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ICT skills, practices and barriers of its use among secondary school students

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Abstract

The survey was conducted to assess the level of ICT skills among secondary school students in Malaysia as well as the barriers that impede its use. A total of 160 students from four schools (rural and urban) from a northern state in Malaysia were involved in this study. The descriptive statistics and t-test method were used to analyze the findings. The study revealed that their levels of ICT skills for basic applications and for Internet applications in accessing and sharing information are at moderate level; their advanced ICT applications at the lowest level, and their Internet applications for communication skills are at the proficient level. The analysis also showed insignificant difference in terms of the students' levels of ICT skills between the male and female respondents. However, there is a significant difference in terms of ICT skills between the urban and rural school students. The findings also indicated that administrative and facility barriers as the two major factors that impede the use of ICT. These obstacles and barriers need to be reduced to assist the integration of ICT as well as to improve the students' ICT skills.

Keywords: ICT skills; ICT barriers in schools; ICT integration

1. Introduction

The impact of ICT has brought so many changes in the education system. Teaching and learning activities are more interesting and more meaningful as ICT provides the element of interactivity that was never thought of before. With the advent of Internet, students no longer need to rely solely on the teacher as knowledge provider, as this technology allows them to access the information at anytime and from anywhere. In addition, with Web 2.0 technology that introduces all sorts of social network sites, students can always communicate, interact and socialize with others without much difficulty.

As a country that is trying very hard to become a developed nation come 2020, the Malaysian government, especially through its Ministry of Education, has introduced several ICT-related initiatives in its school system. Smart Schools, MySchoolNet, computer labs, Educational web TV, Teaching Mathematics and Science in English (using ICT), Access Centre, and several others, are some of the examples of these initiatives. These initiatives were also introduced to enhance students' interest, creativity, skills and knowledge using multimedia and the Internet.

Besides the initiatives, the government has also introduced several ICT related courses in the school system. Courses such as ICT, Computer Graphics, Multimedia Production, Fundamentals of Programming, Creative Multimedia, ICT Literacy, Computer Support System and Network Support System are currently being offered in schools to prepare students with ICT skills, as well as to train them to be creative and innovative. Although some of

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these courses are only offered to certain grade levels, these secondary school students should have the basic skills in ICT as they are required to learn ICT literacy when they are in Grade 7 and Grade 8.

In general, accessibility to ICT in schools in Malaysia is no longer an issue. With the above mentioned initiatives currently implemented in our school environment, students should be able to demonstrate some levels of ICT skills. In addition, for some students, they do not have much difficulty accessing ICT facilities outside their school session, as their families usually own whether personal computers or laptops, or they can access to cybercafés which are mushrooming in their locality. Thus, ICT knowledge and skills among these students should no longer be an issue.

There have been numerous studies pertaining to ICT use among school students, both at the global level and in Malaysia. For instance, Apple Computer Inc. (2002) through its 25 years of efforts to bring innovative technology to schools, reported four main findings, (i) the addition of technology has helped students mastering the fundamental skills of reading, writing and math skills, (ii) ICT has helped students to become proficient users of technology, (iii) ICT has assisted in preparing the students for later achievement in universities and workforce, and (iv) ICT has helped them to higher levels of achievements and motivations in schools. Meanwhile, Normala, Zaliha and Mohamad Kamil (2005) found that the ICT level of 698 respondents from twelve secondary schools in the state of Kedah in Malaysia is at the moderately-high category, and that there is a significant relationship between the parents' level of education and income with the students' computer literacy. In addition, it was found that there were no significant gender differences for word processing, presentation, spreadsheet, Web use, database, social networking and utility (Hew & Lai, 2011). However, Hew and Lai also reported that in the aspect of computer maintenance, male students demonstrated a significantly superior skill than their female counterparts. Another finding was reported by Judi, Amin, Zin and Latih (2011), who reported that, generally, students have moderately positive attitudes toward ICT, demonstrate low to moderate level of ICT competencies and have limited knowledge on Internet. However, some researchers have also reported several issues in using ICT among the students. For instance, Hamzah, Ismail and Embi (2009) have reported limited ICT facilities and equipment, Internet access problem, time constraints and study-load faced by school students in Malaysia.

