

Multimedia Technology: Teachersf Knowledge and Attitudes

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Abstract

The advent of computer multimedia technology in schools has resulted in the presence of computer hardware and software in the language classroom. To harness the potentials of technology, teachers play a pivotal role in ensuring technology use in the English Language Classroom. Hence, there is a need to investigate teachers' knowledge levels and attitudes toward multimedia technology. This study seeks to investigate the correlation between knowledge and attitudes of teachers to multimedia technology. 50 teachers, currently teaching English in government secondary schools in the Kuching-Samarahan area in Sarawak participated in this study. Data analysis employing the Pearson Co efficiency Correlation calculations matched both components and uncovered a positive correlation. Teacher's responses to the study also indicated the awareness among them of the need to upgrade current knowledge in technology use in the classroom.

Introduction

The proliferation of computers in our society, educational institutions and workplaces have been overwhelming. Computers and the technologies offered have been hailed as an enhancement and advancement if not, a panacea to many challenges faced in everyday activities. Perhaps the greatest investment of computer technology is into educational institutions, notably the schools. In the context of Malaysia, the Ministry of Education (MoE) Malaysia has embarked on a series of programmes to ensure that more schools are equipped with computer technology. Efforts have been spearheaded by MIMOS (Malaysian Institute of Microelectronic System) (Mimos, 2002) along with the most recent IntelR CentrinoTM mobile technology (Intel, 2004) at selected schools. Both these endeavours witnessed the provision of personal computers and/or multimedia laptops to teachers teaching English Language, Malay Language, Mathematics, and Science. Along with these types of equipment came hardware like the LCD projector and projector screen, all packaged in a trolley fitted with an uninterruptible power supply (UPS) facility. These teachers were also provided with multimedia courseware pertaining to the individual subjects which were developed and produced by the Ministry. Such efforts were aimed at facilitating the teaching of Mathematics and Science in English and the teaching of English as a second language, through the application of multimedia technology.

Multimedia Technology

In the case of the English Language, the pilot venture began at the Form One level. All teachers teaching ESL were provided with this multimedia technology. In its fundamental sense, Lockard et al (1993: 217-233) defines Multimedia as 'any system that unites two or more media into a single product or presentation' where multimedia are divided into two components, that is, the hardware and the software. Further, Warschauer (1996) advocates multimedia technology as allowing an assortment of media involving text, graphics, sound, animation, and video "to be accessed on a single machine". Elsewhere, Warschauer & Meskill (2000) recognise multimedia-based simulation software as a tool that can expose language learners to cultural and linguistic worlds in a meaningful way through audio and visual settings. This, in turn, would pave the way to ensure that these learners have a degree of control and interactivity to direct their learning process.

And, in this context, the provision of multimedia technology to schools as elaborated earlier, is envisioned as a tool that would pave the way towards facilitating innovations particularly in integrating and developing the skills of listening, speaking, reading, and writing which are crucial skills in language learning. After all, Multimedia tools include computer-generated sound, graphics, and animation, along with sound and visual forms (Forcier & Descy, 2002) and exploited purposefully, enriches a computer-assisted learning environment through interactive learning (Neo and Neo, 2002).

Indeed it could be said that multimedia technology constitutes a powerful tool that enables integration, convenience, and durability. Suffice to state, multimedia technology enables approaches and innovations in language instruction and learning that were never before imagined. But of course the very presence of multimedia technology in and by itself does not ensure pedagogical innovations with a click of a mouse (Murray and Barnes, 1998; McMeniman & Evans, 2003). Galligan (1995) asserts the teacher factor as being "critical to the effective use of computers for learning". At the end of the day, it is the teacher who "remains the primary director of learning" (Murray and Barnes, 1998: 251).

Teachers and Multimedia

Although much hardware and funds have been poured into schools along with assertions of the centrality of teachers' roles, these have left much to be desired. In the case of ESL teachers, McCarthy, (1999) laments that very little is happening with computers, that where it is happening it often does so spasmodically or peripherally, and that the 'wonder' of computer-assisted language learning (CALL) is so often met with indifference, scepticism or scorn. Even where training is provided in most schools, this has been observed as being crash programmes honing into computer literacy at the expense of integrating technology with pedagogy (UNESCO, 2005).

