the total internet users, 43% (285) of them have the tendency of using internet at least once a week, 32% (212) of them have the tendency of visiting and browsing internet at least once a day and 14% (95) of them have the tendency of visiting and browsing internet rarely. However, only 9% and 2% of them visit and use internet at least once a month and at least once in three months respectively.

Table 6: Internet usage experiences among undergraduate students of AAU, n=774, June 2009.

	Variable	Number	Percentage
1	Had ever used internet recently		
	Yes	666	86 %
	No	108	14 %
Total		774	100.0 %

Most students from each stream have the experience of using internet. However, their relative exposure differs between streams. For instance, as shown in figure 3 below, the relative internet exposure experiences of the respondents increase as we go from social science to natural science, health science and technology and informatics streams respectively.

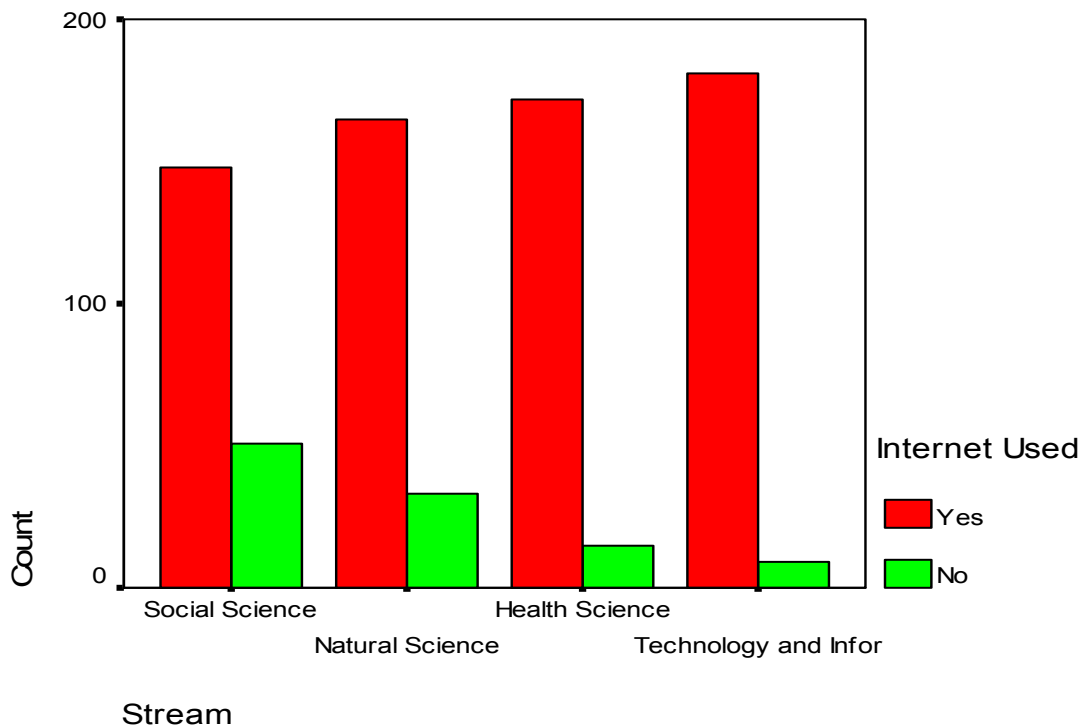


Figure 3: Internet usage experiences among undergraduate students of AAU by stream, June 2009

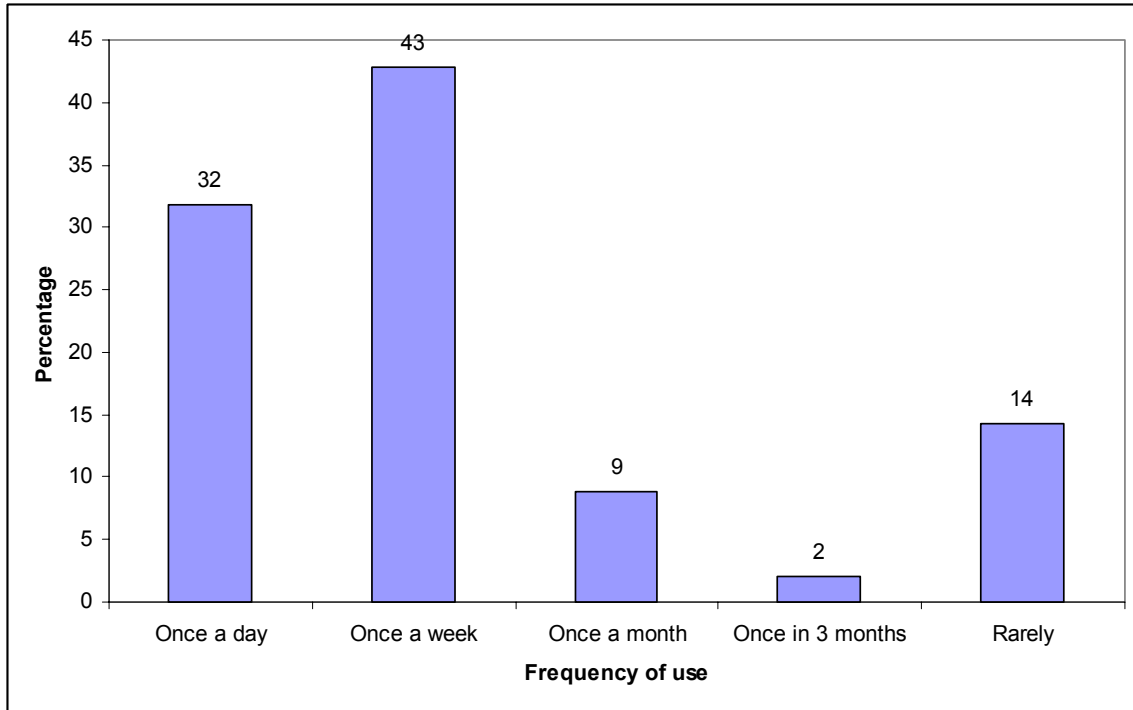


Figure 4: Frequency of internet usage among internet users of undergraduate students of AAU, June 2009

With regard to the sources of internet access, as shown in figure 5 below, out of the total internet users, 57% (380) of them use computer laboratories as their primary source of internet access in the university. And 36% (242) of them use libraries as their secondary source of internet access in the university. However, 41% (274) of the total internet users use internet café as their secondary source of internet access outside the university. The major source of internet access within the university compound especially for social sciences and natural sciences students is from the libraries. This is because of the reason that due to the nature of the courses and syllabus given in these streams of departments, most of the departments don't have computer laboratories which are assigned for student utilization.

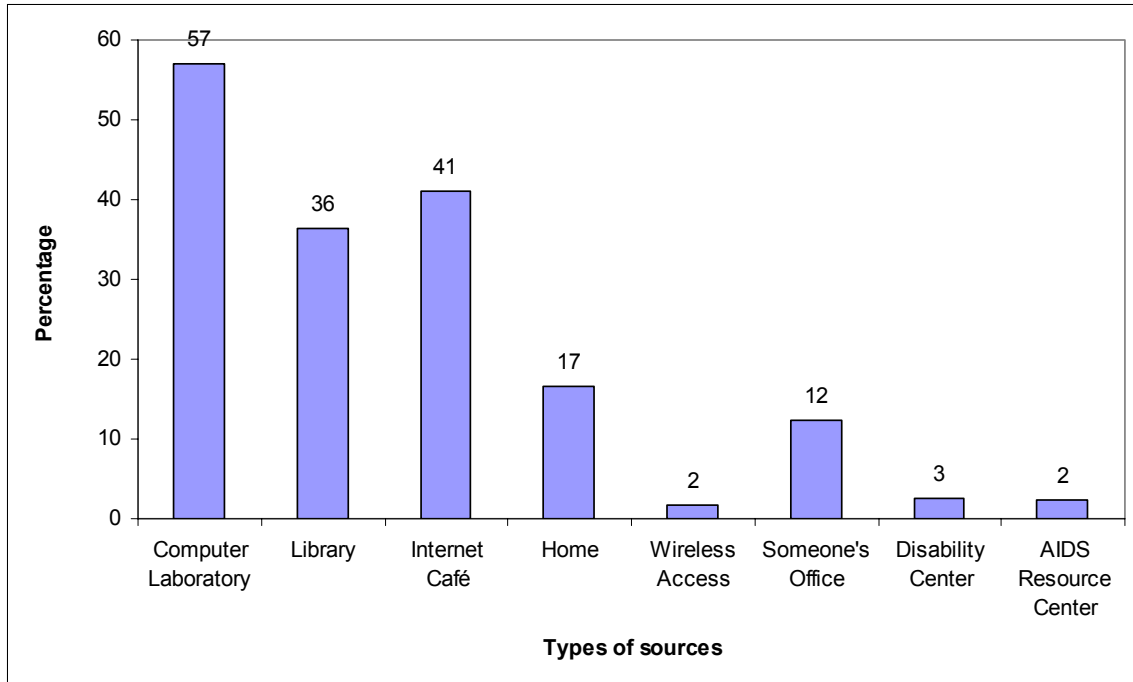


Figure 5: Source of internet access among internet users of undergraduate students of AAU, June 2009

4.5 Internet usage purposes of the respondents

As shown below in figure 6, out of the total internet users, 81% (538) of the respondents primarily use internet sources for educational purposes like doing their academic research, assignments and exercises, 66% (442) of them use it for communication purposes such as email, chat and meeting new people and 47% (313) of them use it for the purpose of informational matters like viewing any current world news. And about 39% (261) of them use it for the purpose of entertainments like for music, movies and games. And only 8% (52) of them use it for the purpose of accessing and browsing explicit contents of information consisting of pornographic documents, images, videos and audio-visual forms of data.