Therefore, this study intended to identify secondary school students' skills and practices in ICT. In specific, as there is a wide range of ICT skills, this study aims to gauge the students' basic ICT skills, advanced ICT skills, Internet application for information access and Internet application for communication purposes. Basic ICT skills referring to storage and data transfer, as well as the use of word processing, and electronic spreadsheet applications. Advanced ICT skills refer to graphics, animation, video and multimedia design and development using certain software and authoring tools. Meanwhile, Internet application for information access refers to the students' skills in accessing the Internet including the use of search engines as well as recording and downloading/uploading materials. Another type of ICT skills involving the Internet application for communication purposes such as the use of social network, chat room, and emails to communicate with others, either for learning or socializing activities. In addition to these four ICT skills, this study served to identify the barriers or issues that the students are facing in using ICT in their respective schools. What are the reasons why the students rarely or hardly use ICT in schools? Are there any administrative or bureaucratic rules and regulations that hamper the use of ICT in their respective schools? This study also sought to investigate the differences between gender and school location in terms of the students' ICT skills.

2. Research Question

In this study, four primary research questions were addressed:

1. What are the students' levels of (i) basic ICT skills, (ii) advanced ICT skills, (iii) Internet application for information access, and (iv) Internet application for communication purposes?
2. What are the issues and barriers in ICT use among secondary school students?
3. Is there any significant difference between male and female students in terms of their ICT skills?
4. Is there any significant difference between urban and rural school students in terms of their ICT skills?

3. Research Methodology

This survey study involves a group of students from four secondary schools in the northern state of Penang, Malaysia. A questionnaire to gauge their skills, practices and attitude towards ICT as well as the barriers in ICT usage in their respective schools was distributed to them. Two urban schools and two rural schools from the state were randomly selected for this purpose. A total of 160 students age between 16-17 years old (Grade 10) was involved in this study, with 40 students randomly selected from each school.

The questionnaire consists of 108 items and was categorized into three broad sections. Section A involves ten demographic items, while Section B consists of 56 items involving the students' skills, practices, and barriers in using ICT in school context. Meanwhile, Section C consists of 42 items pertaining to the use of ICT outside the school setting or classroom environment.

4. Research findings

Demographic data indicates that 94 respondents (58.7%) are female students while 66 respondents (41.3%) are male students. In addition, 66 respondents (41.3%) come from a family whose monthly income is less than RM1,000; 65 respondents (40.6%) from a family that earns between RM1,000-RM2,500; another 19 respondents (19%) with family monthly income of between RM2,500 – RM5,000 and 10 respondents (6.25%) whose family income is between RM5,000-RM15,000.

In terms of years of experience using computer, the findings vary. A total of 90 respondents (56.2%) have between 1-4 years of computer experience, 50 respondents (31.3%) with between 5-9 years of experience, while 20 respondents (12.5%) had more than 10 years of experience.

The survey also tries to investigate the place or location where the students learn and use ICT most. It was found that they learned and used ICT mostly at home (99 respondents or 61.9%), cybercafé (34 respondents or 21.3%), friends' house (14 respondents or 8.8%), school (11 respondents or 6.9%) and others (2 respondents or 1.3%). They were further asked to identify from whom they have learned the ICT skills, and it was found that they learned ICT mostly on their own, followed by from their friends, schools, and finally from their family.

The respondents were also asked whether they own any Internet application accounts. A majority of the respondents (140 or 87.5%) has Facebook account, while 122 of them (76.3%) have email account. Interestingly, 26 of these respondents (16.3%) have their own blog, and 21 of them (13.3%) have personal web pages.

In terms of computer ownership, a total of 124 respondents (77.5%) own a personal computer/laptop at home, and out of this 124 research participants, 89.5% or 111 of them claimed that their home computers are connected to the Internet, with almost all (except two respondents) are allowed to access the Internet at home. Meanwhile, from the aspect of computer usage at home, majority of them (47 respondents or 37.9%) use computers between 2-5 hours per week. Next, 28 respondents (23.4%) use computers for more than 10 hours per week, 25 respondents (20.2%) with less than two hours of computer usage, and 23 respondents (18.5%) use computers between 5-10 hours per week.