Research studies have indicated that while there have been efforts by governments to support the utilisation of multimedia technology in schools, teachers have not been able to tap the purported potentials. In the case of Korea, such efforts have been delayed due to a lack of computer-trained teachers. The research concluded that a careful examination

has to be made into whether 'computer-related trainings are provided with frequency and equality to teachers who are enthusiastic about computer use.' (Miheon, 1996: 204).

Elsewhere, McMeniman & Evans (2003) acknowledge the need to have skilled teachers who can use the multimedia technology effectively in the classroom to enable improvements in language teaching and learning to improve students' target language proficiency. The research concludes that for CALL to be a powerful instructional tool, teachers need to be well trained to utilize the technology in the classroom (McMeniman & Evans, 2003). In a case study of a Malaysian context, Norhayati Abd. Mukti (2000) highlighted the importance of teachers having adequate knowledge about the computer and the use of teaching and learning to utilise the computer as an effective instructional tool.

Teachers' Attitudes

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Indeed, teachers play a pivotal role in the utilisation of computer technology in the classrooms. Hence, there is a need to study this teacher factor. And in doing so, one area that needs to be looked at pertains to teachers' attitudes. Woodrow (1991) observes that the success of computer technology programmes depends on the attitudes of teachers. Teachers' attitudes toward multimedia technology influence students' attitudes towards technology (Akbaba & Kurubacak, 1998). Further, Akbaba & Kurubacak (1998) argued that unless we identify the teacher's attitude towards multimedia technology, we cannot expect the teachers to effectively support the integration of technology into the curriculum.

In defining the term attitude, this study considers it as a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour (Eagly & Chaiken, 1993). Further, attitude can be categorised into the cognitive, the behavioural, and the affective (Eagly & Chaiken, 1993; Jones and Clarke, 1994). The cognitive category represents the users' thinking on the object being evaluated. This denotes the opinions of what they consider advantages/disadvantages in utilising multimedia technology and their fear (mentally) of the challenges they may face in the process. The affective category deals with feelings or emotions concerning the use of the computer. It involves the anxieties that users experience when using technology. The behavioural category is concerned with the people's actions towards the attitude object. This concerns what the users can do or not do with the technology at their disposal.

Teachers' Knowledge

In order to investigate the attitudes of teachers, it is imperative too that the teachers' knowledge in utilising technology be also identified. In this respect, knowledge of the various approaches in which computer technology can be utilised. At its most fundamental, computer technology can be utilised in three ways. These are as a tutor, tool, and tutee (Taylor, 1980 in Paul, 1999).

Computer as a Tutor

As a tutor, computer technology is utilised as a system that presents the subject to which the learners will respond and provides a learning environment that is controlled (Hsu et al, 2000). This involves the user being presented/presenting and guided by the technology to complete a particular task in a regimented and sequenced approach. At this level, the user, in this case, the teachers concerned, possess knowledge that is at a basic or elementary level. They can type, design, and produce or reproduce worksheets using Microsoft word. Such a task requires that they be familiar with basic operations of the software i.e. knowing how to save and print their work. Besides that, these teachers can surf the World Wide Web in search of information using particular search engines. They are also able to utilise the Form One English language multimedia courseware for purposes. These teachers have attended the formal training sessions via the initiatives of the MoE and its selected agencies and know how to operate the courseware. After training, they return to their respective schools to conduct in-house training on how to use the courseware and its' basic operation, to all the teachers teaching Form One English. In addition to these, they also possess a personal interest in certain subjects other than English and may purchase CD Rom on general information from the market to be used in the classroom. Suffice to say at this point, that their utilisation of multimedia technology is at a level where they present information in a lock-step well-ordered approach which reflects a behaviourist trait in utilising the computer.

Computer as a Tool

In the tool category, the computer is exploited to support or facilitate a variety of instructional activities (Chen et al, 2000:185). This requires the user to utilize the presentation package for classroom teaching by using software like Microsoft PowerPoint, Excel, and Word (Taylor, 1980 in Paul, 1999). In doing so, the user utilises the software tools in the computer and in the process needs to learn how to use the software effectively to create a good presentation. This involves the teachers concerned as having made the particular efforts required, to learn and acquire the knowledge of using the presentation package either through self-study or via formal training at an institution that offers courses in using the software. To achieve such a level, these teachers would know about inserting pictures and linking pages to present graphics using the Microsoft Word package. The same applies to the use of the Microsoft PowerPoint with the additions of colours, colour tones, animations, and special effects. When it comes to the use of Microsoft Excel, teachers who use this would know about presenting information in statistical figures and graphs. Their knowledge of using Microsoft FrontPage would enable them to create and upload presentations on the website. These teachers too would be involved in designing and creating graphic illustrations and thus know using particular designing tools to achieve this end. At this point, the knowledge these teachers possess can be classified as a step higher than the previous elementary level. This utilisation of the computer in this respect can be considered as being at an intermediate level. Teachers know to utilise the computer as a tool to enhance instructional performance.

