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Factors Affecting Internet Adoption among Academics of Technical Colleges in Brunei Darussalam

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Abstract

This study surveyed 166 academics working at four technical colleges in Brunei Darussalam. It has identified factors that were related to the adoption of Internet among academics. The findings indicate that 79% of the academics have adopted Internet. The ownership of a Personal Computer (PC), nature of employment and PC usage is associated with academics' adoption of Internet. In contrast, variables like gender, age, and type of faculty, geographical location of institution and PC experience have no relationship with the adoption of Internet.

Keywords: Internet, Internet adoption, academics.

1. Introduction

The last decade of twentieth century has brought a radical change in the widespread use of the Internet technology. "Internet" is international network of networks (Leiner, 1994), More than one hundred million people worldwide are currently regular users of the Net (Long and Long, 1997). The Internet was originally created as a universal instrument of communication by academics and for academics. All other features were added later when commercial exploitation of the Internet started (Long and Long, 1997).

In order to find the deep insight of the use and impact of the technology among various work setting, it is important to find out how technology is being used. The research on the Internet is in fact the extension of previous researches on technology diffusion, IT adoption and utilization. The studies were undertaken to develop various models. The most widely known is Technology Acceptance Model (TAM) of Davis (1989). The TAM has been widely studied in Information Systems research as an explanation of the use of IS across information systems types and nationalities and found significant cross-cultural difference (Gefen and Straub, 1997). TAM hypothesizes that actual use of technology is affected by behavioural intentions that are themselves affected by attitude towards use. Finally, belief about technology, perceived ease of use and perceived usefulness in TAM directly affects attitudes toward use. That is why, researcher on the Internet focuses on the attitudes of the users.

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A formidable body of research exists on the adoption and utilization of the technology. Several of these studies have focused primarily on the diffusion of technology and use of e-mail (Sproull, 1991; Rice and Aydin, 1991; and Markus, 1994). Some researchers have explicitly linked organizational learning with diffusion of Internet in general and e-mail in particular and have further pointed out the factors facilitating or impeding the successful diffusion of the Internet within and between organizations. Similarly, several of the researchers have on getting to get a comprehensive understanding of the adoption, infusion and impact of the Internet on small business firms (Cragg, 1990; Prescott and Conger, 1995).

Comparatively, less has been researched on the adoption, diffusion and impact of the Internet among educational settings. No doubt, Internet is permeating professional life and is being promoted as the future way of information transfer. However, we believe that universities and academic institutions are expected to be on the forefront of applications of new technologies. Previously, the studies on Internet were undertaken among academics and students of the universities. Little is however, researched about the adoption of the Internet technology among the academics of the technical colleges. It is argued that type of faculty; type of institution, and level and skill of computer experience may differ from their counterpart in the universities. This difference may have an impact on the successful adoption of the Internet among the technical institutions. This aspect was not addressed by the prior studies and hence there is a need to investigate this aspect into new geographical environments. As mentioned, a majority of studies were undertaken in the Western countries. However, less has been researched in countries of Asia-Pacific. In addition, all these studies have a number of weaknesses. They are based upon single institution survey and a complete picture of academic adoption cannot therefore be analysed. In the present study, an attempt is made to cover all the academics of technical colleges at large to bring the nationwide picture of Internet adoption and make the study different from the previous studies.

Thus the result of these studies might not be applicable to a small but technologically emerging country like Brunei Darussalam. The country that is culturally different not only from those of the western world but also from several of Asia-Pacific countries. Brunei Darussalam is a small sultanate located on the northwest coast of Borneo island with a total population of nearly 0.3 million (Brunei Statistical yearbook, 1997). Its' main economic activity is dominated by the oil and gas sector, and gross domestic product per capita was B\$ 23,865 (US\$1= 1.63) in 1997. After achieving its independence in 1984, the government placed considerable importance on technical education. Two engineering colleges and one technical institute were established to produce technologically oriented professionals at various levels. The government has also recognised the need for broader use of computer technology in the public sector. As such, Information Technology Division (ITD) was set up to oversee and to support the development of IT projects in the public sector covering schools and technical colleges. Against this background, a pioneering study was undertaken with the following objectives, the first two as major and third one as a minor objective:

- (a) To identify the current level of adoption of Internet among academics of technical colleges.
- (b) To identify the factors that significantly affects the adoption of Internet among academics of technical colleges.
- (c) To identify the current level and extent of use of Internet among academics of technical colleges.