The respondents were also asked whether they use the ICT facilities available in their schools. Interestingly, about half of them (95 respondents or 59.4%) have never used such facilities there, and another 58 of them (36.3%) only use several times in a month. Only a small number of them use either once or twice in a week (4 respondents or 2.5%), between 3-4 times a week (2 respondents or 1.3%) and one respondent claimed to use it every day (0.6%).

The respondents were also asked to declare their ICT practices in schools. Generally, the tasks listed in the questionnaire can be divided into four ICT practices: (i) basic ICT skills, (ii) advanced ICT skills, (iii) Internet application for information access, and (iv) Internet application for communication. Table 1 highlights the use of ICT in schools as declared by the respondents:

Table 1: ICT use by the Grade 10 respondents (N: 160)

ICT use in schools	Yes	No
	n (%)	n (%)
(i) Basic ICT skills		
Writing essay and report using wordprocessor (e.g.: MS Word)	58 (36.3)	102(63.8)
Developing portfolio	86 (53.8)	74 (46.3)
Searching info from CD-ROM	37 (23.1)	123 (76.9)
Creating slide presentation	51 (31.9)	109 (68.1)
Creating electronic spreadsheet	82 (51.3)	78 (48.8)
Creating bulletin / newsletter	37 (23.1)	123 (76.9)
(ii) Advanced ICT skills		
Producing graphics and animation	33 (20.6)	127 (79.4)
Producing multimedia using authoring tools eg. Flash, Authorware)	26 (16.3)	134 (83.8)
(iii) Internet application for information access		
Searching info from the web	117 (73.1)	43 (26.9)
Recording and uploading document on web (eg: Youtube)	52 (32.5)	108 (67.5)
Using search engine (eg: Google)	100 (62.5)	60 (37.5)
(iv) Internet application for communication		
Using web camera for communication	27 (16.9)	133 (83.1)
Using social network sites (e.g.: Facebook)	87 (54.4)	73 (45.6)
Sending and receiving emails	58 (36.3)	102 (63.8)
Using chat rooms	41 (25.6)	119 (74.4)
Conducting tele-conference (e.g. Skype)	16 (10.0)	144 (90.0)

Based on Table 1, it was obvious that majority of the respondents uses the Internet application for information access as the most frequent practices in school, with 117 respondents (73.1%) search information from the web, and use search engines for such activity (100 respondents or 62.5%). The next highest usage is using social network for communication purposes (87 respondents or 54.4%), and followed by two basic ICT skills, namely creating portfolio using computer (86 respondents or 53.8%) and creating slide presentation (82 respondents or 51.3%). The respondents hardly use ICT to create graphics and animation (33 respondents or 20.6%), produce multimedia using any authoring tools (26 respondents or 16.3%), use web camera (27 respondents or 16.9) or participate in tele-conferencing (16 respondents or 10.0%).

Then, the students' levels in each of the four ICT skills were measured. It was found that (i) for basic ICT skills, the respondents indicate a moderate level (mean: 2.76, S.D.:0.95), (ii) for advanced ICT skills, they indicate a low level (mean: 2.17, S.D.:0.94), (iii) for Internet application for accessing information, a moderate skill level was shown (mean: 3.12, S.D.: 1.1), and (iv) for Internet application for communication purposes, a high skill level was declared by them (mean: 3.64, S.D.:1.15). It is important to note that a score of 4.5-5.0 indicates a very high level of ICT skills, a score of 3.5-4.4 reflects a high skill level, 2.5-3.4 suggests a moderate level, a score of 1.5-2.4 signifies a low skill level, and a score of less than 1.4 indicates almost no ICT skill.

