BIBLIOGRAPHY

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ABSTRACT

The study aimed to determine the best-fitting model that approximately summarizes the students' frequency of utilizing the internet facilities of Benguet State University and to determine the odds of the students' frequency of utilizing the internet facilities in relation to their gender, age, course, year level and utilization outside Benguet State University.

A sample of 375 respondents was drawn from the 6118 college students of Benguet State University using Stratified Random Sampling.

Results of the study revealed that gender and course affect the student's utilization of the BSU internet facilities. The frequency of utilization is independent of the student's age, year level and utilization outside BSU. Gender and course revealed a very weak to weak association to the frequency of internet facilities utilization of the students, while the age of the student showed a very weak

association to the frequency of utilization. Furthermore, year level showed a very weak to moderate association to the student's utilization. The findings also showed that outside utilization revealed a weak to moderate association to the student's utilization of the BSU internet facilities. Moreover, the findings revealed that the chances of often utilizing the BSU internet facilities by the students who are female, aged 19 and above, second year, with only one computer subject, and who have their own internet facilities is higher than those belonging to other groups.

A more thorough research on the internet usage is recommended using either same technique or other techniques with wider scope, larger sample size and more variables.

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INTRODUCTION

Background of the Study

The "internet" has become a byword in this age of information technology. To have an access on information, just simply click on the mouse. The internet is a global communications network consisting of thousands of networks typically interconnected by fiber optic cabling. The advances of technology now made it possible to be connected via satellite so that internet access is possible even in remote areas. The internet services include access to the worldwide web, e-mail, e-chat and teleconferencing. The worldwide web links together relevant information to the user's fingertips (Kingat, 2003).

The vital role information plays in day-to-day lives makes the internet a necessity not only for the students and teachers but also for the other people from different walks of life. Since the internet provides students unlimited access to knowledge and information available in the world, students now rely on the internet for their researches and school needs.

The educational institutions' one major function is to share information with their client as part of their preparations for the employment market where stiff competition awaits them. To be competitive, one needs to be equipped with updated information and the best way of getting this is through internet access.

Realizing the importance of the internet to education, Benguet State University (BSU) got connected to cyberspace in 1997 through the partnership with Saint Louis University. In 1999, the internet connection was enhanced with the implementation of the Philippine Institutional University Cooperation (PIUC) Program. Among the components of the program is an internet laboratory where faculty members and students can visit for their information needs. The main library of the university was the most accessible internet laboratory then.

Conceptualized as a tool for e-learning, three internet laboratories were established by the administration. The first was established at the College of Agriculture building, the second at the College of Nursing building and the third at the College of Arts and Sciences building. The locations of these internet laboratories were chosen based on whether or not the buildings had fiber optic connection to the internet server and the buildings' location in the university.

The internet laboratories provide internet services, software application and Information Technology application. Bonafide teachers and students can use these services. With the Php. 150.00 ICT Fund collected from each student for every semester, each student may utilize the computers for a maximum of 15 hours per semester. It is the privilege of every student to utilize these services.

This study then attempts to find out how well the internet laboratories are carrying out its purpose in support of the curricular needs of the university. It also attempts to determine how students utilize the services provided in the internet.

Objectives of the Study

This study was primarily done to determine the students' utilization of the internet facilities at Benguet State University using Log linear Analysis. Specifically, the study aimed to determine the best fitting model that approximately summarizes the students' frequency of utilizing the internet facilities of Benguet State University and to determine the odds of the students' frequency of utilizing the BSU internet facilities in relation to their gender, age, course, year level and utilization outside BSU.

Significance of the Study

The study could be useful to school officials in planning, improving and enhancing the internet facilities and services of the university.

This study could also provide information on how students utilize these facilities and avail of such services.

As a form of communication, the study will be used as a reference material for students and interested individuals for a comprehensive and extensive research on BSU's internet laboratories.

Scope and Delimitation

The study was centered on the college students of the Benguet State University (BSU)-Main Campus, school year 2008-2009. Survey questionnaires were used to gather information from the students.

The study was delimited to the gender, age, courses, year level of the students, their frequency of utilizing the internet laboratories and utilization outside BSU.

REVIEW OF LITERATURE

This chapter presents related studies and literature in relation to the study. These related literatures were presented along the following subject areas.

Internet in Perspective

Technological development involves complex system of computer networks known as Internet. Claravall (2002) defined Internet as a collection of interlinked computer networks or a network of networks which provide global connectivity. Also, William (1999) defined internet as a large collection of networks that are tied together so that many users can share their vast resources.

Moreover, Claravall (2002) enumerated the features of Internet. These are as follows: it is global; it is not controlled by individuals; it can be used to transmit all kinds of data in digital form; it can be accessed easily given the appropriate equipment; and it has a significant impact on the way people live, work and communicate.

Internet Information Services

According to O'Brien (1999), the most popular uses of the internet are as World Wide Web (www); e-mail; use net; internet; relay chat; file transfer protocol (FTP); telnet.

As pointed by Ince (2001), internet provides the user with some space on a web server for their own websites; e-mail addresses, web access, printing, downloading, filtering assistance and training, chat line games, e-commerce, library website and domain names, acts as intermediaries in e-commerce and offer other technical assistance.

Purposes in Using the Internet

The most common reasons why higher education students access the Internet are to identify and retrieve information relevant to research, to send messages, or to collect data (Robinson, 1994).

Furthermore, Wells (1996) also reported that the use of Internet in higher education focuses in the information pathway as both are means to an end unto itself.

Also, Tolhurst and Blancton (2003) noted the reasons of students in using Internet tools. They can exchange information quickly and conveniently; access experts in different fields; receive regular updates on topic interested in; gain wide area access to data; gain access to archived information; translate and transfer data between machines; have fun and be entertained.

Likewise, Maughan (1999) added the reasons why computer users liked best the Internet. The reasons were: opportunity to improve skill and experience on the Internet; to explore real life issues in depth and in real time; opportunity to

work or study independently at one's own place; uniqueness of the information retrieved; more freedom to select themes and interpret information on an individual basis; and discovery of topics associated with communication and information which were new to them.

According to Ang and Loh (1996), communication which is 34.4% is the main reason in using Internet. This was followed by access to databases and research.

