

University of Botswana

Undergraduates Uses of the Internet: Implications on Academic Performance

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Abstract

The recognized potential of technology to improve education has led to several initiatives to foster effective use and integration in the curriculum. The Internet as a new invented technology holds the greatest promise humanity has known for learning and universal access to quality education. It allows students to broaden their academic experience, access important information and communicate to others within academic community. In the light of these therefore, this study examined undergraduate's uses of the Internet and its implications on their academic performance at the University of Botswana, Gaborone. Three hundred and six undergraduate students from thirteen systematically selected departments formed the study sample. A modified Internet Use scale was used to gather data for the study. The data collected was analysed using descriptive statistics, chi-square and Friedman test. The results indicate that: majority of the respondents (66%) access the Internet 1-5 hours per week, 33.3% of respondents access the Internet 6-20 hours per week and 0.7% of respondents access the Internet between 21-25 hours per week. Moreover, most respondents use the Internet for the purpose of obtaining course related information. The results also reveal that Internet contributes significantly to academic performance of the respondents. To enhance and optimise the use of the Internet so that learning can take place at any time and anywhere, providing more access to computers and the Internet on campus constitutes the major recommendations. Future areas of research could include determining variations in Internet use by students from different disciplines, determining the nature and relationships between Internet use and academic performance.

Keywords: Undergraduate; Internet; Use of Internet; Academic performance/ Academic achievement; Botswana

Introduction

The Internet as a new invented technology holds the greatest promise humanity has known for learning and universal access to quality education. It allows students to broaden their academic experience, access important information

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and communicate to others within academic community. By and large, the quality and level of education acquired by an individual determines his contribution to national development. To understand and promote change, one requires a certain level of education as a catalyst for social, political and economic transformation (Akinboye, 1980). In any nation, education is regarded as an agent that promotes human survival. This is often justified by the huge amount of resources allocated to education by most governments.

A major problem faced by those who desire university education, and those who finance it, is the basic consideration of the possibility of academic success. For example the preoccupation of a tutor is how best to enhance the success of his/her students. Parents too, are worried about their children's success in school. Similarly, learners are motivated by the prospect of success. Warnemuende and Samson (2005) assert that most of us expect that our children will succeed as students just as we expect ourselves to succeed as parents. When they do not, we are confused, disappointed, angry, and afraid. Whether the lack of success is in academic skills, social behaviour, or both, the recognition that our youngster is not doing well causes pain (Warnemuende & Samson, 2005).

Supporters of educational technology continue to believe that technology will make a difference in academic achievement (Foltos, 2002). Information Communication Technologies (ICTs) are information handling tools that are used to produce, store, and process, distribute and exchange information. They include the conventional ICTs such as radio, television and telephone, and the new ICTs such as computers, satellite, wireless technology and the Internet. These different tools are now able to work together, and combine to form networked world—a massive infrastructure of interconnected telephone services, standardized computing hardware, the Internet radio and television, which reach into every corner of the globe (UNDP. Evaluation Office, 2001).

The Internet was the result of some visionary thinking by people in the early 1960s who saw great potential value in allowing computers to share information on research and development in scientific and military fields. The Internet now represents one of the most successful examples of the benefits of sustained investment and commitment to research and development of information infrastructure (Howe, 2007). The Internet is a valuable source of information used by students in projects and assignments. With over 50 million websites on the net, the chances are that information on any subject however obscure can be found using appropriate search tools. It also serves as a useful tool for lecturers in helping to prepare lesson plans using a number of sites dedicated to providing educational material.

Although the merits of the Internet make it an ideal research tool, students experience significant academic problems as they surf irrelevant websites, engage in chat room gossip, converse with Internet pen-pals, and play interactive games at the cost of productive activity. Students may have difficulty completing homework assignments, studying for exams, or getting enough sleep to be alert for class the next morning due to Internet misuse. Often, students may be unable to control their Internet use which eventually results in poor grades, academic probation, and even expulsion from the university. There has been indication that some on-line users are becoming addicted to the Internet which may result in academic failure (Brady, 1996). There has been similar report by the University of Botswana Library that students are not using the Internet for academic purposes.

The importance of studies on the use of the Internet and academic performance among students for the University of Botswana does not need to be over emphasised. Since 2001/02, the University has invested a lot of resources in computing and internet resources and students are increasingly being encouraged to use ICTs including the Internet in their learning to enhance the quality of education. For the University to have an idea of whether investment in ICT is having the desired effect of improvement in academic performance, studies such as these are needed. Similarly, studies such as this one would provide an indication of where pedagogical changes are needed to optimise on the use of ICT resources including the Internet at the University of Botswana to enhance academic performance. The study would be able to inform decisions on where additional resources may be needed for the University to consolidate any benefits that have so far been gained from use ICT including the Internet for learning and teaching purposes. The University may also be sensitised on the need to come up with an Internet use policy that would integrate its use in all academic programmes. Finally, this study would assist the university to make informed ICT investments decisions in the future.

University of Botswana (UB)

The University of Botswana was established in 1982. This was after the break up of the multi-national and multi-campus University of Botswana, Lesotho, and Swaziland, which had been established in 1964 to serve the three Southern African countries of Botswana, Lesotho and Swaziland. The University main campus is situated in Gaborone, the capital of Botswana. During 2006, the University had a total enrolment of 15,425 students of which 13,104 were full-time. Approximately 51% of the students are females (University of Botswana, 2006). Of the total enrolment, 14,656 are pursuing undergraduate programmes. The University has six faculties: Business, Education, Engineering and Technology,

Humanities, Science, and Social Sciences. The six faculties comprise 39 departments. Additionally, the University has a School of Graduate Studies and several specialised centres and research units. The University of Botswana has staff of 2,172, of which 760 are faculty members. The academic programmes offered by UB range from certificate to postgraduate (University of Botswana, 2006).

Several structural and curricular changes have taken place at the University of Botswana in the last 5 years. Notable among these are: the introduction of General Education Courses (GEC's) and implementation of WebCT e-Learning platform. Moreover, the University of Botswana in 2002/2003 semesterised its year-long academic programmes as part of key reforms aimed at assisting the University to become a leading academic centre of excellence in Africa and the World (University of Botswana, 2005, p.20). The GECs were introduced to provide more student determined choices and flexibility of academic programmes. The GECs generally address such cross-cutting issues as employer's expectations, competencies in communication skills, computer and information skills, etc. The rationale for GECs is succinctly outlined in the University of Botswana Calendar (University of Botswana, 2005, p.21) which states that every undergraduate student shall take general education courses for the purpose of broadening the knowledge and enhancing University education so that it is broadly-based; and promotes critical thinking, intellectual growth, and general skills for lifelong learning.