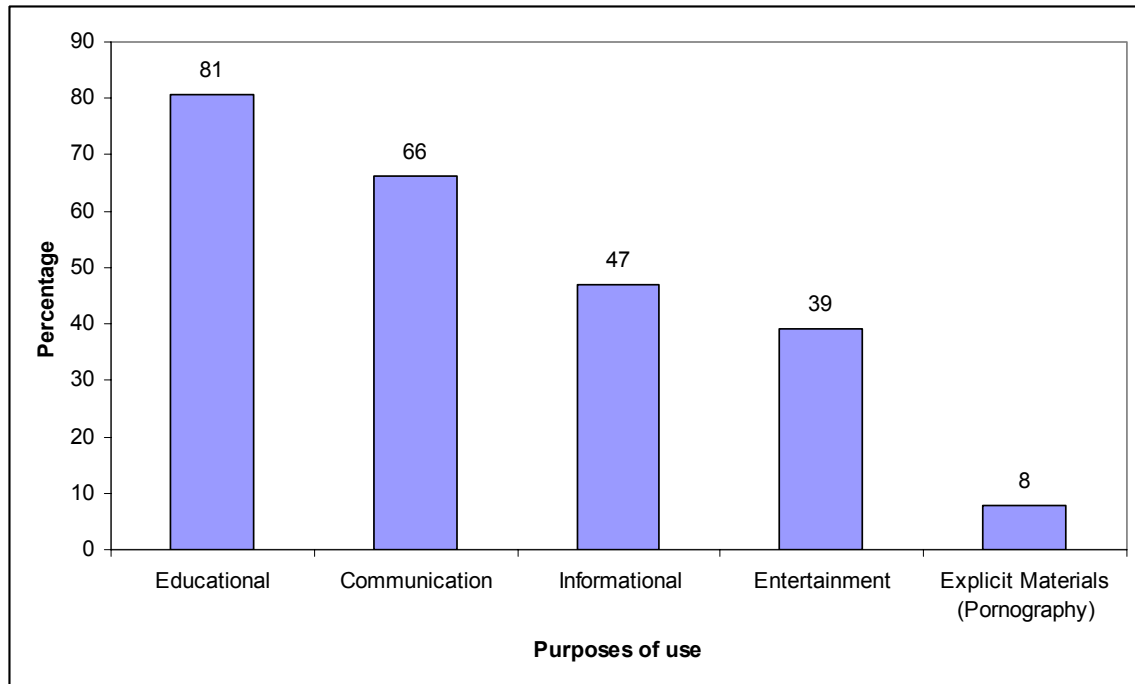


Figure 6: Purposes of internet usage among undergraduate students of AAU, June 2009

4.6 Internet as source of health, sexual and HIV/AIDS related health information among the respondents

As shown in table 7 below, among the total respondents, the overall utilization of internet based sources for general health related information is 39% (300). Out of the total internet users, only 25% of them use it to access sexual and HIV/AIDS related health information. And out of the general health internet users, 63% (189) of them use it for accessing current health news information, 56% of them use it to access sexual and HIV/AIDS related information, 22% of them use it for psychological matters, 18% of them for diet and nutrition, 15% (mostly by males) of them use it for physical fitness and exercise, 12% use it for disease and medicine and only 5% (all females) use it for family planning purposes (figure 6 above). All of the respondents who use internet for accessing disease and medicine issue were from health science stream like medicine, pharmacy and nursing, which is related with their educational or academic field of study.

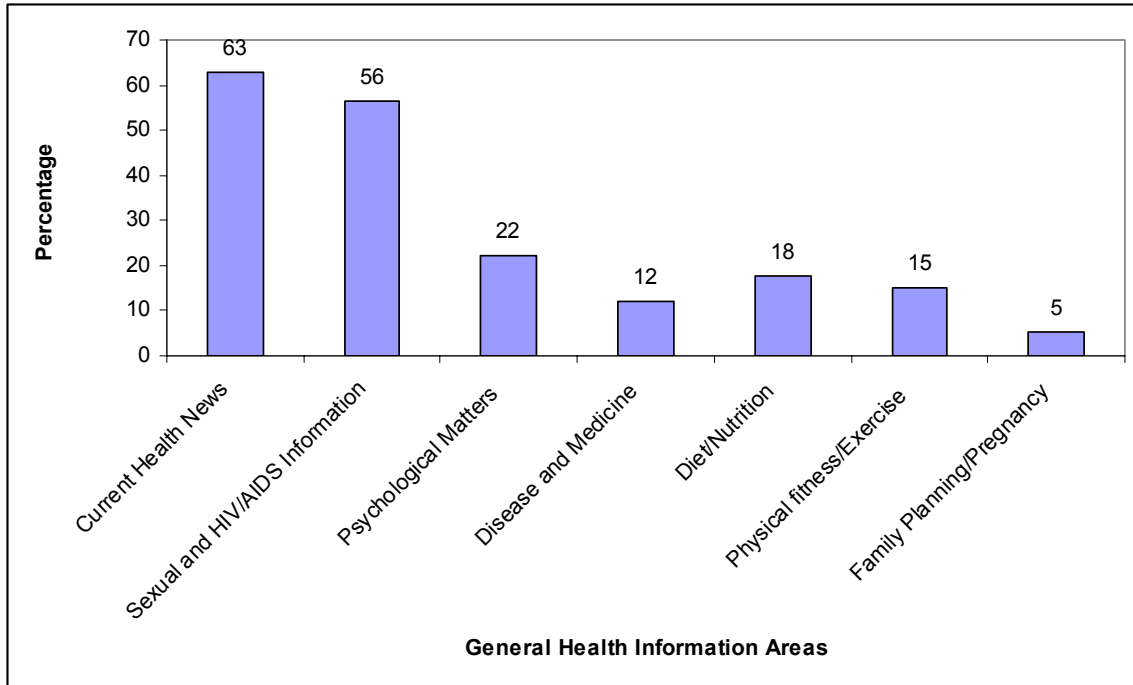


Figure 7: General health information usage areas among internet users of undergraduate students of AAU, June 2009

Table 7: Internet users for general health, sexual and HIV/AIDS related information among undergraduate students of AAU, June, 2009

No	Variable	Number	Percentage (774)
1	Internet users for general health information		
	Yes	300	38.8 %
	No	474	61.2 %
2	Internet users for sexual and HIV/AIDS related health information		
	Yes	169	21.8 %
	No	605	78.2 %
Total		774	100.0 %

There are different reasons behind using these technologies for sexual and HIV/AIDS related information. Out of the users who use it for sexual and HIV/AIDS related health information, their primary reason for using internet-based sources is due its feature of availability of up-to-date or current information (82% [138]), and secondly they prefer because of the availability of variety of information (34% [57]) and thirdly because of its nature of privacy 23% [39]). See figure 8 below for details.

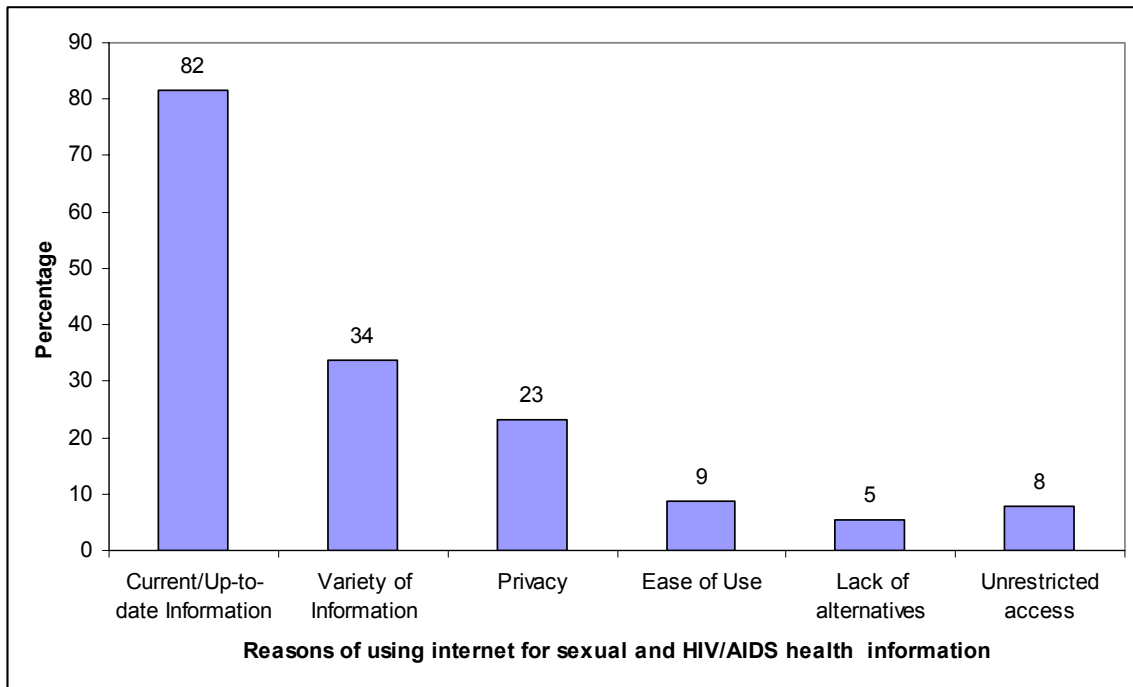


Figure 8: Potential reasons of using internet for sexual and HIV/AIDS related health information among undergraduate students of AAU, June 2009

4.7 Technical ways of accessing Internet for sexual and HIV/AIDS related health information

One of the primary mechanisms or ways of accessing sexual and HIV/AIDS related health information from an internet is by using different kinds of search engines. And this study revealed that, out of the total sexual and HIV/AIDS information users, about 95% (160) of them use primarily different search engines like Google, Yahoo and AltaVista in order to find sexual and HIV/AIDS related information. And secondly 17% (28) of them use it by specifically typing the web address or URL of a given website to access these sources, whereas thirdly only 2.7% (21) of them access the sources by redirecting or opening it from their email inbox which is delivered as a spam mail where they don't know the source of the information primarily or don't subscribe to it before.