Importance of Internet

Vice President Al Gore said that the challenge to the nation's communities is the use of the new technologies to improve educational opportunities motivates students and help tap their natural curiosity (WHPR, 1995). The new generation of students has grown up in a world of computers. Wherever one looks, there are children playing video games in an arcade or a handheld game between classes but there are no kids with books or asking their friends for tips to do better in school. It is generally believed that the "nation at risk" and that teachers are doing a poor job teaching the youth of today. Some educators feel that the use of technology in schools will allow teachers to do a better job in today's challenging environment by motivating students in new ways (U.S. Congress, 1995). The uses of the World Wide Web excites and motivates students and are used in some schools as early as kindergarten (Anonymous).

Yu and Huang (1996) reported that about 73 percent of on-line users use only email services in the network. They also stated that most information from the internet is useful for research.

Problems Encountered in using the Internet

As pointed out by Maughan (1998), problems in the use of Internet are difficulty in accessing certain sites; difficulty in owning a computer.

Lehnus (1997) find out that the problems in using internet are they do not know how to use the internet, no interest in using the internet, no unit available, the unit does not provide floppy disk drive for using data and the internet is not always available.

Profile of Computer Users

Majority of females (56%) learned how to use computers in school and minority of males (35%) learned computers in school (Clarke, 1990). This is because males had a greater access to computers outside the school than females. Clarke (1989) added that the use of computers at home was significantly lower for females than males. Moreover, Fyer (1994) revealed that males typically work with computers. Studies reported that brothers and fathers not sister and mothers use the computer at home.

A case study (Mayer, 1999) found that students who had extension experience in using educational computing software at an after-school computer

club scored higher in comprehending word problems than did equivalent students who had less or no exposure at all.

Internet Use, Gender and Age

Another study was done at Rutgers University in California which studied college students and the Internet in a different prospective. It examined the amount of usage and negative consequences that Internet overuse has on college students. The main issues treated in this research are: What contributes to Internet overuse?; how does gender, age, ethnicity social position of the student in the society affects this?; what are the consequences and the site effects?

The survey consisted of 43 multiple choices on Internet usage, study habits, academic performance and personality measures. Data were grouped to form Internet dependent groups and the nondependent groups. It was correlated with these factors such as guilt, not having control, using the Internet less if responded by his friends, staying up late as well as the academic impairment and missed classes. Recreational Internet was broken down into formats like: length of time using the Internet, Web browsing, e-mails, chat rooms, newsgroup, online shopping and MUDs. Then, students were asked about their feelings and attitudes towards Internet and what effects, positive or negative this has on their lives where 572 students responded to survey. Two-thirds of the students were females, 90% were

in the first three years of college. Most of these students were enrolled in journalism, communication, media studies courses.

When it came to results, only 9% of the sample agreed or strongly agreed that they might have become psychologically dependent on the Internet but the overall hours spent online for the whole sample were considerable, average of three hours per day. Within the dependent group Internet, use was more than double of that of the total sample. Students that spend too much time on the Internet stated: "Sometimes I think it would be better if I spent less time on the Internet;" "Some people have suggested to me that I spent too much time on the internet;" "I feel that I do not always have really good control over my Internet use;" "Sometimes I feel guilty about the amount of time I spend on the Internet".

Researchers found out that Internet-dependent students spend nearly three times online more than nondependent. Males, 33% of the total sample, comprised of the self-reported Internet dependent group. In response to the question, about "How often has your schoolwork been hurt because of the time you spend on the Internet?" (p.373), about 14% of the students reported that their schoolwork has been hurt occasionally, frequently or very frequently. Of the students in the academically impaired group, 40% reported that their Internet use has kept them up late at night frequently. Taking into consideration students social life aspects, this study concluded that Internet dependency stem partly from lonely students communicating with their friends and family because they feel alone in everyday

life. According to the result of this study the frequency of chat/IRC was higher than any other online activity (p.372). The study showed that Internet can be also harmful if students don't manage the time spent online. This study pointed out that Internet overuse can have negative consequences on academic work as well as social life. It concluded, Internet dependents students, were students that didn't have an enhanced social life. This study also showed that there are gender differences when it comes to Internet usage with males being more dependent.

A similar study was conducted at seven different colleges in the U.S. as well as one school in Europe, for a total of eight institutions: a mid-sized private, technical/engineering school, two small private liberal arts colleges, and two large public state universities (all in the northeastern U.S.) and a non-technical college in Ireland. There were 1,302 useable surveys with 649 men and 647 women responding.

The study was designed to be a preliminary investigation into various aspects of Internet use among college students. It also found out that "While the typical Internet using students use the Internet for 100 minutes per day, there is a small group of students that use the Internet to the degree that it interferes with other aspects of their lives" (Anderson). Approximately 10% of Internet-using students have used the Internet to the point that their usage meets criteria that are parallel to those of other forms of dependence. The study focused on how excessive Internet use results in academic, social or lifestyle difficulties. The overall time

spent online by the students was 100 minutes per day including online activities such as WWW, e-mails, games, chatting and MUDs. The researchers divided the students in to two groups, “the high use group” and “the low use group”. As compared to the nondependent, the dependents were significantly more likely to indicate that their on-line use negatively affected their academics, meeting new people and their sleep patterns. In addition, the dependents were significantly more likely to report; spending more than 3 consecutive hours on-line twice in the previous week, have gotten less than 4 hours of sleep more than once due to on-line activity, looking for an alternative way to go on-line when not in school, and to use on-line activity to feel better when feeling down (Anderson). Like the previous research, this study shows how Internet overuse influences negatively the students’ academic work and social life.

A study revised Internet usage more specifically taking into consideration the university or college size. A sample of 349 were taken undergraduate students from a medium size Midwestern university and 184 undergraduate students from a small, private liberal arts university. Each student completed a sheet requesting demographic, information about Internet access, amount of time spent on-line weekly, and the types of Internet applications visited. The students were also asked if time online interfered with work, school or interpersonal relations, and to explain the nature of the interference. Both results from medium sized and small university students reported having high Internet access. In the medium size university men

(M=6.89hr/week) spent more time online than women (W=4.66hr/w) but on the contrary, also in the small university men (M=2.90hr/w) spent more time online than women (W=2.19hr/w). The most important findings were that the small private university uses Internet less than the public one. One of the reasons was that the public university students are less likely to sacrifice their education for non-academic Internet use.