The rationale for the implementation of an e-learning platform (WebCT) at UB in the words of UBel (2002a) was to fulfil the University of Botswana's responsibility to prepare students for effective participation in the wider information society, use ICT to increase the success rates of students, provide the opportunity for the University to enhance flexible learning anytime and anywhere at student's own pace, etc. It was also expected that through e-learning, access to relevant national and international resources would be facilitated and better way of handling large classes would be achieved (UBel, 2002b).

Literature Review

The Internet according to Wells (2000) is a computer mediated communication tool, providing the individual with access to a broad spectrum of information and unique communication technologies. Going by the report of an online survey on the Internet and academic achievement conducted in the U.S., 68% of parents, 69% of students, and 69% of teachers said they have personally seen students' grades improved through the use of Internet information resources (AT & T, 1998). The Internet allows students to broaden their academic experiences, access important information, and communicate to others within academic community.

Using a standard web browser, for example, students can easily access academic information such as course schedules, grade, unofficial transcript, and search for courses that they are interested in pursuing. Additionally, they can communicate with their classmates and faculty members. Internet resources provide the flexibility necessary to approach a concept from various perspectives. Multiple references and approaches increase student's knowledge, inquiry, and depth of investigation (SAS, 2004). The Internet is a valuable source of information used by students in projects and assignments.

Access to the Internet

Internet access refers to the means by which users connect to the Internet. Common methods of internet access include dial-up, landline (over coaxial cable, fiber optic or copper wires) (Wikipedia, 2006). Places of access to the Internet include libraries, Internet cafes, and various places where computers with Internet connections are available. In Africa nowadays, the rate at which people particularly the students are gaining access to the Internet is progressing. However there are restrictions regarding the time of access. Taking the University of Botswana for example, a student is only allowed to access the Internet for only two hours daily. This is due to limited access point on campus. Currently, a substantial amount of Internet usage occurs in schools (Schofield & Davidson, 1997). Participants in the Jackson et al. (2003) study conducted in Washington showed that people held positive attitudes towards the Internet and constantly used the Internet even though sometimes they were aware of the negative side of it, such as inappropriate websites for children. Zhang (2007) asserted that the more useful of the computer network students perceived, the higher the level of Internet usage satisfaction they felt.

Comparison of users with dial-up access in the U.S. indicated that users engage in greater variety of online activities, spend more time online, and create more Internet content. Comunale, Sexton & Voss (2002) found evidence to suggest that higher course grades are related to more frequent website use. A study by Becker (2000) which analysed log file interactions with different resources on a cons ware website found a relationship between frequency of access to learning resources and final exam scores.

Ojedokun (2001) in a study of Internet access and usage by the students at the University of Botswana reported that computers with Internet facilities were still inadequate which denied many students' opportunity of access. On the other hand, a cross tabulation of Internet access frequency versus the mean of surfing time was carried out by Jagboro (2003) in a study on usage of the Internet at

Obafemi Awolowo University Ile-Ife, Nigeria. The analysis showed that 22.06 percent of the respondents accessed the Internet on a daily basis, 38.24 percent weekly, 11.76 percent monthly, 11.76 percent bi-monthly and 16.17 percent quarterly. In addition, 25.00 percent spent an average time of half an hour, 39.71 percent spent one hour (i.e. approximately between 5-7 hours per week), 19.12 percent spent two hours, 7.35 percent spent three hours, and 2.94 percent spent four hours, while 5.88 percent spent more than four hours. A further examination of the results showed that there is a convergence of weekly users who spent only one hour on the Internet.

Similarly, Anderson (2001) carried out a study on Internet use among college students at Rensselaer Polytechnic, New York. The time students spend on the Internet or average Internet use per day for each activity was analyzed. Students' overall average on-line time of Internet use was 100 minutes per day, i.e. 9.8 hours per week.

Robinson (2005) examined the Internet use among African-American college students in Michigan. The respondents were surveyed by using questionnaire to determine the frequency of Internet. The results of the study indicated that most of the African-American college students (76%) had using the Internet for more than three years. The use of the Internet for most African-American college students occurred at school or at the work place, totalling with 495 of the responses. While 47% of the responses indicated that they spent an average of two hours per day on-line. A small percentage of the students spent 5-6 hours per day, i.e. 25-30 hours per week on the Internet.

Waldman (2003) in a study conducted in New Zealand on freshmen's use of library electronic resources reported that 73% of the students said that they accessed the Internet daily, and additional 25% of students accessed the Internet at least once a week. In other words, over 97% accessed the Internet weekly, or more often. Becker (2000) noted that how frequently a student access Internet/computers at school, depends greatly on how many computers are available with Internet connectivity and whether they are located within the classroom or elsewhere.

Uses of the Internet

The use of the Internet in education allows a wide range of international resources to be accessed. Resources can be very well organized on the Internet, which allow for easy information access and exchange (Hicks, 2002). Students and teachers alike use the web because someone has already done the work of finding the information for them. The Internet allows students and teachers to

“exchange greetings, engage in intellectual discourse, conduct meetings, share knowledge, offer emotional support, make plans, brainstorm ideas, learn about other cultures and otherwise broaden their mental horizon” (Baker, 2000, p.91).

The Internet provides an activation of sight, sound, and cognitive reasoning, engaging students as active learners (Baker, 2000, p.91). Through the Internet many different activities can be assigned to the student that will enhance their education (Hicks, 2002). Anything from having discussions with foreign students to research about the universe is possible. Hicks (2002) concludes that the Internet is a double-edged sword, as students can access any educational database, learn about any country, they can also be subjected to perverse and deviant topics. Faculty can use the Internet infrastructure to improve and supplement traditional courses and degree programs. Library holdings can be digitized and made available both on and off campus. Guernsey (2002) noted that universities in New York routinely provide Internet connections in residents’ rooms, a circumstance that brings together the most powerful predictors of greater use, access, and education.

