GENDER DISPARITY IN ICT COMPETENCY AMONG TEACHERS IN FEDERAL TERRITORY LABUAN, MALAYSIA.

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Abstract

ICT has today become a must-have tool in school. For this, government has spent a lot of resources to upgrade the ICT infrastructure both in primary and secondary schools. A lot of money has been spent to train teachers as well. With this investment, the government hopes that ICT can be fully utilized. However, ICT facilities can only be fully used if teachers are competent. This study was to assess the level of ICT competency among teachers in Federal Territory Labuan. In particular, it examined the differences between females and males in terms of nine components (MS WORD, MS POWER POINT, MS EXCEL, MS ACCESS, WWW, E-MAIL, OPERATING SYSTEM, MULTIMEDIA, and VIRTUAL CLASS application) related to ICT. A total of 256 teachers participated in this study. The results of the study showed that there is a small gap between females and males teachers. In some application such as MS WORD, MS POWER POINT, MS EXCEL, female teachers were more competent compared to male teachers. In contrast, male teachers are more capable in MS ACCESS, WWW, E-MAIL, OPERATING SYSTEM, MULTIMEDIA, and VIRTUAL CLASS application. Various reasons attribute to these results.

Keywords: Gender Disparity, ICT Competency, Computer software

INTRODUCTION

Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy.

Malaysia's concern on ICT matter is very serious. Through Multimedia Super Corridor (MSC), Government has introduced smart school concept, which one of the main focuses is ICT. Realizing the value that ICT brings, especially in schools, Ministry of Education introduced the computer literacy into teacher training programme in 1994 and the ministry will continue to facilitate the structural changes needed to develop tertiary education, both in public and private which is essential to bridge the fundamental shift to a knowledge based society (Mahani, 2006)

To achieve the status of industrialized nation and eventually into a K-economy, the country need to build a world-class education system dedicated to producing a world-class workforce (Adris et. al., 2001). This is in line with the mission statement of the Ministry of Education: "To develop a world class…quality education system will realize the full potential and fulfill the aspiration of Malaysia nation" (Ministry of Education, 2002)

The importance of ICT has attracted many researches to study the ICT in various sectors, both in public and private (Li et. Al., 2001; Lee, 2003; Atan et.al., 2002; Houtz & Gupta, 2001; Savery, 2002). Many of the studies were based on perception of ICT (Savery, 2002; Cope & Ward, 2002). Also, many ICT researches have been done in educational field (Mahani, 2006; Chetrilah, 1998; Suzana, 2004). However, there are a small number of studies on relationship of ICT competency and gender.

In recent years, the gender gap issue has caught attention of many scholars and as a result, many studies have been conducted to study this gap in technology locally and internationally. For example, a study by Ong & Lai (in press) revealed that males had more positive attitudes towards

e-learning than females. This is in agreement with Liaw's study (2002) which reported that male had more positive perception toward computers and Web technologies than females. Those findings were further supported by Chen & Tsai (2005) with their findings that males exhibit more favourable attitudes toward Web-based learning than females. In contrast with the above findings, Jackson et. al. (2001), however, found that females use e-mails more than males; the latter used the Web more. Houtz & Gupta's (2001) study revealed significant gender differences in the way females and males rated themselves in their ability to master technology skills.

However, the gender gap is narrowed when both genders are exposed to the same amount and types of experience on computer as noted by Kirkpatrick & Cuban (1998). And Atan et. al. (2002) further added that the absence of gender disparity is obvious when females and males are in a learning environment that requires the constant use of specific computer software to support their learning activities. However, the study by Atan et. al. (2002) agreed that activities such as handling computer hardware and performing computer maintenance are still seen as masculine in nature. In contrast from previous studies (Liaw, 2002; Jackson et.al., 2005; Houtz & Gupta, 2001), a study done by Luan et. al. (2005), in among academician in university, revealed that the gap between females and males has narrowed in terms of their ICT skills and in certain applications, the females competency have even surpassed male competency. One of the reason, as stated in their paper, could be the age factor where females samples in their study were younger age than males. Younger age has been found to be associated with more positive attitudes towards ICT (Jennings & Onwuegbuzie, 2001).

