

# ICT APPLICATION COMPETENCY OF TEACHERS IN ASIA: A STUDY TO UNDERSTAND THE LEVEL OF ICT APPLICATION SKILLS AND SELF CONFIDENCE AMONG SCHOOL TEACHERS

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## ABSTRACT

In the present arena, it is not only the devices that contribute to ICT but the whole infrastructure that enhances the ICT outputs. Use of modern ICT devices and further need to increase the facility and expertise in schools of Asia is urgent, as implementation of the modern devices, can only keep Asian schools in the same track as schools of other developed regions. The intention of the study is to understand the level to which Asian school teachers are equipped with ICT application skills and their self confidence in the use of ICT. The study highlights the concern for the level of ICT application by school teachers in Asia. The study reveals that the respondents have got minimum 1-5 years of teaching experience and some have got experience in teaching up to 20 years (figure 4). Yet the application level of ICT is very low. Hence, this indicates adequate ICT training is not being provided by the schools. The study reveals that the application skills of ICT among Asian school teachers is less compared to the level of training they have received and compared to the positive attitude they have towards ICT (figure 6).

**Keywords:** Information Communication Technologies (ICT), Asian Schools, Teachers

## 1. Introduction

Devices which are considered as tools of ICT are more than just computers and such devices have been used commonly in schools of Asia since several decades back. However, computers have provided a new definition of ICT use in schools. The "Information Age" is characterized by open computing, the internet and a different breed of users. (Farhat & Nadia, 2009) Several Asian countries such as Japan, China and India have become the key role players in the production of computers. However, there are still some hindrances in application level of computers as an ICT tool. The issues surrounding the practical adoption of such technology are often more varied and complex than is usually supposed. (Young & J, 2005)

This emerging digital society represents a new environment in which universities must compete and show ineffectiveness of many of the organizational structures, strategies, and practices which have been successful until now. In this period of rapid change, the riskiest possible strategy is to continue operating as before. (Bard et al., 1997) Hence the need for improvement in the application of ICT skills is essential in the current era.

Some steps to follow in this regard are:

- ❖ Chart an innovative and daring new course and install an agile, responsive, and decisive organizational structure for information technology planning
- ❖ Support and encourage new and improved modes of instruction, research, and administration
- ❖ Re-direct resources to the electronic tools which maximize academic productivity and exploit the opportunities of the incipient digital age.

(Bard, et al., 1997)

Knowledge of ICT skills are not the sole requirement in the field of teaching and use of ICT in schools. Application in the appropriate time, situation and for the required purpose of discourse in education is the real need. Thus learning in isolation causes application in real life situations pointlessly problematic. (Kommers, 2009)

This paper presents the outcome of a study conducted to identify the ICT application skills of school teachers in Asia region. The study includes findings derived by comparing application skills with other contributing factors and overall ICT competency.

## 2. Conceptual Framework

Starker (1989), mentions that though “Information Communication Technologies”(ICT) is used frequently with computers, that is just one of the many facets of ICT where as ICT involves other machines, instruments and technologies used for processing information as well. (WONG, 2005) Besides computers, video recorders, telephones, calculators, cash tills as well come under ICT devices. (WONG, 2005) Selinger (2001), states that ICT is utilized in all the sectors in developed countries, and it is used increasing in the developing world (ALEV, 2003) and teachers’ roles has to expand and change to embrace these resources in the in the information age. (ALEV, 2003)

In the present arena, it is not only the devices that contribute to the ICT but the whole infrastructure that enhances the ICT outputs. The powerful infrastructure is able to link up all computers around the world especially in the recent years enhancing a strong impulse to application of ICT. (WONG, 2005) Further it was identified by Phil (2005), that one of the factors which enhanced a significant change in educational policies is advantages of internet and World Wide Web. (WONG, 2005) Thus, this paved way for extensive importance of ICT, especially in connection with computers, in the field of education. Further, need for teachers to upgrade themselves with knowledge of computer application became extremely important to make their task more output-oriented and suitable for the current arena.

