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Assessing Knowledge and Skill of Information Technology

Baharuddin Bin Aris[1], Maizah Hura Ahmad[2] and Mohd Shafie Rosli[3]

[1,3]Department of Educational Science, Mathematics and Creative Multimedia, Faculty of Education
[2]Department of Mathematical Sciences, Faculty of Science
Universiti Teknologi Malaysia,
81310 UTM Skudai, Johor, Malaysia

Abstract

In Malaysia, the field of information technology (IT) is expanding rapidly in schools. The successful use of IT in schools requires the teachers themselves to be familiar with and competent in the use of such technology. The current study investigates the characteristics of teachers with respect to their knowledge and skill in IT. Based on a questionnaire, 72 respondents comprising of practising teachers were surveyed. Information gathered is useful for planning and making decisions concerning upgrading teachers knowledge in IT.

Keywords: learning style, basic skill in IT, knowledge of IT, Chi-square independence test

1 Introduction

Much of the world has experienced a shift from being an industrial society to becoming an information society. This has been facilitated by the advent and popularisation of multimedia, personal computers and the Internet, commonly known to Malaysians as information technology (IT). There is unprecedented growth in the use of information technology in the teaching and learning environment, and in collections of self-study materials in school and university library media centres [1]. The pervasive use of IT makes knowledge of and the

ability to use IT essential requirements, no matter what kind of work is being done [2].

Information communication technology can improve the quality of education [3]. Teachers need to possess some basic technology skills in order to make use of technology [4]. Teachers need to be IT literate in order to understand the potential of IT in improving teaching and learning. In other words, it is essential that teachers themselves become proactive in understanding and internalising the skills needed in the 21st century. It is commonly assumed that quality teacher will lead to improved student performance in schools. Thus, these teachers are required to acquire general skills in operating the computer and sufficient knowledge about IT in order to fully utilise IT in the teaching and learning process, as well as in the daily running of the school.

The purpose of this paper is to investigate teachers current knowledge and skill in IT. The paper is organized into 4 sections. Section 1 introduces the current study. While section 2 presents the methodology of the study, section 3 presents the data analysis. The study is concluded in section 4.

2 Methodology

Data were gathered using the following research instruments:

Learning Style Inventory

Honey and Mumford Learning Style was used to determine the learning styles of respondents. The inventory suggested four contrasting learning styles [5]. They are:

- Activists - people who involve themselves in new and concrete experiences, tackling problems by brainstorming, and moving from one task to the next when the excitement fades.
- Reflectors - cautious and thoughtful people who like to consider all the possible angles before making any decisions and whose actions are based on observation and reflection.
- Theorists - people who like to form abstract concepts and generalisations based on analysis and objectivity.
- Pragmatists - practical people who like to be actively involved in experiments and apply new ideas immediately.

Questionnaire on Knowledge-About-IT

This questionnaire used a Likert Scale of 0 to 5 (extremely low to very high), and was administered in Malay, which is the official language in Malaysia. Basic IT skills, IT awareness and knowledge of IT and its application in education, were the three components that were looked into to obtain a general overview of how knowledgeable the respondents were. The time allocated to answer the questionnaire was flexible so as to reduce tension among the respondents.

Chi-square Test for Independence

This test is used for testing the independence of two categorical variables that are arranged in several rows (r) and several columns (c). The test statistic $\chi^2_{\text{test}} = \sum_{i=1}^{r}\sum_{j=1}^{c} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$ follows an approximate Chi-square distribution with $(r\text{-}1)(c\text{-}1)$ degrees of freedom, where O_{ij} and E_{ij} are the observed and expected frequencies in ith row and jth column repectively. The null hypothesis states that the variables are independent while the alternative hypothesis states that the variables are dependent [6].

3 Data Analysis and Results

Seventy-two respondents comprising of practising teachers were surveyed. Since the responses to the questionnaire were in the form of nominal data, a frequency count technique was used in the data analysis. For every item in the questionnaire, the responses of scale 0 and 1 were grouped as low, the responses of 2 and 3 were grouped as medium, and the responses of 4 and 5 were grouped as high. Based on the respondents performance in the 'Knowledge about IT Questionnaire', 33 respondents were grouped into low knowledge of IT, 21 respondents were grouped into medium knowledge of IT, and 18 respondents were grouped into high knowledge of IT. Based on the responses in the learning style inventory, 64, 3, 3, and 2 respondents were reflectors, pragmatists, theorists and activists respectively. Table 1 presents the levels of basic IT knowledge among the respondents.