Although there is a widespread belief that computers and the Internet are male-dominated technologies, studies above shows that the evidence for specific gender differences in ICT competency is inconclusive. It would, therefore, be interesting to find out how gender affects the ICT competencies especially among teachers, both in primary and secondary schools. Since ICT has become must-have technology almost in all sectors, it is really worth to conduct a study to assess teachers' competency in ICT. With large investment in ICT, is it our expectation that the teachers are competent in using ICT. The main objective of this study is to find out if genders differences exist among teachers in Federal Territory Labuan, in terms of ICT skills.

METHOD
To achieve the objectives of study, a survey based method was used. This method is very useful in studying the individual respondents as it can help researchers to get more response. One of the most important in generalization is the number of respondents must be large enough. The instrument used was a self-administered questionnaire that consists of five sections. Section 1: is on the demographics profile (include teachers' past experience with computers), followed by section 2: on teachers' ICT competency and section 3: on infrastructure/readiness/knowledge & skill development. Except for section 1, all items in the rest of the sections were measured on a six-point, Likert scale.

Prior to distributing questionnaires to teachers, Federal Territory Labuan, Education Department required researchers to get permission from Ministry of Education. After getting letter of approval from the ministry, again we were told to get another letter of permission from Director of Education Department of Federal Territory Labuan, Malaysia.

There were 300 set of questionnaire distributed to teachers randomly, both in primary as well as in secondary school. Out of 300, there were 270 returned and only 265 were useful in this study, which is almost 98%.

The analysis of the data was accomplished in three steps using SPSS software version 16.0. In the first step, ICT-related background characteristics and previous experience with ICT of female and male teachers were compared using frequency. The chi-square test (for dichotomous variables) and the independent pair t-test (for ordinal and scale variables) were used for the detection of gender differences.

In the second step, ICT literacy was examined. Initially, females and males scores on each individual item were compared. Then, the total scale scores for each of nine groups of ICT capabilities were examined. Next, using exploratory Principal components and Alpha reliability analysis (Cronbachs Alpha α : 0.974), the main subgroups of ICT capabilities (i.e., factors) were determined. The subgroup scores for females and males were then compared again.

RESULTS

Table 1 : Demographic Analysis

Variables		Frequencies (%)	
School	**Primary**	75	(29.3%)
	Secondary	181	(70.7%)
Gender	Male	89	(34.8%)
	Female	167	(65.2%)
Race	Malay	141	(55.1%)
	Chinese	42	(16.4%)
	Indian	7	(2.7%)
	Local Sabahan	49	(19.1%)
	Local Sarawakian	11	(4.3%)
	Others	6	(2.3%)
Academic Qualification	Master	5	(2.0%)
	Degree	99	(38.7%)
	Diploma	88	(34.4%)
	Certificate	54	(21.1%)
	SPM	10	(3.9%)
Age	18-24 years	20	(7.8%)
	25-29 years	73	(28.5%)
	30-34 years	63	(24.6%)
	35-39 years	47	(18.4%)
	40 years above	53	(20.7%)
Computer Usage	7 days/ week	82	(32%)
	Less than 7 days/ week 123	(48%)	
	Once a week	37	(14.5%)
	Once a year	8	(3.1%)
	Never	6	(2.3%)
Internet Usage	Yes	216	(84.4%)
	No	40	(15.6%)
Internet Connection	Dial-up (1515)	187	(73%)
	Streamyx (broadband) 45	(17.6%)	
	Wireless	11	(4.3%)
	No Internet	13	(5.1%)
E-mail	Yes	184	(71.9%)
	No	72	(28.1%)

n = 256

In the third step, the significant differences between females and males total and subgroup scores were analyzed. It was aimed to determine, whether gender differences appeared exclusively due to the sexual category or, possibly, because of differences in teachers backgrounds with ICT. The hierarchical multiple regressions were employed for this purpose. The main results of this analysis are reported in Table 1.

