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LAPTOP OWNERSHIP AND USE AMONG EDUCATORS: REFLECTIONS FROM SCHOOL TEACHERS IN MALAYSIA

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This research explored the experiences of owning and using laptops among three secondary school teachers in Malaysia. They were granted personal laptops by the Ministry of Education through the Teaching and Learning of Science and Mathematics in English, or known as Pengajaran dan Pembelajaran Sains dan Matematik dalam Bahasa Inggeris (PPSMI) programme. This document has no comments. PPSMI was aimed at enhancing the teaching of these subjects in English with the aid of technology. The research adopted a case study qualitative approach using semi-structured interviews. Three in-depth interviews were audio recorded in the teachers' schools, transcribed and analysed. Several themes related to the benefits and challenges of owning and using laptops emerged from these interviews. This paper, therefore, also seeks to discuss these themes in detail.

Key Words: laptop use, ownership, school teachers, benefits, challenges

INTRODUCTION

The development of Information and Communication Technology (ICT) has undoubtedly created many opportunities for development in the educational sector in Malaysia. ICT is now being used to improve proficiency, convenience and quality of the learning process (Teichner, 2004). Realizing the importance of ICT in education, the Malaysian Prime Minister declared in the national budget for the year 2003 that every Mathematics and Science teacher in national schools would be provided with a laptop to enhance the teaching of these subjects in English (Pillay & Thomas, 2004; Noraini Idris, Loh, Norjoharuddeen Mohd. Nor, Ahmad Zabidi Abdul Razak, & Rahimi Md. Saad, 2007). A new initiative, the Teaching and Learning of Science and Mathematics in English, or better known as Pengajaran dan Pembelajaran Sains

dan Matematik dalam Bahasa Inggeris (PPSMI), was launched for this purpose. The Government allocated RM5 billion for the implementation of this initiative. The implementation of this initiative included the allocation of laptops to these teachers. This laptop initiative represented an enormous investment of resources by the Government and it was aimed to help to 'kick start' the use of ICT in the education system.

The Mathematics and Science teachers involved in the PPSMI programme had different levels of competency in English as the majority of them completed their education beginning from the primary right up to the tertiary level in Bahasa Melayu (Noraini Idris et al., 2007). In the field of education, the national language Bahasa Melayu has been the medium of instruction in schools for about 30 years and English was relegated to second language status. To overcome the problem, the Ministry of Education developed a training programme to increase English language proficiency among the teachers. This training was designed to meet the Mathematics and Science teachers' specific needs of teaching these subjects in English.

Apart from the use of English language for instructional delivery, Mathematics and Science teachers are required to master ICT skills in operating the courseware provided by the Ministry of Education during classroom instruction (Noraini Idris et al., 2007). It is, therefore, the teachers' responsibilities to equip themselves with the latest ICT knowledge and skills in order to be able to teach these subjects effectively in English. For this reason, this study was carried out to answer the overarching question: What are the benefits and challenges of laptops use among secondary school teachers?

Statement of the Problem

In the global front, numerous accelerated change with enhanced technologies appeared as the world move into the Information Age. In line with the initiative of teaching Mathematics and Science in English, all PPSMI teachers are required to attend professional preparation courses to enable them to teach in English as well as to operate the ICT gadgets effectively (Noraini et.al. 2006). The scenario of the PPSMI programme reveals that senior teachers are more competent to teach the subjects in English compared to their junior counterparts since they have mastered the language. Senior teachers have a better grasp of the English Language because they were part of the education system before 1982 where the mode of instruction was in English (Hannah Pillay & Mercy Thomas, 2004; Choong, 2004). However, they are not that computer literate and

therefore, they are not able to integrate ICT effectively into the teaching-learning process. This phenomenon results in poor utilization of ICT tools despite several training sessions that the teachers had undergone. The younger generation teachers however, are more ICT literate but are less conversant in English. Therefore, they are more willing to adopt and integrate ICT into the teaching-learning process. Despite the generation gap, there are also teachers who are simply reluctant to use ICT and there were even teachers who are technophobia. According to Noraini et. al. (2006), this leads to the lack of self-efficacy in handling day-to-day lessons and the feeling of inferiority in handling students who have difficulty in learning Mathematics and Science.