2. Review of Literature and Development of Hypotheses

The research on Internet can be broadly classified into three main aspects. It was undertaken at the level of adoption, utilization of the technological innovation (Songan and Noor, 1999). Roger's (1983) Diffusion of Innovation Theory has provided a sound background. Whereas, Doyle and Ponder (1977) and Cuban (1986) found that positive relationship existed between acceptance of innovation when they seem to be compatible with the previously established value, norms, procedure and facility. Brown and McIntyre (1982) found that perceived practicality and cost of implementing an innovation were crucial to utilization.

The second aspect of the research has covered the various levels of adoption and utilization among business firms that are of less concern for the present study. Cragg (1990) has studied adoption and impact on the Internet among small business firms. Prescott and Conger (1995) has suggested that adoption studies should examine who within the organization adopts the Internet. Thong and Yap (1995) in Singapore examined the characteristics of adopter versus non-adopter of Internet of the business firms.

The third aspect of the research that is in direct relation to the present study has covered the adoption and utilization of the Internet in the educational settings among students and academics. Palvi *et al.* (1995) studied both academic staff and undergraduate students population in one of the Singaporean universities and indicated a higher level of awareness between both groups, however, usage was primarily limited to e-mail. Survey has further indicated that majority of the respondents felt that undergraduate students must be Internet literate. Songan and Noor (1999) studied Internet utilization among students at an institution of higher learning in Malaysia and found that gender and faculty's type have no impact on the Internet utilization. Where as, factors such as relative advantage, compatibility, complexity, importance and interactivity affect the use of Internet. In Australia, McClure (1994) researched the impact and role of global networking in academics institutions and suggested that academic community needs to redefine its role and responsibilities in relation to the Internet. Applebee (1997) investigated Internet use by academic at one of the Australian Universities and found widespread use of e-mail facilitation and on-line access to library catalogues. Spennemann (1997) surveyed student attitudes towards use of e-mail at another Australian university and significant differences in positive usage were noticed between external as well as internal students. The internal students are more likely to use e-mail as a method of communication with their academics. Turner and Zheng (1998) in their academic survey at Victoria University, Australia found no difference between the academic and non-academic staff in the level of use of Internet facilities.

The studies cited above have also identified a variety of factors that affect the adoption of Internet of subjects (e.g. students, and academics etc.). Some of the frequently reported factors include gender, age, ownership of a PC, frequency of PC use, type of faculty, educational qualifications and PC experience among others. More efforts were spent to examine the influence of gender on the adoption of Internet. Frequency of PC usage and PC experience was given considerable attention from some authors. Relatively, less attention was paid to prior training, level of computer skill of individuals and educational qualification.

The impact of gender on the use of information technology is still a matter of debate. Although results are inconsistent across studies yet prior research has suggested that women

might likely to report higher computer anxiety (Igbaria *et al.*, 1989). Previously, several studies in IT have considered gender differences, which were examined outside of the specific context of IT. However, studies have found dramatic differences between the sexes. In a study of 70 undergraduate and 56 masters students, approximately half women and half men it was found that female college students had significantly higher computer anxiety than male students (Gilroy and Desai, 1986). Lowe and Krahn, (1989) have found a striking gender difference in computer skills and usage in Canada. Frankel (1995) has studied the participants of a computer-training workshop and found that computer culture is uncomfortable for girls and women. Gefen and Straub (1997) have found a genuine gender differences in various aspect of IT diffusion. Although not directly related, it is important to mention that two studies were previously undertaken from the same population in the Brunei Darussalam in two different contexts using some of the same variables as of this study. Seyal *et al.* (2000) in Brunei-based study of computer attitudes for the same population however, found that gender has no impact on the formation of computer attitude. On the other hand, Kay (1990) has stated that gender related studies have produced conflicting results. Allen (1995) has found in his study of e-mail that females rated e-mail more highly on the categories of ease of use, effectiveness and efficiency. Therefore, understanding gender-based difference in the use of technology is likely to have an important implication.

Like gender, the relationship between age and use of technology has also produced mixed results. Several studies have linked the age with the formation of computer attitudes and PC utilization. Jay and Willis (1986) reported that young males have most favourable predisposition towards computer. Moreover, Kay (1990) identified age as an important variable while assessing the positive attitude towards computer use. Age has been reported as negatively related to attitudes towards computer (Parasurama and Igbaria, 1990). Al-Jabri and Al-Khaldi (1999), also found that age would be negatively related to PC utilization. He is in view that younger are likely to have had some training in the use of PCs in their education, while older people would have gone to school at the time when PC education was not available. Miller (1996) classified Internet users by their age. Given a homogenous group of computer sophisticates, younger and older users focused on communicating while middle-aged users focused more on seeking information.

