Teachers’ Acceptance and Challenges on Technology Use in Secondary Schools

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Abstract: The purpose of this study was to identify the computer use in the management and operation concerning teaching and learning among teachers. This study also identified technology leadership for measuring the NETS-T international standard system (ISTE, 2014) and the impact of technology achievement in these schools.

Methodology: Systematic random sampling was conducted to select a total of 374 teachers and 74 principals and 74 schools from the National Secondary School in Kedah in this cross-sectional survey. The Principal Technology Leadership Assessment (PTL) is based on the National Education Technology Standards-Administrator, NETS-A (2009). The technology leadership questionnaire (PTL) contains 65 Likert-scale items used to obtain information about the involvement of principals in their work.

Findings: The items of this survey were validated by pilot tests with findings of 0.915 for TTU instruments and 0.831 for PTL. The results of the actual study show that the overall leadership skills of the technology heads based on the five standards in the NETS-A are high based on the findings of mean analysis and standard deviation. The SMART-PLS analysis showed moderate achievement in each field of TTU teacher study. Simple Linear regression used to identify the principal technological leadership relationship with teacher computer use and the results were not significant.

Significance: Principals as technology leaders need to facilitate and enhance ICT integration as ICT contributions have proven to be key factors for increasing productivity, promoting economic growth, and reducing poverty in a country.

Keywords: Technology, Management, Teaching, Learning, NETS-T Standards.

INTRODUCTION

Many programs have been highlighted for education sectors to improve technology usage in Malaysian schools. Ministry of Education provides opportunities for all students to have the latest technology skills in order to compete in the technology world of information. The principals as well as teachers have important roles to facilitate technology in schools according to government vision.

21st century teachers need to integrate technology in education so scholars have created some kind of model or framework for technology integration in education [1]. Many of these integration models focus on general pedagogical terms, rather than on specific domains but now technologists consider the use of pedagogical technology strongly influenced by the content and knowledge domains needed to integrate technology in different subjects [1].

Today, the use of computers has spread worldwide and in schools and educational institutions it has become a necessity for educators, students and management alike to use it. The rapid development of information and communication technology (ICT) is crucial to economic development as it enables people to access information and knowledge quickly and easily [2].

Through ICT new markets are accessible at lower cost and efficient capital [3]. Chen [4] emphasizes that Internet access can promote sustainable entrepreneurial development and reduce costs. Several studies have discussed the
importance of the use of ICT in several key sectors of the economy, such as the banking sector where it facilitates the relationship between banks and their customers and enhances banking performance [5].

In the 2014 budget of RM54.6 billion was allocated for the education sector and out of this amount of RM168 million was for Internet access in schools [6, 7]. Many programs are being introduced in schools and these programs are being developed through a computer lab project by the Ministry of Education Malaysia for all primary and secondary schools to gain skills in technology as they prepare to compete for information.

The Information Technology and Communication Technology in Education will make information and communication technology (ICT) a major enabler in the teaching and learning process. These measures enhance the quality of education and give rise to knowledgeable generations and contribute to the development of the country [8].

The Information Technology and Communication Policy in Education is a continuation of the Smart School initiative which emphasizes the use of technology to foster the development of creativity, collaborative learning, critical thinking and problem solving [9].

This policy integrates and coordinates all existing ICT initiatives such as SchoolNet, Computer Labs, EduWebTV, Access Centers and any other ICT initiatives implemented over time with the aim of increasing student achievement [9].

**LITERATURE REVIEW**

Effective use of technology across the school system has been a subject of study by scholars in the United States since 2000 [10]. There are also local studies that attempt to address the theme of this study. Among them are Mei Wei [11], Jamil [12], Sathiamoorthy [13], and Nordin and Norazah [14].

Computer skills are important for teachers. Presticide [15] states that teaching skills using the computer is necessary for every teacher and Andoh [16] emphasizes that teachers must use the ICT in their teaching. According to [17] the adequacy, skills and attitude of teachers influence the successful implementation of ICT in schools as positive teachers' perception of ICT can give school administrators the opportunity to provide appropriate insights into the vision and mission of the school.

Teo [8] in his study in Singapore found that teachers' skills, perceptions and attitudes influence the acceptance and use of ICT in schools where teachers have a positive attitude towards the use of computers in teaching and learning in the classroom and [18] must be nurtured since in further training where [16] college training institutions should emphasize the use of technology in teaching and learning. The failure of these institutions will give rise to teachers who do not understand the importance and extent to which they need to integrate ICT in teaching and that hinder the implementation of ICT in teaching and learning in schools [13].