Table 1: Relationship between Basic IT Knowledge and Gender

		Gender	
		Male	Female
Basic IT Knowledge	Low	9	24
	Medium	7	14
	High	7	11

The χ^2_{test} = 0.749. At 5% significance level, the null hypothesis which states that gender and basic IT knowledge are independent is not rejected. In other words, there is no relationship between the variables.

Tables 2, 3, and 4 present the basic IT skill levels of respondents in the Low IT Knowledge Group, the Medium IT Knowledge Group, and the High IT Knowledge Group respectively.

Table 2: Basic IT Skills of respondents in the Low IT Knowledge Group

Levels of Skills	*Basic IT Skills*
Low	Scanner; Use electronic spreadsheets; Use database; Use CAD; Use graphics; Use educational packages; Use the WWW; Use e-mail
Medium	Monitor; Printer; Work on Windows; Hard-disk; Use word processor.
High	Keyboard; Mouse.

Table 3: Basic IT Skills of respondents in the Medium IT Knowledge Group

Levels of Skills	*Basic IT Skills*
Low	None
Medium	Use database; Use CAD; Use educational packages; Use the WWW; Use e-mail.
High	Keyboard; Mouse; Scanner; Printer; Work on Windows; Hard-disk; Use word processor; Use electronic spreadsheets; Use graphics

Table 4: Basic IT Skills of respondents in the High IT Knowledge Group

Levels of Skills	*Basic IT Skills*
Low	None
Medium	Scanner; Use word processor; Use CAD; Use graphics; Use educational packages; Use the WWW; Use e-mail.
High	Keyboard; Mouse; Printer; Work on Windows; Hard-disk; CD-ROM; Use electronic spreadsheets; Use database.

From Tables 2, 3 and 4, the respondents generally have no problem in handling the keyboard and mouse. However, majority are lacking the skills in using the scanner, using electronic spreadsheets, using database, using CAD, using graphics, using educational packages, using the WWW and using e-mail.

Tables 5, 6, and 7 present the respondents knowledge of IT and its applications in education.

Table 5: Knowledge of IT and its application in education among the Low IT Knowledge Group

Knowledge (Level)	*Knowledge of IT*
Low	Purchasing a computer; system and application software; the application of IT in administration; the role of computers and IT in education
Medium	Internet; the application of IT in learning
High	definition of IT; benefits of IT; the Malaysian government initiatives

Table 6: Knowledge of IT and its application in education among the Medium IT Knowledge Group

Knowledge (Level)	*Knowledge of IT*
Low	None
Medium	Purchasing a computer; system and application software; the application of IT in learning; the application of IT in administration
High	definition of IT; benefits of IT; the Malaysian government initiatives; the role of computers and IT in education; Internet

Table 7: Knowledge of IT and its application in education among the High IT Knowledge Group

Knowledge (Level)	*Knowledge of IT*
Low	None
Medium	Purchasing a computer; system and application software; the application of IT in learning; the application of IT in administration
High	definition of IT; benefits of IT; the Malaysian government initiatives; the role of computers and IT in education; Internet

From Tables 5, 6 and 7, the respondents generally have no full knowledge of purchasing a computer. For most of them, knowledge on system and application software, the application of IT in learning could also be improved.

4 Summary and Conclusion

The information and communication technologies (ICT) and interactive multimedia (IMM) age has given a new meaning to education. Teachers knowledge and skill in IT need to be upgraded. To be able to do so, their current knowledge and skill need to be investigated so as programs designed for them will be meaningful.

Teachers are adult learners. Learning styles developed by Peter Honey and Alan Mumford, based upon the work of Kolb identified four distinct learning styles: Activist, Theorist; Pragmatist and Reflector. In order to maximise learning, learning styles should be determined. This is to make learning easier, more effective and more enjoyable.

From the sample analysed in the current study, programs designed to upgrade teachers knowledge and skill in IT need not consider gender.

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