In this study, we have introduced three new variables 'geographical location of the institution', 'type of faculty' and 'type of employment'. This inclusion was based upon suggestions made by various reviewers of our research design during the pilot study. Moreover, Rahim *et al.* (2000) have used the variable 'geographical location of the institution' while investigating software piracy in academia in Brunei Darussalam. Seyal *et al.* have also used the same variable for studying the computer attitudes of academics of technical colleges in Brunei. It is believed that the academics are more computer-oriented in the capital area due to enhanced business opportunities seminars, workshop and various product shows as compared to the academics from an institution, which is located in a small town at the remote location. The inclusion of the variable 'type of employment' was proposed during the instrument design phase after we participated in a forum. It was suggested that true Bruneian research could not be completed until or unless more local users participated. Any study based upon expatriate population would not reflect the true picture. We were asked to conduct a study with the inclusion of local members of the staff. Although our sampling plan does not favour any bias sampling procedure we have therefore tried to ignore the pressure from the respondents. However, at the face validity phase of the instrument it was

again suggested to add this variable for the Brunei-based study. Unfortunately, this variable was never used previously in any of the study up to the best of our knowledge.

Academics who own a personal computer are likely to spend more time with PC at home. They are curious to perform more varieties of task than academics that do not own a personal computer. To meet this higher level of curiosity, an academic owning a PC is likely to spend more time on the Internet. Literature further suggested that ownership of a PC is related to favourable attitude toward excessive use. For example, Gattiker and Hlavka (1992) have found that individual's attitude to computer usage depends on the ownership of computer. Rahim *et al.* have studied this variable for assessing software piracy among academics in Brunei Darussalam and found that academics with ownership of a PC are likely to use the pirated software. Seyal *et al.* have found a strong support of the ownership of a PC with the positive computer attitude of the academics of technical colleges.

Working experience with PC and frequency of PC use was found to be an important factor. Loyd *et al.* (1987) have supported this assertion and have reported that the subjects participating in their study developed more positive attitude towards computer, once they achieved a certain level of computer skill. It is suggested that per week use of personal computers by the subjects may have some influences in promoting favourable attitudes that leads to high use. Computer knowledge and experience was positively correlated with attitude toward computer usage (Howard and Smith, 1986; Rivard, 1982 and Raub, 1981). Igbaria *et al.* (1989) associated computer anxiety and computer experience with microcomputer usage. Igbaria and Chakraborti (1990) have found computer experience is significantly related toward computer attitude. In studying micro computing in Taiwan, Igbaria (1992) reported significant positive correlation between computer experience and attitudes. Wilkins (1996) in Ireland found that level of computer experience and user participation is associated with the use of microcomputer. Al-Jabri and Al-Khaldi (1997) found positive and significant relationships between experience and overall attitudes. Based on these assertions, it is therefore observed that working experience with personal computer and frequency of use might have some influence in the adoption of Internet.

For this study we have also introduced a variable, the type of faculty. The existing literature does not provide much information about the influence of faculty type either in the use of computer technology or developing a positive attitude toward computer. Turner and Zheng have confined their research of use of Internet among academics versus non-academic staff. Songan and Noor have selected this variable for his Internet based research among the students. However, again during the design of questionnaire and preliminary discussion with the several of the academics of the authors' institution, it was found that academics from Computing and Engineering departments are more likely to adopt Internet technology.

Based upon the relevant research as discussed above, the following eight hypotheses are proposed:

- H1: *There is a significant association between gender and academics adoption of Internet.*
- H2: *There is a significant association between age and academics adoption of Internet.*
- H3: *There is a significant association between ownership of a PC and academics adoption of Internet.*
- H4: *There is a significant association between geographical location of institution and academics adoption of Internet.*

- H5: *There is a significant association between faculty type and academic adoption of Internet.*
- H6: *There is significant association between nature of employment and academics adoption of Internet.*
- H7: *There is significant association between PC use and academics adoption of Internet.*
- H8: *There is significant association between PC experience and academics adoption of Internet.*

3. Research Methodology

3.1 Design of Instrument

A questionnaire consisting of two parts was developed. Part A was adapted from Turner and Zheng (1998) with addition of items to measure frequency of PC use and use of Internet. The addition of variable PC experience was adapted by Igbaria and Chakraborti (1990). A variety of scales were used to measure independent variables (as given in section 2). For instance, dichotomous scale was adopted to measure gender and PC ownership, while categorical scale was used to measure age, type of faculty, and geographical location of institution. Lastly, five-point interval scale was used to measure PC experience and Internet use. Most of the questions were structured and asked the respondents to indicate whether they had experience in using different type of computer packages. The detail is given in Table 1. Responses were coded on five-point Likert scale with 1 for no experience and 5 for excellent experience. The total number of categories in which respondents reported experience was used as an overall index of computer experience. The definition of the dependent variable (which is adoption of Internet) was tailored based on the definition of adoption as suggested by Manser (1986) in Macmillan English Dictionary, defines adoption as “course of action”. For this study, we refer to the course of action taken by academics to gain access to Internet regardless of the location either at office or at home.