Based on **Table 1**, about 65.2% of the total respondents were female with male respondents accounted with 34.8%. Females are dominant with total of 167 (65.2%) respondents, whereas male only 89 (34.8%) respondents. In terms of respondent races, Malay represent 141(55.1%), Chinese 42(16.4%), Indian 7(2.7%), Local Sabahan 49 (19.1%), Local Sarawakian 11(4.3%) and Others 6(2.3%). Master degree seems to be the higher qualification among teacher in Federal Territory Labuan with 2% of respondents, followed by 38.7% Bachelor Degree and Diploma with 34.4%. In terms of respondents' age, the total aged between 18-24 years old are represent 20(7.8%), 25-29 years old with 73(28.5%), 30-34 years old with 63(24.6%) and age between 35-39 and 40 years and above are 18.4% and 20.7% respectively. Internet usages among teachers in Federal Territory Labuan are considered high with 84.4% and Dial-up (73%) as popular internet connection. In this study, teachers are also found to be the active e-mail users with 71.9% usage rate. This is in line with study by Lim (2005) which stated that majority of students were able to use e-mail software. General ICT characteristics of female and male teachers in Federal Territory Labuan were quite similar. On average, the teachers used computers 32% for 7 days a week and 48% for less than 7 days a week. It also found that majority of female and male teachers had easy access to a computer and Internet. These results are consistent to the findings of many other recent studies (King et al., 2002; North & Noyes, 2002; Whitley, 1997).

Table 2: ICT Competency between genders
(Overall Comparison between Genders)

Applications	Gender	Mean	SD
MS WORDS	Male	4.24	1.16
	Female	4.40	1.18
MS EXCEL	Male	3.79	1.23
	Female	3.94	1.09
MS POWER POINT	Male	3.14	1.49
	Female	3.35	1.62
MS ACCESS	Male	3.44	1.41
	Female	3.30	1.36
WWW	Male	4.42	1.44
	Female	4.21	1.42
E-MAIL	Male	3.93	1.46
	Female	3.74	1.41
OPERATING SYSTEM	Male	3.93	1.46
	Female	3.74	1.41
MULTIMEDIA	Male	3.13	1.27
	Female	2.98	1.29
VIRTUAL CLASS	Male	3.01	1.35
	Female	2.94	1.38

n = 256

Based on **Table 2** above, female teachers were significantly more competent in MS WORDS (mean: 4.40), MS EXCEL (mean: 3.94) and MS POWERPOINT (mean: 3.35) application

compared to male teachers MS WORDS (mean: 4.24), MS EXCEL (mean: 3.79) and MS POWERPOINT (mean: 3.14). In contrast, male teachers are more capable in MS ACCESS (mean: 3.44), WWW (mean: 4.42), E-MAIL (mean: 3.93), OPERATING SYSTEM (mean: 3.930), MULTIMEDIA (mean: 3.13) and VIRTUAL CLASS (mean: 3.01) applications than female teachers. This finding is different from the results of some other similar studies (Qutami & Abu-Jaber, 1997; Shapka & Ferrari, 2003; Yuen & Ma, 2002). This result is quite expected, as in terms of educational background, the researched sample was very homogenous, thus the teachers have quite similar learning experience and cognitive skills.

T-test were conducted for each item to determine if differences existed between females and males in terms of their ICT competencies according to nine components, namely, MS WORDS, MS EXCEL, MS POWERPOINT, MS AACCESS, WWW, E-MAIL, OPERATING SYSTEM, MULTIMEDIA and VIRTUAL CLASS.

Table 3: ICT Competencies between genders (MS WORD)

	Word Processing	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Insert texts	4.61	1.270	4.54	1.253	-.431	.667
2	Edit texts	4.63	1.234	4.49	1.226	-.831	.407
3	Change margins	4.47	1.255	4.21	1.257	-1.575	.117
4	Insert graphics	4.31	1.317	4.20	1.272	-.639	.523
5	Create tables	4.45	1.240	4.24	1.306	-1.286	.200
6	Using mail merge feature	3.95	1.293	3.79	1.247	-.988	.324

**Significant at p<.05

Table 3 present data between the genders in terms of their perceived skills in word processing. The *T*-test result showed that there is no items were statistically significant. The mean values of female participants were statistically higher than those of males when it came to inserting (m = 4.61) and editing texts (m = 4.63). This could possibly mean that female staff prefer to type and make changes to their work compared to males. The mean scores for all five items were higher than 4.0, except the item no 6. It could be assumed that both females and males perceived themselves as skilful in using word processing applications. One probable reason is that most teachers in Labuan used this software for much of their daily jobs such as preparing notes and writing reports. These kinds of software are seen as pertinent and are widely used in school.

