

Perceptions of information and communication technology among undergraduate management students in Barbados

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ABSTRACT

This exploratory study examined attitudes and usage of ICT among undergraduate management students in Barbados. Of the sample of 166 students, the majority indicated they had access to a computer, and had access and regularly used the Internet. In addition, more females than males had access to a computer off campus. Over 90% used the course-based WebCT, whereas only 30% used the Campus Pipeline. The study showed that students were generally favourable towards ICT. Males were more inclined to incorporate ICT in web-based instruction compared to other teaching activities. Older students were more interested in using ICT only as a supplement to teaching activities. The findings suggest high usage of and positive attitudes toward ICT among tertiary level students. University administrators need to address the gender and age differences regarding ICT usage as well as develop strategies to maintain positive student attitudes and high usage of ICT.

Keywords: *Information and communication technology; WebCT; Internet; management students.*

INTRODUCTION

Information and Communication Technology (ICT) encompasses the effective use of equipment and programs to access, retrieve, convert, store, organize, manipulate and present data and information (Gay and Blades, 2005). E-learning, which is described as the use of ICT to enhance or support learning and teaching in education, has become increasingly important in tertiary education (OECD, 2005). ICT skills are currently of great interest to governments, businesses and individuals alike. Through the use of automation, ICT has become integrated in the management of knowledge and its accompanying ICT tools. Industry and commerce also depend on knowledge management, which has forced businesses to become ICT savvy (COM, 2003). More importantly, it is expected that ICT would be fully integrated into the academic curriculum in order to prepare students for the world of work.

Background

The University of the West Indies (UWI) is the major tertiary level institution in the West Indies and has three campuses in Barbados (Cave Hill Campus), Jamaica (Mona Campus) and Trinidad and Tobago (St. Augustine Campus). All three campuses have embraced ICT in their quest to enhance teaching and research to students and staff. This exploratory study looked at ICT at only one of the campuses, Cave Hill Campus. Students at UWI, Cave Hill Campus, have access, at minimal cost, to a variety of electronic information resources. These include:

- the Distance Education Centre (DEC), which was intended to explore the potential for using telecommunications technology across the three campuses,
- on-line registration of courses, and

- access to course material via web-based tools such as WebCT and Campus Pipeline.

Web Course Tools (WebCT) is an online virtual learning tool used by many educational institutions for the delivery of e-learning to students. This tool has numerous benefits for students and lecturers including effective communication of course material, email exchanges, online discussion and general course management. Campus Pipeline is another online system that caters to students, faculty and administration by providing centralised Web access to information and services. Some of the benefits of Campus Pipeline include reducing time on administrative tasks, distribution of information to students and faculty and extend communication beyond the classroom.

Objectives of the study

This study sought to explore the attitudes and usage of ICT among undergraduate management students at the Cave Hill Campus of the University of the West Indies in Barbados. The present study addressed four main research questions:

- 1) What are the attitudes of undergraduate students to ICT?
- 2) To what extent do students use ICT?
- 3) How does gender and age impact on the use of and attitudes to ICT?
- 4) What are the main reasons behind students' ICT usage?

Rationale for the study

This study is important as it measures the attitudes and usage of ICT in a small developing country. The Government of Barbados has invested millions of dollars in encouraging ICT in primary and secondary schools via a project called Edu-tech, with one of its perceived benefits being the increased proficiency in ICT among students entering the tertiary level – the level to which secondary students should proceed. Thus, this study should show whether Edutech has achieved its main objective of promoting the widespread use of ICT in schools. It is hoped that this paper will inform government and educators on how to shape their educational policy regarding student use of ICT and its supporting resources. Educators will also be informed as to whether they need strategies to encourage students to fully embrace ICT in their learning. More importantly, this study will contribute to the scant body of literature on the usage of ICT among tertiary level students in Barbados, and by extension the Caribbean.

Structure of the paper

The paper is structured as follows. The first section presents a selective review of the literature on the nature and importance of ICT. The second section presents the methodology and data collection procedures of the study. Next, the findings and discussion are presented as it relates to the main research questions. The final section concludes the present study.