3.2 Population and Sample size

There are 4 technical colleges in Brunei Darussalam that offer Trade Certificate, National diploma (ND) and Higher National diploma (HND) programmes in various disciplines. The target population was the academics of these technical colleges. The total numbers of academics in all these four colleges were reported to be 340. The questionnaire was therefore sent to all these academics and out of the total, 166 responses were received with the response rate remained around 50%.

Table 1. Computer Experience

Items	Responses Above Average	Mean Experience	Corrected -item total
Using computer packages such as spreadsheet and word processing	56%	3.51	.66
Using application languages such as, SQL, Oracle, dBase IV, Access	12.5%	1.95	.78
Using decision support packages such as, financial, statistical or graphical	10%	1.96	.60
Programming in computer language such as, Cobol, Fortran, Pascal, C, C++	19%	2.19	.72
Participation in the non-technical design of computer system	13%	1.76	.75
Participation in the technical design of computer system	13%	1.79	.78

3.3 Instrument validation and reliability

In general, validity refers to the degree to which instrument truly measure the constructs that they are intended to measure (Peter, 1979). Where as, reliability can be defined broadly as the degree to which measures are free from error and yield a consistent results (ibid). There are several types of validity measurements that include from face validity to the convergent validity. In order to establish face validity, an initial version of the instrument was pre-tested using several academics chosen randomly from two colleges located in close proximity of the authors' work place. The participants were asked to comment on the format and appropriateness of questions, and to suggest any items that they believed should be included in the instrument. In view of their suggestions, several amendments were incorporated into the instrument, with the inclusion of some new variables that has greatly improved clarity. The convergent validity of the constructs PC experience and use of Internet is measured by the average variance extracted that should be 0.5 or better (Fornell and Larcker, 1981; Igbaria and Iivari, 1995). The derived instrument was then tested for reliability. Chronbach's alpha (1951) was calculated and provided in the Table 2. The measures of internal consistency and convergent validity for the computer experience and use of Internet is generally acceptable. For PC experience α is found to be 0.89 comparative to originally calculated value of 0.90 by Igbaria and Chakraborti. Since no alpha was calculated initially for the construct Use of Internet, so a comparison can't be made on this basis.

Table 2. Internal consistency and convergent validity

Construct	Internal consistency (0.70 or above)	Convergent validity (0.50) or above
PC Experience	.89	.78
Use of Internet	.90	.61

4. Results

166 questionnaires were analysed using SPSS to examine the various variables affecting the academics' adoption of Internet.

4.1 Background profile

The background of the participating academics is summarised in Table 3. The dominance of male participation is clear. This is expected, as nearly 69% of the academics in technical colleges are males. A majority (61%) of the participating academics fell in the age between 30 to 50 years. 26% fell in the age group of less than 25 years and merely 11% are over 50 years of age. Moreover, most of the academics (89%) owned a personal computer. Apparently, academics showed keen interest in PC to perform works at home. The extent of PC use by them varied widely. Nearly, 32% of the academics have reported frequency of their PC use between 1-5 years. About 30% are using PCs between 5 to 10 years. A majority (37%) of the

Staff members belong to various engineering related faculties. 24% belong to computing faculty as compared to the various other faculties.

Table 3. Background profile of the academics

Geographical Location of Institution	Number	(%)
<i>Capital 1</i>	56	34
<i>Capital 2</i>	45	27
<i>Capital 3</i>	12	7
<i>Remote</i>	53	32
Gender		
<i>Male</i>	115	69
<i>Female</i>	51	31
Age		
<i>Less than 30 years</i>	39	38
<i>Between 31-40 years</i>	50	32
<i>Between 41-50 years</i>	50	32
<i>Over 50 years</i>	17	11
<i>No answer</i>	10	6
Faculty Types		
<i>Business</i>	15	9
<i>Computing</i>	40	24
<i>Engineering</i>	62	37
<i>Science</i>	16	10
<i>Hospitality and Catering</i>	6	4
<i>Language and Communications</i>	4	2
<i>Others</i>	24	14
PC Use (frequency)		
<i>Less than a year</i>	8	5
<i>Between 1 – 5years</i>	53	32
<i>Between 5 – 10 years</i>	49	30
<i>More than 10 years</i>	46	28
<i>No answer</i>	10	5
PC Ownership		
<i>Own one</i>	148	89
<i>Does not own</i>	18	11
Nature of Employment		
<i>Local</i>	91	55
<i>Expatriates</i>	75	45