The t-test results in **Table 4** shows there is no significant differences between females and males for all five items. Once again, the mean scores for females were higher than those of males for all items. This could be an indication that females prefer to prepare their own presentations before class. This result also shows that all items are reached high mean value. It could be assumed that both females and males perceived themselves as skilful in using presentation applications.

Table 4 : ICT Competencies between genders (MS POWER POINT)

	Presentation	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Insert texts	4.43	1.381	4.29	1.375	-.735	.463
2	Move graphics	4.24	1.323	4.17	1.325	-.409	.683
3	Change templates	4.22	1.319	4.10	1.332	-.693	.489
4	Delete slides	4.32	1.349	4.45	1.306	.754	.451
5	Add slides	4.41	1.322	4.38	1.319	-.145	.885
6	Change background color	4.41	1.345	4.15	1.336	-.566	.572
7	Create text animation and slide transition	4.26	1.340	4.31	1.293	-.634	.526

**Significant at p<.05

The comparative analyses in **Tables 5, 6, 7, 8, 9, 10** and **11** shows that there is no significant difference between females and males in terms of their competency in MS EXCEL (spreadsheet), MS ACCESS (database), WWW, e-mail, operating system, multimedia and virtual class applications. This suggests that female and male skills are almost at the same level for these applications.

Table 5 : ICT Competencies between genders (MS EXCEL)

	Spreadsheet	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Insert data into cells	4.13	1.193	3.90	1.332	-.585	.166
2	Use formulas	3.72	1.145	3.54	1.253	-1.154	.250
3	Delete data in columns	4.07	1.223	4.02	1.373	-.259	.796
4	Sort records	3.98	1.174	3.79	1.327	-1.212	.227
5	Create charts	3.81	1.124	3.72	1.234	-1.391	.559

**Significant at p<.05

Table 6 : ICT Competencies between genders (MS ACCESS)

	Database (Access)	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Input data	3.42	1.433	3.26	1.599	-.821	.413
2	Delete records	3.63	4.169	3.24	1.581	-.856	.393
3	Sort records	3.28	1.400	3.13	1.517	-.743	.458
4	Search records	3.26	1.401	3.07	1.444	-1.023	.307
5	Create reports	3.20	1.429	3.02	1.438	-.964	.336

**Significant at p<.05

Table 7 : ICT Competencies between genders (WWW)

	World Wide Web	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Use search engines	3.82	1.580	4.10	1.545	1.364	.174
2	Download files	3.77	1.559	4.13	1.517	1.788	.075
3	Create homepages	3.07	1.485	3.18	1.564	.574	.567
4	Add hyperlinks in homepages	3.17	1.455	3.19	1.623	.117	.907
5	Add images in homepages	3.01	1.450	3.13	1.583	.656	.513
6	Create tables in homepages	3.26	1.569	3.03	1.577	-.132	.895
7	Upload file	3.06	1.471	3.35	1.666	.403	.687

**Significant at p<.05

Table 8 : ICT Competencies between genders (E-MAIL)

	Electronic mail	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Compose messages	4.31	1.413	4.48	1.463	.947	.345
2	Send messages	4.26	1.477	4.49	1.493	1.218	.224
3	Reply messages	4.30	1.446	4.52	1.478	1.137	.257
4	Send attachments	4.12	1.536	4.31	1.482	1.214	.329
5	Open attachments	4.10	1.534	4.34	1.477	.978	.226

**Significant at p<.05

Table 9 : ICT Competencies between genders (OPERATING SYSTEM)