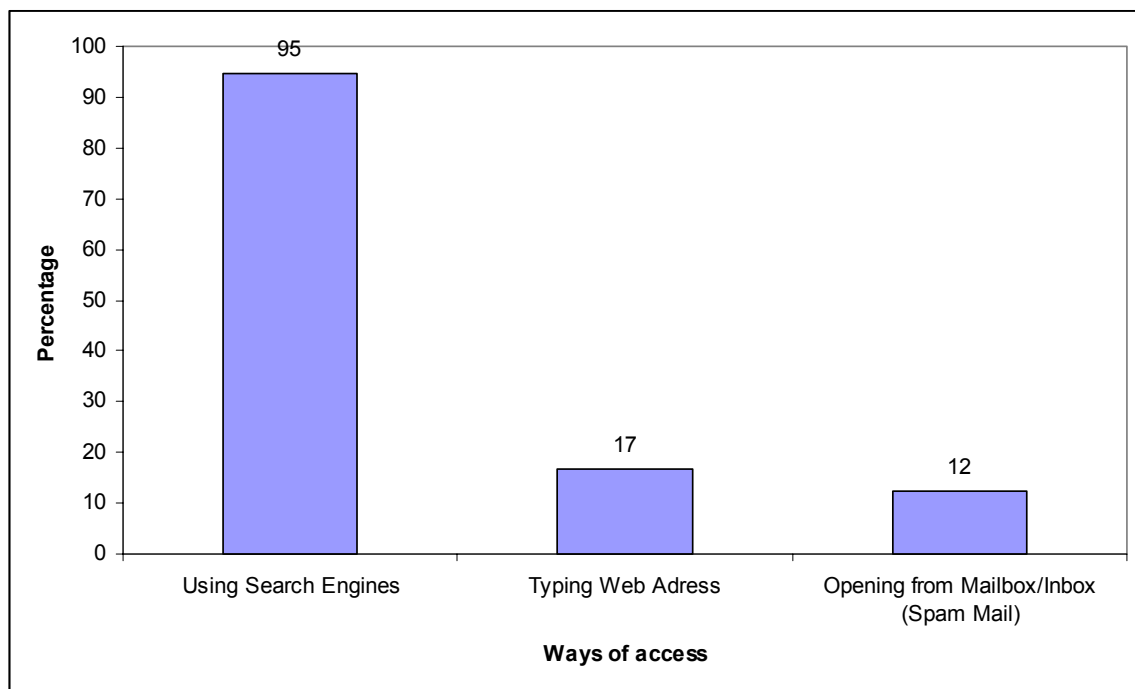


Figure 9: Technical ways of accessing internet for sexual and HIV/AIDS related health information among internet users of undergraduate students of AAU, June 2009

As it is clearly shown in figure 10 below, out of the total respondents of sexual and HIV/AIDS health information users, about 85% (144) use it as a supplementary source of information, whereas only 15 % (25) of them use it as a substitution source of information in relation with other existing alternative sources of sexual and HIV/AIDS information like printed materials (newspaper, magazine, booklets, pamphlets), friends and mass media sources (Television, radio and public advertisements), books, HIV/AIDS information centers, etc.

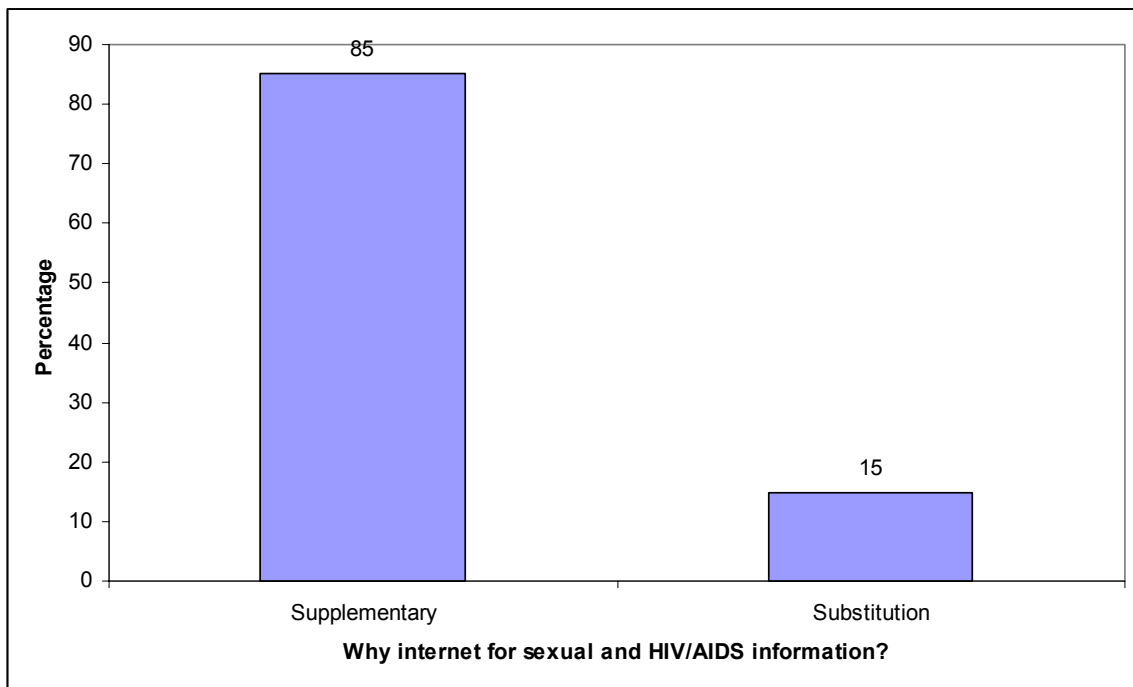


Figure 10: The reasons why sexual information users use internet as source of their information among undergraduate students of AAU, June 2009

4.8 Factors associated with utilization of internet-based sources for sexual and HIV/AIDS related health information

There are different potential factors which can associate and affect the utilization of internet-based sources for sexual and HIV/AIDS related health information. In this study, the independent variables are studied for their level of association with the dependent variable. The dependent variable which is utilization of internet based sources for sexual and HIV/AIDS related information is analyzed with different independent variables like socio-demographic variables (sex, age, and background high school). It is also associated with their stream, awareness, computer and internet skill, demand and computer and internet access and internet source variables (either from university, from internet café, or from home) in order to identify the their level of association. Moreover, in order to determine their strength of association, first each of the variables were associated independently with the dependent variable to determine their individual effect using the crude odds ratio (Crude OR) and later these independent variables were analyzed together to determine for their cumulative effect by using the adjusted odds ratio (Adjusted OR).

Based on this, as shown in table 8 below, it is highly significant that the odds of utilization of internet-based technologies who are aware is higher by 2.3 times compared with students who are not aware after adjusting it with other variables ($p < 0.05$). Moreover, the odds of utilizing internet for sexual and HIV/AIDS related information who are interested use it by 5.5 times higher than the one who are not interested to use the technology ($p < 0.05$). In addition, it is also highly significant that the odds of utilizing internet for sexual and HIV/AIDS related information among natural science students were higher by 2.31 times when it is compared with social science students ($p < 0.05$). Moreover, the odds of using internet sources by health science students is significantly higher by 1.5 times compared with social science students. In addition, even though it shows a less significant value, the odds of using internet among students who come from Gambela is higher by six times compared from SNNP.

Table 8: Comparison of utilization of internet for sexual and HIV/AIDS related information by different factors among undergraduate students of AAU, June, 2009

No	Variable	Sexual Internet Health Users (N, %)	Odds Ratio (OR)	
			Crude OR (95% CI)	Adjusted OR (95% CI)
1	Sex			
	Male	107 (63.3)	1.05 (0.74, 1.49)	0.93 (0.61, 1.41)
	Female	62 (36.7)	1	1
2	Age Group			
	18 - 22	135 (80)	1.20 (0.34, 4.27)	0.74 (0.07, 7.44)
	23 - 27	31 (18.3)	1.21 (0.35, 4.83)	1.05 (0.10, 10.76)
	>28	3 (1.7)	1	1
3	High school Region			
	Addis Ababa	118 (69.8)	0.99 (0.43, 1.89)	0.74 (0.30, 1.83)
	Amhara	18 (10.7)	1.65 (0.66, 4.10)	2.75 (0.92, 8.25)
	Oromia	15 (8.9)	0.54 (0.22, 1.32)	0.98 (0.34, 2.84)
	Tigray	6 (3.6)	1.10 (0.33, 3.42)	1.54 (0.39, 6.10)
	Gambela	2 (1.2)	6.4 (0.52, 78.22)	2.11 (0.07, 65.52)
	SNNP	10 (5.9)	1	1
4	Stream			
	Natural Science	54 (32)	2.03 (1.24, 3.33)	2.31 (1.24, 4.32) **
	Health Science	49 (29)	1.92 (1.16, 3.18)	1.47 (0.67, 3.23) **
	Technology & Informatics	35 (20.7)	1.22 (0.72, 2.08)	1.07 (0.48, 2.38)
	Social Science	31 (18.3)	1	1
5	Interest/Demand			
	Yes	146 (84.6)	5.58 (3.49, 8.91)	5.54 (3.38, 9.08) **
	No	23 (15.4)	1	1
6	Internet Skill/Knowledge			
	Yes	151 (89.3)	1.7 (0.99, 2.90)	1.23 (0.60, 2.30)
	No	18 (10.7)	1	1
7	Awareness of using internet for sexual & HIV/AIDS information			
	Yes	155 (91.7)	3.03 (1.69, 5.41)	2.3 (1.19, 4.43) **
	No	14 (8.3)	1	1

8	University Internet Access			
	Yes	101 (59.8)	1.06 (0.75, 1.50)	1.15 (0.56, 2.36)
	No	68 (40.2)	1	1
9	Source of Access *			
	University	79 (27)	1.3 (0.84, 2.04)	0.90 (0.54, 1.49)
	Internet Café	47 (24.7)	1.1 (0.69, 1.86)	0.91 (0.53, 1.59)
	AIDS Resource Center	6 (40)	2.3 (0.79, 7.06)	1.67 (0.52, 5.38)
	Home/Someone's office	37 (22)	1	1
	Total	169 (100%)		

* Since multiple answers are possible for source of internet access, its total percentage exceeds 100%.

** Highly significant, p -value < 0.05

Though, it shows a less significant result, students who use AIDS resource center use internet sources higher by 1.6 times for sexually and HIV/AIDS related purposes compared with the one's who use from their home or someone's office.

As illustrated above, the main factor of using internet-based technologies for sexual and HIV/AIDS related information is their awareness level. As their awareness level increase, so does their internet usage from sexual and HIV/AIDS issues. And their awareness level is also associated with other variables like their stream, internet skill, computer access as well as internet access. For instance, as shown in table 9 below, it is highly significant that students from technology or informatics stream are almost 5 times aware about the provision of internet-based sources for sexual and HIV/AIDS related information compared with social science students ($p < 0.05$). Moreover, students who have the skill to operate internet are almost 4 times aware about the provision of internet-based sources for sexual and HIV/AIDS related information compared with social science students ($p < 0.05$). It is also highly significant that students who have internet access are by 3 times aware about the provision of internet-based sources for sexual and HIV/AIDS related information compared with social science students ($p < 0.05$). It is depicted in table 9 below.