Bordbar [19] argues that computer competence is the most important predictor in teaching. Evidence shows that most teachers who are negative and moderate about the integration of ICT in the learning and teaching process are due to lack of knowledge and skills [19]. Zaidatun *et al.* [20] emphasize that teachers' competence in ICT is high but there are still obstacles in applying it while in school. In a study by Kellah M. Edens [21], she says that the advancement of information technology has led to increased use of the web and the Internet for educational purposes.

The impact of a teacher's computer is the confidence of a teacher who has it and its ability to use it in teaching and learning in schools [22].

**There are four objectives presented in this study**

- To identify the level of teachers’ technology in school management, teaching and learning.
- To identify the competency of computer usage among the teachers studied.
- To identify the frequency of computer use among the teachers studied.
- To measure the relationship between principals’ technology leadership and teachers’ technology use

**Problem Statement**

**Method**

**Sampling**

Systematic sampling method was used for teacher sample selection. The survey respondents consisted of teachers from selected secondary schools. A total of 74 secondary schools were involved in this study. The total number of teachers is 12131. According to the Krejcie Morgan table, 1970, the sample selected of 374 teachers was sufficient.
There are many types of secondary schools in Malaysia, especially in the northern zone of Peninsular Malaysia, but only National Secondary Schools were chosen as sample because other secondary schools have unique organizational structures and instructional programs where they are designed to meet specific needs, for example, Religious Secondary School, National Type Secondary School, Special Education School, Vocational Secondary School and International Secondary School. National Secondary School is the largest type of secondary school in Malaysia and its students are of various religions and races and have the same organizational structure and instructional program. It is easier and practical for researchers to conduct surveys in National Secondary Schools than for other types of secondary schools.

**Instrument**

This study uses a quantitative approach. In this study the written study tool is 'Teachers Computer Use Questionnaire' for teachers. The instrument 'STO' is an instrument for teachers developed by Alexandra B. Paige-Jones [23]. Researchers have been using the same instrument and translate it into Malay language.

'Leadership Technology Assessment' for principals which based on the National Education Technology Standards-Administrator [24]. These measures are designed to help administrators evaluate the technology direction in their schools: Visionary Leadership, Digital Learning Culture, Excellent Professional Practice, Systemic Improvement; and the Digital Education Citizenship. This survey contains five areas as outlined in the above five standards. This exploratory study was conducted randomly to test principals' leadership models and their relationship to teacher computer use.

**Survey Reliability and Validity**

Prior to conducting the survey at the 74 schools, the reliability test was conducted at 40 schools involving 40 principals and 150 teachers. Secondary schools other than the schools designated for the principal's survey purpose were chosen in this study. This test was conducted to identify the reliability of the study instrument to be used. Generally, reliability is a measure of the extent to which it is error-free and produces consistent results and to measure the consistency of the researchers using the Cronbach Alpha Consistency Index [5].

According to John W. Creswel [25] in his book 'Educational Research', validity refers to the development of an event in which the interpretation of a test on a concept or construct that will be measured meets the purpose of the study (p. 14). The research instruments that researchers use should be able to accurately measure what they want to measure and meet the topic, objectives and research questions [14].

**RESULTS**

| Table-4.1: Teachers Response on Demographic Information (n = 374) |
|---------------------------------------------------------------|
| **Demographic Info** | **Teachers Response** | **Frequency** | **Percentage (%)** |
| Experience          | Minimum 1 year       | 362           | 96.8              |
|                     | Less than 1 year     | 12            | 3.2               |
| Gender              | Male                 | 112           | 29.9              |
|                     | Female               | 262           | 70.1              |
| Age                 | Less than 30 years   | 37            | 9.9               |
|                     | 30 – 40 years        | 116           | 31.0              |
|                     | 41 – 50 years        | 132           | 35.3              |
|                     | More than 50 years   | 89            | 23.8              |
| Academic            | Diploma              | 1             | 0.3               |
|                     | Bachelor             | 336           | 89.8              |
|                     | Post Graduate        | 37            | 9.9               |
| Technology Knowledge| Yes                  | 92            | 24.6              |
|                     | No                   | 282           | 75.6              |

A total of 374 teachers participated in this survey. Questionnaires were sent via ‘Google Form’ to their respective emails. The item distribution of this questionnaire can be found in table 3.4.3 below.