Use of modern ICT devices and further need to increase the facility and expertise in schools of Asia is urgent, as implementation of the modern devices, can only keep Asian schools in the same track as schools of other developed regions. The level of teacher competency in application of ICT devices however, still seems to be lacking even with initial training and available facilities. A study conducted in West Australia which is a more advanced region than most Asian countries revealed that only 18% of teachers regularly integrate ICT within teaching and learning, though 46% teachers integrate occasionally and 36% integrate ICT in teaching and learning only once a term. (Training, 2001) Further it is more alarming to know that only 82% of teachers are using ICT in the classroom regularly, while 95% of ICT application used by teachers are only word processing, Internet, email and file navigation. (Training, 2001) While this is the image of ICT use by teachers in more advanced countries than most countries of Asia, it is difficult to identify the current picture of ICT use by most Asian school teachers without a proper research. However, it is also not obligatory for the current status of ICT use by Asian school teachers to be much lower than what is found by the Australian study. Further

the main concern of this study is to identify the level of application rather than ICT education acquired by school teachers and facilities available for them.

A futuristic view of the issue in 2007 emphasizes that access to and of the internet, computer skills, higher education graduates in computing and ICT workforce are some of the trends that may show a significant impact in education up to 2012, as even identified by HAB(Horizon Advisory Board) .(Kommers, 2009) The prediction is quite accurate as we are currently experiencing the trend in education. The current practice of teaching and learning calls for extensive use of ICT commonly related to computers and the negligence of accepting the existing trend by some teachers may soon keep them out of the picture of teaching and learning. Further the present requirement is ability to practice or apply ICT in the process of teaching and learning by teachers.

### 3. Application of ICT in Schools

ICT application is a common need to all learning environments currently, as the traditional methods of teaching where the teacher keeps talking and students memorize, listen, make notes and even sleep is not at all an acceptable practice. It has become necessary to enhance more engagement of students in the process of learning in order to make learning more appealing for students and to make teaching more outcome-based. Integrating computers into education was thus necessary; to make the new technology more friendly to students, and to improve teaching and learning process(ALEV, 2003) through its use.

Computer courses were not available for all in 1980's in secondary schools.(ALEV, 2003) They were offered for selected people as the facility were limited and the cost of training was high. Learners were asked to learn what was prescribed for them.(Kommers, 2009)

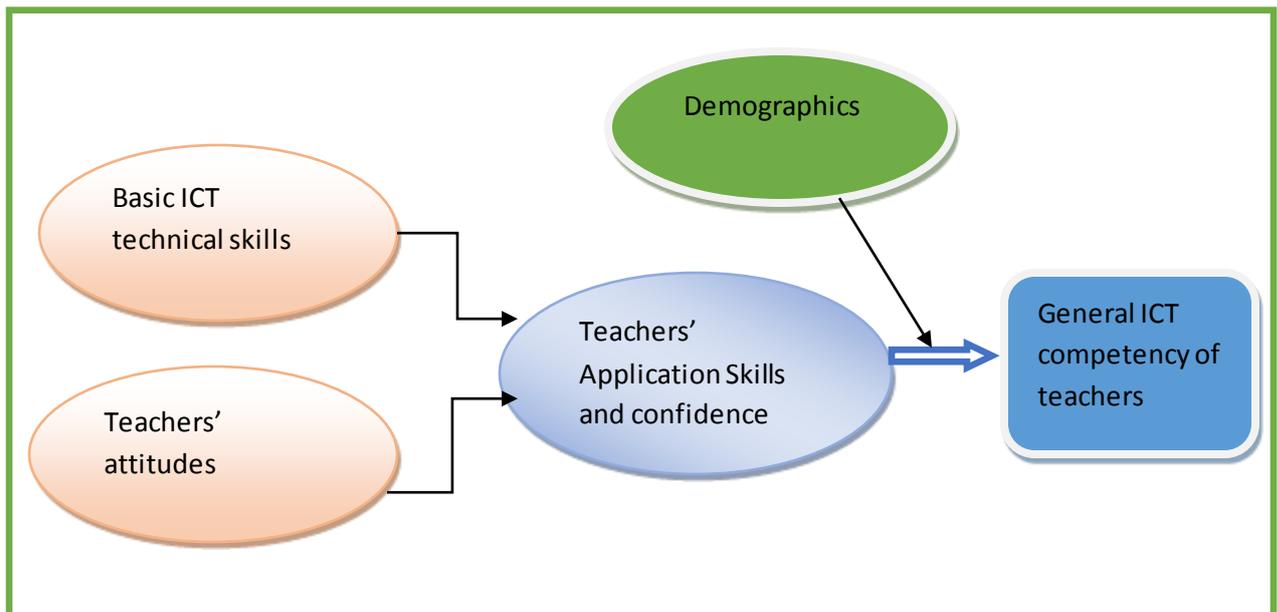
Due to developments in Information Communications Technology, it has become necessary to integrate ICT to science curriculum and instruction.(ALEV, 2003) This, on the other hand has called for integration of ICT into teacher education(ALEV, 2003) and this is the only way to make the new generation teachers more competent.