In summary, 55% of the surveyed staff is local comparative to 45% of expatriates. The mean computer experience of academic for each item is given Table 1. The overall mean is reported to be 2.21. It is commonly believed that use of Internet is multi-dimensional construct that measure various types of Internet usage and as such to determine the use of Internet is one of the objective of the study, therefore Table 4 provides the detail of various types of use along with their mean and standard deviation.

Table 4. Internet use

Items	Mean	Std.Dev
1. To gather research material	3.21	1.47
2. To gather teaching material	2.87	1.42
3. To perform teaching activities	2.30	1.29
4. To enhance general knowledge	2.56	1.37
5. To keep informed of interesting development	3.41	1.41
6. To keep abreast of conferences	2.30	1.34
7. To subscribe to scholarly newsgroups	2.09	1.18
8. For recreational use	2.73	1.40

The impact of academics gender, age, faculty type, PC experience, PC ownership, geographical location, PC use and nature of employment, with the dependent variable (adoption of Internet) was investigated using multiple logistic regression analysis.

4.2 Hypotheses Testing

As such, the dependent variable is measured on binary scale; the logistic regression analysis was used to determine the extent of prediction. Logistic regression is a more flexible instrument than logliner modelling for analysing a mixed set of nominal/ordinal and interval variables (Hosmer and Lemeshow, 1989). As such, we have categorical set of variables with the exception of one that is on interval scale; we prefer to use logistic regression analysis. Logistic regression provides Wald Z and likelihood ratio test statistic to estimate the magnitude of the impact of one unit change in the independent variable on the relative probabilities of the dependent variable. The results and Hosmer and Lemeshow goodness of-fit and Chi-square values with the likelihood statistics indicate that model does produce expected results similar to the observed one. It further indicates that frequency of PC use, nature of employment and ownership of PC make a significant contribution in adoption of Internet among academics.

The amount of variance in adoption of Internets that could be accounted for by all eight variables was around 52%. Table 7 clearly indicates that only three hypotheses (e.g. H3, and H6 and H7) were supported.

Table 5. Results of Logistic Regression Analysis

Variables	B	SE	Wald	p-value
Gender	-.647	.538	1.44	.228
Age	-.339	.270	1.57	.209
Type of Faculty	.222	.132	2.85	.059
Geographical location of institution	.109	.263	.172	.678
PC Ownership	1.67	.670	6.22	.012*
Nature of Employment	-1.55	.790	3.86	.048*
PC Use	.770	.361	4.542	.033*
PC Experience	-.503	.423	1.40	.235

Cox and Snell $R^2 = 52\%$ Nagelkerke $R^2 = 69\%$ -2 log likelihood 16.03

Hosmer and Lemeshow Goodness

Goodness of fit test: Chisquare 6.93 DF = 8 Significance= .54

Note: * indicates statistical significance at ($p < .05$)

5. Discussion

The first objective of this study is to identify the current level of adoption of Internet among academics. The study has produced an interesting finding. 79% of the academics have adopted an Internet facility. Out of them, 48% are using the facility at home only 12% of the academics are using at their work place. This finding can be a good source for the college authorities in planning the Internet facilities at college level. Most of the academics (51%) have considered Internet as very important for their professional activities.

The second objective of this study was to find the factors that are affecting the adoption of Internet among academics. Logistic regression analysis has confirmed that out of eight

variables, only three i.e., frequency of use of PC, PC ownership and type of employment was found to be significant. The detail is provided in the following sections:

5.1 Gender and Age on the adoption of Internet

Gender was found to be insignificant ($F = .000$, $Sig = .994$). The gender based differences in the use of technology in the various behavioural researches (Allen, 1995 and Grefen and Straub, 1997), failed to bring any impact in the current study. One plausible explanation might be for the reason that only 31% female academics participated in our survey. Our findings are in line with Rahim *et al.* and Seyal *et al.* for their Brunei based study that gender based difference among academics for two separated studies could not be significant.

Similarly, age was also found to be insignificant and findings have confirmed the previous research of Rahim *et al.*, Seyal *et al.*, and Al-Jabri and Al-Khaldi. On the other hand, it is in contrast with Miller who found age and use of technology is related with each other. An analysis of correlation in Table 6 further suggests that negative small relationship exists between age and Internet adoption.

