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USING COMPUTER TECHNOLOGY FOR EDUCATIONAL AND OCCUPATIONAL INFORMATION

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INTRODUCTION

Usage of any tool including Computer Technology (CT) for any purpose depends on a number of factors especially access, utility and motivation. The growth of Internet Technology has made numerous resources on the World-Wide-Web (WWW) available to various users for a variety of purposes. The educational sector and the business communities have also developed innovative strategies to expand customer base using this technology (Ram et al. 1999).

The explosive increase of PC users has led to the dramatic shifts in the way of conducting business, from daily life to commercial business transactions. Individuals have found personal computers significant in business transactions and source of personal information including educational and occupational information. Electronic commerce (e-commerce) presents enormous opportunities for both consumers and businesses in the world. Online firms engaged in e-commerce deliver their products/services faster to customers. Other products such as learning materials, books and journals are also available on the internet. This provides further attraction for using CT for information sourcing.

Many developing countries are at present benefiting from the information revolution brought by the use of personal computers. More establishments are adopting the use of the CT for various services and activities.

A study on CT diffusion in Botswana was conducted to determine the nature, extent and predictors of CT adoption and use in the country in general. One of the focal area is the usage of CT for educational and occupational information in particular. This paper uses data collected from the study to examine CT use by subjects for educational and occupational purposes. The specific educational and occupational areas of use of interest considered were the use of CT for: i) seeking information in general, ii) web-based learning and iii) job application.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Information Systems (IS) researchers have made significant efforts in building theories to examine and predict the determinants of information technology (IT) adoption and use (Argawal & Prasad 1998; Venkatesh et al 2003). Models of IT adoption and usage have their foundations in a variety of theories, notably Innovation Diffusion Theory (IDT) where individual's perception about using an innovation are considered to affect their adoption behaviour (Moore & Benbasat, 1991; Rogers 1995). Other important theoretical models that attempt to explain the relationship between user beliefs, attitudes, intentions and actual system use include the Theory of Reasoned Action (TRA) proposed by Ajzen and Fishbein (1980), the Theory of Planned Behaviour (TPB) by Ajzen (1991), and the Technology Acceptance Model (TAM) by Davies (1987) and Davies et al, (1989).
TAM is one of the most influential extensions of Ajzen and Fishbein's TRA in the literature. It was developed by Fred Davis and Richard Bagozzi (Bagozzi et al., 1992; Davis et al., 1989). TAM replaces many of TRA's attitude measures with the two technology acceptance measures - perceived ease of use, and perceived usefulness. TRA and TAM, both of which have strong behavioural elements, assume that when someone forms an intention to act, that they will be free to act without limitation. The TAM has been the most widely used in explaining factors of CT use and several studies have subjected it to empirical and theoretical validation. These studies have proposed extensions and modifications such as adding constructs and variables to TAM drawing on the TRA, and the TPB in particular. In the TAM, "perceived usefulness" and "perceived ease of use" are hypothesized as key determinants of usage through two mediating variables, user attitude and intention (Davis 1989).

Perceived usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance".
Perceived ease-of-use (PEoU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989).
Perceived ease of use and perceived risk have also been explored as factors that influence the use of computer technology. Information Systems that users perceive easier to use and less complex will increase the likelihood at its adoption and usage (Agarwal & Prasad, 1999) According to the TRA model, beliefs influence attitude, which consequently lead to intentions, which direct or make

behaviours. Thus introduced an attitudinal factor into predicting behavioral actions. The research model for the aspect of the study reported in this paper is as shown in Figure 1.

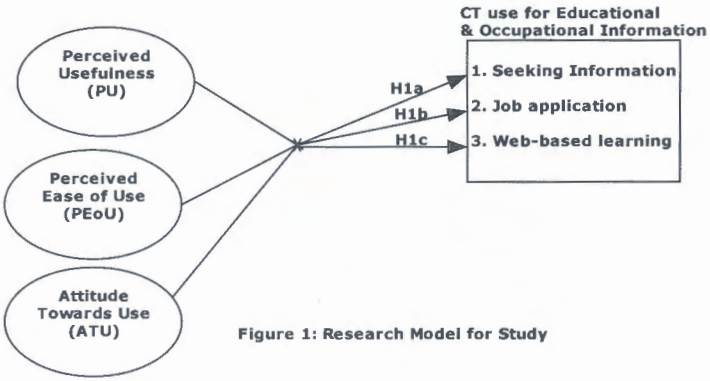

Figure 1: Research Model for Study

The hypotheses derived from the model and which are tested and validated are:
H1a: Perceived Usefulness (PU), Perceived Ease of Use (PEoU) and Attitude Towards Usage (ATU) will together influence CT use for Seeking Information.
H1b: Perceived Usefulness (PU), Perceived Ease of Use (PEoU) and Attitude Towards Usage (ATU) will together influence CT use for Job Application.
H1c: Perceived Usefulness (PU), Perceived Ease of Use (PEoU) and Attitude Towards Usage (ATU) will together influence CT use for Web-based Learning.