An internet survey about gender and the internet was conducted with a sample of 630 Anglo American graduates. The survey consisted of questions e-mail and Web use. It specifically tried to point out the gender differences in internet usage. Path Analysis to identify mediators of gender differences in internet use revealed that computer self-efficacy, loneliness, and depression accounted in part for gender difference, but that gender continued to have a direct effect on use often these factors were considered (p. 363). The survey consisted of three sections: 1) multiple aspects of e-mail, 2) web use, 3) a subset of motivational and cognitive factors. The results of these study showed that females used e-mails more than the males did, males used Web more than females, and females reported more computer anxiety and less stereotypic computer attitudes (p.370). Some of the factors that link to this are thought to be: computer self-efficacy, loneliness and depression, which had to deal directly with the gender factor. In conclusion, the factors that contribute to internet use and overuse are gender, ethnicity, possibility of internet access including here students that own a computer and the other factor

is the size and potential of the university or college to provide their students with internet access.

Studies on Loglinear Analysis

The analysis of cross-classified data changed quite dramatically with the publication of a series of papers on loglinear models in 1970's (Goodman, 1970).

Loglinear analysis can also be applied in medicine. In the study of patients with community acquired pneumonia (CAP), presence of diabetes mellitus, neoplastic diseases and neurologic diseases with significantly associated with mortality with a significant odds ratio as perpendicular of mortality (Task Force on CAP, 1998 as cited by Jularbal et. al, 2008).

Chayao et. al. (2005) employed loglinear analysis on the occurrence of crimes in La Trinidad using socio-demographic and socio-economic profile of the respondents.

An analysis of the socio-demographic and economic characteristics by women in La Trinidad using loglinear was made by Wakat (2002). She used odds ratio and its function Yule's Q to get the proportion and to determine the relationship of socio-demographic characteristics such as age, sex, civil status, and kind of disabilities of citizens.

Add to this, Febronia (2004) applied loglinear analysis of some factors affecting income of disabled persons in La Trinidad, Benguet. Results of the study

revealed that gender, age, civil status, kinds of disabilities and educational attainment were related to the income of the respondents with different level of association. The odds ratio and Yule's Q was used to determine such relationship. The independent model fits data on the cross tabulation of income and each of the socio-demographic characteristics. Analysis revealed that gender, age, civil status and kind of disabilities did not affect the disabled respondent's income.

THEORETICAL FRAMEWORK

Log-linear Analysis

Data that consist of count of people, places or things arise naturally when summarizing surveys. Individuals in these surveys were classified using certain variables as criteria. As the classifications were used simultaneously, the data that were usually presented in tabular form were referred to as categorical data. Loglinear techniques, propagated among social scientists like Goodman, were excellently suited to analyze this type of data.

To discuss the analysis, a two-dimensional table was considered. Let n_{ij} be the observed frequencies in the i^{th} row and j^{th} columns. The data format is presented below.

Table 1. Observed frequency distribution in an r x c table.

		Variable Y (columns)					
		1	2	3	....	j	Totals
Variable X (rows)	1	n_{11}	n_{12}	n_{13}	….	n_{1j}	$n_{1.}$
	2	n_{21}	n_{22}	n_{23}	….	n_{2j}	$n_{2.}$
	.	.	.	.	….	.	.
	.	.	.	.	….	.	.
	.	.	.	.	….	.	.
	i	n_{i1}	n_{i2}	n_{i3}	… .	n_{ij}	$n_{r.}$
	r	$n_{.1}$	$n_{.2}$	$n_{.3}$	….	$n_{.j}$	$n_{..}$

where:

n_{ij} is the sample joint frequency distribution;

$n_{j^2} = \sum_{j=1}^{I} n_{ij} =$ the column marginal total

$n_{..} = \sum_{i=1}^{I} \sum_{j=1}^{J} n_{ij} =$ total number of observation

$n_{i^2} = \sum_{i=1}^{J} n_{ij} =$ the row marginal total

The Loglinear Model

The loglinear model is one of the specified cases of generalized linear model for Poisson-distributed data. It is an extension of the two-way contingency table where the conditional relationship between two or more discrete categorical variables is analyzed by taking the natural logarithm of the cell frequencies within the contingency table.

The following model refers to the traditional chi-square test where two variables, each with two levels (2x2 tables), are evaluated to see if an association exists between the variables.

Saturated Model

$$\ln(F_{ij}) = \mu + \lambda_i^A + \lambda_j^B + \lambda_{ij}^{AB}$$

where:

$\ln(F_{ij}) =$ is the log of the expected cell frequency of the cases for cell ij in the contingency table

$\mu =$ is the overall mean of the natural log of the expected frequencies

$\lambda_i^A =$ the main effect for variable A

$\lambda_j^B =$ the main effect for variable B

$\lambda_{ij}^{AB} =$ the interaction effect for variables A and B

$\lambda =$ represents an "effect" which the variables have on the cell frequencies

Given that the saturated model has the same amount of cells in the contingency table as it does effect, the expected cell frequencies will always exactly match the observed frequencies, with no degrees of freedom remaining (Knoke and Burke, 1980). In order to find a more parsimonious model, set some of the effect parameters to zero. For instance, if the effect parameters λ_{ij}^{AB} are set to zero then the remaining terms is the unsaturated model.

Unsaturated Model

The unsaturated model contains both row and column effects as well as the grand mean. Mathematically, the unsaturated model is written as

$$\ln(F_{ij}) = \mu + \lambda_i^A + \lambda_j^B$$

where:

$\ln(F_{ij}) =$ is the log of the expected cell frequency of the cases for cell ij in the contingency table

$\mu =$ is the overall mean of the natural log of the expected frequencies

$\lambda_i^A =$ the main effect for variable A

$\lambda_j^B =$ the main effect for variable B

$\lambda =$ represents an "effect" which the variables have on the cell frequencies

The unsaturated model lacks an interaction effect parameter between A and B. Implicitly, this model hold that the variables are unassociated. Note that the unsaturated model's most important assertion is that Y and X are not associated which is analogous to the chi-square test for independence.

Choosing a Model to Investigate

Typically, either theory or previous empirical findings should guide this process. However if a priori hypothesis does not exist, there are two approaches that one could tale.