Table 6. Pearson Correlation between Internet adoption and antecedant variables (n= 166)

Variables	R
Gender	-.01
Age	-.06
Type of Faculty	-.26**
Geographical location of the institution	.13
PC Ownership	.40**
Nature of Employment	.28**
Frequency of PC Use	.39**
PC Experience	-.26

(** $p < .001$)

5.2 Type of Faculty, Nature of Employment and Geographical Location of Institution on Internet Adoption

Out of three new variables used for this study, only nature of employment based upon local versus expatriate respondents has impact on the Internet adoption ($F = 7.34$, $Sig = .003$). Table 6 further shows that small but statistically significant relationship exists, therefore null hypotheses cannot be accepted.

Geographical location based upon the assertion that the academics from capital areas institutions is better exposed to technology and is likely to adopt Internet cannot be a valid one and was remained insignificant.

Similarly type of faculty (ANOVA $F = 3.422$ $Sig = .324$) has further confirmed that no significant difference exists between type of faculty and Internet adoption. Although the engineering and computing academics are more commonly using the Internet yet, that difference is not statistically significant.

5.3 PC Ownership, PC Use and PC Experience on Internet Adoption

The ownership of a PC is found to have an impact on academics adoption of Internet. The Table 6 also confirms the relationship that is statistically significant ($r = .40$, $P = .001$). This finding is in line with the various previous studies on the technology adoption, diffusion and utilization (Gattiker and Hlavka, Rahim *et al.* and Seyal *et al.*). This is also evident from Table 4 that about 89% of the academics own personal computer. Some most interesting findings emerge from this study. Out of these three variables, two are found to be significant; ownership of PC and frequency of use of PC. Although 89% of the staff possesses a personal computer, only 65% of the academics are using it for 1-10 years (Table 4). Unfortunately there mean experience remained at the 2.21 at below average (Table 1). The only experience that 40% of the academics have is in using Word Processing and Spreadsheets packages. That is why; PC experience is not found to be a significant and could not support the findings of Al-Jabri and Al-Khaldi, Wilikins and Igbaria and Chakraborti.

The third objective of the study although minor in nature, yet it reflects the various types of the use of Internet among the academics. Table 4 shows the various type of usage that are not very high and for 6 items the use remained below average. The primary use is in the area of “gathering research material” and “to keep informed of interesting development”. Both of these areas are slightly above average on the scale of 5. These two usages are inconsistent with the findings of Turner and Zheng. In our study, academics are using Internet to gather teaching material or to perform teaching activities however, they are using as an indirect tool for fulfilling their research objectives and the use remains below average. The interesting fact is that use of Internet for the recreational purpose is also below average.

The logistic regression model used for this study does not represent the ideal situation. It has its weaknesses. A well fitting model will have a smaller value of $-2 \log$ likelihood ratio. However, the insignificant values of chi-square goodness of-fit test indicate that model does not differ significantly from the optimal model (Tansey *et al.*, 1996).

Table 7. Summary of Findings

Hypothesis	Relationship	Supported
H3	Ownership of a PC and academics adoption of Internet	Supported
H6	Nature of Employment and academics adoption of Internet	Supported
H7	Frequency of PC use and academics adoption of Internet	Supported

6. Limitations and Conclusions

Similar to other studies, the present one is not free from weaknesses. Most of the prior research was undertaken in the business world. The studies in the academic settings were limited and mostly are confined to academics’ and students’ use of e-mail. Most of these studies have used the model of technology diffusion, adoption and utilization as a basis of theoretical framework. Further there is a lack of rigour in measuring some of research variables. Likewise, the magnitude of academics’ use of PC should have better measured by introducing task characteristics. This is accomplished by further studying the adoption of Internet with the variety of tasks performed such as use of e-mail, type of material down load for academic or personal use, checking data bases for personal or professional use that could further improve the overall chi-square goodness of fitness.

The results of this study demonstrate that majority of respondents (79%) have adopted the Internet to enhance or support their routine work. The study has also confirmed that frequency

of use of PC, ownership of a PC, and the type of employment are found to be significant factors in determining the adoption of Internet among academics. However, PC experience has no impact that shows that although majority of the academics possesses a PC at home, they use it frequently but their use is limited to software packages of word processing and spreadsheets. There is a need to train the staff or encourage them to use PC for others areas such as database and decision supports packages. The experience on these areas will provide them with more confidence in adopting Internet for academic use that unfortunately is not measured in this study. The study has further identified the two main area of Internet usage that is “to gather material for research” and “to keep informed of interesting development” and that make sense for the academics use. But unfortunately the use of Internet solely for the purpose of teaching is neglected aspect and need to be further explored prior to emphasizing the use for academic purposes.