Ebersole (2000) pointed out that there are four basic types of Internet usage for students. These are:

i. website, which provides documents or collections of documents that can be read for informational purposes. Other types of information gathering services are available on the Internet, including commercial information services and research companies. Also, thousands of libraries are connected to the Internet, permitting even casual users to access their catalogues and request loans through inter-library programs. In addition to those information services, the number of on-line journals, newspapers and trade magazines increases each month. Much of the information in these publications is free, although some are accessible only for paid subscribers.

ii. E-mail is nothing more than sending and/or receiving messages through your computer. It combines the immediacy of the telephone with the word processing power of the computer. Students use e-mail to keep in touch with friends and relatives, and to work on a project with someone a hundred kilometers away. E-mail is a low-cost form of communication and unlike telephone or standard postal services, there are no volume or long distance surcharges for sending e-mail. One e-mail message can be sent across the city or 10,000 messages to the other side of the world for the same fee;

iii. Chat rooms are Internet facilities where students can communicate with each other on the computer at the same time, typing messages to each other;

iv. Newsgroup is an electronic bulletin board. According to Alexander (1996),

newsgroup is an example of the use of Internet in facilitating the development of international perspective in students. He adds that this encourages team work, effective communication, and the ethics of social and political action. Alexander described how students enrolled in undergraduates' subjects in politics of the Middle East at Macquarie University chose to take part in role play simulation conducted via the Internet. Special interest Usenet newsgroups are excellent places to locate expertise in a given field. Newsgroups act as electronic bulletin boards, through which people exchange information, ask technical questions, offer solutions, and forge new contacts. One can log into a newsgroup, check any or all of the messages that have been posted, add own message or simply leave.

Mathew & Schrum (2003) in a random survey of 364 students in an Australia university on Internet use revealed that students used the Internet for communicating with the professors through emails by asking for clarification or reporting information, e-mailing papers, and getting feedback. Secondly, they used the Internet to get materials (web links, notes, practice, quizzes, hints for tests etc.) from professional websites, checked grades, and accessed resources from WebCT. In a related survey, NCES (2001) in the U.S. found that 715 of online students said they relied mostly on Internet sources for the last big project they did for school and 345 of online young people aged 12-17 downloaded study aides from the Internet (Lenhart, Rainie, & Lewis, 2001). The U.S. Bureau of the Census (2003) found that 57% of all children in school aged 7-17 used the Internet to complete school assignment.

Mashra, Yadav, & Bisht (2005) conducted a study on Internet utilization pattern of undergraduate students in College of Agriculture and Technology, Pantnagar. The findings showed that 61.5% respondents of the males and 51.6% of the females used the Internet for the purpose of preparing assignments. Papastergiou & Solomonidou (2005) in a study conducted among high school students in Greece to find out the gender issue on uses of the Internet and favourite activities. They reveal that the majority of the students, 73 out of 124 students (58%), searched the web for information about school courses, while fewer of them engaged in communication activities via chat, e-mail or video conferencing and in web page creation. The researchers also reported that the vast majority of the 240 pupils who used the Internet outside school (about 80% or more of them) engaged in searching the web for information of personal interests, downloading games, music, logos, ring tones, video clips, surfing, and playing online games. Their study showed that the students' favourite uses of the Internet outside school are similar to those inside school, and related to entertainment and to the students' personal interests. About 49-67% of the 240 students engaged in chatting, e-mail-

ing, and searching for information about school courses. Studies of home Internet use by Krant, et al., (1998) and campus Internet use by Anderson (2001) and Scherer (1997) showed that electronic mail and World Wide Web browsing were the most often used Internet applications. According to the 9th World Wide Web user survey conducted by Graphic Visualization and Usability GVU's 9th WWW user survey in 1998 in U.S., the WWW youngest users (aged 11-20) used the web mainly for "entertainment" (81%), "education" (70%), "time wasting" (67%), and "personal information" (60%).

Purpose for using the Internet

Ebersole (2000) in his study reported that respondents to the computer-administered survey gave the following reasons for using the Internet:

- * Research and learning 52%,
- * Communicate with other people 7%,
- * Access to material otherwise unavailable 5%,
- * Find something exciting/ fun 8%,
- * Finding something to do when bored 5%,
- * Sports and game information 1%.

Considering the use of Internet for learning in the UK, the Internet is overwhelmingly used in ways that relate directly, or indirectly, to learning. Some 90% of those who use the Internet daily or weekly do so to do schoolwork and 94% use it as a research tool for obtaining academic information (Livingstone & Bober, 2005). In Canada teenagers are reported to spend 2.4 hours per week of their time online on activities explicitly related to learning, such as researching information from school projects. Levin & Arafeh (2002) conducted interviews with American teenagers and found that the Internet was used for a wide range of education-related purposes, from research, to corresponding with teachers and classmates about school projects.

In another study based on review of literature by Kumar & Kaur (2006), it was revealed that students are the most frequent users of the Internet. They used the Internet mainly for educational purposes rather than for entertainment. Bava-kutty & Salih (1999) conducted a study among undergraduate at Calicut University. Their results showed that students, research scholars, and teachers used the Internet for the purpose of study, research, and teaching, respectively.

Internet access and academic performance

Kuh & Hu (2001) suggested that using the Internet has a strong relationship with an overall measure of student engagement. In a study of "best wired campuses"(institutions that have made large investments in technology),

students reported slightly more frequent contacts with faculty and participated more in active learning activities compared with their counterparts attending less wired campuses (Kuh & Hu, 2001). The results pointed to a positive link between Information technology and engagement in effective educational practices. Laird & Kuh (2004) in their study of use of data of the National Survey of Student's Engagement (NSSE) in Indiana University Bloomington to investigate the relationship between student's uses of the Internet and other forms of student's engagement and found a strong positive relationship between using the Internet for educational practices such as active and collaborative learning and student-faculty interaction. When students used the Internet, their opportunities for other types of engagement increased (Laird & Kuh, 2004).

Moreover, Al-Othman (2003) examined the relationship between online reading speed rates and performance on proficiency tests. The study involved 25 post-graduate students enrolled in an ESL course at the private centre for teaching English as a foreign language in Kuwait. The main finding of the study was that high rates of reading speed were positively correlated with good performance on the CBT, which is a subset of TOEFL reading comprehension.

Comunale, Sexton & Voss (2002) found evidence to suggest that higher course grades are related to more frequent website use. The National Science Foundation (1997) conducted a gallop poll in the U.S. to find out issues about technology use by students. Five categories of user were generated from a cluster analysis. The participants reported that they were in the top percentile of their school in overall achievement. It was also reported that there appeared to be a positive relationship between self ratings of academic performance with the amount of time spent per week on both the computer and the Internet. Furthermore, the relationship between times spent in after-school activities seemed to be positively related to both academic performance and time spent on the computer and the Internet.

Mathew & Schrum (2003) in the report of their own study on high speed Internet use and academic gratification among college students in America indicated that correlation exists between students' perception of time using the Internet for academic purposes. Similarly, the correlation between the students' perception that their effort leads to good grades and their perception of Internet helps with academic work is weak but statistically significant. In the light of the importance of the Internet to learning and education highlighted in the background of this study and the review of literature above, this study aims at examining undergraduate students' use of the Internet and its implications on their academic performance. To achieve this objective, the following research questions were developed to guide

the study.