Computer as a Tutee

As for the computer as a tutee, this refers to users, in this case, teachers, who can create programme(s) using a computer programming language such as LOGO, Java Script etc., and have control over the usage of the computer (Taylor, 1980 in Paul, 1999). In short, the user learns as well as teaches the computer in the process of creation. In this respect, the user has to put in more effort to learn and master the computer language. At this particular point, the teachers concerned have made increased efforts to learn and acquire knowledge. These have been achieved through rigorous formal training in an institution of higher learning or via the tremendous amount of self-learning to acquire highly skilled knowledge. As this level suggests, these teachers possess the knowledge in installing and managing computer hardware and software. They are also able to carry out troubleshooting and repair works on computers to address technical faults and detect viruses. Thus, at this particular stage, these teachers can be considered as advanced users of the technology and would, in turn, apply such knowledge level in their instructional efforts.

Teachers and Multimedia: Attitudes and Knowledge

These three levels of knowledge and use and their corresponding requirements are translated as a guide in which these teachers' level of knowledge will be assessed. This is important in investigating these teachers' attitudes towards multimedia technology in correlation to their background knowledge. With these in mind, this particular case study intends to investigate the correlations between the English Language Teachers' attitude toward multimedia technology and their background knowledge in using multimedia technology.

This will operate on the following assumptions i. English Language Teachers with positive attitudes towards multimedia technology are at an intermediate or advanced level of knowledge in multimedia technology. ii. English Language Teachers with low or negative attitudes towards multimedia technology are at the most basic level of knowledge in multimedia technology.

The Study

The study is a cross-sectional study using a quantitative and qualitative descriptive survey questionnaire as an instrument to elicit the participants' responses. The descriptive quantitative and qualitative survey will provide the study with the necessary data to analyse the English language teachers' attitudes towards using multimedia technology.

Data were obtained using the Likert scale-based questionnaire. The questionnaire consisted of three sections. The first section was to determine the teachers' background level of knowledge in using multimedia technology. In this section, the 5-point Likert Scale used has a minimum score of 15 and a maximum score of 75. There are 15 statements related to background knowledge. Teachers with a low level of knowledge in using Multimedia Technology will have a score of 15 to 24. Scores at an average level

are between 25 to 50. Teachers with a high level of knowledge in using Multimedia Technology will fall between the scores of 51 to 75. (see Table 1)

Table 1:
Scores in Level of Knowledge in Using Multimedia Technology

Score	Level of Knowledge
15 to 24	Low or elementary level
25 to 50	Average or intermediate level
51 to 75	High or advanced level

The second section was to determine their attitudes toward multimedia technology. There are 15 items in this section. The items are divided into 3 categories, which are cognitive, affective, and behavioural. The minimum point score for this section is 15, while the highest score for this section is 75. Therefore, the neutral score for this section is 45. Scores that fall below this point are scores for negative attitude, while scores that are above 45 are positive attitudes. (see Table 2)

Table 2: Score for Level of Attitude

Score	Level of Attitude
15 to 44	Negative attitude
45	Neutral
46 to 75	Positive attitude

The last section consists of a list of open-ended questions aimed at eliciting their opinions on the importance of training in using multimedia technology. Three questions are posed requiring respondents to write their answers in the spaces provided. The questions are as follows:

- OPQ1: How would you characterize your computer training?
- OPQ2: Do you think that you would benefit from more training? How?
- OPQ3: How often do you use the computer in the classroom?

The instrument designed is based on Roberson et al (1995) list of items of computer attitudes. Originally, Robertson et al (1995) set out to investigate gender differences, students, and staff differences in attitude towards using computers in the school. The instrument they used to measure the attitude of the students and staff is used as a guide here for developing the attitude survey for Form One English language teachers for this research. This instrument is proximate to the items being used which is relevant to the attitude statements of the teachers being measured in the questionnaire for this study. These are classified into behavioural, cognitive, and affective items of attitude measurement.