Table 9: Comparison of awareness level of students about internet-based sources for sexual health information by different factors among undergraduate students of AAU, June, 2009

No	Variable	Total Aware (N, %)	Crude OR (95% CI)	Adjusted OR (95% CI)
1	Stream			
	Natural Science	162 (25.7)	2.18(1.37, 3.48)	2.23(1.34, 3.69) **
	Health Science	162 (25.7)	3.14(1.88, 5.26)	1.84(0.89, 3.84)
	Technology & Informatics	172 (27.3)	4.64(2.62, 8.17)	2.50(1.15, 5.42) **
	Social Science	134 (21.3)	1	1
2	Internet Skill/Knowledge			
	Yes	556 (88.3)	3.53(2.30, 5.40)	2.24(1.39, 3.61) **
	No	74 (11.7)	1	1
3	Computer Access			
	Yes	405 (64.3)	2.38(1.65, 3.44)	0.39(0.13, 1.21)
	No	225 (35.7)	1	1
4	Internet Access			
	Yes	397 (63.0)	2.60(1.79, 3.77)	3.89(1.09, 13.85) **
	No	223 (37.0)	1	1
	Total	630 (100%)		

** Highly significant, p -value < 0.05

4.9 Comparison of level of significance of difference of access, skill and utilization level across streams

The major dependent variable, which is utilization of internet based sources for sexual and HIV/AIDS related health information as well other variables (like computer and internet skill or knowledge, computer and internet access, general internet usage rate, internet usage for sexual health information and interest or demand) which have impact for the major dependent variable, are analyzed for their existence of significance of difference across streams. It is analyzed by using the Chi square (χ^2) test value and its p-value. Based on this the test shows the existence of significant difference of availability of these variables across streams.

As shown in table 10 below, there is a significant difference of computer and internet access across streams (χ^2 value of 122.6 and 117 respectively, $p < 0.05$). Based on this, the level of computer and internet access among technology, informatics and health science groups of students is significantly higher compared with students from social science and natural science. For instance the access to internet and computers is better among students from technology and informatics stream than health science, social science and natural science streams. And access to internet and computers is also better among students from health science stream compared with natural science and social science stream. Moreover, internet and computer access is better among students from social science streams than natural science streams.

The awareness level of students for internet sources among the streams also shows a significant difference in that the odds of exposure among students from technology, informatics and natural science streams is higher compared with the others. This fact is also supported by the result displayed in table 9 above.

Table 10: Comparison and Chi-Square test of variables across streams among undergraduate students of AAU, June, 2009

Variables		Streams				Statistical Test	
		Social Science	Natural Science	Health Science	Technology Informatics	Chi Square (χ^2) Stat.	p-value
Computer Skill (N, %)	Yes	121 (19.3)	146 (23.3)	173 (27.6)	186 (29.7)	122.6	0.00
	No	78 (52.7)	52 (35.1)	14 (9.5)	4 (2.7)		
Internet Skill (N, %)	Yes	131 (20)	161 (24.6)	172 (26.3)	190 (29.1)	117	0.00
	No	68 (56.7)	37 (30.8)	15 (12.5)	0 (0)		
Awareness of using internet for sexual health information (N, %)	Yes	134 (21.3)	162 (25.7)	162 (25.7)	172 (27.3)	38.3	0.00
	No	65 (45.1)	36 (25)	25 (17.4)	18 (12.5)		
Department Computer Access (N, %)	Yes	51 (10.9)	39 (8.4)	187 (40.0)	190 (40.7)	616.7	0.00
	No	148 (48.2)	159 (51.8)	0 (0)	0 (0)		
Department Internet Access (N, %)	Yes	51 (11.2)	26 (5.7)	187 (41.2)	190 (41.9)	539.4	0.00
	No	148 (46.3)	172 (53.8)	0 (0)	0 (0)		
Internet Usage at least once (N, %)	Yes	148 (22.2)	165 (24.8)	172 (25.8)	181 (27.2)	14.9	0.00
	No	51 (47.2)	33 (30.6)	15 (13.9)	9 (8.3)		
Internet usage for general health information (N, %)	Yes	53 (17.7)	77 (25.7)	109 (36.3)	61 (20.3)	16.2	0.00
	No	146 (30.8)	121 (25.5)	78 (16.5)	129 (27.2)		
Internet usage for sexual and HIV/AIDS health information (N, %)	Yes	31 (18.3)	54 (32)	49 (29)	35 (20.7)	3.8	0.01
	No	168 (27.8)	144 (23.8)	138 (22.8)	155 (25.6)		
Interest of using internet for sexual and HIV/AIDS health information (N, %)	Yes	121 (25.9)	125 (26.7)	119 (25.4)	103 (22)	1.5	0.21
	No	78 (25.5)	73 (23.9)	68 (22.2)	87 (28.4)		

With regard to the exposure of using internet at least once, it shows a significant difference across streams (χ^2 value of 43.7, $p < 0.05$) in that technology and informatics students having better exposure and experience of using internet and becoming the first, health science students the second and natural science students being the third and social science students being the last.

The study also shows that there is a significant difference of utilization of internet based sources for accessing general health information content with the odds of health science students using it more higher compared with the other streams (with χ^2 value of 45.7 $p < 0.05$). Moreover, as shown in table 9 above, there is a significant difference of using internet based technologies for accessing sexual and HIV/AIDS related information among students who use internet across the streams (with χ^2 value of 11.5, $p < 0.05$). Accordingly, as shown also in the association table above, the result shows that among the internet users the odds of using internet for sexual and HIV/AIDS purposes among natural science and health science students is higher than social science, technology and informatics students. However, having these differences across streams, there is no significant difference of interest or demand of using these technologies across the streams (with $p\text{-value}=0.21$). These shows that the existence of difference of awareness, access and skill of these technologies between the streams doesn't have a significant impact on their level of interest to use the technologies for sexually and HIV/AIDS related health information purposes.

4.10 Challenges of using internet-based sources generally and specifically for sexual and HIV/AIDS related health information

According to the respondents, about 42.6% (330) of the respondents indicated that they have problems or challenges of using internet-based sources generally and specifically as source of sexual and HIV/AIDS related health information. As shown in figure 11 below, out of these respondents, 66% (218) of them have indicated that their major and primary source of problem is lack of adequate internet access. And secondly 28% (93) of respondents indicated that their source of problem is lack of both computer and internet skill. Among the 14% (108) respondents who had never used internet at least once, 44% (48) have indicated that their common and major problem is lack of adequate access to internet, with 40% (43) having lack of computer skill and 37% (40) having lack of internet skill.

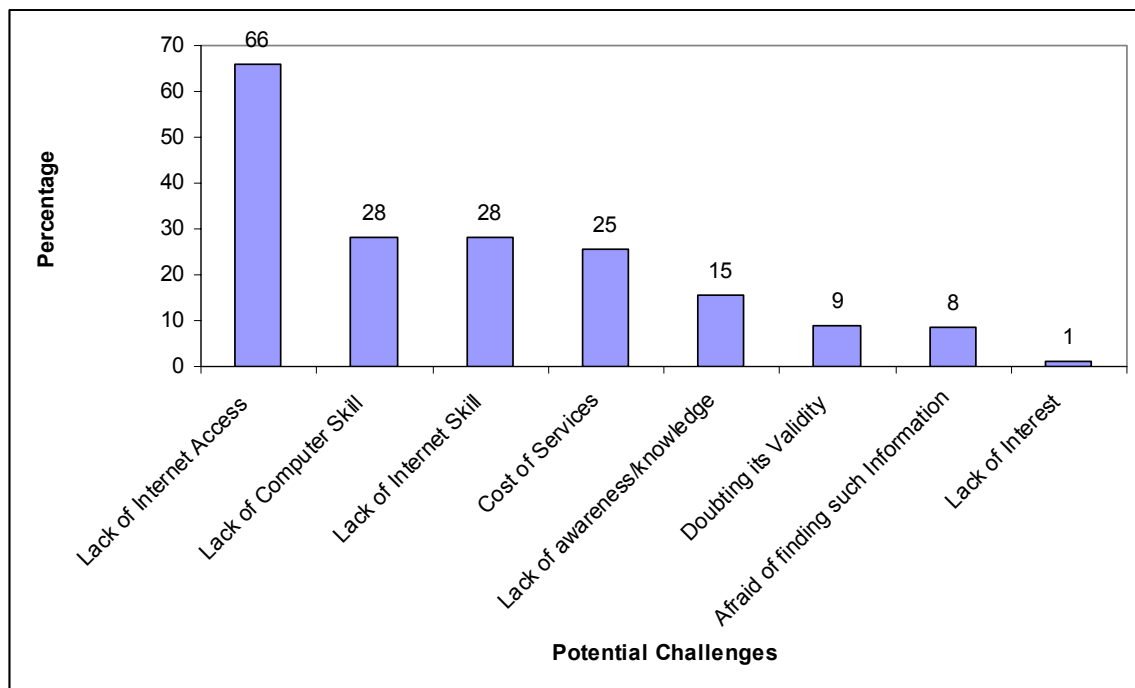


Figure 11: Potential challenges in using internet for sexual and HIV/AIDS related information among undergraduate students of AAU, June 2009

4.11 Existing alternative sources of sexual and HIV/AIDS related health information

As indicated by the study, out of the total respondents, 58% (449) of the respondents have said that their major existing alternative source of sexual and HIV/AIDS related information is printed materials like magazines, booklets, newspapers, brochures, leaflets, and pamphlets. And 57% (442) of the respondents use public media like Television and radio as their secondary alternative source of information. Their friends or classmates are also their source of information ranking thirdly 48% (372). Books, films and public health campaigns are also utilized by students as an existing alternative source of information ordered respectively. However, the use of digital compact disks like CD-ROM and DVD Disk as an alternative source is very insignificant where only 4.8% (37) of respondents sited as their alternative source. It is clearly depicted in figure 12 below.