**Teacher Demographic Information**

According to Table 4.1, 362 teachers (96.8%) had at least one year teaching experience while 12 teachers (3.2%) had less than 2 years teaching experience. In this study, 112 teachers (29.9%) were male while 262 teachers (70.1%) were female. Furthermore, Table 4.6 also shows 37 teachers (9.9%) less than 30 years old, 116 teachers (31.0%) aged 30 to 40, 132 teachers (35.3%) aged 41 to 50 and 89 teachers are over 50 years old.
In addition, one teacher (0.3%) reported having a diploma, of which 336 teachers (89.8%) were first-degree graduates while 37 teachers (9.9%) had post-graduate certificates. Based on this demographic information, the survey found that 92 teachers (24.6%) had technology knowledge in the field of study.

Table 4.2: Distribution of Teachers’ Computer Use Questionnaire (TTU)

| SL. No | Item                                                      | Numbers | Total |
|--------|-----------------------------------------------------------|---------|-------|
| 1      | Computer technology competency in among the teachers      | 1-22    | 22    |
| 2      | Frequency of teachers to use computer for tasks           | 23-27   | 5     |
|        | administration and management                             |         |       |
| 3      | Frequency of teachers using computers for planning        | 28-42   | 15    |
|        | teaching and during teaching                              |         |       |
| 4      | Frequency of teachers use computer to give assignments    | 43-57   | 15    |
|        | to students                                               |         |       |
|        | Total                                                     | 57      |       |

Table 4.3: Mean Value of Frequency for Each Item in Teachers’ Computer Use Competency

| Item | Statement                                                                 | Mean | Score |
|------|---------------------------------------------------------------------------|------|-------|
| 1    | I am very good at computer                                                 | 3.64 | 1362  |
| 2    | I am very good at using technology other than computers                    | 3.48 | 1303  |
| 3    | I talk about school technology planning with principals/teachers           | 3.31 | 1237  |
| 4    | I have a goal to achieve in technology                                     | 3.60 | 1347  |
| 5    | I use the allocation provided to fund new technology: hardware & software   | 3.31 | 1238  |
| 6    | I support and participate in training for the latest technology             | 3.70 | 1384  |
| 7    | I use computers often                                                      | 3.90 | 1460  |
| 8    | Computers help me improve student performance / examination                | 3.72 | 1391  |
| 9    | Computers have helped members of our organization communicate effectively  | 4.00 | 1497  |
| 10   | Our organization members are well versed in computers                       | 3.63 | 1356  |
| 11   | I use computers to design lessons                                          | 3.66 | 1370  |
| 12   | I use a computer to analyse student test/data evaluation                   | 3.85 | 1440  |
| 13   | I’m interested in learning more about computers                            | 3.90 | 1458  |
| 14   | I know the std of technology a teacher should have                         | 3.51 | 1312  |
| 15   | I need more computer hardware/software for teaching                        | 3.59 | 1342  |
| 16   | I encourage my students to use computers to do assignments                 | 3.67 | 1372  |
| 17   | My students are good at using at using computers to do assignments         | 3.51 | 1313  |
| 20   | Computer labs at my school are always available when needed                 | 3.41 | 1277  |
| 21   | I use computers to achieve my curriculum goals                            | 3.79 | 1417  |
| 22   | I know what technology std a student should have                           | 3.23 | 1209  |
| 23   | I monitor students’ skills in the use of technology especially computers   | 3.49 | 1307  |

Competence is the knowledge that is acquired and the ability to perform an activity or task [26] and researchers have found that the level of computer usage competency among teachers has been shown to provide a low level of competence for teachers to use the knowledge and skills to perform a task.