In the present arena schools focus on ELSSs "Electronic Learning Support System" instead of depending on blackboard and exercise book and this is the current practice in many secondary and higher education institutes.(Kommers, 2009)

This study is based on the work of research studies such as that of Wong (2005) and the research conducted in West Australia(Training, 2001) and included in the Auditor General's report in 2001. These studies are purely based on the evaluation of ICT application in schools. Hence the models they have followed in evaluating their desired context suites the need of this study as well. Thus this study was conducted by considering; basic ICT technical skills, attitudes towards computers and application skills as the primary focus of the evaluation.

### 4. Research Design

Considering the findings of the study highlighted in the Report of the Office of the Auditor General of West Australia(Training, 2001)and the study on Information Technology Use by Wong(2005) ,a model to encompass the major relevant spheres of influence of ICT use among school teachers was designed. The study denotes that the three most influential factors on ICT competence for teachers are: the extent to which ICT is used for professional purposes, the ICT capacity of their school and motivation.(Training, 2001) The study also reveals that training on how to integrate ICT in classroom has the most positive impact on teachers' level of ICT integration.



**Figure 1 - Conceptual Framework of Evaluation**

Figure 1 According to the model basic ICT technical skills and teachers' attitude towards ICT will give rise to teachers' ICT application skills and confidence. When the results are analyzed with demographics the general ICT competency of a teacher would be derived. The study focuses on the level of application skills in the light of the general ICT skills. Further, demographics will be utilized to understand the level of current practice, better.

## 5. Purpose of the Study

The objective of this study is to understand the level to which Asian school teachers are equipped with ICT application skills and their self confidence in the use of ICT. The study would also examine the relationship between other factors such as gender, race, number of years in service, experience, and their ICT application skills.

## 6. Methodology

The study sample consisted of 110 school teachers from different countries of Asia currently working in Malaysia, Maldives, Sri Lanka, India and Singapore. The countries represented races; Chinese, Malay, Indian and other. The respondents are all trained teachers currently working as teachers. Respondents were selected randomly.

## 7. Procedure

A survey using a structured questionnaire was utilized to conduct the study. This questionnaire is an instrument developed to determine the application skills along with focus on technical skills and attitude towards ICT with reference to the model of ICT usage which includes three main areas as shown in Table 1. The questionnaire was divided into 4 sections. Section one consists of demographic information on the respondents' gender, race, years of experience as a teacher, ethnicity and

experience as a teacher in the current school where they work. Section two consists of 17 items based on Teachers' basic ICT technical skills and self-confidence. Section three consists of 8 items based on Teachers' Application Skills and Self Confidence and section four consists of 26 items based on Teachers' Attitudes towards ICT.