Teachers' resistance to use ICT primarily laptops for the PPSMI programme results in them being left behind in their professional development of ICT. Use of ICT is not merely for the teaching-learning process, but is pertinent in administrative practices or planning and preparing for lessons as well. Although the Government might mandate participation and use, adoption of technology is still an individual choice. Based on the preceding scenario, several questions need to be answered: How did teachers benefit from the integration of laptops in schools? Has the ICT initiative helped in discharging their daily duties more effectively? Are the teachers more technology savvy? Have teachers become frequent users of laptops now that they own the portable technology? Therefore, it is imperative to determine if the laptop initiative has brought significant change towards the teachers' daily routine.

As technology is teachers' new learning area, they need to develop their own understandings as well as the theoretical and practical constructs in their attempt to learn and apply ICT in their everyday curriculum offerings in school. Additionally, they need to be supported in their effort to implement and incorporate ICT primarily during the teaching-learning process. The MOE has invested massively in ICT infrastructures as well as to prepare the teachers professionally in the effort of incorporating ICT into the education system. Furthermore, it is hoped that ICT can be a mediator in developing human capital as outlined in the National Education Blueprint 2006-2010. The programme of integrating laptops into the curriculum has come to the sixth year of implementation, and thus it has come to the extent to explore the benefits that teachers have gained as well as the challenges that teachers face from the infusion of laptops in the education system. Therefore it is against this background that this study is undertaken.

Importance of the Study

An overview of the education landscape in Malaysia has shown that very few research studies have been carried out to determine benefits and factors hindering the use of laptops among PPSMI teachers. The general aim of this study is to contribute significantly to the existing knowledge in the infusion of technology into the education system. Research studies on the use of laptops in ICT environment settings have become imperative since the massive immersion of ICT in schools such as Smart School and PPSMI programme (Pillay & Thomas, 2004; Choong, 2004). Teachers' views of the laptops can help the researcher to seek valuable information on how the mobile technology has significantly brought change to their daily practice and consequently enhance their ability to discharge their daily routines in school. Therefore, it is believed that the findings of this study could benefit the MOE in their efforts to advance the use of ICT primarily laptops in schools and attract more teachers to use laptops in their teaching.

Specifically, the findings provided by this study may be useful in developing continuing professional development courses and trainings for teachers so that teachers are better equipped with appropriate knowledge, skills, and resources, and have good experiences in their process of learning to teach with laptops. Consequently, teachers can realize the full potential of laptops as teaching tools when they are able to use the technology efficiently and effectively.

Benefits and Challenges of Laptops for Teachers

Educational authorities around the world have begun to realize the importance of laptops as a means of integrating technology into the curriculum. As such, educational authorities have started to provide teachers with laptops through various initiatives. One such initiative was made by the education authorities in the United Kingdom, New Zealand and United States (Cunningham, Kerr, McEune, Smith, and Harris, 2004; Cowie and Jones, 2005; Rutledge, Duran, and Carroll-Miranda, 2007). In the initiative, teachers and principals were provided with laptops. Research studies have begun to explicate the impact of these initiatives on teachers. These studies (Cunningham et. al, 2004; Cowie and Jones, 2005; Rutledge, Duran, and Carroll-Miranda, 2007) showed the positive impact of laptops on the teachers' personal and professional development, and the resources, skills and conditions that helped them integrate ICT into their lives. It is also reported that teachers having laptops were afforded greater access to resources for lesson planning and preparation as well

as opportunities to streamline management and administration tasks. The teachers also reported that their confidence and competence level in using ICT tools in the classroom increased and this had a positive impact on the students.

Laptop infusion provides beneficial impact on teaching practices and the learning environment. According to Cunningham et al. (2004, p. 9), the Laptop for Teachers Initiative (LfT) in Britain:

> [H]ave been able to produce high quality teaching materials, aid students' skills development in specific curriculum areas, use ICT more confidently and competently in their teaching, enhance students' motivation to learn and increase their current awareness of developments in ICT and recognize how these may benefit teaching and learning in the future.