1. What is the undergraduate students' frequency of access to the Internet?
2. What is the purpose of using the Internet by the undergraduate students?
3. What is the undergraduate students' perception of the contribution of use of the Internet to their academic performance?
4. How can the use of Internet be enhanced and optimized for effective learning at UB?

Methodology

Research design

This study employed an ex-post-facto research design. This is known as causal comparative, explanatory observational or descriptive research (Ezeani, 1998; Best & Kahn, 1998, 2006). Kerlinger (1975) described it as a systematic empirical enquiry in which the investigator does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable. Inferences about relations among variables are made without direct intervention from concomitant variation of independent and dependent variables. The study could have employed experimental research design to establish the cause and effect of the use of Internet on perceived academic performance. Rather an ex-post facto research design is chosen because the study is interested in finding the relationship between the variables and in observing what has happened to the sample subjects without any attempt to control or manipulate them.

Population

A population is any group of individuals that has one or more characteristics in common and that is of interest to the researcher. In other words, it is a group of individuals with at least one common characteristic which distinguishes that group from other individuals (Best & Kahn, 2006, p.13). The target population of the study consists of 4000 senior undergraduate students out of the 10,602 undergraduate students at the University of Botswana distributed in 6 faculties and 39 departments. The senior students were chosen because they started using the Internet right from their first year. Based on this, it was felt that it would be easier for this group to determine the contribution the Internet has made to their academic performance starting from the third year.

Sample and sampling procedure

A sample is a small proportion of the population that is selected for observation and analysis. There are many models for determining sample size. The

principle used for this sample selection is based on Israel's (2003) model which states that, given a sample size allowing for the following marginal errors: $\pm 3\%$, $\pm 5\%$, $\pm 7\%$, and $\pm 10\%$ and the precision where confidence level is 95% the value of P should be 5. Following this principle, the size of the target population of this study was 4000. If $\pm 5\%$ marginal error was allowed, the sample size would be 364 (Israel, 2003). The most practical approach to arrive at the desired sample size (given that on average each department has about 30 fourth year students) was to take systematic sampling procedure of departments with interval of 3. Consequently, the departments were arranged in alphabetical order and every third department on the list was selected. This resulted in 13 departments being chosen for the study sample. Given that on average there are 30 students per department ($13 \times 30 = 390$), a census of fourth year student population in all departments was taken leading to a sample of 434. This size was considered acceptable since it is more than needed. Questionnaires were administered during a core course where all students were expected to attend. Proportionate sampling technique could have been employed, but this would result in a very small sample from some departments with few students and make results largely skewed in favour of departments with large number of students. To minimise this error therefore, census was considered appropriate. The census sample comprised of 167 males and 267 females resulting in sample size of 434, which is 10.9% of the 4000 senior undergraduate students at the University of Botswana.

Data collection

A modified instrument tagged Internet Access/Perceived Academic Performance Scale (IU-PAPS) was used. This involves framing questionnaire using pre-designed questions. Items in the instrument were adapted from various standardized scales that have been tested, and used for gathering data on the topic relevant to the study. These items were adapted from scales such as the one designed by Tsai, Lin, and Tsai (2001), Internet Attitude Scale (Zhang, 2007), and the Internet Use Attitude Scale (Eastin & LaRose, 2000).

The Internet Access/Perceived Academic Performance Scale consists of two sections. Section 1 requires respondents' bio data information, while Section 2 contains the various items on access to and use of the Internet facilities. This is further divided into 8 parts. Only the response of part 1-4 are used in this study. These are described below.

Part 1: Part 1 contains items that elicit responses on Internet Access. Response to the items in this part consists of YES/ NO.

Part 2: This part contains items that elicit responses on the purpose for

which students use the Internet. Respondents are required to respond by ticking what is applicable to them from a list of options.

Part 3: This part contains items that elicit responses on the frequency of Internet use by the respondents. Respondents are required to indicate the number of hours spent using the Internet during school session and during holiday.

Part 4: This part contains items that elicit responses on the influence/relationship of Internet use on the respondents' academic performance. It is purely a Likert types with responses ranging from strongly agree to strongly disagree. Respondents were also required to self rate their performance in their second year and third year on a two items of four points rating format. In adopting this approach, it is assumed that respondents would be honest in telling the truth about their performance. This type of approach has been adopted in some studies on internet use and academic performance (e.g. Kruse, 2006).

Validity and reliability

The validity of the scale in this study was ensured because all the items in the instrument were adapted from various scales that have been validated, tested, and used, and their results found to be accurate by various researchers. Similarly, the scale has both content and face validity because all the items in it are relevant to the content and construct of what is being measured.

To ensure the reliability of the tool, each of the parts of the scale with the overall co-efficient was determined through a test-retest method of over two week's interval. The instrument was administered to 50 respondents out of the envisaged population from a department that was not involved in the sample. Data collected was subjected to Pearson Product Moment Correlation analysis to get the reliability co-efficient alpha of the scale. The general reliability coefficient of the scale yielded an $r = 0.82$. The reliability coefficient of each of the various questions included in Part 1-4 of the scale is $r = 0.78$.

Data collection procedure

The researcher administered the questionnaire to the respondents in their respective departments during a core course. This approach disallowed exchange of ideas which could distort the results of the study. Out of 434 respondents, 306 were present at the time the questionnaires was administered and collected.

Results

Research question 1: What is the undergraduate student's frequency of access to the Internet?

Respondents were asked to state the average number of hours they spent

accessing or using the Internet per week. The purpose of this question was to determine the frequency of access to the Internet as well as the time spent on the Internet by the respondents. The findings reveal that majority of the respondents spent an average of 1-5 hours on the Internet per week. The results are further presented in Table 1.

Table 1 Frequency of Access to the Internet per Week

(N=306)

Time of access	Frequency	Percentage
1 – 5 hours	202	66.0
6 – 10 hours	88	28.7
11 – 15 hours	12	3.9
16 – 20 hours	2	0.7
21 – 25 hours	2	0.7
Total	306	100

The results show that majority of the participants 202 (66%) access the Internet 1-5 hours per week. This is followed by 88 (28.7%) who access the Internet 6-10 hours per week. Moreover, 12 (3.9%) access the Internet 11–15 hours per week. Only two participants (0.7%) indicate they access the Internet 16-20 and 21-25 hours per week respectively. The results generally indicate that majority of respondents have access but spent limited time on the Internet per week.

Research question 2: What is the purpose of using the Internet by the students?