Table 1. List of main areas to assess ICT competency which the questionnaire focused are given below with a brief description

Main Areas	Items
1. Teachers' basic ICT technical skills and self-confidence which includes basic skills starting from turning on the computer to ,sending and receiving emails, using printer appropriately and other similar functions.	B-1 to B-17
2. Teachers' Application Skills and Self Confidence which includes from preparing lessons, identifying relevant resources and monitoring student progress using ICT.	C-1 to C-8
3. Teachers' Attitudes to ICT, includes positive and negative attitudes towards use of ICT	D-1 to D-26

The areas mentioned in table 1 were administered through the questionnaire which provided a five point Likert Scale which identified how strongly the statements put forward based on the areas mentioned in table 1 were agreed or disagreed by the respondents.

### **8. Data Analysis**

The data collected from 110 respondents were computed using SPSS version 10.5. The overall mean of the three main variables were analyzed to determine the level of usage of ICT among Asian school teachers. Application Skills of ICT among males and females were compared using t-test. This technique was used because it involved comparison of only two variables and as the accuracy will be more valid.

To determine the relationship between application skills and independent variables such as gender, ethnicity, years of working experience, period of working in the present school, Pearson correlation was carried out. Similarly Pearson correlation was carried out to identify significance of any correlation among other dependent variables; ICT technical skills, application skills and attitude.

Further, to portray the participation of respondents in the survey corresponding to; gender, ethnicity, years of working experience, and period of working in the present school, histograms were produced and bar graphs to represent the mean level of ICT technical skills, application skills and positive attitudes were produced.

### **9. Results**

The data collected were analyzed and reported as shown in the following tables. Table 2 below, indicates that means of technical skills, application skills and attitudes are 65.12, 25.56, and 80.37 respectively. Table1 also emphasizes attitudes towards computers as having the highest mean score (80.37) and application skills as having the lowest mean score (25.56). Hence the results indicate that though the respondents' attitude towards use of ICT is high, the application skills are significantly low compared to the other variables. However, their technical skills of ICT (mean score 65.12) is considerably high.

Further Table 1 also indicates that the standard deviation of technical skills, application skills and attitudes are 13.97, 6.89, and 11.97 respectively where the SD of application is the lowest. This also indicates that though respondents are from different countries their level of application of ICT as school teachers is relatively similar.

Table 2  
GENDER TS APPSK ATTITG

	TS	APPSK	ATTITG
Male			
Female			
Grand Total			
Mean	65.12	25.56	80.37
Minimum	24.06	9.25	38.08
Maximum	125.24	35.63	128.04
StdDev	13.97	6.89	11.97
Skewness	.08	-.22	-.16

Table 3

Group Statistics

GENDER		N	Mean	Std. Deviation	Std. Error Mean
APPSK	Male	37	26.9189	7.26938	1.19508
	Female	73	24.8716	6.64103	.77727

Table 4

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
APPSK	Equal variances assumed	1.698	.195	1.480	108	.142	2.0473	1.38376	-.69551	4.79020
	Equal variances not assumed			1.436	66.912	.156	2.0473	1.42561	-.79826	4.89295

To compare the statistical values of male and female respondent's t-test was used. Group statistics (table3) indicated that mean for male and female and standard deviation for male and female are

26.92 and 24.87, and 7.27 and 6.64 respectively. This highlights that there is considerably less difference in ICT application skills when males and females are compared.

Further independent sample test (table 4) indicates that the difference in application skills among males and females is not significant.

Table 5

		GENDER	RACE	NO_EXP	NO_YEAR	APPSK
GENDER	Pearson Correlation	1	.189(*)	.068	.092	-.141
	Sig. (2-tailed)	.	.048	.478	.341	.142
	N	110	110	110	110	110
RACE	Pearson Correlation	.189(*)	1	.007	.074	-.054
	Sig. (2-tailed)	.048	.	.942	.441	.577
	N	110	110	110	110	110
NO_EXP	Pearson Correlation	.068	.007	1	.711(**)	-.169
	Sig. (2-tailed)	.478	.942	.	.000	.078
	N	110	110	110	110	110
NO_YEAR	Pearson Correlation	.092	.074	.711(**)	1	-.156
	Sig. (2-tailed)	.341	.441	.000	.	.104
	N	110	110	110	110	110
APPSK	Pearson Correlation	-.141	-.054	-.169	-.156	1
	Sig. (2-tailed)	.142	.577	.078	.104	.
	N	110	110	110	110	110

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation test (table 5) indicated that there is no significant correlation between application skills and any of the independent variables. Hence gender, race, years of work experience and period of work in the current school has not impacted the application skills of the school teachers.