The Subjects

A total of 50 secondary school English Language teachers teaching at the Form One level participated in this study. They were identified at random from 20 schools. The method used for random selection of the sample is called the Criterion-based sampling (LeCompte & Preissle 1993: 98), where the researcher sets the criteria for the type of characteristic that will be accepted into the case study. In the typical-case selection (LeCompte & Preissle 1993: 75), the researcher sets the profile and attributes of the sample of respondents who will be selected for the study and then sets out to seek the sample that fits the description of the criteria. For this study the characteristic of the type of respondents who were accepted for the study are:

- Form One English language teachers
- Utilising the computer notebook or laptop, computer desktop, the Form One English language multimedia CD-ROM and the portable projector provided by the government
- Teaching in a secondary school

Data Analysis

The data collected were tallied into frequency counts. Each section of the questionnaire has a total value of 75 marks for the highest score (highly skilled or positive attitude) and 5 marks for the lowest score (low skilled or negative attitude).

Each score complied with a frequency score, which was displayed in the form of a mathematical percentage. This was to enable the study to identify the culmination and frequency of scores in the calculations within the designated categories such as either the elementary level, intermediate and advanced levels in the background knowledge of the teachers using the Multimedia Technology; and the classification of what constitutes as 'positive' or 'negative' attitude in the scores.

The data of the two sections were then further analysed and assigned to x and y axis to identify whether there is any correlation between the two independent variables. The r correlation coefficient was calculated based on Pearson's correlation coefficient formula to investigate if the correlation is positive or negative.

The Findings

Teachers' Knowledge

14% of the English language teachers teaching Form One classes utilising Multimedia Technology scored a low or below average in their level of knowledge in Multimedia Technology. 48% of these teachers reported an average level of knowledge in using multimedia technology. 38% of these respondents recorded an above-average or high score of knowledge in Multimedia Technology.

Teachers' Attitude

A total of 16% of the respondents indicated negative attitudes towards Multimedia Technology. 4% of the respondents reported neutral attitudes, while the remaining 80% expressed positive attitudes towards Multimedia Technology.

Correlations between Form One English language teachers' knowledge and their attitudes towards Multimedia Technology in the classroom.

As mentioned earlier, the calculation of the data for the correlation study is based on the formula called Pearson's Coefficient of Correlation. In mathematical and statistical terms this is represented by the symbol - r . The calculation will be made from two approaches:

- Calculations of r from Deviation scores;

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{n S_x S_y}$$

- Calculations of r from the Raw Scores.

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (SS_x)(SS_y)}}$$

Fig. 1: Two approaches for the calculations

The rationale for using these two approaches in the calculation is to ensure that the results from the r calculated are the same when using the two approaches, which is two different angles of observing the same data for the correlation study

The data analysis for the English language teachers' background is represented by the symbols; while the data for the English language teachers' attitude towards multimedia technology is represented by the symbols.

The symbol n indicates the number of respondents and the symbol s indicates the denominator. The calculations of r from the deviation score are derived from the following formula:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{n S_x S_y}$$

- The sum of x and y are as follows.

$$\sum x = 2239$$

$$\sum y = 2838$$

- Therefore the mean for x and y are:

$$\bar{x} = \frac{\sum x}{n} = \frac{2239}{50} = 44.78$$

$$\bar{y} = \frac{\sum y}{n} = \frac{2838}{50} = 56.78$$

- thus $\sum (x - \bar{x})^2 = 13140.50$
and $\sum (y - \bar{y})^2 = 7787.12$

- Therefore $\sum (x - \bar{x})(y - \bar{y}) = 8127.36$

- Finally the complete calculation of r from Deviation Scores are as follows:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{n S_x S_y} = +0.8034407$$

Fig 2: The calculations of r from the deviation score

Calculations of r from the Raw Scores. The calculations of r from the Raw Scores are based on the following formula:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (SS_x)(SS_y)}}$$

- Since x is 2239 and y is 2838

$$\bullet \quad SS_x = \sum x^2 - (\sum x)^2 / n = 13140.58$$

$$\bullet \quad SS_y = \sum y^2 - (\sum y)^2 / n = 7787.12$$

$$\bullet \quad \sum (x - \bar{x})(y - \bar{y}) = \sum xy - \frac{(\sum x)(\sum y)}{n} = 8127.36$$

$$\bullet \quad r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (SS_x)(SS_y)}} = +0.8034407$$