The findings of this study are relevant to college administrators and policy-makers in the technical institutions. As such they have to understand the level of adoption and use for planning and Internet facility at the college level. Based upon the results we therefore recommend another study based upon task characteristics of the academics. We should also extend the study up to the university and to the school level to find out the true profile of the teaching staff in Brunei.

References

- Al-Jabri, M. I., and Al-Khaldi, A. M. “Effects of User Characteristics on Computer Attitudes among Undergraduate Business Students,” *Journal of End User Computing* (spring), 1997, pp. 16-21.
- Allen, B. J. “Gender and Computer-mediated Communication,” *Sex Roles* (32:7and8), 1995, pp. 557-563.
- Applebee, A. A., Clayton, P., and Pascoe, C. “Australian Academic Use of the Internet,” *Internet Research* (7:2), 1997, pp.85-94.
- Brunei Darussalam Statistical Yearbook*, Statistic Review Economy, Economy Planning Unit, 1997, Ministry of Finance: Brunei.
- Brown, S., and McIntyre, D. *Cost and Reward of Innovations: Taking account of the teachers’ viewpoint in Innovation in the Science Curriculum*, 1982, London: Croom Helm.
- Cronbach, L. J. “Coefficient Alpha and the Internal Structure of Test,” *Psychometrika* (16), 1951, pp.297-334.
- Cockburn, C., and Wilson, T. D. “Business Use of the Worldwide Web,” *International Journal of Information Management* (29), 1995, pp. 1-8.
- Cragg, P. B . “ Adoption of the Internet by Small Firms,” *In Proceedings of The Second Australian World Wide Web Conference (AusWeb 96)*, 7-9 July 1996, Gold Coast Queensland Australia, pp.427-430.

Cuban, L. *Teachers and Machine: The Classroom Use of Technology since 1920*, 1986, New York, NY: Teachers' College Press.

Davis, F. "Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology," *MIS Quarterly* (13:3), 1989, pp. 319-340.

Doyle, W., and Ponder, G.A. "The Practicality Ethic in Teacher Decision-making", *Interchange* (8:3), 1977, pp.1-12.

Fornell, C. R., and Larcker, D. "Evaluating Structural Equation Models with Unobservable Variable and Measurement Error," *Journal of Marketing Research* (18), 1981, pp.39-50.

Frankel, K.A. "Women and Computing," *Communications of the ACM* (33:11), 1990, pp. 34-45.

Gattiker, E. and Hlavka, A. "Computer and Attitudes and Learning Performance Issues for Management Educational and Training," *Journal of Organisational Behaviour* (13), 1992, pp. 89-101.

Gefen, D., and Straub, D. W. "Gender Difference in the Perception and Use of E-Mail: An Extension of Technology Acceptance Model," *MIS Quarterly*, 1997, pp.389-399.

Gilroy, D. F., and Desai, H. B. "Computer Anxiety: Sex, Race and Age," *International Journal of Man-Machine Studies* (25), 1986, pp.711-719.

Hosmer, D., and Lemeshow, S. *Applied Logistic Regression*, 1989, New York: John Wiley.

Howard, G. S., and Smith, R. "Computer Anxiety in Management: Myth or Reality?" *Communications of the ACM* (29), 1986, pp.611-615.

Igbaria, M., and Chakrabarti, A. "Computer Anxiety and Attitudes towards Microcomputer use," *Behaviour and Information Technology* (9:3), 1990, pp.229-241.

Igbaria, M., and Iivari, J. "The Effects of Self-efficacy on Computer Usage," *OMEGA* (23), 1995, pp. 587-605.

Igbaria, M., and Tan, M. "The Consequences of Information Technology Acceptance on Subsequent Individual Performance," *Information and Management* (32), 1997, pp. 113-121.

Igbaria, M., Pavri, F., and Huff, S. "Microcomputer Applications: An Empirical Look at Usage," *Information and Management* (16), 1989, pp.187-196.

Igbaria, M. "An Examination of Microcomputer Usage in Taiwan," *Information and Management* (22), 1992, pp.19-28.

Jay, G. M., and Willis, S. L. "The Elderly's Attitudes toward Computers: A Select Review of the Literature," *Gerontological Society of America, Chicago, Ills*, 1986.