METHODOLOGY

Sampling

In the overall study for CT diffusion in Botswana subjects were randomly selected in the country taking the various demographic variables under consideration. The target population in the overall study were sampled at organizational and individual (within organization) levels. The organizational sampling stratification included small, medium and large scale organizations, with target organizational sample size of 170 in focus. The organizations were also selected to reflect national representation, i.e. the geo-political, sectoral and urban-rural segments of the country. The contact person selected for organizational level information was a CT policy decision maker. The individual level sampling was random for individuals with access to CT.

Research Instrument

The questionnaire instrument comprised four parts. Part A focused on type and location where subjects were employed and accessibility of computers to respondents. Part B covered information on the actual use of CT by subjects, the application software being used and the area CT use by subjects, and the attitude toward the use CT. Part C was designed to collect information on variables theorized in literature to influence the subjects use of CT, namely (i) relative advantage, (ii) perception of usefulness, (iii) perceived ease of use, (iv) compatibility of use, (v) observability, (vi) self efficacy, (vii) risk, (viii) subjective norm, (ix) behavioural control and (x) behavioural intention for future use. Part D gathered demographic information on gender, age, nationality, level of formal education, level of computing qualification, position at work, income, years of work experience, level of proficiency in computer literacy/skills and organizational policy on computer use. However, a pilot study was conducted to ensure the validity of the instrument and the items in the questionnaire were reviewed by experts.

Permission to conduct the study was obtained from the Presidency of Botswana. A letter of support was also obtained from the Government Directorate of IT. Various organizations such as Botswana Confederation of Commerce Industry and Manpower and management of various organizations selected were contacted and the researchers with the assistance of proctors carried out data collection. The participating organizations cut-across Government establishments, the private sector. The variable under focus included gender, level of education, level of computing experience, position of work, income, years of work experience and years of computer experience.

Data Analysis

A total of 1420 questionnaires were administered and completed. The focus of this paper was to determine associations between use of PCs for educational and occupational purposes: Perceived usefulness, perceived case of use and attitude towards usage. Three indicators of use were selected, namely seeking information, job application and web-based learning.

Preliminary analyses sort to determine the extent to which use of PCs was associated with background characteristics. Chi-squared test of independence were used for this purpose.

Following the conceptual model in Figure 1 Logistic regression analysis was used to determine a model for predicting the likelihood that an individual will use PC

given their PU, PEU and attitude. Separate models were fitted to each indicator of use – seeking into job application and web-based learning.
The background factors: gender, age and current position at work were added as mediating factors in the model. Only factors found to be significant at 5% level were retained in the final model. Relative likelihood of use vs. non-use was measured using odds ratios; while significance tests were based on the Wald Statistics (SPSS, V15)

DATA PRESENTATION/ANALYSIS

The use of Personal Computers for educational and occupational purpose

Use of PCs and Gender
Results in Table 1 show the number and percentage of respondents using PC for seeking information, applying for jobs and for web based learning by gender, age group and current position at work.

Use of PCs and Gender

The results indicated that 413 of the 759 females surveyed said that they use PCs for information seeking compared with the 411 males who indicated that they use PCs for information seeking. Hence relatively more males (65.6%) use PCs for information seeking than females (54.4%). This difference is statistically significant as seen in Table 2, with chi-squared of 14.32 and $P<0.001$.
The results further indicated that relative more males use PCs for applying for jobs and for web-based learning than females. Almost 22 percent of males use PCS for applying for jobs compared with 14 percent of females. With respect to use of PCs for Web-based learning, a similar difference between males and females is observed as 22.3 percent of males use PCs for Web-based learning compared with 15.7 percent of females.
As shown in Table 2, the differences between males and females are all statistically significant; $P<0.01$ for Seeking for information and Applying for jobs, and $P=0.003$ for use of PCs for Web-based learning.

Use of PCs and Age

The percentages of people using PCs for seeking information by age range from 57.8 among age group 26-35 to 72.0% among people aged 56years or older. However, the number aged 56+ was small (25). Overall, the differences in use

between age groups are small, and as shown in Table 2, not statistically significant (P=0.737).

The percentages of people in different age groups that use PCs to apply for jobs range from 9.0 percent among those aged 46-55 to 22.4 percent among those age 26-25. It can also be observed that as the age groups increase, the percentage of people among the age group that use PCS to apply for jobs decreases. Hence there is a negative association between age and use of PCs to apply for jobs. The differences are found to be statistically significant (P=0.008). As shown in Table 2, there are no statistically significant age differences in the use of PCs for Web-based learning (P=0.455), although there is a greater tendency for younger respondents to use PCs for web based learning than older respondents.