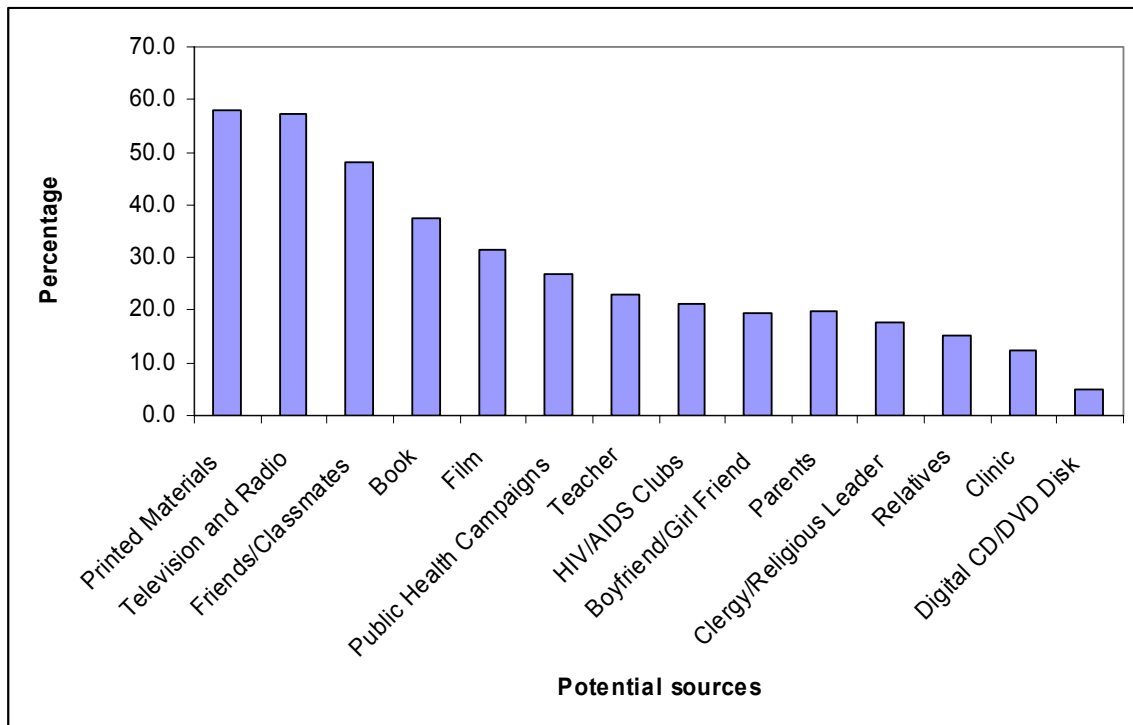


Figure 12: Existing alternative sources of sexual and HIV/AIDS related information among undergraduate students of AAU, June 2009

4.12 Attitude of respondents towards internet-based sources for sexual and HIV/AIDS related health information

Knowing or identifying the level of attitude or perception about these sources is critical because of the existence of some pessimistic attitude in the society. In an attempt to measure their level of perception among the respondents, more than 91% of them are very optimistic about internet-based sources for the delivery of sexual and HIV/AIDS related information, which is highly related with their awareness level in that they are quite aware and interested to use the technology. And only 3.1% (24) of the respondents said that internet is not an important source for such information provision. Interviewed data justify that it is because of fearing its nature of reliability and the potential to be utilized for other explicit materials like pornographic contents. Even out of the total respondents who don't want to use internet for sexual and HIV/AIDS purposes, more than 85% of them are highly optimistic about it. It is clearly depicted in figure 13 below.

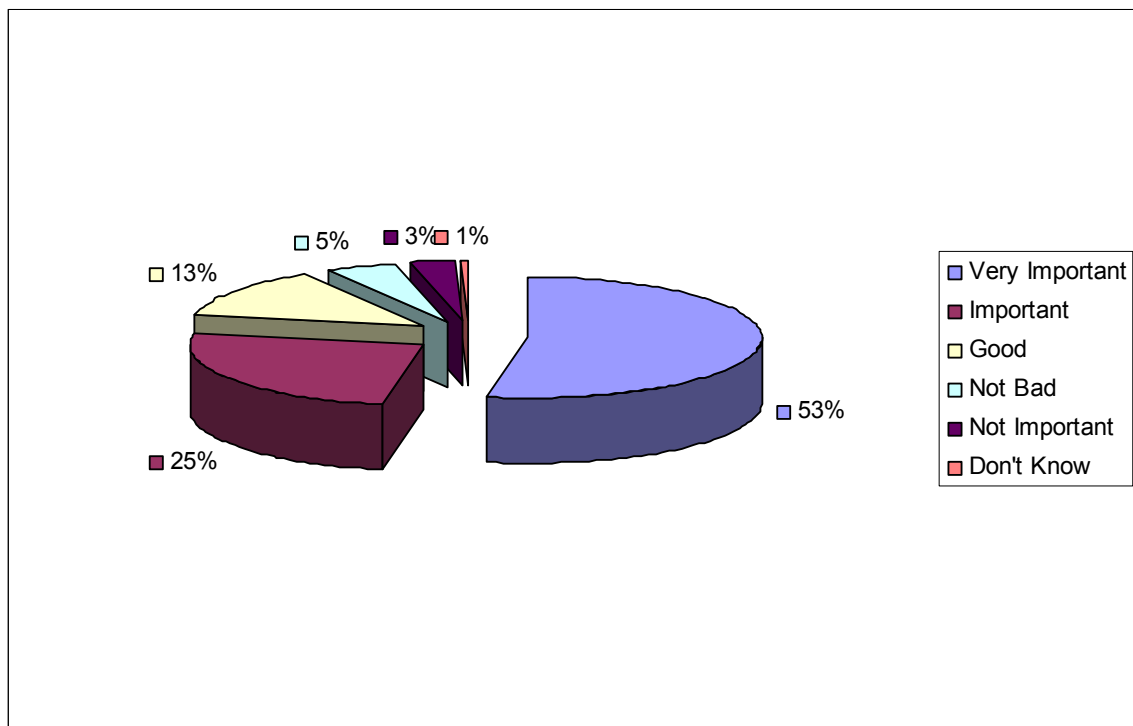


Figure 13: Attitude of students towards internet-based sources for sexual and HIV/AIDS related health information among undergraduate students of AAU, June 2009

CHAPTER FIVE

ANALYSIS AND DISCUSSION

In this chapter, the results of interviewee and observed data will be discussed and analyzed through integrating and categorizing it with the core themes and topics identified in the quantitative data results. Public health researchers are beginning to embrace the internet as a new and interactive technology with potential for use as an intervention tool in developed countries, yet little research attention has been paid to similar applications in Africa (Ybarra et al., 2006). Although there is lack of adequate similar researches conducted on this area in Ethiopia, this research has attempted to compare with similar researches especially researches conducted in developing countries due to the similarity of their economic and technological infrastructure availability.

The overall utilization of internet-based sources for sexually and HIV/AIDS related health information is relatively low. It shows a good and even better status when it is compared with some researches conducted in developing countries having similar scenarios. On the other hand, it shows a low status when compared with some other similar studies especially of countries having a better economic status. For instance the prevalence of utilization of internet-based technologies for the delivery of general health information content is 38.8%, which is almost exactly equivalent with a similar cross sectional study done among adolescent higher education boarding school students of Mbarara in Uganda which is 38% (Ybarra et al., 2006). Moreover, among the internet users, 25.4% of them use this technology for accessing sexually and HIV/AIDS related information which is relatively in better status comparable with the Ugandan study, which is 20% out of total internet users (ibid, 2006). However, according to a survey conducted in Nigeria to assess their reproductive health usage among adolescent university students, 73.1% of them use internet at least once and among the total internet users, 40.3% of them access internet sources for finding sexual and HIV/AIDS information (Williams, 2007), which is relatively higher compared with this study.

When this research is also compared with a survey conducted among undergraduate students of Georgia universities, which are in good economic status than ours, it shows a significant difference. In an attempt to examine internet use and health seeking behavior of students, 74% of the respondents report that they had used internet for accessing health information online (Cam Escoffery et al., 2005), which is significantly higher when it is compared with this study having 38.8% of utilization. Therefore, it shows the existence of different factors of problems attributed and correlated to this low level of utilization.

The major factors associated for this low utilization level are lack of adequate access to internet and computer facility, lack of technical (computer and internet) skill, lack of awareness and internet service charge. One of the major factor or reason that is associated with internet-based utilization is university internet access, which has also a direct implication on computer access. As internet access increased, so did the odds of its relative use. When this study is also compared with a similar study conducted among university students of Dar es Salaam, Tanzania in terms of challenges which hinders to use, it shows a relatively better but equivalent result. Accordingly 71% of them reported that their major problem is due to lack of adequate internet facilities (Ireneus, 2004) and in the case of this study about 66% reported that it is due to such problem. According to the interview and onsite observation data, even though there is a good level of computer and internet access in the university and specifically for health, technology and informatics steams, it has also its own limitations. In an interview with a 4th year male student from department of Journalism and Communication, he said that:

“Actually we have a computer lab access in our department having around 25 workstations, but the number of computers that are currently functioning and connected to the internet are not more than 12, and some of them are also affected by virus, so that we are forced to depend on limited computers for shared access”

For instance, there are limited numbers of working computers in computer laboratories where they are accessed by few students at a time. So that students have to wait for some time to get access. Moreover, the availability of computers and internet access in the university library is limited where some computers which are failed to work and become out of use due to lack of maintenance or virus problems.

The other factor for its low utilization of internet-based sources for sexual and HIV/AIDS related information is lack of skill of computers and internet applications. This is highly associated with lack of exposure to computers in their high school background, lack of basic ICT courses in their curriculum and lack of computer and internet access. For instance the proportion of respondents who don't use as a result of lack of skill which is 28% is higher when it is compared with a similar study in Dar es Salaam where 24% of them don't use as a result of same factor (ibid, 2004). In this case primarily students from technology or informatics streams are highly benefited as a result of their academic affiliation with access to internet having larger proportion who can operate and use internet. Students from health science, natural science and social science are also benefited ranked in descending order respectively.