Educators are found to be more motivated in using ICT in the teaching-learning process after receiving laptops (Cunningham et al., 2004). Teachers also reported that students are more motivated when laptops are used in the teaching-learning process.

Educators use laptops in a variety of ways, and most frequently in developing instructional materials, conducting study related to instruction, and communicating with colleagues (Silvernail & Lane, 2004). It was also found that teachers use laptops in three different aspects namely in teaching-learning, management and administration and whole school impact (Cunningham et. al., 2004). Falba, Grove, Anderson and Putney (2001) reported that by using laptops, teachers were able to decrease the fear of using computer, increase teacher's motivation and interest in technology, develop technology skills, and also help to build teacher's confidence.

Laptop programmes also influence teachers by increasing their collaboration with other teachers (Rockman et. al., 2003). Some of this collaboration is sharing information about the technology and finding solutions to technical problems; a great deal more is sharing ideas about classroom management strategies. The adoption of technology into the teachers' professional development has brought a new paradigm where teachers begin to shift their roles as instructional leader and master of all knowledge (Rockman et. al, 2003). Mouza (2002) found that teachers with laptops integrate technology habitually in their classroom for a wide range of instructional tasks. Another study by Mouza (2006), showed that the laptop use can foster comfort level with computers; positive attitudes towards technology; increase motivation and

engagement with school-work; frequent peer interactions; and increase self-efficacy of the teachers.

Although the use of laptops among teachers has brought many benefits, there are others who think otherwise. Preliminary observations found that the ICT facilities were not fully utilized by the teachers (Chong, Sharaf Horani, & Daniel, 2005). Teachers are not willing to use technology and they are still not sufficiently competent to use technology although many opportunities of professional development training have been provided (Noh, 2005). A recent study by Warschauer and Grimes (2005) indicated that the factor that leads to the preceding scenario is that the teachers are neither hired nor selected to teach using laptops based on their interest in technology. Integrating ICT in instruction may require the teachers to reconceptualise the ways in which they have completed their task for so many years (Becker & Ravitz, 1999).

A study by Urwin (2007) indicated that teachers do not have time to learn from experience and have difficulty keeping up to date with ICT development. Furthermore, they may be reluctant to invest time and effort with the latest technologies. This continuous change in technology may lead to ICT alienation and anxiety by some teachers (Urwin, 2007) because many adults feel uncomfortable with technology and are fearful of looking foolish (Schrum, 1999).

Many of the technology professional development programmes have been unsuccessful because teachers in general lack sufficient time to become more skilled. They also claimed they were not given sufficient access, support and encouragement to become comfortable with computers (Siegel, 1995; Silvernail & Lane, 2004). A recent study conducted at Maine's middle schools reported that the teachers experienced challenges in finding the time to work with the laptop themselves. Although the tool is great, but the teachers do not have time to fully explore the laptop's possibilities to the fullest (Silvernail & Lane, 2004).

Scheduling has been one of the difficulties that teachers face to integrate laptops in instruction because little time is left for enhancing teaching-learning with the use of laptop (Warschauer & Grimes, 2005). This is because laptops need to be set up beforehand. Furthermore, it is used in conjunction with the LCD projectors and white screens.

Other challenges teachers face using laptops include rearranging classroom furniture to allow for laptop access to electrical outlets, establishing routines for

taking laptops out of backpacks and storing them away into locked cabinets, taking good care of the equipment, learning basic computer and file management skills (Mouza, 2006). Samuel and Zaitun Abu Bakar (2006) added that teachers also face problems such as the lack of support from the school administrators, exam pressure and fear of not being able to complete the syllabus, inadequate trolleys to house the LCD in the classrooms, long waiting list to use the computer laboratories, overburdened with administrative tasks, school servers are not maintained and riddled with all kinds of 'stubborn' virus, no supervision on ICT integration by school administrators, absence of any kind of school management system in most schools and negative attitude of some teachers.