In terms of the differences in ICT skills between the male students and female students, the ANOVA result shows no significant difference in all four ICT skills between the male and female students. In specific, there is no significant difference between gender in terms of (i) basic ICT skills (mean for male: 2.75; female mean score: 2.77, p: 0.875), (ii) advanced ICT skills (male : 2.18; female: 2.16; p:0.843), (iii) Internet for information access (mean for male: 3.13; female: 3.11; p:0.875), and (iv) Internet for communication (mean for male: 3.62; mean for female: 3.66; p:0.830). These findings indicate that gender is no longer an issue in using ICT as perceived by these groups of participants.

This study also aimed to investigate whether there are any significant differences in terms of the four ICT skills between the rural and urban students. The findings indicate significant differences in (i) basic ICT skills (t-value: 7.47, $p<.05$), (ii) advanced ICT skills (t-value: 4.32, $p<.05$), (iii) Internet application for information access (t-value: 4.88, $p<.05$), and (iv) Internet application for communication purposes (t-value: 4.86, $p<.05$),, between the urban and the rural school students, with the former group scored significantly higher than the latter group in all four categories. These results clearly show that there is still a significant gap between the urban students and those from rural areas in terms of ICT skills and use.

The respondents were also asked to identify the barriers or issues that impede the use of ICT in their respective schools. The items were divided into three main aspects, namely administrative issues (7 items), facilities (5 items), and their attitudes (2 items). In the administrative aspect, the three barriers that top the list are (i) time limit for the students to use ICT facilities in school (140 respondents or 87.5%), (ii) the students are not allowed to use ICT facilities without their teachers monitoring the session (124 respondents or 77.5%), and (iii) ICT rooms and labs are always locked (110 respondents or 68.8%). Meanwhile, in the aspect of ICT facility, 115 respondents (71.9%) claimed that computers in their schools are often malfunctioning. Also, the computers available in schools are claimed to be outdated and using slow processor (105 respondents or 65.6%), and the programs or software available are different than the ones they are using at home (also 105 respondents or 65.6%). Nevertheless, in terms of attitude, the respondents disagree that computers in school are not user-friendly (89 respondents or 55.6%). They also disagree that they do not know and do not like using computer (14 respondents or 91.3%).

The findings of this study reveal that majority of the respondents are skillful in the Internet application for communication purposes. With the popularity of social networking sites such as Facebook and chat rooms such as Yahoo Messenger, it is not a surprise to observe this finding among the teenage respondents. It was also found that they are moderately skilled in basic ICT skills and Internet application for information access. These students have learned ICT literacy course (as part of their secondary school curriculum) in Grade 7 and Grade 8 in which the basic ICT skills were introduced. Thus, they do not have much problem in word processing, spreadsheet and slide presentation skills. However, they still lack some skills in the advanced ICT levels such as in producing graphics and animations as well as multimedia creation; and this is an expected finding as they did not receive any formal learning session in such skills. In general, the respondents in this study are at the moderate level in terms of ICT skills. This overall finding on ICT skills is consistent with previous research which indicates that their respondents' ICT skills are at the moderate level (example: Nor Izah, Norazah & Zalizan, 2008).

The results also indicate that, as compared to the rural school students, their urban school colleagues show significantly better skills in all four ICT levels: basic ICT, advanced ICT, Internet application for information access and Internet application for communication purposes. This finding suggests that urban school students are better exposed to ICT facilities and applications, and that those facilities (either at home or in their schools) are probably of better quality. In other words, the digital divide between the rural and urban school students still exists, and the government as well as the society needs to consider the necessary actions to overcome this issue.

5. Conclusion

As future leaders and workforce of any nation, students need to be well trained in ICT. With the introduction of several ICT related programs and initiatives in Malaysia, it is hoped that the school students are well equipped with the necessary skills and knowledge. Issues such as gender differences in using ICT are no longer seen as a problem in this country. However, the digital divide is still the main issue that needs to be addressed by the education policy-makers. Therefore, the government needs to provide the best possible ICT service, programs and trainings, especially to the students from rural areas. It is also hoped that the barriers impeding the use of ICT in schools be reduced. Only then, the school students will be able to use ICT skills at the optimum level and master these skills accordingly.

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