Table 4.4: Mean Value of Frequency of Computer Usage for Administrative and Management Tasks

| Item | Statement                                                                 | Mean | Score |
|------|---------------------------------------------------------------------------|------|-------|
| 24   | Email                                                                     | 3.70 | 1385  |
| 25   | Online course                                                             | 3.47 | 1296  |
| 26   | Database for students usage                                               | 3.42 | 1299  |
| 27   | Website                                                                   | 3.55 | 1326  |
| 28   | Accessed shared files through shared network directory                     | 3.31 | 1239  |

Based on Table 4.4, the mean value of computer usage frequency for the highest administrative and management tasks was for item number 24 (3.70). Item No. 24 relates to email usage. In this study, the use of email among teachers was high. This is because the use of email is an alternative to manual administration and management of documents. Using email can also save time and cost.
Furthermore, the mean value of computer usage frequency for the lowest administrative and management tasks was for item number 28 (3.31). It is at a moderate level [12, 27]. Item 28 provides a statement about accessing shared files through the shared network directory. The frequency of accessing shared files through the shared network directory may be due to teachers’ lack of understanding of how to access shared files.

Table-4.5: Mean Frequency Competence of Administration and management, Teaching and Learning Planning

| Item | Statement                                                                 | Mean | Score |
|------|---------------------------------------------------------------------------|------|-------|
| 29   | Word dan PowerPoint                                                       | 3.55 | 1329  |
| 30   | Microsoft Excel                                                           | 3.25 | 1214  |
| 31   | Software Concept Mapping eg. Inspiration                                  | 3.30 | 1234  |
| 32   | Software to edit photos dan video eg Paint, Adobe Photoshop, Moviemaker dll.| 3.00 | 1230  |
| 33   | HTML editing/web page, desktop publishing, eg Macromedia Dreamweaver, Microsoft Front Page, Microsoft Publisher | 3.47 | 1298  |
| 34   | Internet search engines or online encyclopedia, eg Google, Yahoo, Worldbook Wikipedia | 3.30 | 1236  |
| 35   | Software based on skills development Web, eg Google, Yahoo, Riverdeep     | 3.29 | 1230  |
| 36   | Textbook, online teachers guide books                                     | 3.35 | 1252  |
| 37   | Database for pupils, eg Datawarehouse, Esembler                          | 3.37 | 1261  |
| 38   | Image capture devices, eg digital camera, scanner                         | 3.57 | 1335  |
| 39   | File copying and transportation devices, eg CD burner, flash drive        | 3.50 | 1310  |
| 40   | Presenting devices ceg. projector video, interactive whiteboard         | 3.75 | 1404  |
| 41   | Laptop, tablet                                                           | 3.27 | 1222  |
| 42   | DVD player                                                               | 3.81 | 1425  |
| 50   | Online textbook                                                          | 3.11 | 1164  |
| 51   | Database for students information, eg Datawarehouse, Esembler            | 3.12 | 1168  |
| 56   | Computer lab                                                             | 3.06 | 1144  |
| 57   | Computer/laptop in class                                                  | 3.80 | 1422  |

The frequency of teacher technology use in teaching and teaching preparation was 3.400 mean, standard deviation 0.584 (table 4.5) showing moderate achievement. In order to achieve success in education in schools, technology leaders need to ensure that teachers integrate teaching models (objectivists) and constructivist models with the use of ICT especially computers in teaching. The blend of traditional and modern teaching models with ICT can create a new model of teaching that is suitable for students of various intelligence, abilities and backgrounds.

The mean value of computer use frequency for teaching and learning planning tasks was highest for item 42 of 3.81. The level is high [12, 27]. Item 42 is related to the frequency of using technology for teaching and learning planning tasks through the use of DVD players.

Table-4.6: Mean Value of Each Item Frequency of Computer Use for Student Assignment

| Item | Statement                                                                 | Mean | Score |
|------|---------------------------------------------------------------------------|------|-------|
| 43   | Microsoft Word and PowerPoint                                              | 3.47 | 1299  |
| 44   | Microsoft Excel                                                           | 3.09 | 1156  |
| 45   | Concept Mapping eg. Inspiration/Kidspiration                              | 3.28 | 1227  |
| 46   | Paint, Adobe Photoshop, Moviemaker                                        | 3.21 | 1202  |
| 47   | HTML editing/web page, desktop publishing, eg Macromedia Dreamweaver, Microsoft Front Page, Microsoft Publisher | 3.38 | 1265  |
| 48   | Internet search engines or online encyclopedia, eg. Google, Yahoo, Worldbook Wikipedia | 3.12 | 1166  |
| 49   | Animation software eg Macromedia Flash, Poser                             | 3.15 | 1178  |
| 52   | Image capture devices, eg. digital camera, scanner                        | 2.94 | 1100  |
| 53   | Website, eg FCAT Explorer, Riverdeep                                      | 2.97 | 1111  |
| 54   | classroom clickers                                                        | 3.48 | 1302  |
| 55   | Laptop, tablet                                                           | 3.75 | 1403  |