1. Start with the saturated model and begin to delete higher order interaction terms until the fit of the model to the data becomes unacceptable based on the probability standards adopted by the investigator.
2. Start with the simplest model (independence model) and add more complex

interaction terms until an acceptable fit is obtained which cannot be significantly improved by adding further terms.

Fitting Loglinear Models

Once a model has been chosen for investigation the expected frequencies need to be tabulated. For two variable models, the following formula can be used to compute the direct estimates for non-saturated models.

$$E(x) = \frac{\sum_{i=1}^{I} n_{ij} \sum_{j-1}^{J} n_{ij}}{\sum_{i=1}^{I} \sum_{j=1}^{J} n_{ij}} \qquad (1)$$

For large tables, an interactive proportion fitting algorithm (Deming-Stephen algorithm) is used to generate expected frequencies. This procedure uses marginal tables fitted by the model to ensure that the frequencies sum across the other variables to equal the corresponding observed marginal tables (Knoke and Burke, 1980).

The interactive proportional fitting process generates maximum likelihood estimates of the expected cell frequencies for a hierarchical model. In short, preliminary estimates of the expected cell frequencies are successfully adjusted to fit each of the marginal sub-tables specified in the model. For example, in the model AB, BC, ABC, the initial estimates are adjusted to fit AB then BC and finally to equal the ABC observed frequencies. The previous adjustments become

distorted with each new fit, so the process starts over again with the most recent cell estimate. This process continues until an arbitrarily small difference exists between the current and previous estimates (Christensen, 1997).

Parameters Estimates (Odds ratio)

Once estimates of the expected frequencies for the given model are obtained, these numbers are entered into appropriate formulas to produce the effect parameter estimates $(\lambda's)$ for the variables and their interactions. The effect parameter estimates are related to odds and odds ratios. Odds are described as the ratio between the frequency of being in one category and the frequency of not being in the category. In symbol,

$$\text{Odds ratio} = \frac{\Omega_1}{\Omega_2} \qquad (2)$$

where:

$$\Omega_1 = \frac{n_{11}}{n_{ij}}$$

$$\Omega_2 = \frac{n_{21}}{n_{2j}}$$

An odds ratio above 1 indicates a positive association among variables, while odds ratios smaller than one indicate a negative association. An odds ratio equal to 1 demonstrates that the variables have no association (Knoke and Burke, 1980). It was noted that odds and odds ratio are highly dependent on a particular

model. Thus, the associations illustrated by evaluating the odds ratios of a given model are informative only to the extent that the model fits well.

Odds ratio ranges from 0 to infinity, with one indicating statistical independence. Values less than 1.00 implies a "negative association" while values greater than 1.00 means a "positive association". The greater the departure of the ratio from 1.00, in either direction, it implies stronger the relationship. The measure of association, Yule's Q, is a simplified function of odds ratio:

$$Yule'sQ = \frac{OR-1}{OR+1} = \frac{(n_{11})(n_{22})-(n_{12})(n_{21})}{(n_{11})(n_{22})+(n_{12})(n_{21})} \qquad (3)$$

While the Yule's Q ranges from -1 to +1, with zero indicating no relationship, odds ratio takes only positive values, have no upper limit and is one when no relationship exists (i.e., the two conditional odds are equal). Odds ratios larger than one indicate direct covariation between variables, while odds ratios smaller than one indicate an inverse relationship.

Adopting the interpretation of Yule's Q by Landicho (1998), the associations could be,

$0 < |Q| < 0.2 =$ very weak association

$0.2 \leq |Q| < 0.4 =$ weak association

$0.4 \leq |Q| < 0.6 =$ moderate association

$0.6 \leq |Q| < 0.8 =$ strong association

$0.8 \leq |Q| < 1.0 =$ very strong association

Testing Goodness of Fit of Loglinear Model

Once the model has been fitted, it is necessary to decide which model provides the best fit. Comparing the expected frequencies for each model assesses the overall goodness-of-fit of a model. The Pearson Chi-Square or likelihood ratio L^2 can be used to test a model's fit. However, the L^2 is more commonly used because it is statistic that is minimized in maximum likelihood estimation and can be partitioned uniquely for more powerful test of conditional independence in multiway tables. The formula for the L^2 statistic is as follows:

$$L^2 = 2\sum f_{ij} \ln\left(\frac{f_{ij}}{F_{ij}}\right) \qquad (4)$$

The likelihood ratio L^2 follows a chi-square (χ^2) distribution with the degrees of freedom (df) equal to the number of lambda terms set equal to zero. Thus, L^2 statistic tests the residual frequency that is not accounted the effects in the model (the λ parameters set equal to zero). The larger the L^2 relative to the available degrees of freedom, the more the expected frequencies depart from the actual cell entries. Therefore, large L^2 indicates that the model does not fit the data. Hence, the model should be rejected (Tabachnick and Fidell, 1996). The likelihood ratio can be used to compare an overall model within a smaller, nested model. The equation is as follows:

$$L^2_{comparison} = L^2_{model1} - L^2_{model2}$$

Model 1 is the model nested within model 2 the degrees of freedom (df) are calculated by subtracting the df of model 2 from the df of model 1 if the L^2 comparison statistics is not significant, then the nested model (1) is not significantly worse than the saturated model (2). Therefore, choose the more parsimonious (nested) model.

Loglinear Residuals

In order to investigate the quality of fit of a model, one should evaluate the individual model cell residuals. Residual frequencies can show why a model fits poorly or can point out the cells that display a lack of fit in a generally good-fitting model. The process involves standardizing the residuals of each cell by dividing the difference between frequencies and frequencies expected the square root of the frequencies expected. In symbol,

$$\text{Re}\,siduals = \left(\frac{F_{obs} - F_{\exp}}{\sqrt{F_{\exp}}} \right) \qquad (5)$$

The cell with largest residuals shows where the model is not appropriate. Therefore, if the model is appropriate for the data, the residual frequencies should consist of both negative and positive values of approximately the same magnitude that are distributed evenly across the cell of the table.

Definition of terms

Algorithm. This is a set of procedures that, when followed in a step-by-step manner, will provide an optical solution to a problem.

Categorical data. It refers to data that consist of count of people, place as things grouped in any system of classification.

Contingency table. It present a multinomial count data classified in two scales or dimension of classification.

E-chat. This is much like text messaging. It is conversing on the web by typing the message and receiving reactions immediately.