Respondents were asked to state what they use the Internet for. A list of uses of the Internet was provided from which they choose by ticking what was applicable to them. The purpose of the question was to determine the use to which students put the Internet. The results of the analysis based on Friedman Test are presented in Table 2.

Table 2 Purpose of Using the Internet

Purpose of using Internet	Mean rank	Chi-square	Sign. F
To obtain course related information	7.68	978.326	.001
Communicate by e-mail	7.06		
Do school work (assignment)	6.95		
Obtain non-course related information	6.39		
Chat with other persons	5.38		
Entertain myself	5.33		
Play games	4.27		
Download music	4.12		
Download games	4.10		
Create web pages	3.74		

(Chi-Square=978.326, DF=9; N=306) Significant level: .001

The most use of the Internet was for the purpose of obtaining course related

information with the mean rank of 7.68. This is immediately followed by communicating by e-mail with the mean rank of 7.06. Next to this is to do school work with 6.95 and to obtain non-course related information with 6.39. From the bottom of the table is to create web pages with the mean rank of 3.74. This is followed by downloading games 4.10; while to download music is next with 4.12. The findings generally show that the Internet is being used by the respondents mainly to obtain course related information and it is least used by the respondents for creating web pages. The result also reveal that a significant difference exist between the main and the lowest purpose of using the Internet.

Research question 3: What is the undergraduate student's perception of the contribution of use of Internet to their academic performance?

Respondents were asked to indicate their perceived relationship between the Internet use and the perceived academic performance. The purpose of this question was to determine the use of the Internet and their perception of its contribution to their academic performance. The results are presented in Table 3.

Table 3 Student's Perception of the Contribution of the Internet to their Academic Performance

S/N Items	SA	A	D	SD	Total	Sign
1 Without the Internet, it will be difficult to survive in my programme at the University of Botswana	204 (61.2)	41 (61.2)	37 (61.2)	24 (61.2)	306	431.9*
2 Without the Internet, I would have been an average student	158 (76.3)	62 (76.3)	44 (76.3)	42 (76.3)	306	119.7*
3 Use of the Internet as supplementary to the information given by our teachers has improved my GPA.	155 (76.3)	84 (76.3)	40 (76.3)	27 (76.3)	306	132.5*
4 Internet access enhances my academic performance more than class lectures.	139 (76.3)	67 (76.3)	61 (76.3)	39 (76.3)	306	75*

* Significant level: $P < .05$.

(Legend: SA = strongly Agree, A = agree, D = disagree, SD = strongly disagree, Sign = significance level)

The results show that the 204 respondents strongly agreed that it would be difficult to survive in their programme without access to the Internet while 41 agreed, 37 disagreed and 24 strongly disagreed. The numbers of those who strongly agreed with those who agreed is far more than those who disagreed and strongly disagreed. The results reveal that 158 respondents strongly agreed that without Internet, they would have been average students while 62 respondents agreed. This outnumbers the numbers of those who disagreed (44) and strongly disagreed (42), shown in the second row of Table 3. The response to the third question in Table 3 shows that 155 respondents strongly agreed that the use of Internet as supplementary to the information given by their teachers improved their GPA while 84 respondents agreed. The sum of these two responses also outnumbers those who disagreed (40) and those who strongly disagreed (27). The results

in Table 3 further show that on question 4, 139 respondents strongly agreed that Internet access and use enhances their academic performance while 67 agreed. These two responses are also more than the sum of responses for those who disagree (61) and strongly agree (39) that the Internet enhanced their work. The computed Chi-square showed that all the four items are significant. From these results, the proportion of responses are significantly biased in favour of strongly agree and agree. These results suggest that a relationship generally exists between the use of the Internet by the respondents and their academic performance. To obtain additional information, respondents were asked to indicate the number of hours they spent accessing the Internet during school session and during holidays. At the same time they were asked to self-rate their academic performance on a four points scale: Poor, Average, Good, and Excellent. These four points were collapsed into two: Poor and Average were grouped as Low; while Good and Excellent were grouped as High. The results are presented in the Tables 4 and 5.

Table 4 Frequency of Internet Access during School Session and Academic Performance in 3rd Year of Study

Frequency of access/hours	Self-rating of performance			Chi. cal.	Chi. tab.	Df	Remark
	Low	High	Total				
0-5 hours	41(52.2)	55(43.8)	96	7.885	3.84	1	S**
6 hours +	119(107.8)	79(90.2)	198				
Total	160	134	294				

**Significant level: $P < .05$

The results shows that frequency of Internet access during session by the respondents in 3rd year significantly relates with respondents' academic performance where (Chi. cal. 7.885; Chi. tab. 3.84; df, 1 at .05 significance level). These results suggest that access to the Internet during session of respondents in 3rd year relate to their perceived academic performance.

Further effort was made to find out whether frequency of access to the Internet during the holidays relate to the respondents' perceived academic performance. To establish this, the respondents were asked to indicate their frequency of access during holidays in 2nd year. The Table 5 below presents the results.

Table 5 Frequency of Internet Access during Holidays in 2nd Year of Study and Academic Performance in 3rd Year of Study

Frequency of access/hours	Self-rating of performance			Chi.cal.	Chi.tab.	Df	Remark
	Low	High	Total				
0 - 5 hours	122(118.8)	94 (97.2)	216	.760	3.84	1	N.S
6 hours +	38(41.2)	37 (33.8)	75				
Total	160	131	291				

Not significant level: $P < .05$

The results in Table 5 suggest that no relationship exists between the frequency of access to the Internet by the respondents during the holidays in their 2nd year of study and their perceived academic performance in their 3rd year of study (Chi. cal. = .760 > Chi. tab. 3.84, df = 1, and .05 significance level). The non-significant relationship between frequency of access to the Internet and respondents' perceived academic performance during holidays in 2nd and 3rd year of study may suggest that no serious academic work took place due to the lack of access to the Internet on campus.

Furthermore, respondents were asked to self rate themselves on relationship between Internet access and use on one hand and their academic performance during 2nd and 3rd year of study on the other hand. The purpose of this exercise was an attempt to establish changes in the self-rating of perceived academic performance of the student in 2nd and 3rd year of their study and the actual academic performance for the 3rd year of study. The results are depicted in Table 6.

Table 6 Percentage Change in the Self Ratings of Participants on Perceived Academic Performance in Their 2nd and 3rd Year of Study

Frequency of access	Percentage change			Total	0 X	0 X	Df	Rm
	Decrease <0	Unchanged 0	Increased >0					
0 -5 hrs	35 49.0	41 35.7	19 10.4	95	17.679	5.99	2	S**
6 hrs above	116 102.0	69 74.3	13 21.6	198				
Total	151	110	32	293				

*Significant level: P< .05

The results in Table 6 show that during 2nd and 3rd year of study, the percentage change in the self rating of perceived academic performance for those respondents using the Internet between 0-5 hours per week decreased with expected (49), while 41 respondents with (35.7) expected indicated that there was no change at all in their performance and 19 respondents with (10.4) expected indicated that there was an increase in their performance.