The frequency of assignments to students had a mean value of 3.259, a standard deviation of 0.652 (table 4.6) showed moderate achievement. Today, more data is accessible in schools than before, but most teachers are unable to apply it due to lack of skills in data usage [28].
Table-4.7: Summary of Teacher Computer Use Levels (TTU)

| Construct                      | Item | Mean  | Std Dev | Teacher Computer Use Level (TTU) |
|--------------------------------|------|-------|---------|---------------------------------|
| Competence                     | 23   | 3.615 | 0.583   | Moderate                        |
| Administration & Management    | 5    | 3.454 | 0.532   | Moderate                        |
| Teaching and Learning Planning | 18   | 3.400 | 0.584   | Moderate                        |
| Student Assignment             | 11   | 3.259 | 0.652   | Moderate                        |

Descriptive analysis was conducted to look at the level of use of computers in school management, teaching and learning planning. The levels of computer use in school management, teaching and learning among the 374 teachers in Kedah are shown in Table 4.7. The mean and standard deviation of each tested construct proved to be moderate. Determination of the level of computer use among teachers is based on the views of Jamil [12] quoted from Hamzah, Juraimi, Hamid, Nordin, N and Attan [27], mean values ranging from 1.00 to 2.33 (low), 2.34 to 3.66 (medium) and 3.67 to 5.00 (high). In this study, this construct was categorized as moderate. The Competency construct had mean values (X̄ = 3.641, SD = 0.583).

The mean value of computer use frequency for teaching and learning planning tasks was highest for item 42 of 3.81. The level is high et al. [12] Item 42 is related to the frequency of using technology for teaching and learning planning tasks through the use of DVD players. Frequency of DVD player usage among teachers was high. This study shows the DVD player was used widely among teachers in the classroom. For example, for science subjects, the use of DVD players can facilitate the process of teaching, learning and engaging students in science subjects. This is because, through a DVD player, teachers are able to explain and demonstrate basic concepts that are difficult for students to understand.

Item number 56 gives the lowest mean value of 3.06. This level is moderate [29, 27]. This indicates that the frequency of the use of computers for teaching and learning planning tasks for item 56 is low. Item number 56 presents a statement regarding the use of computer labs. In this study, teachers stated that the frequency of computer lab use was low. This low frequency may be due to the lack of equipment available in the computer lab. As such, the school management should provide adequate equipment as well as inform all students about the technological services provided in the computer lab. Table 4.5 shows the mean values and scores of all items used to assess the frequency of computer use for planning, teaching and learning tasks among teachers.

Table-4.8: Distribution of Principal Technology Leadership (PTLA) Evaluation Items by Principal

| SL. No | Construct                  | Item Number | Total |
|--------|----------------------------|-------------|-------|
| 1      | Visionary Leadership       | 1,2,3,4,5,6 | 6     |
| 2      | Digital Learning Culture   | 1,2,3,4,5,6 | 6     |
| 3      | Excellence in Professional Practice | 1,2,3,4,5 | 5     |
| 4      | Systemic Improvement       | 1,2,3,4,5,6 | 6     |
| 5      | Digital Citizenship        | 1,2,3,4,5,6,7,8,9,10,11,12 | 12    |
| Total  |                           |             | 35    |

Table-4.9: Profile of Principals (n = 74)

| Variables          | Frequencies (n) | Percentage (%) |
|--------------------|-----------------|----------------|
| Gender             | Male            | 34             | 45.9            |
|                    | Female          | 40             | 54.1            |
| Age                | 30 – 40 years   | 5              | 6.8             |
|                    | 41 – 50 years   | 26             | 35.1            |
|                    | More than 50 years | 43            | 58.1            |
| Academic           | Bachelor Degree | 61             | 82.4            |
|                    | Post Graduate   | 13             | 17.6            |
| Technology Knowledge | Yes            | 29             | 39.1            |
|                    | No              | 45             | 60.9            |
| Experience as Principal | 11 – 20 years | 4              | 5.4             |
|                    | 21 – 30 years   | 34             | 45.9            |
|                    | More than 30 years | 36            | 48.6            |

The researcher performed a descriptive analysis to answer the fourth research question that measured the level of Leadership Technology (PTLA) based on Moidunny’s [30] recommendation. Moidunny [9] states that the mean score for the Principal Technology Leadership (PTLA) variable can be interpreted using the NETS-A standard values as shown in Table 4.10.