According to discussion made by Chivhanga (2000), slow internet speed is one of the major factors affecting internet access and use in Africa. According to interview data, 17 (59%) of the respondents said that the speed of internet connection both within the university as well as outside the university, which is too slow, is contributing for the low level of utilization of the technologies which hinders them to access and download any forms of data (files, images, documents, video and audio-visual) especially of educational materials and software as well as sexually and HIV/AIDS related health information from the internet. In an interview with a 3rd year female student from department of Information science department, she quoted that:

“.....Let alone to access sexual and HIV/AIDS related health information through web in the university, opening my email is very sluggish which takes more than 3 minutes to open it”

The factor for the low internet speed is attributed primarily to the backbone bandwidth of internet connection of the university to its service provider, which is the Ethiopian Telecommunication Corporation. Accordingly, Addis Ababa University is gaining about 6MB of bandwidth connection from ETC (ICTDOAAU, 2009), which is don't support and satisfies the current need and increasing number of internet users from time to time. Moreover, the internal network infrastructure as well as virus attack has contributed for its low speed of internet which congests and makes down the internal network.

One of the key factors of utilization of internet-based sources concerning students who use internet outside of the university, especially from internet café is its service charge or cost. In an attempt to determine the internet use characteristics among university students of Dar es Salaam, out of the 100 respondents, 47% of them use internet from computer laboratories, 38.8% from libraries and 31.3% access from internet cafés (ibid, 2004). In this study 49% of them access from computer laboratories, 31% from libraries and 35% from internet cafés. The reason for this relatively good percentage of internet café users is due to the respondents high exposure to internet café's where most of them were from the capital city of the country, where there is relatively higher number of internet cafés compared with other regional cities. Out of the total internet café users, about 82% (252) of them were their high school background from Addis Ababa region whereas only few of them (18%) were from outside of the capital. According to an interview with a 3rd year male student from department of Political science and International relations, he said that:

"I sometimes go to internet café and try to browse internet but I couldn't use it for long time to download documents because I couldn't afford it which charges me 0.25 cents per minute"

The factors associated with this low level of access to internet café is due to lack of adequate internet skill, lack of awareness of utilization and relatively expensive cost or tariff of internet service for students, which costs from 0.20 to 0.50 Ethiopian cents per minute depending on their service and status, which most students couldn't afford to use it for long hours.

The significant difference of odds of utilization of internet-based sources for sexual and HIV/AIDS related information within streams especially of students from natural science and health science is also attributed to different factors. The reason for health science students to utilize higher especially for general health issues is due to their academic discipline in using it for disease and medicine purposes as well as their relative good knowledge about general health matters and specifically of sexuality and HIV/AIDS issues compared with the other streams of students. The other reason concerning natural science students to utilize it higher for sexual and HIV/AIDS related health information could be due to their awareness level and other unforeseen potential factors which need further intensive study. As shown in the results part, it can be highly correlated with their awareness, internet access in the university and their computer and internet skill. For instance, according to result of findings, the odds of awareness among students from natural science, technology and informatics streams are significantly higher compared with social science students. The reason for technology and informatics students being highly aware is that they are frequently intact and accessible to such technologies for theoretical demonstration in computer laboratories compared with other students although their odds of utilization is low as to their awareness level is concerned.

The factor associated for higher odds of utilization of internet-based sources for sexual and HIV/AIDS related health information among students who use from AIDS resource center is as a result of the mission of the organization being dedicated to deliver any kind and forms of sexually and HIV/AIDS related contents of information free of charge for the public. So that the available internet access points in the center are utilized mostly for such purposes not only for students but also for the general public. Moreover, the organization has lot of collections of resources like books, brochures, magazines, offline CD-ROMs as well as audio-visual materials concerning sexual health and HIV/AIDS prevention issues which initiates users including students to access such contents of information when they go there. However, most students when they become online at their university, internet café or home, they most likely tend to spend their time in browsing important documents related with their educational or academic endeavors.

As a result of the lack of adequate access of internet and computers as well as lack of technical skill, which hinders to use internet-based sources as source of sexual and HIV/AIDS related information, students tend highly to depend on other existing alternative sources of information due to many factors. Printed sources are among the primary existing alternative source of sexual and HIV/AIDS related information among the respondents. It includes different mediums like magazines, booklets, newspapers, brochures, leaflets, and pamphlets produced either within the university or outside. Out of the print source users, the most common and well known printed source material that is highly available and utilized among students currently is the “Life 101” magazine or booklet which is produced and distributed by the AAU-MARCH project to students free of charge. A 2nd year student from department of foreign language studies said that:

“I usually like to use the Life 101 booklet because it highly touches our daily sexual health life through entertaining and I think it is a good way of learning and developing our awareness for it and about HIV/AIDS disease and its prevention mechanisms too”

It is highly concerned in displaying university student’s day to day life in the form of printed serial drama. The same content of this printed information, which is also available at the website of AIDS Resource center, is being utilized by some students who use the center as their source of information. And according to them they reported that they are very interested about the contents as well as by being able to access such contents of information from their website. However, they have emphasized that the availability of such information centers is very limited in the university as well as the city which hinders them to access it for long time by multiple students at a time.

There are also very few respondents who are not currently interested in accessing sexual and HIV/AIDS related health information from any sources and especially from internet-based sources even though they are highly optimistic about the technology. Though it needs further study, it is related with different reasons. One of the primary reasons behind this is lack of adequate time being highly busy with their academic assignments, projects

and exercises. The other reasons include lack of adequate internet access, slow internet speed connection and being afraid of accessing such kinds of information from the available as well as internet-based sources of information.

Strength and Limitation of the study

Strengths

- The use of relatively large sample size and higher response rate is believed to provide reliable and valid findings;
- The use of self-administered questionnaires is also another strength which enables to get a lot of respondent's data in short time as well as minimizing individual's subjective and social desirability bias;
- Most of the data collection tools used in the questionnaire are adopted from similar studies which are already tested and could have the potential of maximizing the validity of the research outputs.

Limitations

- As far as the knowledge of the principal investigator is concerned, there is lack of adequate related researches done on this area especially of local ones in order to do proper and enough comparison;
- The study doesn't include first year and blind regular undergraduate students due to their lack of adequate exposure and inability to fill the questionnaire respectively.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

This chapter is organized to provide conclusive information and possible recommendations out of the data results, discussions and analysis of the findings of the research. The first topic is organized in such a way to infer and conclude the study from the results and analysis of the data obtained in chapter five. And potential and possible recommendations are attempted to forward in the next topic.

6.1 Conclusion

Although the utilization level of internet-based technologies for sexual and HIV/AIDS related information is low compared with other purposes like educational and communication issues, most students are quite aware and interested to use it for such information provision. And most students use these sources as a substitute source of information in relation with the existing alternative sexual and HIV/AIDS related health information sources.

Moreover, despite the fact that the utilization of internet-based sources is relatively low compared with other sources of information, it has a better utilization level compared with digital technologies like compact disks (CD-ROM or DVD) for sexual and HIV/AIDS related health information provision. Accordingly, the general utilization of internet-based sources for general health issues and specifically for sexual and HIV/AIDS related health information is 39 % and 22 % respectively. However, the utilization of digital technologies for sexual and HIV/AIDS information is only 5%, which is utilized very low and insignificantly compared with other sources.

In addition, the utilization of internet-based sources for general health, sexual and HIV/AIDS related health information is highly affected by factors like student's technical computer and internet skill, internet access, their awareness level, interest and their field of study (stream). Based on this, there is a significant difference of awareness level, computer and internet access between streams which has high potential of affecting their utilization of these technologies for general, sexual and HIV/AIDS related health information purposes.

And mainly, as indicated in the hypothesis part of the first chapter of this research paper, it is possible to conclude that the proposed hypothesizes outlined are valid based on the results and analysis shown in chapter four. Accordingly, there is a significant difference of utilization of internet based sources for sexual and HIV/AIDS related information between streams. Moreover, there is similar difference of factors of utilization like level of awareness, interest or demand, technical skill and internet access across the streams or field of studies.

Lack of adequate access of computer and internet, lack of technical skill (basic computer and internet skill) and lack of awareness are the major challenges that students are currently facing which hinders them to effectively utilize it generally as well as for sexually and HIV/AIDS related health information purposes. As a result students highly tend to depend on other existing alternative sources of information. This include printed media (magazines, newspapers, booklets brochures, leaflets, and pamphlets), broadcast media (TV and radio) as well as school friends or classmates, which are the major existing alternative sources of information that students highly depend currently as an alternative source of sexual and HIV/AIDS related information.

Generally, although the current utilization level of internet-based sources is low due to the above mentioned problems and further awareness raising needed, most students are highly optimistic, highly interested, quite aware and are also ready to use internet-based and digital technologies for accessing sexually and HIV/AIDS related health information.

6.2 Recommendation

Based on the findings of the research, the following points are recommended to effectively and efficiently utilize internet-based and digital technologies as source of sexual and HIV/AIDS related health information:

- Expansion of computer and internet access as well as balancing the access across streams in the university compound is needed in order to improve their awareness and to make it widely accessible and utilize the technology for multiple students at a time.
- Special computer and internet training sessions has to be conducted especially for those who doesn't belong to technology or informatics stream or come from minor cities and in order to enhance their skill as well as make them able to utilize it generally and specifically for accessing sexual and HIV/AIDS related information.
- Further adequate and special awareness creation for students is needed particularly for those who are not interested to use the technology, who come from minor regions, or whose stream doesn't belong to either technology or informatics about the availability of sexual and HIV/AIDS related health information from the internet as well as to change the perception who are pessimistic about the technology. This can be done by ICT office of the university together with sexual and HIV/AIDS health information providers either through formal sessions or using promotion by printed materials.
- Establishment and development of specific and reliable dedicated websites within the university in which the contents focus on sexual and HIV/AIDS related information.
- Sending contents of sexual and HIV/AIDS related health information through the email address of students proactively by service providers in collaboration with ICT Development office of AAU. This is due to the reason that most students use internet is for communication purpose such as email system which is possible to deliberately forward such contents of information through their email inbox.