E-mail. It is electronic mail. Writing correspondence sent through the internet much like conventional postal mail faster and cheaper.

Dependent Variable. This refers to variable that depends on one or more explanatory variables.

File transfer protocol (FTP). They are downloaded data files, programs, report, articles, magazines, books, pictures, sounds and other type of files from thousands of source to your computer system.

Gender. This refers to either male or female.

Group A. they are courses with two or more computer subjects: B.S. Information Technology, B.S. Applied Statistics, B.S. Development Communication and B.S Library Science.

Group B. They are courses with one computer subject: B. Elementary Education, B. Secondary Education, B. S. Forestry, B. S. Entrepreneurial Technology, B. S. Home Economics, B. S. Nutrition and Dietetics, B. S. Nursing, B. S. Agriculture, B. S. Agribusiness, B. S. Environmental Science, B. S. Agricultural Engineering, and Doctor of Veterinary Medicine

IAC. It means Internet Access Data.

Independent Variable. This is the variable used to predict values of the dependent variable in regression analysis.

Internet access. It refers to ability to use internet.

Keyword. This is a word to type in a search engine to help look for websites related to your topics of interest.

Loglinear Analysis. This is used to analyze the relationship of association of cross-tabulated nominal data.

Model. It is an abstract symbolic representation of a problem, it depicts the functional relationship among the variables.

Nominal data. This is a discrete observation that can be sorted into categories.

Parameter. It is any characteristic of the population in the study.

Parsimonious model. The probability distribution that describes the number of random occurrences in a given time period.

Respondent. This refers to the student who will furnish the information or answer the questionnaire.

Stratified Simple Random Sampling. This is the procedure of dividing the population into a number of internally homogenous, non-over lapping strata.

Telnet. This is to log on to and use thousands of internet computer system around the world.

Usenet. It refers to the collective term given to newsgroups which are accessible via internet.

Variable. This is a characteristic of interest that is measurable and observable in every aspect in the study.

Website. It is used for a set of link themed pages which are stored on a web server.

World Wide Web (www). A web for short generally refers to the internet. It is the compilation of web pages that are connected together through link.

METHODOLOGY

Respondents of the Study

The respondents of the study were the college students of Benguet State University-Main Campus. Out of the 6118 college students of Benguet State University, a sample of 375 respondents was chosen as the sample of the study using Stratified Random Sampling. The population was subdivided into two subpopulation called strata. Stratum I included students who are taking up B.S. Information Technology, B.S. Applied Statistics, B.S. Development Communication, and B.S Library Science. The students from these courses are classified as Group A. These are courses with two or more computer subjects. The B. Elementary Education, B. Secondary Education, B. S. Forestry, B. S. Entrepreneurial Technology, B. S. Home Economics, B. S. Nutrition and Dietetics, B. S. Nursing, B. S. Agriculture, B. S. Agribusiness, B. S. Environmental Science, B. S. Agricultural Engineering, and Doctor of Veterinary Medicine students constituted stratum II. They are the Group B having only one computer subject. The number of students in each stratum was determined using the proportional allocation with the given formula:

Stratified Random Sampling for Proportional Allocation:

$$n = \frac{nN_i}{N} \qquad (6)$$

where: $n =$ sample size $= \frac{N}{1 + Ne^2}$, Slovin's Formula:

where:

$N =$ the population size

$N_i =$ subpopulation size of the i^{th} stratum

$e =$ margin of error

Stratum I consisted of 2,495 students which is 40.78% of the total population. And stratum II with 3,623 students constituted 59.22% of the total population. Thus the numbers of respondents to be taken were 153 and 222 from stratum I and II, respectively. The sample of each subpopulation was drawn using simple random sampling.

Survey questionnaire consisting of structured questions were administered to the students. The respondents were asked to fill up the questionnaires by checking their preferences from the choices given. Their gender, age, courses and year level were asked . Their frequency of utilizing the internet laboratories and their utilization outside Benguet State University were asked, also.

Data Analysis

The data were summarized, tabulated, analyzed and interpreted according to the objectives of the study. Computations of summary statistics tests were facilitated with the Statistical Packages for Social Sciences (SPSS).

Table 2. Distribution of the student respondents

VARIABLES/VARIABLE CODE	FREQUENCY	PERCENT
Gender		
1-Male	152	40.5
2-Female	223	49.5
Age		
1-15-18 years	188	50.1
2-19-and above	187	49.9
Course		
1-Group A	153	40.8
2-Group B	222	59.2
Year		
1-First Year	85	22.7
2-Second Year	101	26.9
3-Third Year	112	29.9
4-Fourth Year	77	20.5
Frequency of Utilization		
1-Never	57	15.2
2-Occasionally	240	64.0
3-Always	78	20.8
Outside Utilization		
1-Own internet facility	40	8.8
2-Computer Shops	335	89.3

RESULTS AND DISCUSSIONS

Frequency of Internet Facilities Utilization
in Relation to Gender

Table 3 shows the distribution of the Benguet State University (BSU) students according to gender and the frequency of internet facilities utilization. The odds ratio 1.86 means that the tendency of male to never utilize the facilities than their tendency to always utilize the facilities is greater compared to the tendency of female to never utilize it. The odds ratio 0.84 means that the chance of male to utilize the internet facilities occasionally is lesser than their chance to always utilizing it, compared to the females. A Yule's Q value of 0.30 indicates a weak association between male and never utilizing the internet facilities while a Yule's Q with -0.09 indicates a negative very weak association between being male and occasionally utilizing BSU internet facilities.

The model that best fits the observed frequencies is the independence model. An L^2 of 7.060, significant at 5% level indicates that the students' frequency of utilizing the internet facilities is affected by their gender.