SELECTIVE LITERATURE REVIEW

The increased use of computers and the level of Internet access by businesses and individuals alike is an important measure of technological development. Governments also measure this development in areas such as education and health. This development has been heavily influenced by the introduction of formal and informal ICT training, whether conducted in the workplace, through an institution, or by self-training. Training therefore is of paramount importance as current and future employees are expected to be adequately skilled in ICT.

Online learning, using ICT and e-learning, have become the norm across tertiary educational institutions where students have been identified as stakeholders in the development and implementation of e-online learning (Ling et al., 2001; Petrova and Sinclair, 2005; Lee and Nguyen, 2005). To support online learning, administrative and faculty offices at universities utilize substantial proportions of their budgets to provide this technology for their students in the learning process.

Universities have sought methods of developing ICT skills and knowledge in their graduates in an effort to prepare them for employment. These methods include possession of basic ICT certification as an entry requirement, specific ICT foundation courses, or integrating ICT skills into the curriculum, which is accredited as part of the degree award (DEE, 2001).

Universities and other tertiary education institutions have indicated that e-learning has a generally positive effect on the quality of teaching and learning, although few have been able to offer detailed evidence (Goldman et al., 1999; Petrova and Sinclair, 2005; OECD, 2005). Many student satisfaction surveys (Dorup, 2004; Shashaani, 1997) have been conducted on the use of e-learning tools. For example, Dorup (2004) found that most students reported that they had a strong preference for ICT resources to supplement teaching and that they would prefer to use a computer during their studies. However, it is still unclear whether students use these resources enough. It should be determined whether refraining from its use is simply through ignorance or some other underlying concern, and how it can be addressed. Without investigation, it is difficult for universities to know if they are meeting the needs of students effectively (OECD, 2005). Goldman et al. (1999) has argued that computer usage has numerous benefits as it primarily assists student learning. Chavez (1997) argued that Internet and computer usage can also impact positively on critical thinking, problem solving, prompt feedback and collaborative instruction.

The University of the West Indies (UWI), whose role is the delivery of high-quality, relevant tertiary-level education to meet the human resource development needs primarily of the Caribbean basin, finds itself having to respond to a number of challenges in this Millennium Era. As the business of education becomes increasingly competitive, and more for-profit stakeholders enter the marketplace, the UWI, like any private sector business, must find ways to respond effectively to the new threats. This challenge, coupled by the need to deliver to rapidly increasing numbers of students, many of whom opt for the part-time rather than full-time mode of study, has led the UWI to respond by implementing a number of ICTs.

Another challenge facing tertiary education institutions concerns the rapid development of ICTs. For example, Seely Brown and Duguid (2000: 210) argued that:

these technologies offer new ways of producing, distributing and consuming academic material. As with so many other institutions, new technologies have caused universities to rethink not simply isolated features but their entire mission and how they go about it.

In addition, this challenge is joined by the Barbadian government's mandate to harness the ICTs as a tool that could be utilized to further transform the Barbadian society and economy. Consequently, there is a the need to capitalize on thrusts that would harness the new ICTs' power to support development and economic growth in both the public and private sectors (Nation, 2005)

As Petrova and Sinclair (2005:69) proposed:

organizational formats developed to accommodate the new educational paradigm need to be managed carefully in order to avoid early disillusionment and the subsequent failure of students to realize the full education potential of online and e-learning.

For UWI to have a competitive advantage in the global marketplace, e-learning and use of ICTs must be managed effectively as a business. Therefore, the infrastructure and management of human resources must be ready for the challenge. This includes the ability of administrative and teaching staff to be capable of designing, creating, delivering and managing e-learning. Ultimately, much of this responsibility falls upon the teaching staff who have to deliver the course materials. Similar to other international universities, which are re-shaping for e-learning, UWI must also ensure that students are properly prepared for this transition into the blended learning environment (Concannon et al., 2005). Finally, financial costs and adequate budgets must be available to support this infrastructure.