Table 1: Use of PCs for educational and job seeking by Gender, Age and Position at work

	Number using PCs for:				Percent using PCs for:			
	Seeking for information	Applying for jobs	Web-based learning	Total	Seeking for information	Applying for jobs	Web-based learning	Total
Gender								
Female	413	108	119	759	54.4	14.2	15.7	100
Male	411	137	140	627	65.6	21.9	22.3	100
Total	824	245	259	1386	59.5	17.7	18.7	100
Age								
16-25	96	35	36	156	61.5	22.4	23.1	100
26-35	382	129	122	661	57.8	19.5	18.5	100
36-45	242	66	72	402	60.2	16.4	17.9	100
46-55	85	13	25	144	59.0	9.0	17.4	100
Over 55	18	3	3	25	72.0	12.0	12.0	100
Total	823	246	258	1388	59.3	17.7	18.6	100
Current Position at work								
Industrial/Clerical	71	19	12	123	57.7	15.4	9.8	100
Secretarial	127	44	37	251	50.6	17.5	14.7	100
Administrative	118	23	38	197	59.9	11.7	19.3	100
Managerial	97	23	35	160	60.6	14.4	21.9	100
Technical	134	46	53	217	61.8	21.2	24.4	100
Professional	201	67	67	302	66.6	22.2	22.2	100
Other	34	8	9	67	50.7	11.9	13.4	100
Total	782	230	251	1317	59.4	17.5	19.1	100

Use of PCs by Current Position at work

Current rank was found to be a determinant of use of PCs for seeking information. The percentages of people in the different positions that use PCs to

apply for jobs range from 50.6 among secretariat as well as managerial staff to 66.6% among professional staff. Technical staff (61.8%) was the category with the next highest percentage that use of PCs for seeking information. Overall, likelihood of use of PCs for seeking information was significantly associated with the current position of an employee (P=0.004).

Table 2: Bivariate tests of Association between Independent and Dependent Variables

Independent Variable	Dependent Variable	Response N	Chi-squared	Degree of freedom	P-Value
Gender	Seeking for information	1,310	14.32	1	0.000
	Applying for jobs	1,281	12.44	1	0.000
	Web-based learning	1,273	8.93	1	0.003
Age group	Seeking for information	1,312	1.99	4	0.737
	Applying for jobs	1,284	13.90	4	0.008
	Web-based learning	1,276	3.65	4	0.455
Current Position at work	Seeking for information	1,246	18.89	6	0.004
	Applying for jobs	1,217	14.29	6	0.027
	Web-based learning	1,212	20.08	6	0.003

The likelihood that an employee would use PCs to apply for jobs or for Web based learning were also found to depend on their current position.

The percentages of employees in different positions who use PCs for job applications ranged from 11.7 percent among administrative staff to 22.2 percent among professional. As with use of PCs for seeking information, the difference between professional and technical staff was negligible. Similarly, the difference between administrative and managerial staff was small. Hence the statistically significant differences shown in Table 2 (P=0.027) are mainly due to differences between administrative and managerial staff on the one hand, and professional and technical staff on the other hand.

With respect to use of PCs for Web based learning, clear differences exist between the different categories of employees. Industrial/clerical are the least likely (9.8%) to use PCs foe Web based learning, followed by secretariat (17.7%), Administrative (19.3 percent), technical (24.4) and professional (22.2). Hence junior staff tend to be less likely to use PCs for web based learning than senior or technical staff (p=0.003).

Attitude towards the Use of Computers

Summary results indicated that 149 (10.5%) of respondents had a negative attitude towards the use of personal computers, while just over half (50.3%) had an extremely positive attitude. A fairly high percentage (28.0) did not find PCs to be useful, 664 (46.8 %) found PCs to be very useful. An even higher percentage of respondents (39.5%) found PCs difficult to use. Less than one in three respondents (29.1%) found PCs to be extremely easy to use. Further analysis revealed that more respondents use PCs to seek information irrespective of their attitudes towards usefulness of PCs. However, relative more respondents who are positive (64.6%) or extremely positive (62.7%) use PCs compare to those who are not positive (59.6%). This suggests that use of PCs for seeking information may be influenced by factors outside attitude.

Perceived Usefulness and Perceived Ease of Use in Computer Usage

The results of the final logistic regression model for predicting likelihood that a respondent will use PCs for Seeking for information given their attitude, perceived usefulness and perceived ease of use are shown in Table 3. Non-significant factors such as attitude were dropped from the model using step-wise logistic regression.