	Operating System	Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Create folder and sub-folder	3.95	1.480	3.96	1.602	.822	.412
2	Format disk	3.60	1.477	3.88	1.506	1.392	.165
3	Creating user account & password	3.83	1.481	3.85	1.556	1.173	.242
4	Search document on hard disk	3.82	1.518	3.96	1.544	.672	.520
5	Back up document or data	3.65	1.435	3.85	1.534	1.043	.298
6	using scandisk and defragmentation	3.62	1.532	4.11	1.496	.644	.502

**Significant at p<.05

Table 10 : ICT Competencies between genders (MULTIMEDIA)

Multimedia		Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Input sound from the microphone	2.84	1.344	2.94	1.282	1.012	.312
2	Digitize sound from the microphone	2.95	1.352	3.17	1.392	1.207	.228
3	Create simple animations	2.99	1.353	3.09	1.362	.572	.568
4	Create multimedia product	3.14	1.405	3.33	1.436	.573	.567

**Significant at p<.05

Table 11 : ICT Competencies between genders (VIRTUAL CLASS)

Virtual Class		Female		Male		*t*-value	Sig.
		Mean	SD	Mean	SD		
1	Upload teaching materials	3.05	1.480	3.15	1.466	.291	.613
2	Update teaching materials	3.07	1.502	3.08	1.432	.066	.948
3	Integrate audio and video	2.85	1.421	2.97	1.402	.625	.533
4	Manage teaching materials in servers	2.90	1.415	2.94	1.343	.217	.828
5	Interact with servers	2.88	1.396	2.93	1.321	.507	.771

**Significant at p<.05

Table 12 : ICT Competencies Levels among Teachers in Federal Territory Labuan (OVERALL MEAN)

Applications	Mean	SD
MS WORDS	**4.34**	**1.18**
MS EXCEL	3.88	1.14
MS POWER POINT	**4.30**	**1.28**
MS ACCESS	3.28	1.57
WWW	3.35	1.38
E-MAIL	**4.28**	**1.43**
OPERATING SYSTEM	3.81	1.42
MULTIMEDIA	3.03	1.29
VIRTUAL CLASS	2.97	1.37

*n = 256

DISCUSSION

It appears that female and male teachers were most skilful in the use of MS WORD ($m = 4.34$) followed by MS POWER POINT ($m = 4.30$) and E-MAIL ($m = 4.28$) as indicated by the high means (> 4.0) of all items in these components. In other words, they perceived themselves to be competent in these applications. It can be assumed that MS WORD and MS POWER POINT are

widely considered by them as writing and teaching tool to increase their teaching productivity. The results were in agreement with those of Cuckle *et al.* (2000) and Luan *et al.* (2005), who found teachers rating them to be most competent in word processing compared to other applications. At the same time, the E-MAIL is also regarded as a means for communication both for leisure and academic purposes. Their competency in these applications could be due to their constant use as Atan et. al. (2002) highlighted that users exhibited greater competency in computer when made frequent use. This findings also supported by Silong *et al.*(2001), who found that high levels of competency among online learners in word processing. In contrast, Tables 6, 9, 10, and 11 above showed the mean value less than 4.0 (<4.0), which indicate that males and females teachers do not perceived themselves to be competent in database (MS ACCESS), MULTIMEDIA, OPERATING SYSTEM, and VIRTUAL CLASS applications. One probable reason is that teachers may do not use these applications frequently in their daily tasks. In other words, multimedia and virtual applications are considered to be specialized software and require advanced skills from users.

CONCLUSION

In general, we can conclude that females and males teachers, both in primary and secondary schools in Federal Territory Labuan were equally competent in MS WORD, MS POWER POINT and E-MAIL applications as shown by mean score values exceeded 4.0. This is not surprising as Luan et. al., (2005) revealed that the gap between genders (females and males) academicians have narrowed in terms of ICT skills, and in certain applications, females staffs were more capable than males. On the other hand, both genders were equally poor in the use of MS ACCESS, MULTIMEDIA, OPERATING SYSTEM and VIRTUAL CLASS applications as all mean score values were below 4.0.

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