Empirical studies concerning ICT, its importance and usage among students can be noted. For example, Dorup (2004), in a study of undergraduate medical students in Denmark, found that most students had access to computers at home as well as used email and the Internet regularly. In addition, Dorup (2004) found that males had more access to computers at home, and held more favourable attitudes towards the use of computers in their medical studies compared to females. A small proportion of students reported that they would prefer not to use computers in their studies. Males were also significantly more inclined to replace traditional teaching activities with better ICT resources. Finally, there were favourable attitudes toward the use of ICT as a supplement, as opposed to using ICT or distance education as a replacement to traditional teaching activities.

Schumacher and Morahan-Martin (2001) argued that females have less overall experience with computers, and are more likely than males to have negative attitudes towards computers. These authors found that there were significant differences between males and females in computer experience and attitudes towards computers. It was found that males were more likely to take high school courses requiring computer use, and reported higher skills in applications such as programming, games and graphics. Males were perceived to be more experienced and reported higher skills level with the use of the Internet, except for email, than females. Moreover, Kay (1992) also discovered that females had less favourable attitudes toward computer and Internet usage. Shashaani (1997) also made a similar discovery where higher levels of interest in Internet usage existed among men than females.

In terms of age, Kraut et al (1998) found that Internet usage was higher among older persons, compared with younger persons. However, Ramayah and Jantan (2003) found that age was negatively related to Internet and computer usage where younger students were more likely to use these facilities. Overall, previous findings regarding age differences in Internet and computer usage tended to be mixed.

Cuban (2001) found that university students in America usually utilized computers for word processing, searching the Internet, and for using email, while teachers used computers for research purposes rather than for teaching in the classroom. Frizler (1995) argued that computers may never replace teachers, and that computers could make excellent and fairly inexpensive supplementary materials available to improve classroom teaching.

METHOD

Sample, Instrument and Procedures

The sample was chosen from the undergraduate management students in the Department of Management Studies at the Cave Hill Campus of the University of the West Indies in Barbados. Three hundred undergraduate management students were targeted for the study, using a self-administered questionnaire. The questionnaire sought to measure students' attitudes, experience

and reasons for the use of ICT on and off campus. It was adapted and modified from Dorup's (2004) study of medical students in Denmark. The first part of the questionnaire sought demographic information such as age, gender and enrolment status. Table 1 shows the demographic profile of the respondents in the sample. One hundred and sixty-six useable responses were obtained, resulting in a 55.3% response rate. Of the students who returned the questionnaires, the majority were female (77%), persons 25 years and under (61%) and full-time students (53%).

Table 1: Demographic Profile for the Sample

	N Frequency	% Percentage
Gender		
Male	39	23
Female	127	77
Age		
25 years and under	102	61
Over 25 years	64	39
Enrolment Status		
Full time	88	53
Part time	78	47

The second part of the questionnaire elicited information on students' attitudes to computer use, which were dichotomously scored ("yes" and "no"). These questions were:

1. I like to use a computer for typing assignments, calculations or reports.
2. I wish I would not have to use a computer as part of my studies.
3. I would like to use the computer as a supplement to other teaching activities.
4. I would like to use the computer instead of other teaching activities.
5. I would like to use email to ask questions to my teachers if possible.
6. I would like to use the computer for distance education from home.

The third section of the questionnaire focused on students' usage of computers and other ICT resources. The responses were also dichotomously scored ("yes" and "no"). The questions were:

7. Do you have access to a computer off-campus?
8. Do you have Internet access at home?
9. Do you have an off-campus email address?
10. Do you use WebCT for any of your courses?
11. Do you use Campus Pipeline?
12. Do you know the campus home page?

In the fourth part of the questionnaire, students were asked to indicate the extent to which they used the Internet and email, on a five-point scale ranging from 1 (Never) to 5 (Daily). The final item on the questionnaire asked students to identify their primary reasons for using the Internet. This item had an open-ended format to allow students to respond freely.

Data Analysis

Due to the descriptive nature of research questions 1 and 2, frequencies and percentages were computed. For research question 3, Pearson's Chi square analyses were conducted to examine the effects of gender and age on attitudes to ICT and ICT usage. Research question 4 was addressed qualitatively by summarising the key themes relating to students' reasons for ICT usage.