Perceived

The results in Table 3 indicate that Perceived Ease of Use (PEoU) and Perceived Usefulness (PU) are only significant predictors of a persons use of PCs to seek career and job related information. The odds-ratio (OR) indicate the relative likelihood that a person with the given characteristic will use PCs to seek information over a person with the reference characteristic. For example, a person who perceives use of PCs to be easy is almost one and a half times (OR= 1.457, p=0.017) to use PCs to seek information than someone who perceives PCs to be "not easy". Similarly, a person who perceives use of PCs to be Extremely Easy is over one and a half times (OR= 1.564, p=0.007) to use PCs to seek information than someone who perceives PCs to be "not easy".

The predictive ability of the model with only perceived ease of use as a predictor is 62.9%, and this improves to just 63.1% when perceived usefulness is added. Though this represents a mere 0.2% improvement, the reduction in prediction error is significant (chi-squared = 9.78, p=0.004).

When perceived ease of use is included in the model (Table 3), usage of PCs to seek information is negatively associated with perceived usefulness. Those who

believe that PCs are useful in enhancing their work performance are less likely to use if for seeking information (OR=0.654, p=0.021) than respondents who do not believe that PCs are useful. Given PU and PEoU, Attitude towards PC use was not significant in predicting likelihood that a person will use PC for seeking information.

Table 3: Predictive Model of Use of PCs for Seeking for information

							95.0% C.I.for OR	
	B	S.E.	Wald	df	Sig.	OR	Lower	Upper
PEoU			9.700	3	.021			
Not Easy						1.00		
Easy	.377	.158	5.669	1	.017	1.457	1.069	1.987
Extremely Easy	.447	.165	7.348	1	.007	1.564	1.132	2.160
Not Applicable	.723	.681	1.128	1	.288	2.060	.543	7.820
PU			15.194	3	.002			
Not Useful						1.00		
Useful	-.425	.184	5.366	1	.021	.654	.456	.937
Extremely Useful	-.592	.166	12.749	1	.000	.553	.400	.766
Not Applicable	-1.224	.641	3.653	1	.056	.294	.084	1.032
Constant	.698	.114	37.281	1	.000	2.010		

PC Use and Job Application

PU is not a significant predictor of PC use (OR= 0.965, p=0.412) for applying for job. Similarly, neither PEoU nor Attitude towards PC use is a significant predictor of PC use.

Web-based learning

Only Perceived ease of use was found to be a significant predictor (p=0.001) of the likelihood that a person will use PC for seeking information. A person who perceives use of PCs to be easy is more likely (OR= 1.705, p=0.003) to use PCs for web-based learning than one who perceives PCs to be "not easy". Similarly, those who perceived PCs to be very easy to use are 1.8 times more likely to use PCs for web-based learning (OR=1.836, p <0.001).

SUMMARY AND DISCUSSION

In all the areas of use investigated, there were more non-users compared to users. Various factors could account for this based on the theory of technology acceptance (Lederer, 2000; Staub, 1997) that influenced subjects.

The results indicate that 413 of the 759 females surveyed, said that the use PCs for information seeking. Comparing this with the 411 males who indicated that they use PCs for information seeking, the responses indicate that relatively, more males (65.6%) use PCs for information seeking than females (54.4%). The difference was statistically significant as indicated in Table 2, with chi-squared of 14.32 and $P<0.001$. However, 382 respondents or 46.4% of subjects that used PC for seeking information were in the age range 26 – 35 years, followed by 242 subjects or 29.4% in the age range 36 – 45 years. The younger subjects used their PC to seek information in general compared to the older respondents. The eagerness for information was displayed by younger subjects.

The use of PC in seeking information was higher among subjects at the technical/professional level, 42.8%, followed by the administrative/managerial level 27.5%. Among other things, the urge to provide leadership could account of the use of PC to seek information at these levels.

Use of PC for Web-Based Learning

More male subjects (54.1%) had used PC for web-based learning, compared to female subjects 45.9%. The use of PC for web-based learning was higher 47.3% among subjects in the age range 36 – 45 years, accounting for 27.9%. Perhaps the need to advance themselves could be a factor in the use of PC for this purpose. The use of PC for web-based learning was higher at the professional/technical level, 37.8% and at the administrative/managerial level 29%. The need to keep up with new developments and innovations could have served as a motivating factor for subjects at this level, in using PC for web-based learning (Lin et al., 2000).

Use of PC for Job Application

More male subjects 55.9% compared to female subjects 44.1% had used PC for job application. The use of PC for job application was higher for subjects in the age 26 – 35 years 52.4% and age range 36 – 45 years, 26.8%. The use of PC for job application was also higher for subjects at professional/technical level, 49.1% followed by subjects at secretarial/industrial/clerical cadre 27.4%.

The frequent use of PC for job application by the younger subjects could be due to interest in relocation for a variety of reason. It is noted that subjects at a higher level in the organization particularly professionals, 29.1% ranked highest in the use of PC for job application. Bearing in mind the large number of expatriates on

contracts in some establishments, the high rate of the use of PC for job application could be a factor for subjects in this category (Theo et al., 1999).

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