- Kay, R. H. "Predicting Student Teacher Commitment to the Use of Computers," *Journal of Educational Computing Research* (6), 1990, pp.299-309.
- Leiner, B. M. "Internet Technology," *Communications of the ACM* (37:8), 1994.
- Long, L., and Long, N. *Introduction to Computers and Information Systems, The Internet Edition (5th ed.)*, 1997, NJ.: Prentice-Hall.
- Lowe, G. S., and Krahn, H. "Computer Skills and Use among High School and University Graduates," *Canadian Public Policy* (15:2), 1989, pp.175-188.
- Loyd, B. H. and Gressard, C. "The Effects of Age, Sex and Computer Experience on Computer Attitude," *Association of Educational Data Systems Journal* (18), 1984, pp.67-77.
- Manser, M. H. *Macmillan Student's Dictionary*, 1986, London: Macmillan Publishers Ltd.
- Markus, M. L. "Electronic Mail as a Medium of Management Choice," *Organisation Science* (5:4), 1994, pp.502-527.
- McClure, C. "So What are the Impacts of Networking on Academics Institution?" *Internet Research* (4:2), 1994, pp.46-53.
- Miller, T. E. "Segmenting the Internet," *American Demographics* (1), 1996, pp.48-52.
- Palvi, S., Tung, L. L., Leng, P. T., Chin Ee, S., and Pei, L. W. "A Study of Internet Awareness and Usage of two Singapore University," *In the Proceedings of Pan Pacific Conference on Information Systems, Singapore, 29 June – 2 July 1995*, pp. 118-120.
- Parasuraman, S., and Igarria, M. "The Examination of Gender Difference in Determinants of Computer Anxiety and Attitudes toward Microcomputer among Managers," *International Journal of Man-Machine Studies* (in the Press).
- Peter, P. J. "Reliability: A Review of Psychometric Basics and Recent Marketing Practices," *Journal of Marketing Research* (16), 1979, pp.6-17.
- Prescott, M., and Conger, S. "Diffusion of Innovation Theory: Borrowing, Extensions and Modifications from IT Researchers," *DATA BASE for Advances in Information System*, (26:2and3), 1995, pp. 20-41.
- Rahim, M. Md., Rahman, M. N., and Seyal, A.H. "Software Piracy Among Academics: An Empirical Study in Brunei Darussalam," *Information Management and Computer Security* (8:1), 2000.
- Raub, A. C. "Correlates of Computer Anxiety in College Student," *unpublished Ph.D dissertation*, University of Pennsylvania, Philadelphia.
- Rice, R. E., and Aydin, C. "Attitudes towards new Organisational Technology: Network Proximity as a Mechanism for Social Information Processing," *Administrative Science Quarterly* (36), 1991, pp.219-249.

Rivard, S. "User Developed Computer-based Application: A Model of the Factors of Success," *Unpublished Ph.D dissertation*, 1982, University of West Ontario, London, Ontario, Canada.

Roger, E. M. *Diffusion of Innovation*, 4th, Ed., 1995, New York: The Freeman Press.

Seyal, A.H., Rahim, M. Md., and Rahman, M. N. "Computer Attitudes of Non-Computing Academics: A Study of Technical Colleges in Brunei Darussalam," *Information and Management* (37:4), 2000, pp.169-180.

Songan, P., and Noor, F. M. "Predictors of Internet Utilization among Students in an Institution of Higher Learning in Malaysia," *In the Proceedings of Conference on Information Technology in Asia (CITA 99)*, Kuching, 16-17 September, 1999.

Spennemann, D. H. R. "Do Techno-skeptics use on-campus E-Mail?" *Campus Wide Information Systems* (14:2), 1991, pp.46-53.

Sproull, R. A. "Lesson in Electronic Mail", in *Sproull, L., and Kiesler, S (eds.), Connections. New Ways of Working in the Net Work*, 1991, MA, Cambridge: MIT Press.

Tansey, R., White, M., Long, R., and Smith, M. "A Comparison of Log Linear Modelling and Logistic Regression in Management Research," *Journal of Management* (22:2), 1996, pp. 339-358.

Teo, S. H. T., and Tan, M. "An Empirical Study of Adopters and Non-adopters of the Internet in Singapore," *Information and Management* (34), 1998, pp. 339-345.

Thong, J. Y. L., and Yap, C. S. "An Information Technology Adoption Model for Small Business," *In the Proceedings of Working Conference in IFIP W.G 8,6*, Oslo, 14-17 October 1995.

Turner, R., and Zheng, W. "Staff Use of the Internet," *In the proceedings of XVth Pan Pacific Conference* in Seoul, 1998.

Wilkins, M. "Determinants of Microcomputer Usage in the Republic of Ireland," *Journal of End User Computing* (8:4), 1996, pp.3-9.