For the respondents using Internet for more than 6 hours per week, 116 of them with expected value of (102) indicated that there was a decrease in their performance, 69 with expected value of 74.3 indicated that their performance remained unchanged, and 13 with expected value of 21.6 indicated that there was an increase in their performance. Despite the fact that many respondents than expected indicated that there was a decrease in their perceived academic performance in their 3rd year even though they had used the Internet, the result still showed that use of the Internet made a significant contribution to the respondents'

perceived academic performance (Chi. cal. = 17.68, Chi.tab. 5.99, at 2 degree of freedom).

Overall, the results indicated that the use of Internet significantly contribute to students' academic performance. These results are also in agreement with what has been established in Tables 4 and 5 above, which show that the use of Internet improves academic performance of the respondents. Apart from the perception of the respondents in Table 4, a general contribution of Internet to perceived academic performance was established.

Measures needed to enhance and optimize use of the Internet

Respondents were asked to suggest ways to enhance Internet access at the University of Botswana. The findings are shown in Table 7.

Table 7 Measures Needed to Enhance Internet Access at UB

S/N	Measures (s)	No of respondents	%
1.	More access points should be provided.	89	29.1
2.	Government should start giving students allowances for laptops/computers.	45	14.7
3.	Cyber-café operators should be allowed to operate on campus	38	12.4
4.	Each department should have computer laboratory connected to the Internet and should operate 24 hours.	36	11.8
5.	Restrictions of access in terms of hours of operation and lack of opportunity to use Internet on campus during holidays should be removed.	25	8.2
6.	Internet facilities should be made available in hall of residence to allow students who have computers to be connected.	16	5.2
7.	Slow connection of the Internet should be improved and more technicians recruited.	15	4.9
8.	Computer courses should be made compulsory in every semester or should be infused in all courses.	15	4.9
9.	No suggestion.	27	8.8
	Total	306	100.0

The findings generally show the provision of more Internet access points on the campus as the most common suggestion with 89 respondents (29.1%). This is followed by other suggestions such as: giving allowances to students to buy personal computers or laptops, with 45 respondents (14.7%), and allowing cyber café operators to operate on campus, with 38 respondents (12.4%).

Discussion of Findings

The results on participants' access to the Internet show that the majority of the participants 202 (66%) access the Internet 1-5 hours per week. This is followed by 88 (28.7%) who access the Internet 6-10 hours per week. Moreover, 12 (3.9%) access the Internet 11-15 hours per week. Only two participants (0.7%)

indicate they access the Internet 16-20 and 21-25 hours per week respectively. The results generally indicate that the majority of respondents spent limited time on the Internet per week.

This result corresponds with Jagboro's (2003) finding in a similar study that showed the majority of users access the Internet for an hour per day, i.e. between 5-7 hours per week. This is almost in the same range with the present finding. However, the result is contradicted with Anderson's (2001) finding which reported an average of 9.8 hours of access to the Internet by the students of Rensselaer Polytechnic Institute in New York and Robinson's (2005) finding that reported an average of 25-30 hours per week on the Internet by African American college students in Michigan. It should be noted that while a student here at the University of Botswana is allowed to use the Internet for just two hours per week on schedule, the situation is different in other universities because no restriction is set on the time of access. What may be responsible for the variation in the results may be linked to Becker (2000) who noted that how frequently a student accesses the Internet/computers at school, and for what purposes, depends greatly on how many computers are available with Internet connectivity and whether they are located within the classroom or elsewhere. Moreover, the restriction of access in terms of two-hour schedule allowed by a student per week at the University of Botswana may also be a factor responsible for the difference.

On participants' use of the Internet, the results of the analysis based on Friedman Test revealed that most use of the Internet was for the purpose of obtaining course related information with the mean rank of 7.68. This is immediately followed by communicating by e-mail with the mean rank of 7.06. Next to this is to do school work with 6.95 and to obtain non-course related information with 6.39. From the bottom of the Table is to create web pages with the mean rank of 3.74. This is followed by downloading games 4.10; while downloading music is next with 4.12. The findings generally show that the Internet is being used by the respondents mainly to obtain course related information and it is least used by the respondents for creating web pages. The results also reveal that a significant difference exist between the main and the lowest purpose of using the Internet.

These results generally corroborate the findings by Livingstone and Bober (2005) who reported that students used the Internet mostly for the purpose of obtaining academic related information with 94% and 90 % of the students used the Internet to do school work such as assignment. Similarly, Kumar and Kaur (2006) reported that students used the Internet mainly for academic purposes which included obtaining course related information and communication by e-mail. Similarly, the report by Jagboro (2003) indicated that 69.86% of students used the

Internet for e-mail, 53.42% for research material, and 39.71% for course material, also lend credence to the present results.

On determining the use of the Internet and the participants' perception of the Internet's contribution to their academic performance, the results generally show that respondents strongly agreed that it would be difficult to survive in their programme without access to the Internet while 41 agreed, 37 disagreed, and 24 strongly disagreed. The results reveal that 158 respondents strongly agreed that without Internet, they would have been average students while 62 respondents agreed. This outnumbers the numbers of those who disagreed, and strongly disagreed. Moreover, 155 respondents strongly agreed that the use of the Internet as supplementary to the information given by their teachers improved their GPA while 84 respondents agreed. The sum of these two responses also outnumbers those who disagreed and those who strongly disagreed.

Overall results reveal that the participants perceived the Internet as significant contribution to their academic performance. This was shown with the relationship between frequency of access during school session and perceived academic performance in their third year of study; and the relationship between percentage changes in the self ratings of participants' perceived academic performance in their 2nd and 3rd year of study and the frequency of access. However, no significant relationship was shown in the use of Internet during holiday in the second year and self-rating of perceived academic performance of the participants during session in the third year of study. The decrease in the academic performance in the 3rd year of study may be an aberration but may also be attributed to limited access to the Internet because of inadequate access points.