FINDINGS AND DISCUSSION

Attitudes to Information Technology

Table 2 shows that the majority of the sample expressed favourable attitudes to the use of ICT within the academic environment. Particularly, students were more inclined to use computers for: typing assignments (92%), part of their studies (95%), supplementing other teaching activities (72%), emailing questions to teachers (90%), and distance education from home (68%). However, students were resistant to the use of computers as full replacement of the regular, traditional teaching experience. This finding suggests students' strong preference for both forms of the academic experience (i.e., interaction with the teacher and interaction with information technology), which is consistent with Dorup's (2004) findings. Furthermore, Frizler (1995) asserts that although computers can never substitute teachers, computers can "provide excellent and fairly inexpensive supplementary materials to enhance classroom instruction" (Bataineh and Baniabdelrahman, 2005:35).

With respect to gender, no significant gender differences were found on five of the six attitudinal ICT statements, indicating that both males and females generally had a preference for the use of information technology (See Table 3). However, males (55%), to a significant degree, generally preferred to use computers as replacements to other traditional teaching activities, compared to females (33%) (Chi-square = 6.10, $p < .05$). This finding was also congruent with that of Dorup (2004). Moreover, previous research has documented that male students have more positive perceptions about computers and information technology than female students (Schumacher and Morahan-Martin, 2001; Shashaani, 1997; Young, 2000).

Concerning comparisons using age, no significant differences were found on five of the six items ($p > .05$). However, a significant age difference was found for using the computer as a supplement to other teaching activities. Older students (over 25 years) (81%) preferred using the computer as a supplement to teaching, compared to younger students (25 years and under) (67%) (Chi-square = 4.18, $p < .05$) (See table 3). This finding is consistent with Kraut et al.'s (1998) findings and implies that older students may have a somewhat more positive perception of computers.

Table 2: *Overall Attitudes to Information Technology*

	% Yes	% No
I like to use a computer for typing assignments, calculations or reports.	92	8
I wish I would not have to use a computer as part of my studies.	5	95
I would like to use the computer as a supplement to other teaching activities	72	28
I would like to use the computer instead of other teaching activities	39	61
I would like to use email to ask questions to my teachers if possible	90	10
I would like to use the computer for distance education from home	68	33

Table 3: *Attitudes to Information Technology by Gender and Age*

	GENDER χ^2	AGE χ^2
I like to use a computer for typing assignments, calculations or reports.	1.39	.64
I wish I would not have to use a computer as part of my studies.	.02	.004
I would like to use the computer as a supplement to other teaching activities	.96	4.18*
I would like to use the computer instead of other teaching activities	6.10*	.27
I would like to use email to ask questions to my teachers if possible	.04	.47
I would like to use the computer for distance education from home	1.02	2.69

Notes:

Chi-square statistics were computed with gender and age as the independent variables for separate analyses.

* $p < 0.05$.

Computer and Internet Usage

Table 4 shows that majority of students in the sample had access to a computer off campus (94%), 89% reported they had access to the Internet at home, and 96% had an off-campus email address. Concerning the on-campus facilities, over 90% indicated that they used WebCT and were aware of the campus online homepage. However, only a third of the sample (30%) indicated that they use the Campus Pipeline system. This finding suggests that most students were actively taking advantage of the available computer and information technology facilities and resources at

their institution. Again, these findings were consistent with Dorup (2004). Moreover, Raymayah and Jantan (2003) and Machmias, Mioduser and Shemla (2000) all argued that computers and Internet usage have pervaded the world of education in hope of making student learning easier and more enjoyable. Concerning the Campus Pipeline, the low usage of this resource may be attributed to the fact that students are not required to use this facility and that other resources, such as WebCT, have gained popularity among lecturers and course administrators due to flexibility and convenience.