Fig 3: The calculations of r from the Raw Scores

The positive score of $r = +0.8034407$ indicates that there is a positive correlation between these English language teachers' knowledge in Multimedia Technology and their attitudes towards Multimedia Technology in the Form One English language classroom. The graph below illustrates this correlation accordingly:

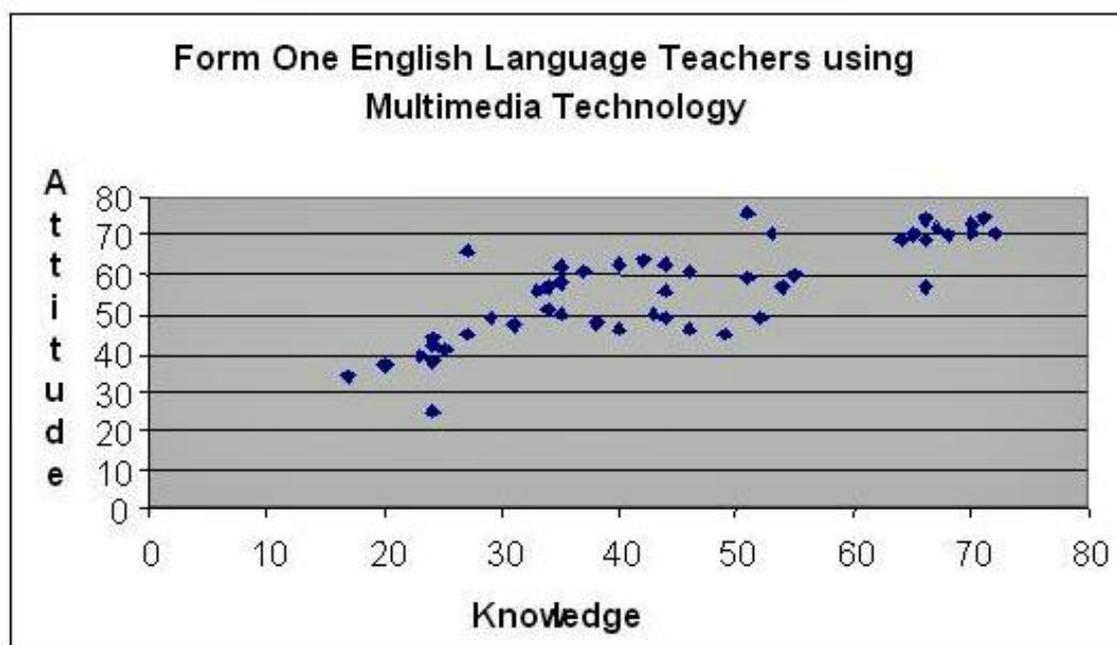


Figure 4: *English language teachers' knowledge in multimedia technology*

Open-ended Questions

As mentioned earlier, three open-ended questions were posed at the end of the questionnaire. These were:

- OPQ1: How would you characterize your computer training?
- OPQ2: Do you think that you would benefit from more training? How?
- OPQ3: How often do you use the computer in the classroom?

18% of teachers considered their computer training to be at a poor level. This is reflected in the responses that were remarked as poor, no training, outdated, not good, below average, below par. 24% characterised their computer training as being average, moderate, satisfactory. The remaining 58% described their computer training as good, ok, excellent, very good, extremely good.

When enquired whether they would benefit from more training, almost all teachers (92%) saw the significance of training. Among the reasons cited were as an improvement of existing skills, enhancement of knowledge, and building of confidence in using multimedia technology in the classroom. The remaining respondents (8%) however were unsure whether they would benefit from more training.

Overall most of these teachers were regular computer users especially the laptops provided by the government in their Form One classes. 4% recorded non use of the computer at all.

Discussion

The data obtained and analysed revealed that most of these Form One English language teachers possess knowledge of multimedia technology use that range from average to above average. Such an encouraging response of 86% may be largely attributed to their attainment of such knowledge through formal training and exposure or via self-taught. Also, because the introduction of multimedia technology in schools is still at its infancy, these teachers may find such innovations, interesting. Hence, they would be keen to explore and try out the tools available at their disposal.