These results agree with the various empirical findings and reports of studies, postulates and assertions from the literature. For instance, the results correspond with Comunale, Sexton and Voss (2002) who found evidence that suggest that higher course grades are related to more frequent website use, and the National Science Foundation (1997) which reported that time spent on the Internet significantly relate to academic performance. The result is also in agreement with the report by Gao and Lehman (2003) that use of web-based learning environment provides different levels of interactivity and increased student's performance considerably. Another survey report by NCES (2001) also confirms this present result by revealing that most students (88%) indicate Internet has helped them to do better in school. Similarly, the findings by Mathew and Schrum (2003) showed that positive relationship exists between ratings of academic performance with the amount of time spent per week on the Internet. Additionally, the report by Laird and Kuh (2004) show that there is a strong positive relationship between

using information technology and academic performance.

To enhance and optimize the use of Internet at UB, the findings generally reveal the provision of more Internet access points on the campus as the common suggestion. This is followed by giving allowances to students to buy personal computers or laptops instead of depending on the school. Another common suggestion is that cybercafé operators should be allowed on University of Botswana campus. The solution that more access points should be provided should be considered a vital one.

Conclusion

This study examined the issue of Internet use and its implication on the academic performance of the undergraduate students at the University of Botswana. The results have so far demonstrated that the use of Internet contributes immensely to the academic performances of the students. It was revealed that the majority of the respondent access the Internet between 1-5 hours per week with the purpose of obtaining course related information. Provision of more access points was revealed as the common suggestions to enhance and optimize the use of Internet at the University of Botswana. If this suggestion and others stated in this study are taken into consideration, it is assumed that the future use of ICTs at the University is very bright.

Recommendations

Based on the findings of this study it is recommended that students need to look for alternative means of gaining access to the Internet such as going to cybercafé outside the campus instead of wholly depending on the limited access on campus. The University of Botswana, especially the library, should not restrict access to Internet as is currently the practice. Students should be well equipped with skills for them to make effective use of the Internet services in order to enhance their learning. The University of Botswana should put in place a policy that integrates use of the Internet in programmes. University of Botswana should consider increasing Internet access points on campus to enhance access. Efforts should be made to upgrade the infrastructure to improve Internet access speed.

Recommendations for further research

Future areas of research could include determining variations of Internet use by students from different disciplines, determining the nature and extent of relationships between Internet use and academic performance, impact of the Internet at the University of Botswana since it is increasingly used for learning in 2001/02 academic year.

Limitations of the study

The study was limited to the University of Botswana. It drew samples from among the senior undergraduate students from 39 departments in all the six faculties of the University. This means that the findings of the study are expected to be applied only to similar academic environment. This study is limited to establishing the contribution of the Internet to academic performance. No attempt is made to use psychometric measurement to determine performance. This is because it has been found to be problematic (Ford & Antoinette, 1997). Part of this problem is the fact that when using psychometric measure, respondents are asked to respond to questions based on options provided. With this scenario, they are forced to engaged in a cognitive decision making process. By so doing, the results of the study may be distorted. Moreover, psychometric measures tend to be subject specific with respect to performance of individuals, whereas this study is independent of any particular discipline.

References

- Akinboye, J. O. (1980). *How to read and pass important examination: A psychological approach*. Ibadan: Maritime Printers.
- Al-Othman, N.M.A. (2003). The relationship between online reading rates and performance in proficiency tests. *The Reading Matrix*, 3(3), 1-17.
- Alexander, S. (1996, July). Teaching and learning on the World Wide Web. In *AusWeb96*, Symposium held at the Gold Coast, Australia.
- Annan, K. (1999, February 19). Utilizing information and communication technology for education. *United Nation Science and Technology Magazine*, 1079.
- Anderson, K. (2001). Internet use among college students: An exploratory study. *Journal of American College Health*, 50(1), 21-27.
- AT & T. (1998). *Internet deserves a top spot on the back-to school shopping list*. Retrieved March 3, 2006, from <http://www.att.com/press/0998/980902.csa.html>
- Baker, B. O. (2000). Anytime, anyplace learning. *Forum for Applied Research & Public Policy*, 15(1), 88-92.
- Bavakutty, M., & Salih, T.K.M. (1999). Internet services in Calicut University. In *Proceedings of the 6th national convention on academic libraries in the Internet era* (pp.37-44). India: Ahemdabad.
- Becker, H. J. (2000). Who's wired and who's not: Children's access to and use of computer technology. *The Future of Children*, 10(2), 44- 75.
- Best, J. W., & Kahn, J. V. (1998). *Research in education* (8th ed.). Boston: Allyn and Bacon Publishers.
- Best, J. W., & Kahn, J. V. (2006). *Research in education* (10th ed.). Boston: Allyn and Bacon Publishers.
- Brady, K. C. (1996, October). Dropouts rise a net result of computers. *The Buffalo Evening*

News, 10, 1.

- Comunale, C.L., Sexton, L.T., & Voss, A. (2002). The effectiveness of course web site in higher education: An exploratory study. *Journal of Educational Technology Systems*, 30(2), 171-190.
- Eastin, M., & LaRose, R. (2000). Internet self-efficacy and the psychology of the digital divide. *JCMC*, 6(1). Retrieved February 12, 2006, from <http://www.jcmc.indiana.edu/vol6/issue1/eastin.html>
- Ebersole, S. (2000). Uses and gratifications of the Web among students. *Journal of Computer-Mediated Communication*, 6(1). Retrieved February 12, 2006, from http://www.findarticles.com/p/articles/mi_m1387/is_4_53/ai_n14735977/pg_6-31k
- Ezeani, S. I. (1998). *Research methods: A realistic approach*. Ibadan: Elohim Publishers.
- Foltos, L. (2002). *Technology and academic achievement*. Retrieved February 27, 2006, from <http://www.newhorizons.org/>
- Ford, D. Y., & Antoinette, T. (1997). *Underachievement among gifted minority students: Problems and Promises*. The Eric Clearing House on Disabilities and Gifted Education. (ERIC:EC) Digest #E544.
- Gao, T., & Lehman (2003). The effects of different levels of interaction on the achievement and motivational perceptions of college students in a Web-based learning environment. *Journal of Interactive Learning Research*, 14(4), 367-386.
- Graphic Visualisation and Usability Center GVU. (1998). *Tenth WWW user survey*. Retrieved February 10, 2006, from http://www.gvu.gatech.edu/user_survey
- Guernsey, L. (2002, January 13). Very big pipes. *The New York Times*, 23-27.
- Hicks, J. L. (2002). Distance education in rural public schools. *USDLA journal*, 16(3). Retrieved July 22, 2005, from <http://www.firstsearch.org>
- Howe, W. (2007). *An anecdotal history of the people and communities that brought about the Internet and the Web*. Retrieved March 14, 2007, from <http://www.walthowe.com/navnet/history.html>
- Israel, G. D. (2003). *Determining sample size*. Retrieved February 10, 2007, from <http://edis.ifas.edu>
- Jackson, L. A., Eye, A. V., Barbatsis, F., Bocca, F., Zhang, Y., & Fizerald, H. E. (2003). Internet attitudes and Internet use: Some surprising findings from the HomeNetToo project. *International Journal of Human-Computing Studies*, 59, 355-382.
- Jagboro, K. O. (2003). A study of Internet usage in Nigeria universities: A case study of Obafemi Awolowo university, Ile-Ife, Nigeria. *First Monday*, 8(12). Retrieved May 12, 2006, from <http://www.firstmonday.org/issues/issue82/jagboro/index.html>
- Kerlinger, F. (1975). *Foundation of behavioural research*. New York: L. E. Associates.
- Kluge, D. (1997). The Internet: Promises, problems and possibilities. Retrieved February 10, 2007, from <http://www.jalt-publications.org/tlt/field/files/97/jun/promises.html>
- Krant, R., Patterson, M., Lundmark V., Kiesler, S., Mukophadiyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53(9), 40, 81-86.
- Kruse, N. B. (2006). *The effect of instruction on students' abilities for self-rate Etude perfor-*