Table 3. Relationship between frequency of internet facilities utilization and gender of the students in BSU

	FREQUENCY			
GENDER	Never	Occasionally	Always	TOTAL
Male	32	89	31	152
Female	25	153	45	223
TOTAL	57	242	76	375
Odds ratio **(Yule's Q)**				
Male	1.86 **(0.30)**	0.84 **(-0.09)**	-	
Female	-	-	-	

MODEL	MODEL DESCRIPTION	df	L^2	SIGNIFICANCE
Independence	$\mu+\lambda_i^{freq}+\lambda_j^{gender}$	2	7.060*	0.0293

Legend: * - Significant at 5% level of significance

Yule's Q in bold face
Interpretation:
0<|Q|<0.2 = very weak association
0.2≤|Q|<0.4= weak association
0.4≤|Q|<0.6= moderate association
0.6≤|Q|<0.8= strong association
0.8≤|Q|<1.0= very strong association

Frequency of Internet Facilities Utilization in Relation to Age Group

An odds ratio of 1.05 in Table 4 indicates that the tendency of younger students (15-18 years old) not to utilize the internet facilities is almost the same with the older students (19 years old and above) who tend to do the same. The Yule's Q 0.02 implies a very weak association between age group and frequency of utilization of the internet facilities. Likewise, the chance of the younger students who opted to utilize the internet facilities occasionally than always is almost the same with the older students, who opted to do the same. A Yule's Q value of -0.04 indicates a negative very weak association between age group from 15-18 to 19 years old and above and frequency of utilization from occasionally to always.

The best model that shows the best fit for the data is the independence model. This is evident in the presence of low L^2 relative to the available degrees of freedom. Likewise, the level of significance equal to 0.8719 implies that the hypothesis of goodness of fit cannot be rejected since it is greater than 0.05. Hence, age group does not affect the student's frequency of utilizing the internet facilities.

Table 4. Relationship between frequency of internet facilities utilization and age group of the students in BSU

	FREQUENCY			
AGE	Never	Occasionally	Always	TOTAL
15-18	30	119	39	188
19 and above	27	123	37	187
TOTAL	57	242	76	375
Odds ratio **(Yule's Q*)**				
15-18	1.05 **(0.02)**	0.92 **(-0.04)**	-	
19 and above	-	-	-	

MODEL	MODEL DESCRIPTION	df	L^2	SIGNIFICANCE
Frequency Effect	$\mu+\lambda_i^{freq}$	1	154.590**	0.0000
Age Effect	$\mu+\lambda_j^{age}$	2	0.003^{ns}	0.9588
Independence	$\mu+\lambda_i^{freq}+\lambda_j^{age}$	2	0.274^{ns}	0.8719

Legend: ** - Highly significant at 1% level of significance
ns – Not significant

Yule's Q in bold face
Interpretation:
0<|Q|<0.2 = very weak association
0.2≤|Q|<0.4= weak association
0.4≤|Q|<0.6= moderate association
0.6≤|Q|<0.8= strong association
0.8≤|Q|<1.0= very strong association

Frequency of Internet Facilities Utilization
in Relation to Course

As shown in table 5, the model that provides the best fit is the independence model. The model has an L^2 of 7.9431 with a significance of 0.02. This means the model is significant at 5% level of significance. This result implies that the students' frequency of utilizing the internet facilities could be attributed to their course.

Table 5. Relationship between frequency of internet facilities utilization and course of the students in BSU

	FREQUENCY					
COURSE	Never		Occasionally		Always	TOTAL
Group A	16		111		26	153
Group B	41		131		50	222
TOTAL	57		242		76	375
Odds ratio **(Yule's Q*)**						
Extensive	0.75	**(-0.14)**	1.63	**(0.24)**	-	
Non-extensive	-		-		-	
MODEL	MODEL DESCRIPTION			df	L^2	SIGNIFICANCE
Independence	$\mu+\lambda_i^{freq}+\lambda_j^{course}$			2	7.9431*	0.02

Legend: * - Significant at 5% level of significance
Group A - courses with 2 or more computer subjects (BSIT, BSAS, BSDC and BLIS)
Group B - courses with only 1 computer subject (BEE, BSE, BSF, BSET, BSHE, BSND, BSN, BSA, BSES, BSAEng and DVM)

Yule's Q in bold face
Interpretation:
$0<|Q|<0.2$ = very weak association
$0.2\leq|Q|<0.4$= weak association
$0.4\leq|Q|<0.6$= moderate association
$0.6\leq|Q|<0.8$= strong association
$0.8\leq|Q|<1.0$= very strong association

An odds ratio of 0.75 implies that the tendency of the Group A students to never utilize the facilities over those who always utilize the facilities was found to be lower than the tendency of Group B students. The association between groups and frequency of utilization of internet facilities is a negative very weak association

indicated by the Yule's Q value -0.14. The odds ratio of Group A in occasionally utilizing the net is 1.63 times greater than in always utilizing it over the Group B. The Yule's Q 0.24 implied a very weak association between Group A and occasionally utilizing the facilities.

Frequency of Internet Facilities Utilization
in Relation to Year Level

Table 6 shows the relationship between year level and frequency of internet facilities utilization. The odds of first years from never (0.91) or occasionally (0.48) in utilizing the Benguet State University (BSU) internet facilities to always utilizing is lower than the fourth year students. The association between being a first year and in never utilizing the facilities is a negative very weak association (-0.05), and in occasionally utilizing the facilities is a negative weak association (-0.35). The odds ratios of 1.13 and 1.04 imply that the tendency of second years to either never or occasionally utilize the internet facilities is almost the same with their tendency to always utilize it as compared to the fourth years. There is both a very weak association between being a second year and either utilizing the facilities never or occasionally as indicated by the Yule's Q values 0.06 and 0.02, respectively. The junior's tendency to never utilize the internet is 0.32 times lesser, and to occasionally utilize the internet is 0.61 times lesser than their tendency to always utilize it over the seniors. The Yule's Q value -0.52 and -0.24 indicate that

the association between being a junior and to never utilize the net is a negative moderate association, and to occasionally utilize it is a negative weak association.

This is further shown in the model that gives the best fit for the observed frequencies. The saturated model with an L^2 of 14.113 and significance of 0.0284 fits the data. The significance value lesser than 0.05 means rejecting the model hence, the students' year level does not affect their frequency of utilization on BSU internet facilities.