- Parallel production of the existing sexual and HIV/AIDS related information in different portable storage mediums. This involves documenting the contents through compact disks (offline CD-ROM or DVD) which enables them to access the information in their own native language as well as to use it anywhere in their convenience like in their computer laboratories, libraries, homes, or offices in offline form without even no need of being connected and being online to internet.
- Promoting and enhancing the available free sexual and HIV/AIDS information providers to produce their content in the form of online and offline medium free of charge for students.
- Increasing of the bandwidth of the university in order to improve the speed of internet which motivates and enables more students to utilize it at a faster pace both for their educational as well as sexual and HIV/AIDS health information is concerning.
- Intervention of ICT courses (basic computer and internet) into their existing curriculum is required in order promote their general technical skill as well as in utilizing the technologies for sexual and HIV/AIDS related health information matters. Moreover, integrated development of ICT policies and procedures across streams and departments is important in effectively utilizing the technologies generally and for sexual and HIV/AIDS related health information among university students.
- Generally, due to lack of similar researches done on this area, this study can serve as a preliminary assessment regarding information sources for sexual and HIV/AIDS related health matters. And further intensive studies related to this area can also be done especially with the objective of practically developing and implementing these sources. Moreover, similar studies can be made in other regional universities having basic internet infrastructure with the aim of developing national policy for the universities in utilizing their internet technology for general health, sexual health and HIV/AIDS related information purposes among university students.

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Annex 1:

QUESTIONNAIRE: FOR AAU UNDERGRADUATE STUDENTS

Dear Sir/Madam:

The main objective of this questionnaire is to study the utilization of Internet-based and digital technologies as source of Sexual Health Information and its implications for HIV/AIDS Intervention among Addis Ababa University students. Since you don't need to write your name on it, all your responses will remain confidential and held private to be used only for this research study purpose.

Please note that you are not required to write your name on any page of this questionnaire paper. If you have any questions concerning the study, you can ask the investigator or supervisor. We would like to thank you in advance for your cooperation in the study of this research for taking your time and filling this questionnaire.

Do you want to participate in this research? Yes No

- If you are not willing to participate in this research, please return this paper to the Supervisor or Investigator of this research.
- If you are willing to participate in this research go to the next page of the document and fill on the questionnaires. And please make sure that you have answered your respective questions on the questionnaire paper.
- We would like to thank you in advance for your cooperation in the study of this research for taking time and filling this questionnaire.

Please mark **X** or \surd in the boxes below.

I) BACKGROUND INFORMATION

1. Age _____
2. Sex 1) Male 2) Female
3. Marital Status:
A) Single B) Married C) Divorced D) Widowed
4. Place of Birth _____
5. Faculty/College _____
6. Department _____
7. Year: 1st 2nd 3rd 4th 5th (Circle the appropriate one)
8. In which of the following regions did you finish your high school study?
1) Addis Ababa 2) Afar 3) Amhara 4) Benishangul Gumz
5) Dire Dawa 6) Gambela 7) Harari 8) Oromia
9) SNNP 10) Somali 11) Tigray

II) KNOWLEDGE, DEMAND AND SKILL

9. Do you have the basic skill/experience of working on a Computer?
1) Yes 2) No
10. Do you have the skill to operate and use Internet?
1) Yes 2) No
11. Do you know/aware that Internet can provide sexual and HIV/AIDS related health information?
1) Yes 2) No
12. Do you want to use Internet for sexual and HIV/AIDS related health information?
1) Yes 2) No

III) ACCESS AND UTILIZATION

13. Do you have Computer access in your department?
1) Yes 2) No
14. Do you have Internet access in your department?
1) Yes 2) No
15. Have you ever used Internet anywhere?
1) Yes 2) No (*If No, go to Question No: 24*)

(If Yes, answer the next questions)

16. Where are you using Internet currently? (More than one response is possible)

- 1) University 1.1 Library 1.2. Computer Lab
- 2) Internet Café
- 3) Home
- 4) Office
- 5) Someone's home/office
- 6) Other, Please specify _____

17. How frequently do you use internet?

- 1) At least once a day
- 2) At least once a week
- 3) At least once a month
- 4) At least once in 3 months
- 5) Rarely

18. For what purpose(s) do you use Internet mostly? (More than one response is possible)

- 1) Educational (Academic assignment, research, etc)
- 2) Informational (World News, Sport, etc)
- 3) Communication (Email, Chat, meeting new people)
- 4) Entertainment (Music, Movie, Game)
- 5) Explicit materials (Pornography, etc)
- 6) Other, Please specify _____

19. Have you ever used the Internet for general Health related information?

- 1) Yes 2) No (If No, go to Question No: 24)

(If Yes, answer the next questions)

20. If you use Internet for health related information, for what specific topic (s) are you using it? (More than one response is possible)

- 1) Current health News
- 2) Sexually and HIV/AIDS related information
- 3) Psychological matters
- 4) Diet/Nutrition
- 5) Physical fitness/Exercise
- 6) Family planning (Pregnancy)
- 7) Other, Please specify _____

21. If your answer includes Choice 2 (sexual and HIV/AIDS), why do you prefer to use Internet for sexually and HIV/AIDS related health information? (More than one response is possible)

- 1) Current/Up-to-date information
- 2) Relevant information
- 3) Privacy
- 4) Variety of Information
- 5) Ease of use
- 6) Lack of alternatives
- 7) Unrestricted access
- 8) Other, please specify _____

22. How do you get sexual and HIV/AIDS related information from the Internet? (More than one response is possible)

- 1) Using search engines (E.g. Google, Yahoo, AltaVista, etc)
- 2) By specifically typing its web address/URL (E.g.http://www.health.com)
- 3) Opening/redirecting from your email inbox or spam mail
- 4) Other, Please specify _____

23. In what way do you use Internet for sexual and HIV/AIDS related information compared with other sources of information like newspaper, TV or radio? (Choose only once)

- 1) As an additional source/to Supplement
- 2) As a replacement source/To substitute

IV) CHALLENGES AND LIMITATIONS

24. Do you have a problem or challenge of using internet generally and/or specifically for sexual and HIV/AIDS related health information?

- 1) Yes
- 2) No

25. If your answer is Yes to the above question, what is (are) your challenges? (More than one response possible)

- 1) Lack of access to internet
- 2) Lack of computer skill
- 3) Lack of Internet skill
- 4) Lack of awareness or knowledge
- 5) Cost of service (for Internet café users only)
- 6) Afraid of searching sexually related information from internet
- 7) Doubting its validity/reliability
- 8) Other, Please specify _____

26. What source(s) of information were you using for sexual and HIV/AIDS related information for the past? (More than one response possible)

- 1) Print materials (Newspaper, Magazine, Bulletin, and Pamphlet)
- 2) Public health campaigns
- 3) Friends/Classmates
- 4) Boyfriend/Girlfriend
- 5) Relatives
- 6) Books
- 7) Television
- 8) Film
- 9) Clinic
- 10) HIV/AIDS clubs
- 11) Digital CD/DVD Disk
- 12) Parents
- 13) Clergy/Religious leader
- 14) Teachers
- 15) Other, Please specify _____

27. How do you rate/consider the role of Internet-based sources for the provision of sexual and HIV/AIDS related information for students? (Choose only once)

- 1) Very important
- 2) Important
- 3) Good
- 4) Not bad
- 5) Not important

28. What is your comment or idea on the utilization of internet-based technologies for sexually and HIV/AIDS related health information for students?

Thank you very much for you cooperation

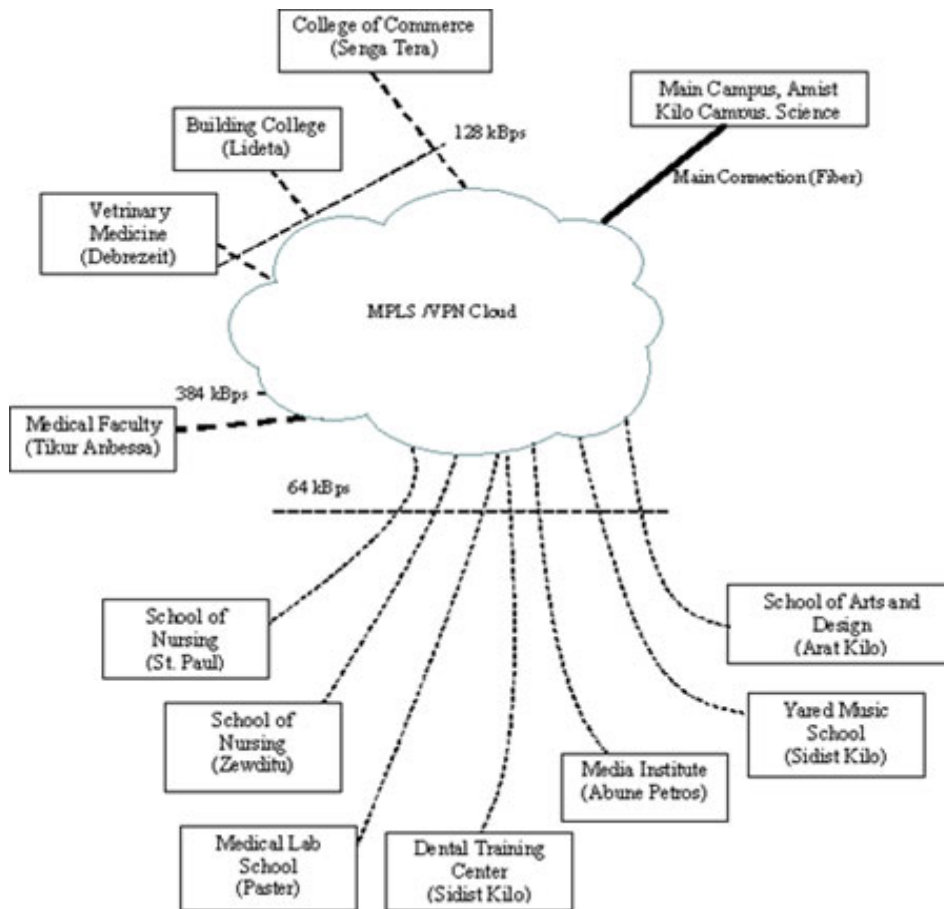
Annex 2:

Interview Guide Questions

1. What do you think about the availability of sources of access for sexually and HIV/AIDS related health information at Addis Ababa University?
2. How do you get sexually and HIV/AIDS related health information within the university or outside? Or From where are you getting it?
3. How do you see the contents of the information that you get from your sources?
4. What are your challenges in accessing sexual and HIV/AIDS related health information from internet-based sources in the university?
5. What should be done from the university side or other bodies in order to improve internet access and utilize it best for sexual and HIV/AIDS related health information?
6. What are your general comments on the delivery of sexual and HIV/AIDS related information either through internet-based or the existing alternative sources in the university?