In relation to gender, no significant gender differences were found with the exception of the access to a computer off-campus; females (96%), to larger degree than males (87%), reported that they had access to a computer off-campus (Chi square = 4.37, $p < .05$) (See table 5). This finding conflicts with Dorup (2004), who found that males were more likely to have access to computers off campus, compared to females. This finding is also inconsistent with that of Machmias et al. (2000) and Ramayah and Jantan (2003) who found that computer and Internet usage was higher among males than females. This study's finding implies a growing interest in ICT among females, compared to that of the past. With respect to age, no significant differences were found.

Table 4: Overall Computer and Internet Usage

	% Yes	% No
Do you have access to a computer off-campus?	94	6
Do you have Internet access at home?	89	11
Do you have an off-campus email address?	96	4
Do you use WebCT for any of your courses?	98	2
Do you use Campus Pipeline?	30	70
Do you know the campus home page?	92	8

Notes:

+Chi- square statistic was computed with gender as the independent variable.

* $p < 0.05$.

Table 5: Computer and Internet Usage by Gender and Age

	Gender χ^2	Age χ^2
Do you have access to a computer off-campus?	4.37*	1.55
Do you have Internet access at home?	.04	2.08
Do you have an off-campus email address?	.14	1.26
Do you use WebCT for any of your courses?	1.23	.32
Do you use Campus Pipeline?	.08	.001
Do you know the campus home page?	1.87	.34

Frequency of and Reasons for Internet Usage

In relation to frequency of Internet usage at home, majority (64%) of students surveyed indicated that they use the Internet regularly. In addition, a larger proportion (75%) indicated that they regularly use email. This finding correlated well with that of Dorup (2004). This finding is consistent with that of Machmias et al. (2000) and Ramayah, Jantan and Aafaqi (2003) who also discovered high Internet and email usage among students. The finding presents a favourable picture that ICT is becoming increasingly important to students and that the use of Internet and email is now a commonplace practice among management students.

A question was posed concerning the primary reasons for Internet use. The most common responses, cited by students, included *research*, *school assignments*, *emails* and *chatting*. This finding implies the growing importance of the Internet for school-related activities and that students are seemingly taking advantage of this resource. Overall, these findings are consistent with that of Goldman et al. (1999), who argued that computer and Internet usage can assist student learning. In addition, Chavez (1997) has suggested that computer usage (including the Internet) assists critical thinking, problem solving, prompt feedback and collaborative instruction. Particularly, Machmias et al. (2000) found that the most frequently cited reasons for using the Internet were email exchanges and chatting, consistent with the current finding. Ramayah et al. (2003) have argued that the extent to which students use the computer and the Internet depends on the perceived usefulness of this resource in terms of effective communication and access to information to complete projects and assignments efficiently.

CONCLUSION

This study found that management students were generally favourable to ICT in an academic setting. In addition, males were more favourable towards the use of computers as replacements to other teaching activities. Older students were more favourable to computer use as a supplement to other teaching activities, compared to younger students.

Students had access to computers and the Internet off campus. There also seems to be widespread usage of various forms of information technology such as Internet, WebCT and email.

No significant gender differences were found with the exception of the access to a computer off-campus; females to a larger degree than males (87%), reported that they had access to a computer off-campus. With respect to age, no significant differences found. The main reasons for the use of the Internet offered included research and email.

Based on the above findings, it is recommended that academicians and course administrators pay more attention to gender and age differences regarding the use of ICT resources as a major component in classroom teaching. This should serve to attract greater support for ICT and e-learning among all categories of students. Secondly, it is recommended that university administrators maintained the high levels of ICT usage among students through continuous education and promotion of the benefits attached to ICT resources. This would involve the use of seminars and training programmes as well as encouraging lecturers and course administrators to embrace e-learning and its resources.

These findings are important in that they can serve to inform educators about the usage of information and communication technology in an academic environment. This is important in that the students will need to use ICT in the workplace and prior preparation is a necessity. Moreover, the international community has embraced information technology in business, and these findings augur well for business in Barbados and the wider Caribbean.

A limitation of the study was the relatively small sample size, which may limit the generalisability of these findings to the population under study. Future research should examine ICT usage among students in different disciplines campus wide. In addition, future research could consider undertaking large-scale studies of attitudes to ICT and its usage outside the academic setting, targeting business professionals and other practitioners.

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