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Table 4.10: Mean Score Based on NETS-A Interpretation

| Mean Score | Interpretation    |
|------------|-------------------|
| 1.00 – 1.80 | Very low         |
| 1.81 – 2.60 | Low              |
| 2.61 – 3.20 | Moderate         |
| 3.21 – 4.20 | High             |
| 4.21 – 5.00 | Very high        |

Source: Moidunny (2009)

Table 4.11: Summary of Principal Technology Leadership Interpretation (PTLA)

| Construct                  | No. of Items | Mean | Std Deviation | Principal Technology Leadership Level (PTLA) |
|----------------------------|--------------|------|---------------|---------------------------------------------|
| Visionary Leadership       | 6            | 3.888| 0.513         | High                                        |
| Digital Learning Culture   | 6            | 4.068| 0.528         | High                                        |
| Excellent Professional Practice | 5        | 4.000| 0.522         | High                                        |
| Systemic Improvement       | 6            | 4.018| 0.508         | High                                        |
| Digital Citizenship       | 12           | 3.753| 0.632         | High                                        |

Table 4.12: ANOVA RESULT anovaa

| Model       | Sum of Squares | Df | Mean Square | F    | Sig.   |
|-------------|----------------|----|-------------|------|--------|
| Regression  | 34536.466      | 1  | 34536.466   | .475 | .493b  |
| Residual    | 5232103.480    | 72 | 72668.104   |      |        |
| Total       | 5266639.946    | 73 |             |      |        |

a. Dependent Variables: Teachers’ Computer Usage (TTU)
b. Predictors: b. (Constant), Principals’ Technology Leadership (PTLA)

Table 4.13: Estimated Parameters (Coefficients*)

| Model       | Unstandardized Coefficients | Standardized Coefficients | t     | Sig. |
|-------------|-----------------------------|---------------------------|-------|------|
|             | B                           | Std. Error                | Beta  |      |
| 1 (Constant)| 724.952                     | 395.901                   |       | .071 |
| PTLA        | 1.982                       | 2.875                     | .081  | .689 | .493 |

a. Dependent Variable: TTU

Table 4.14

| No. | Study Hypothesis                                      | Original Sample (β) | Standard Deviation | T Value | P Value | Result      |
|-----|-------------------------------------------------------|---------------------|--------------------|---------|---------|-------------|
| 1   | Principal Technology Leadership (PTLA) \rightarrow Teacher Computer Use (TTU) | 0.171               | 0.170              | 1.001   | 0.317   | Not Significant |

Note: Not Significant at significance level 0.05 (Two tailed) with t value <1.96 and p value > 0.05

This study model involves the direct relationship between Principal Technology Leadership (PTL) and Teacher Computer Use (TTU). Table 4.14 shows the results of the evaluation of the structural model (direct effect) involving hypothesis testing of H01. Hypothesis H01 predicts that there is no significant relationship between Principal Technology Leadership (PTL) and Teacher Computer Use (TTU). The results of the H01 test were not significant (β = 0.771, t = 35.004, p <0.05). Therefore, the study hypothesis was rejected and the null hypothesis was accepted that there is no relationship between Principal Technology Leadership (PTL) and Teachers Computer Use (TTU).

**DISCUSSION**

Davies [10] emphasizes that technology leadership in schools should take into account various factors from various stakeholders. All relevant parties will have an impact on the basics of technology in schools. However, this
framework does not take into account the opinions of the various parties. For example, the use of teacher technology in the classroom is not considered part of technology leadership, but rather as a 'result'. Venkatesh and colleagues [15] added that UTAUT aims to clarify the user's intent to use information systems and subsequent usage behaviors. This theory argues that the four main constructs are: 1) performance, 2) business, 3) social influence, and 4) ease of use. Koehler and Mishra [31] further emphasize the three fundamentals of science (content, pedagogy, and technology) as they are the core frameworks of technology, pedagogy, and content knowledge (TPACK). Zaidatun et al. [20] claiming teachers' competence in ICT is high but there are still obstacles in applying it while in school.