- mance. Retrieved January 15, 2007, from http://www.VRM_submission.kruse.pdf
- Kuh, G. D., & Hu, S. (2001). The relationship between Internet use, student learning and other college experiences. *Journal of College Student Development*, 42, 217- 232.
- Kumar, R., & Kaur, A. (2006). Internet use by teachers and students in engineering colleges of Punjab, Haryana, and Himachal Pradesh states of India: An analysis. *Electronic Journal of Academic and Special Librarianship*, 7(1), 1-12.
- Laird, T. F. N., & Kuh, G. D. (2004, June). Students experiences with information technology and their relationship to other aspects of student engagement. In *Annual Meeting of the Association for Institutional Research*.
- Lenhart, A., Rainie, L., & Lewis, O. (2001). *Teenage life online*. Washington, DC: Pew Internet & American Life Project.
- Levin, D., & Arafeh, S. (2002). The digital disconnect: The widening gap between Internet-savvy students and their schools. Retrieved March 14, 2007, from http://www.pewinternet.org/report_display.asp?r=67ay.asp?r=67
- Levin, H. (2003). Making history come alive. *Learning and Leading with Technology*, 31(3), 22-27.
- Livingstone, S., & Bober, M. (2005). *UK children go online: Final report of key project findings*. Retrieved March 14, 2007, from <http://www.Ise.ac.uk/collections/ukCGOfinalReport.pdf>
- Mathew, D., & Schrum, L. (2003). High speed Internet use and academic gratification in the college residence. *The Internet and Higher Education*, 6(2), 125-144.
- Mashra, O. P., Yadav, N., & Bisht, K. (2005). Internet utilization pattern of undergraduate students. *University News*, 43(13), 8-12.
- National Centre for Education Statistics (NCES) (2001). *IPEDS college opportunities online: CUNY Bernard M Baruch College*, IPED ID: 19051. Washington, DC: National Centre for Education Statistics. Retrieved October 18, 2005, from <http://nces.ed.gov/ipeds/cool/Enrollment.asp?>
- National Science Foundation. (1997). U.S. teens and technology. *Webs wires waves: The science and technology of communication*. Retrieved January 31, 2006. from <http://www.nfs.gov/search97cgi/vtopic>.
- Ojedokun, A. A. (2001). Internet access and usage by students of the university of Botswana. *African Journal of Archive Library and Information Science*, 11(2), 97-107.
- Papastergiou, M., & Solomonidou, C. (2005). Gender issues in Internet access and favourite activities among Greek high school pupils inside and outside school. *Computers & Education*, 44(4), 377-393.
- Robinson, J. W. (2005). Internet use among African-American college students: An Exploratory study. Retrieved May 12, 2006, from ProQuest database.
- SAS. (2004). *The research basis for curriculum pathways from SAS in school: Web based educational resources for grades 8 -14*. NC, USA: SAS Institute Inc.
- Scherer, K. (1997). College life online: Healthy and unhealthy Internet use. *Journal of College Student Development*, 38(6), 655-665.
- Schofield, J. W., & Davidson, A. L. (1997). *The Internet in school: The shaping of use by or-*

- ganizational, structural, and cultural factors*. Toronto, Canada: WebNet 97 World Conference of the WWW, Internet & Intranet Proceedings. (ERIC Document Reproduction Service No. ED 429545)
- Tsai, C, Lin, S. S. J., & Tsai, M. (2001). Developing an Internet attitude scale for high school students. *Computers and Education*, 37(1), 41-51.
- University of Botswana E-learning (UBel). (2002a). *E-learning*. Unpublished paper, University of Botswana at Gaborone.
- University of Botswana E-learning (UBel). (2002b). *Guidelines and proposal form for an E-learning pilot in 2003-7*. Unpublished Manuscript, University of Botswana at Gaborone.
- UNDP. Evaluation Office. (2001). *Information communication technology for development*. Research Report, No 5, 1- 31.
- University of Botswana. (2005). University of Botswana Calendar 2000-2006. (Available from Public Affairs Department, university of Botswana, Gaborone).
- University of Botswana (2006). University of Botswana Calendar 2000- 2006. (Available from Public Affairs Department, university of Botswana, Gaborone)
- U.S Bureau of Census. (2003). *A nation online: Broadband age*. Retrieved October 10, 2005, from <http://www.censtats.census.gov/cbpnaic/cbpnaic.shtml>
- Waldman, D. (2003). Freshmen's use of library electronic resources and self-efficacy. *Information Research*, 8(2), 150. Retrieved October 18, 2006, from <http://informationr.net/ir/8-2/paper150.html>
- Warnemuende, M. S., Samson, M. D., & John, H. (2005). *Underachievement: A frequently ignored problem of childhood*. Retrieved March 3, 2006, from <http://www.informedparent.com/articles/template.php?article=18.underachievement>
- Wells, J. G. (2000). Walls, effects of an on-line computer communication course, prior computer experience and Internet knowledge, and learning styles on students' Internet attitudes computer-mediated technologies and new educational challenges. *Journal of Industrial Teacher Education*, 37(3), 22-53.
- Wikipedia the Free Encyclopaedia. (2006). *Internet*. Retrieved December 18, 2006, from <http://www.wikipedia.org/wik/Dictionary>
- Zhang, Y. (2007). Development and validation of an Internet use attitude scale. *Computers and Education*, 49(2), 243-253. Retrieved February 10, 2006, from <http://www.sciencedirect.com/science> (in press).

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