Table 6

		TS	APPSK	ATTITG
TS	Pearson Correlation	1	.704(**)	.189(*)
	Sig. (2-tailed)	.	.000	.048
	N	110	110	110
APPSK	Pearson Correlation	.704(**)	1	.041
	Sig. (2-tailed)	.000	.	.672
	N	110	110	110
ATTITG	Pearson Correlation	.189(*)	.041	1
	Sig. (2-tailed)	.048	.672	.
	N	110	110	110

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Pearson correlation was conducted to identify any correlation between application skills and other dependent variables; technical skills and attitudes towards computer use. The results indicated that there is a significant correlation at 0.01 levels between technical skills and application skills indicating that higher technical skills may enhance the level of application skills among school teachers.

## 10. Discussion and Conclusion

This study has been concluded by following a conceptual model which guided the evaluation of application skills of school teachers in Asia which is derived from the visions derived from findings of the study highlighted in the Report of the Office of the Auditor General of West Australia(Training, 2001)and the study on Information Technology use by Wong(2005).

It was identified from this study that application skills of the school teachers in Asia is significantly low when compared with the training they had acquired (table2). It has also been identified in the study by Higgins(2010), that ICT applications have got some problems and one such problem is the negligible use of it.(Higgins, 2010) Wong (2005), also highlights that lack of confidence could be another reason for this.(WONG, 2005) Further Higgins (2010) states that unless there is effective use , having more computers does not make any difference.(Higgins, 2010) Besides this, it is identified that, though the respondents are from different cultures, as teachers, their application level has remained almost the same (table 2).

Comparison of male and female respondent's group statistics (table3) indicated that there is considerably less difference in ICT application skills when males and females are compared. Other studies though not conducted on Asian teachers, have different views. One study highlights the need to provide opportunities of ICT independently to avoid unnecessary view of negative self-image of girls(Kommers, 2009), indicating the low level of ICT application among females. While another study finds that there is a strong relationship between gender and ICT competence as males are not likely to

integrate ICT into classroom when compared with females ,though males tend to possess better competence.(Training, 2001) Thus this indicates that Asian teachers possess less gender differences in ICT application in teaching. Further the Pearson correlation test (table 5) indicated that there is no significant correlation between application skills and any of the independent variables. Hence gender, race, years of work experience and period of work in the current school has not impacted the application skills of the school teachers in Asia.

The results indicated that there is a significant correlation at 0.01 levels between technical skills and application skills indicating that higher technical skills may enhance the level of application skills among school teachers. Wong (2005) highlights inadequate training as one of the potential obstacles in implementation of ICT in schools.(WONG, 2005) The study reveals that the respondents have got minimum 1-5 years of teaching experience and some have got experience in teaching up to 20 years (figure 4). Yet the application level of ICT is very low. Hence, this indicates adequate ICT training is not being provided by the schools.

The study reveals that the application skills of ICT among Asian school teachers is less compared to the level of training they have received and compared to the positive attitude they have towards ICT (figure 6). As the purpose of promoting ICT in schools is to increase effectiveness of teaching and to acquire progress for the learning approach of students(Higgins, 2010) it is necessary to provide further ICT training for Asian school teachers and to include a compulsory module of ICT application in the teacher training. Further it is essential to motivate teachers to utilize ICT by providing further ICT facilities and by providing opportunities to participate in processes where ICT is the core area. Lack of proper motivation also hinders promising and productive function activities. Hence it is necessary for school heads to motivate teachers and facilitate them in an appropriate way.

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