Descriptive analysis was also conducted to look at the level of use of computers in school management, teaching and learning. It has a total of 374 teachers who teach in National Secondary Schools throughout the state of Kedah. The researchers found that the mean values and standard deviations of each of the constructs tested were moderate. Determination of the level of computer use among teachers is based on the views of Jamil [11] quoted from Hamzah, Juraime, Hamid, Nordin, N and Attan [27], mean values ranging from 1.00 to 2.33 (low), 2.34 to 3.66 (medium) and 3.67 to 5.00 (high). In this study, the whole construct was categorized as moderate. The Competency construct had mean values (X̅= 3.641, SD = 0.583) followed by the Administration and management constructs (X̅=3.454, SD = 0.532). Next, the Teaching and Learning Planning construct (X̅= 3.400, SD = 0.584) and finally the Student Assignment construct (X̅= 3.259, SD = 0.652).

The frequency of computer use among teachers studied was about the frequency of teacher technology use in teaching, teaching preparation and assignments to students. Technology resources especially computers with sufficient numbers and in good condition are one of the important factors and they are a hindrance to the effective use of technology [32].

**Implications for Teachers**

The involvement of teachers in this survey reflects that teachers are aware of their increasingly challenging task and want to work with school administrators to increase their mastery of students and technology. Teachers need to master the skills of communicating information to students whether in the classroom, computer lab or in the classroom. Knowledge transfer skills to students must be in line with the competency of using computer hardware as well as the use of appropriate teaching and learning approaches such as TPACK which was popularized by Mishra and Koehler [33].

There are three core components of technology integration in teaching: content, pedagogy, and technology, and the relationships between them. The three fundamentals of science (content, pedagogy, and technology) constitute the core framework of technology, pedagogy, and content knowledge (TPACK). Teachers need to apply enough knowledge to develop technology such as producing code and algorithms and developing a simple application system for students to develop. If early exposure to Industry 4.0-related technology is possible and encouraged, this highly skilled workforce will be able to create schools according to market needs. Information and processes to gain knowledge about developing a technology are easily accessible and learned through the Internet and are largely free.

**Implications for Principals**

School principals must move forward to keep up with the latest emerging technology. Principals must alert of the changes occurring in the school to promote latest technology that empower educators to build students’ learning through digital resources [24].

**Implications for Students as future skilled workers for Industrial Revolution 4.0**

Advances in Information and Communication Technology (ICT) have further increased the use of the Internet, web and networking in education. These new developments have created a more flexible learning environment in terms of time, place, methodology and learning materials, as well as creating greater opportunities for greater collaboration in the educational process [20]. Advances in information technology have led to increased use of the web and the Internet for educational purposes [21]. Communication technology enables individuals or groups of individuals to exchange data and information in unlimited time and space, quickly and simultaneously through local or global networks [29]. Progress in computing has changed the pattern of education in the country [34, 35].

According to Pradhan et al. [3], the information and communications technology infrastructure refers to digital telephone networks, mobile phones, Internet capabilities, Internet browsers, broadband and other technologies. Principals and teachers need to be efficient and frequent users of this infrastructure as they need to provide students with these technology applications. The rapid development of ICT is crucial to the growth of the country's economy as the development of this technology enables its users to access information easily and quickly to obtain information and knowledge [2]. ICT also enables companies to communicate faster and better, thus reducing production costs and increasing productivity of a country [6].
ICT also enables access to new markets, lower cost of capital as a result of efficient functioning of financial markets, reducing regional differences in income and productivity, enabling access to human capital through telecommunications networks [3]. The use of ICT through Internet access can promote sustainable entrepreneurship and small business development as it reduces their financing difficulties by reducing agency costs [4].

The emergence of new technologies can provide greater opportunities for students with physical disabilities and the development of new technologies also helps those with disabilities start something that gives them comfort. Many new systems in the field of technology are on display at the Electronic Consumer Exhibition in Las Vegas and are aimed at improving the quality of life of individuals with disabilities [20].

**Limitations**

This study was carried out only in the state of Kedah, hopefully further research will be done in other states in Malaysia. The following study can include students involvement for better result. This was a cross-sectional study and it is recommended a mix-method approach to get more precise outcomes.

**Conclusions**

The rapid explosion of the computer industry has led to various technological innovations around us. The technology field are becoming important so people are trying their best to learn it, so it is imperative that our students move forward if we want to see our students in line with the students in developed countries.

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