Annex 3:

Internet backbone infrastructure of different campuses of Addis Ababa University



Source: ICT Development Office of AAU, 2007

Annex 4:

List of Streams, departments and Faculty/College Of the Undergraduate Programme, AAU

1. Social Sciences and Business

No	Department/Programme	Faculty/College
1.	Geography and Environmental Studies	Social Science
2.	History and Heritage Management	Social Science
3.	Political Science and International Relations	Social Science
4.	Philosophy	Social Science
5.	Sociology and Social Anthropology	Social Science
6.	Accounting and Finance	Business and Economics
7.	Economics	Business and Economics
8.	Management	Business and Economics
9.	Public Administration	Business and Economics
10.	Adm. Services Mgt. and Technology system	Commerce
11.	Business Adm. And Information system	Commerce
12.	Finance and Development Economics	Commerce
13.	Marketing Management	Commerce
14.	Procurement and Supply Management	Commerce
15.	Law	law
16.	Psychology	Education
17.	Business Education	Education
18.	Educational Planning and Management	Education
19.	Physical Education and Sport	Education
20.	Amharic	Education
21.	Biology	Education
22.	Chemistry	Education
23.	English	Education
24.	Geography	Education
25.	History	Education
26.	Higher Diploma	Education
27.	Mathematics	Education
28.	Oromo Language and Literature	Education
29.	Physics	Education
30.	Tigrigna	Education
31.	Ethiopian Language and Literature	Institute of Lang. Studies
32.	Foreign Language and literature	Institute of Lang. Studies
33.	Linguistics	Institute of Lang. Studies
34.	Folklore	Institute of Lang. Studies
35.	Theatre Arts	Institute of Lang. Studies
36.	Journalism and Communication	Journalism and Comm.

2. Natural Sciences

No	Department/Programme	Faculty/College
1.	Biology	Science
2.	Chemistry	Science
3.	Earth Science	Science
4.	Mathematics	Science
5.	Physics	Science
6.	Statistics	Science

3. Health Science

No	Department/Programme	Faculty/College
1.	Anesthesia	Medicine
2.	Dental Therapy	Medicine
3.	Laboratory Technology	Medicine
4.	Medicine	Medicine
5.	Midwifery	Medicine
6.	Nursing	Medicine
7.	Radiography	Medicine
8.	Pharmacy	Medicine
9.	Veterinary Medicine	Veterinary Medicine

4. Technology and Informatics

No	Department/Programme	Faculty/College
1.	Architecture and Urban Planning	Technology
2.	Building Engineering	Technology
3.	Chemical Engineering	Technology
4.	Civil Engineering	Technology
5.	Construction Tech. and Mgmt.	Technology
6.	Electrical and Computer Engineering	Technology
7.	Mechanical Engineering	Technology
8.	Information Science	Technology
9.	Computer Science	Technology

Annex 5:

**ENROLLMENT OF REGULAR UNDERGRADUATE STUDENTS
FIRST SEMESTER 2008/09 (2001 E.C) ACADEMIC YEAR**

COLLEGE/FACULTY Department	Level of Programme	Year II		Year III		Year IV		Year V		Year VI & above		Total	
		Female	Total	Female	Total	Female	Total	Female	Total	Female	Total	Female	Total
SOCIAL SCIENCES	TOTAL	67	515	77	213	113	232	41	91	0	0	298	1051
Geography and Environmental Science	Degree	5	78	17	39	31	44	11	29			64	190
History	Degree	15	84	9	24	24	31	11	15			59	154
Philosophy	Degree	5	56	15	28	18	31	7	14			45	129
PSIR	Degree	12	106	7	50	8	67	4	9			31	232
SANT	Degree	12	84	29	72	32	59	8	24			81	239
Sociology	Degree	18	107									18	107
BUSINESS & ECONOMICS	TOTAL	285	1182	157	423	177	385	0	0	0	0	619	1990
Accounting and Finance	Degree	71	296	22	75	36	82					129	453
Economics	Degree	68	301	50	140	47	114					165	555
Management	Degree	84	304	36	89	63	117					183	510
Public Administration	Degree	62	281	49	119	31	72					142	472
SCIENCE	TOTAL	219	1163	56	293	116	424	0	0	0	0	391	1880
Biology	Degree	78	220	24	55	37	90					139	365
Chemistry	Degree	40	216	10	56	23	77					73	349
Earth Science	Degree	38	217	6	62	12	71					56	350
Mathematics	Degree	10	146	7	34	14	51					31	231
Physics	Degree	15	104	5	29	7	48					27	181
Statistics	Degree	16	145	4	57	23	87					43	289
Sport Science	Degree	22	115									22	115
TECHNOLOGY	TOTAL	675	2866	136	415	165	494	121	486	0	0	1097	4261
Architecture & Urban Planning	Degree	55	222	12	36	13	36	11	50			91	344
Chemical Eng'g	Degree			20	49	14	52	17	46			51	147
Civil Eng'g	Degree			21	94	27	106	21	111			69	311
Construction Technology and Mag't	Degree			22	43	21	67	15	55			58	165
Electrical Eng'g	Degree			24	79	34	102	29	113			87	294
Mechanical Eng'g	Degree			11	54	6	31	6	65			23	150
Urban & Regional Planning	Degree			13	30	25	50	11	23			49	103
Pre-Eng'g	Degree	620	2644	13	30	25	50	11	23			669	2747

Annex 5:

**ENROLLMENT OF REGULAR UNDERGRADUATE STUDENTS
FIRST SEMESTER 2008/09 (2001 E.C) ACADEMIC YEAR**

COLLEGE/FACULTY Department	Level of Programme	Year II		Year III		Year IV		Year V		Year VI & above		Total	
		Female	Total	Female	Total	Female	Total	Female	Total	Female	Total	Female	Total
EDUCATION	TOTAL	124	692	467	1435	327	1213	0	0	0	0	918	3340
Amharic	Degree	4	31	77	85	48	93					129	209
Biology	Degree			80	132	38	92					118	224
Business Education	Degree			29	59	64	153					93	212
Chemistry	Degree			27	95	28	98					55	193
Educ. Planning & Mgt.	Degree	21	99	22	101	21	111					64	311
English	Degree	2	23	61	147	45	135					108	305
Geography	Degree	13	134	17	130	9	23					39	287
History	Degree	13	29	42	142	5	98					60	269
Mathematics	Degree			17	98	10	84					27	182
Oromigna	Degree			33	100	14	53					47	153
Physical Educ.&Soprts	Degree	21	114	10	94	9	81					40	289
Physics	Degree			17	98	10	60					27	158
Psychology	Degree	37	212	6	69	9	68					52	349
Special Needs	Degree	7	44	10	50	7	43					24	137
Tigrigna	Degree	6	6	19	35	10	21					35	62
LAW	Degree	52	190	66	123	64	114	91	176			273	603
MEDICINE	TOTAL	187	586	172	457	189	400	49	111	20	90	617	1644
Anesthesia	Degree	17	41	13	41							30	82
Dental Therapy	Degree	17	51	22	52	11	47					50	150
Medical Labratory Technology	Degree	16	39	8	60	11	49					35	148
Dental Medicine	Degree	14	32									14	32
Medicine	Degree	73	300	55	155	54	103	49	111	20	90	251	759
Midwifery	Degree	38	50	38	39	50	73					126	162
Nursing	Degree	6	39	27	57	50	83					83	179
Radiography	Degree	6	34	9	53	13	45					28	132
PHARMACY	Degree	12	80	39	68	38	75	29	71			118	294

Annex 5:

**ENROLLMENT OF REGULAR UNDERGRADUATE STUDENTS
FIRST SEMESTER 2008/09 (2001 E.C) ACADEMIC YEAR**

COLLEGE/FACULTY Department	Level of Programme	Year II		Year III		Year IV		Year V		Year VI & above		Total	
		Female	Total	Female	Total	Female	Total	Female	Total	Female	Total	Female	Total
LANGUAGE STUDIES	TOTAL	195	836	197	557	136	480	3	7	0	0	531	1880
Ethiopian Lang.& Literature	Degree	24	62	45	107	41	108					110	277
Forieng Lang.& Literature	Degree	97	395	46	138	42	198					185	731
Folklore	Degree	20	100	20	60	14	32						
French	Degree	11	45	16	47	3	15	3	7			33	114
Lingustics	Degree	4	54	8	36	13	39					25	129
Oromigna	Degree	14	89	12	66	4	25					30	180
Tigrigna	Degree	7	23	11	24	3	7					21	54
Theatre Arts	Degree	11	44	39	79	16	56					66	179
Sign Language	Degree	7	24									7	24
INFORMATICS	TOTAL	278	670	26	81	46	132	0	0	0	0	350	883
Computer Science	Degree	142	335	11	42	28	81					181	458
Information Science	Degree	136	335	15	39	18	51					169	425
VETERINARY MEDICINE	TOTAL	4	152	19	63	19	62	5	56	12	66	59	399
Veterinary Medicine	Degree	4	152	19	63	19	62	5	56	12	66	59	399
Yared Music School	Degree	2	25	4	22	7	24	3	24	1	12	17	107
Fine Arts & Design	Degree	3	27	3	26	5	27	6	33			17	113
COMMERCE	TOTAL	471	1522	358	902	439	1168	0	0	0	0	1268	3592
Accounting	Degree	129	511	140	343	198	513					467	1367
Adm.Services Mgt. & Technology System	Degree	73	191	40	84	30	96					143	371
Adm.Services Mgt. & Technology System(Fre)	Degree			6	12	9	16					15	28
Business Adm. & Information System	Degree	78	255	74	170	83	159					235	584
Business Adm. & Information System (Fre.)	Degree	5	10									5	10
Finance & Development Economics	Degree	32	105	32	93	16	80					80	278
Marketing Management	Degree	119	255	38	105	61	175					218	535
Procurement & Supply Management	Degree	35	195	28	95	42	129					105	419
JOURNALISM & COMMUNICATION	Degree	20	96	20	94	26	101					66	291
SOCIAL WORK	Degree	12	81									12	81
GRAND TOTAL	TOTAL	2606	10683	1797	5172	1867	5331	348	1055	33	168	6651	22409

Declaration

I, the undersigned, declare that this thesis is my original work, has never been presented in this or any other university and that all resources and materials used for the thesis have been duly acknowledged.

Name Elias Worku

Signature _____

Place Addis Ababa

Date of Submission July 15, 2009