Table 6. Relationship between frequency of internet facilities utilization and year level of the students in BSU

	FREQUENCY					
YEAR LEVEL	Never		Occasionally		Always	TOTAL
I	19		45		21	85
II	17		69		15	101
III	9		75		28	112
IV	12		53		12	77
TOTAL	57		242		76	375
Odds ratio **(Yule's Q*)**						
I	0.91	**(-0.05)**	0.48	**(-0.35)**	-	
II	1.13	**(0.06)**	1.04	**(0.02)**	-	
III	0.32	**(-0.52)**	0.61	**(-0.24)**	-	
IV	-		-		-	

MODEL	MODEL DESCRIPTION	df	L^2	SIGNIFICANCE
Saturated	$\mu+\lambda_{ij}^{freq*year}$	2	14.113*	0.0284

Legend: * - Significant at 5% level of significance

Yule's Q in bold face
Interpretation:
0<|Q|<0.2 = very weak association
0.2≤|Q|<0.4= weak association
0.4≤|Q|<0.6= moderate association
0.6≤|Q|<0.8= strong association
0.8≤|Q|<1.0= very strong association

Frequency of Internet Facilities Utilization
in Relation to Utilization Outside BSU

The parsimonious model that best-fit the data is the independence model (Table 7). The model's $L^2 = 2.913$ is not significant at 5% level of significance. This indicates that utilization of internet facilities outside Benguet State University (BSU) does not affect the student's frequency of BSU internet facilities utilization. The two main effects do not interact with each other but they have significant effect on the data.

The odds of the students whose outside utilization is their own facilities, in never utilizing the internet is 2.66 times greater than in always utilizing it as compared to the students whose outside utilization is in computer shops. The odds ratio 1.71 implied that the tendency of students having their own internet in utilizing the BSU facilities occasionally is greater than their tendency in utilizing it always over the students not having their own net facilities. The Yule's Q values 0.45 indicated that the association between the students having own internet and never utilizing the BSU internet is moderate and 0.26 indicated a weak association between students having own internet and occasionally utilizing the BSU facilities.

Table 7. Relationship between frequency of internet facilities utilization and utilization outside BSU

UTILIZATION OUTSIDE	FREQUENCY			
	Never	Occasionally	Always	TOTAL
Own Internet	9	26	5	40
Computer Shops	48	216	71	335
TOTAL	57	242	76	375
Odds ratio **(Yule's Q*)**				
Own Facilities	2.66 **(0.45)**	1.17 **(0.26)**	-	
Internet Shops	-	-	-	

MODEL	MODEL DESCRIPTION	df	L^2	SIGNIFICANCE
Frequency Effect	$\mu+\lambda_i^{freq}$	2	154.591**	0.0000
Outside Utilization Effect	$\mu+\lambda_j^{out}$	1	265.244**	0.0000
Independence	$\mu+\lambda_i^{freq}+\lambda_j^{out}$	2	2.913^{ns}	0.2330

Legend: ** - Highly significant at 1% level of significance
ns – Not significant

Yule's Q in bold face
Interpretation:
0<|Q|<0.2 = very weak association
0.2≤|Q|<0.4= weak association
0.4≤|Q|<0.6= moderate association
0.6≤|Q|<0.8= strong association
0.8≤|Q|<1.0= very strong association

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

For the data of the cross-classified variables such as (frequency of internet facilities utilization) by (gender/age/course/utilization outside BSU), the best fitting model that accounted for the variation of the cell frequencies is the independence model. The saturated model best fits the data of the cross-classified variables: (frequency of internet facilities utilization) by (year level). Gender and course revealed a very weak to weak association to frequency of internet facilities utilization of the students, the age of the student showed a very weak association to the frequency of utilization. Furthermore, year level showed a very weak to moderate association to the student's utilization. The findings also showed that outside utilization revealed a weak to moderate association to the student's utilization of the BSU internet facilities. On one hand, students, aged 15-18 years, belonging to the Group B, who are second years, and have their own internet facilities were more likely to never utilize the BSU internet facilities than to always utilize it. On the other, the female students, aged 19 and above, who are second years belonging to Group A, who have their own internet are more likely to occasionally utilize the facilities than to always to utilize it.

Conclusion

Based on the result of the study, the following conclusions were drawn: The gender and course are the variables that affect the student's utilization of the BSU internet facilities. The frequency of utilization is independent from the students' age, year level and utilization outside BSU.

Moreover, the findings revealed that the chances of often utilizing the BSU internet facilities by the students who are females, aged 19 and above, second years, with only one computer subject, and who have their own internet facilities is higher than those belonging to other groups.

Recommendation

Based on the conclusions, the following are suggested: To be able to use the multi-way log linear analysis, a large sample size should be obtained. Data from the logbook of internet laboratories may also be used for the research. Further investigation is recommended similar to this study with wider scope research area including more variables specifically, those related to internet usage like family background, psychological, social and physical environment using either similar technique or other techniques.

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APPENDIX A

Data Set

Respondents	Gender	Age	Course	Year	Frequency	Outside
1	2	1	1	2	2	2
2	2	1	1	2	3	2
3	2	1	1	3	2	2
4	2	2	1	2	2	1
5	2	1	1	2	2	2
6	2	1	1	1	2	2
7	1	2	1	3	1	2
8	2	1	1	2	3	2
9	1	2	1	4	2	2
10	2	2	1	3	2	2
11	2	2	1	3	2	2
12	2	2	1	4	3	2
13	1	2	1	4	2	2
14	2	2	1	3	3	1
15	1	2	1	3	2	2
16	1	2	1	3	2	2
17	1	1	1	3	2	2
18	1	1	1	1	1	2
19	2	2	1	4	2	2
20	2	2	1	3	2	2
21	2	1	1	3	2	2
22	2	1	1	1	3	2
23	2	1	1	3	3	2
24	1	2	1	4	2	2
25	1	1	1	2	2	2
26	1	2	1	4	2	2
27	2	1	1	1	2	2
28	2	2	1	4	1	2
29	2	2	1	4	2	2
30	2	2	1	4	1	2
31	1	2	1	4	1	2
32	1	1	1	1	1	1
33	2	2	1	4	2	2
34	1	2	1	4	2	2
35	1	2	1	3	1	2
36	2	1	1	1	2	2
37	1	2	1	3	2	2
38	2	1	1	2	2	2
39	1	2	1	3	2	2
40	2	2	1	2	2	2
41	1	2	1	4	2	2
42	1	2	1	2	3	2
43	1	1	1	2	2	2
44	1	1	1	1	3	2