Judging from their responses to the open-ended question on the benefits of training and reasons for this, almost all these teachers responded positively to this. They were aware of the significance of training to enhance their skills, knowledge, and confidence. Perhaps they do realise the need to constantly upgrade themselves beyond their present level. Notably, 82% described their computer training at a range from average to good.. As they were sentient of their training level they saw the need and significance for more training. And as such, they were receptive with regards to trying out the multimedia tools available. Such developments both from the aspects of knowledge levels that are encouraging and training which is viewed with optimism, translate to a positive indication in attitudes that stand at 80%.

The Assumptions

English Language Teachers with positive attitudes towards multimedia technology are at an intermediate or advanced level of knowledge in multimedia technology.

In total, 80% of the sample population has a positive attitude towards using multimedia technology. Conversely, 86% of these English language teachers using multimedia technology have an average or above-average level of knowledge of using computers in the classroom. Despite the high level of knowledge in using multimedia technology, the positive attitude towards using multimedia technology is lower by 6%. Therefore, it could be said that the stated assumption is largely true in this case, given the negligible correlation. Although these teachers are at a higher level in terms of knowledge of multimedia, their attitudes towards the technology in terms of the cognitive, affective, and behavioural largely correlate but records a minor difference. Perhaps such a negligible difference could be attributed to these teachers' confidence in exploiting the technology for teaching and learning purposes. While they may possess a higher level of knowledge with regards to using the technology, their attitudes towards its use may be slightly affected by their confidence in integrating it with their lessons. Perhaps they lack the necessary support and encouragement towards that end, as observed by Akbaba & Kurubacak (1998). After all, they do realise the need for more training as 90% of the total respondents do view training as an avenue for improvement and confidence building.

Nevertheless, it could be concluded that English Language Teachers with positive attitudes towards using multimedia technology in the Form One classroom have a higher level of knowledge in using multimedia technology and this knowledge is at an intermediate or advanced level.

English Language Teachers with low or negative attitudes towards multimedia technology are at the most basic level of knowledge in multimedia technology.

Of the 50 respondents who participated in the study, a total of 16% recorded negative attitudes towards multimedia technology based on the score value of the level of attitude. As for the level of background knowledge, 14% of these respondents are classified in the low or elementary level. There appears to be a 2% difference in the correlation with a higher number of respondents indicating a negative attitude as compared to the level of background knowledge which is slightly lower. It could be concluded in this respect that the stated assumption is indeed true.

Such a low level of background knowledge although negligible may be attributed to a lack in computer training which contributes to obstacles in the active use of computers in the school for instructional purposes (Miheon, 1996). As observed earlier, a total of 18% of these respondents acknowledged that their computer training levels were poor. Further, nearly half of this (8%) were unsure as to the significance of training in improving themselves.

As such, it is no wonder that this population of teachers possesses a low or negative attitude towards using multimedia technology in their classrooms. Because of the poor level of training cited, these teachers may not want to use the technology at their disposal as they simply do not know how to exploit it for a possible fear that they may look foolish. As such, they may even resent the use of technology and develop negative attitudes towards its use. Moreover, they are unable to see training as bearing any significance. As a result, the possibilities of negative perception towards multimedia technology is inevitable. Consequently, the use of multimedia technology is limited among these teachers who lose out on experiencing the purported usefulness of the technology in the classroom (Yuen and Ma, 2001). And because their use of the technology is low to the possible point of non-use, they would not take the opportunity to advance their knowledge of the technology beyond what has been exposed to them and remain at low levels of attitudes.

Suffice to state, teachers with low or negative attitudes towards using multimedia technology in the Form One classroom only possess the most basic knowledge of using multimedia technology.

Conclusion

Merely introducing multimedia technology into the ESL classroom does not guarantee the expected innovations in learning. While software and hardware may be in place, the 'humanware' (Warschauer and Meskill, 2000) must be in a position too. Teachers play an essential role in this respect. This necessitates that they be receptive to their attitudes to the technology. In this case, a positive attitude indicates a higher level of knowledge and vice versa. But a possibility that the higher level of knowledge in technology use contributes to having positive attitudes cannot be ruled out as well. Hence, both the components of attitude and knowledge are complementary. In this respect, it is imperative that in introducing and gradually integrating multimedia technology in the English Language Classroom, a consideration of teachers' attitudes and knowledge is essential to ensure that the CALL enterprise will achieve the potentials it deserves. And this requires time, concentration and support, involving long term viable efforts. After all, Rome was not built in a day.

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