Appendix A continued…

45	2	1	1	2	2	2
46	2	1	1	2	2	2
47	1	2	1	3	3	2
48	1	2	1	3	2	2
49	1	1	1	2	2	1
50	2	1	1	1	3	2
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52	2	1	1	2	3	2
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55	1	1	1	3	2	2
56	2	1	1	1	2	2
57	2	1	1	1	2	2
58	2	1	1	3	3	2
59	2	1	1	1	2	2
60	2	1	1	1	2	2
61	2	1	1	1	2	2
62	2	2	1	4	2	2
63	2	1	1	1	2	2
64	2	1	1	2	2	1
65	1	2	1	4	3	2
66	2	2	1	4	2	2
67	1	2	1	4	2	2
68	2	1	1	1	3	2
69	2	1	1	1	2	2
70	2	1	1	1	2	2
71	2	1	1	1	3	2
72	1	1	1	1	3	2
73	1	2	1	1	2	2
74	1	1	1	1	2	2
75	2	1	1	2	2	2
76	1	2	1	4	2	2
77	2	1	1	2	2	2
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90	2	2	1	4	2	2
91	2	1	1	1	2	2
92	2	2	1	4	2	2
93	1	2	1	4	3	2
94	1	2	1	4	2	2

Appendix A continued…

95	2	2	1	2	2	2
96	2	2	1	3	2	2
97	1	2	1	3	3	2
98	2	1	1	1	2	2
99	2	1	1	1	2	2
100	1	1	1	1	2	2
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104	1	2	1	3	2	2
105	2	1	1	2	2	2
106	1	2	1	1	2	2
107	1	2	1	3	1	1
108	2	1	1	2	1	1
109	1	1	1	1	1	1
110	1	1	1	3	2	1
111	1	2	1	3	2	1
112	1	2	1	3	3	2
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115	1	1	1	3	2	2
116	1	1	1	1	2	2
117	2	1	1	3	3	2
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121	2	2	1	3	2	2
122	1	2	1	4	2	1
123	2	2	1	4	2	1
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125	2	2	1	3	2	2
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140	2	1	1	1	3	2
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143	2	2	1	2	2	2
144	2	2	1	4	1	2

Appendix A continued…

145	2	2	1	4	2	2
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147	2	2	1	3	1	1
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149	2	2	1	2	2	1
150	1	1	1	1	2	1
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152	2	2	1	4	3	2
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155	2	2	2	3	2	2
156	1	2	2	4	1	2
157	2	1	2	2	2	2
158	2	1	2	2	2	2
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180	2	2	2	4	2	2
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190	2	2	2	3	2	1
191	2	1	2	3	2	2
192	2	1	2	3	2	2
193	2	1	2	3	2	2
194	2	1	2	1	2	2

Appendix A continued…

195	2	1	2	1	2	2
196	2	1	2	3	2	2
197	1	2	2	2	3	2
198	1	1	2	1	3	1
199	1	1	2	1	2	2
200	2	2	2	3	3	2
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204	1	2	2	4	2	2
205	1	2	2	4	1	2
206	1	2	2	4	1	2
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233	1	2	2	4	1	2
234	1	2	2	3	1	1
235	2	1	2	2	2	2
236	1	2	2	2	1	2
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239	2	1	2	2	3	2
240	1	1	2	2	2	2
241	2	1	2	2	2	2
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243	2	2	2	4	2	2
244	2	2	2	2	2	2

Appendix A continued…

245	2	1	2	3	2	2
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248	2	1	2	2	2	2
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254	2	2	2	4	2	1
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256	1	2	2	3	2	2
257	1	2	2	4	2	2
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259	1	2	2	3	2	1
260	2	2	2	3	2	2
261	2	2	2	4	2	2
262	2	2	2	3	2	2
263	2	2	2	3	2	2
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267	2	1	2	2	3	2
268	2	2	2	3	2	2
269	2	1	2	1	1	2
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288	1	2	2	4	2	2
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291	2	1	2	1	3	2
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293	2	2	2	3	2	2
294	1	2	2	3	2	2

Appendix A continued…

295	1	1	2	1	3	1
296	2	1	2	3	3	2
297	2	1	2	3	2	2
298	1	1	2	2	2	2
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321	1	2	2	4	3	2
322	1	2	2	4	2	2
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326	2	2	2	4	3	2
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328	1	2	2	4	2	1
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334	1	2	2	2	1	2
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336	1	1	2	2	1	1
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338	2	1	2	1	1	1
339	2	2	2	3	1	2
340	1	2	2	2	1	2
341	2	1	2	3	1	2
342	1	1	2	2	1	2
343	1	2	2	3	2	2
344	2	2	2	1	3	2

Appendix A continued…

345	1	1	2	1	3	2
346	2	2	2	3	2	1
347	2	2	2	4	2	1
348	1	2	2	3	2	2
349	2	2	2	4	2	2
350	1	1	2	1	3	2
351	2	2	2	3	2	2
352	2	2	2	1	2	2
353	1	2	2	3	3	2
354	1	1	2	1	2	2
355	1	1	2	2	2	2
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357	2	1	2	2	3	2
358	2	2	2	3	3	2
359	1	1	2	1	3	2
360	1	1	2	2	2	2
361	2	2	2	2	3	2
362	1	1	2	3	3	2
363	2	2	2	4	2	2
364	2	2	2	4	2	2
365	1	2	2	3	3	2
366	2	2	2	3	2	2
367	2	2	2	3	2	2
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369	1	2	2	4	2	2
370	1	2	2	3	3	2
371	2	2	2	4	3	2
372	1	1	2	2	2	2
373	2	2	2	3	2	2
374	2	2	2	3	3	2
375	2	2	2	4	3	2

APPENDIX B

Sample Survey Questionnaire

Gender: ___Male ___Female Course & Year: _____
Age: _____

On the use of Internet Laboratories

1. How often do you use the internet laboratories?

   _____ Never
   _____ Occasionally
   _____ Always
   _____ Others (Please specify):_____

2. Why do you use the internet facilities?
   _____ for research, assignment
   _____ for entertainment
   _____ for communication
   _____ for thesis, encoding
   _____others (Please specify):_____

3. Which internet laboratory do you often go?
   _____ Main Library
   _____ College of Agriculture
   _____ College of Arts and Sciences
   _____ College of Nursing

4. Are you satisfied with the internet services at BSU?

   _____ Highly Satisfied
   _____ Moderately Satisfied
   _____ Not Satisfied

5. Where else do you utilize internet connection outside BSU?
   _____ own internet facilities
   _____ computer shops