METHOD

The first author of this paper conducted face-to-face interviews with teachers from two secondary schools in Muar, Johor. The respondents of this study were three secondary school teachers who are currently teaching Mathematics. Teachers' range of teaching experience and grade levels taught varied, from eleven to sixteen years, and from lower secondary to upper secondary. All the respondents are female and have six years of experience in teaching Mathematics using English.

Interviews were conducted with an open-ended protocol and spontaneously generated probes in order to investigate what is in the subjects' mind (Patton, 1990). Following Merriam's (1988) suggestions, there are three classifications of interviews namely; structured interview, semi structured interview, and unstructured interview. The structured interview is employed in this study so that accurate information such as subjects' job experiences and other relevant matters that relate to the subjects' job can be acquired. However, unstructured interview is also employed to allow for flexibility.

Rapport between the researcher and the subjects is one of the key factors in deciding the success of this study. Rapport building started about a year before the study began when the first author went several times to the schools and had some informal conversations with these teachers. This allowed the subjects to feel at ease and this resulted in the smooth running of the interview.

Each teacher was interviewed once in the national language. The seven questions that were asked are as follows:

1. Does the use of the laptop in the classroom facilitate and enhance the teaching-learning process?

2. In what ways do you think computer training has increased your competence?
3. Apart from the use of the laptop for the teaching-learning process, in what other ways do you use it for?
4. How do you utilize the laptop at home?
5. How will more computer training help in discharging your duties effectively?
6. What obstacles do you face in discharging your duties when using the laptop?
7. What has the laptop allowed you to do that you could not do before?

Each interview with the respondents lasted approximately forty-five minutes, and was recorded using the Sony SOK–NWD–B103F(B) mp3 player and recorder. This allowed the researcher to keep a verbatim record of the interview that could be accessed at any time. The interviews were later transcribed.

The interviews were transcribed in the national language and later translated into English. The transcripts were read and reread as a means to familiarize with the data (Ary et. al., 2006). The researchers also took note of nonverbal information that may give added meaning. After familiarization, the next step is coding and recoding of data. Words, phrases, sentences and behavior patterns or events that seem to appear repeatedly were sorted out into major and minor categories. The researchers inductively analyzed the categories into themes and drew conclusions. The themes were then developed into a coding system related to the research question. The researchers sought the relationships amongst the codes and then categorized it into themes and sub-themes before the ultimate reporting. The consequences of the qualitative data are reported discretely in the findings.

FINDINGS

This section reports the findings from the interviews carried out by. The findings from the interviews will be described in detail in this section. The researcher will then discuss the benefits and challenges that the teachers experience in their daily duties. For clarity and a more thorough discussion, the researcher has divided this section into two sections namely the benefits and challenges of laptop use. Four themes emerged in relation to the benefits of laptop programme: teaching-learning, laptop competence, lesson preparation and planning, and use of resources, while three themes emerged in relation to the challenges that arise from the implementation of laptop integration in schools. The researcher coded the three respondents as R1, R2 and R3. The

interviews were done in the national language. The transcripts were in the national language and translated into English and again into the national language by two different persons. This step is taken to ensure the accuracy of the translation. The second part involves a discussion of the findings.

Benefits of Laptop Use among Teachers

Teaching-learning

This section outlines some of the ways in which respondents have used their laptops to enhance the quality of teaching-learning in the classroom. During the interview, respondent R3 claimed that the use of laptops does not disrupt the teaching-learning process at all. When asked about her views, the respondent commented:

> It does not disrupt at all. Indeed, it is very essential. It is something new that brings paradigm shift for at least the teachers can keep up with the advances of technology. It is an advantage …
>
> (R3, Teacher Interview)

Respondent R2 commented that laptop is effective in explaining abstract topic:

> In terms of topics that are quite abstract, I will use the laptop. For example, 3-dimensions. I use the laptop because it provides clearer [explanation].
>
> (R2, Teacher Interview)

Respondent R3 agreed that the use of laptops in the classroom facilitates and enhances the teaching-learning process:

> It is very helpful, with all the software provided. It really enhances the teaching-learning process. For example, the introduction of a mathematical concept can be explained easily with the visual assistance from the laptop computer.
>
> (R3, Teacher Interview)

This teacher claimed that the interactive illustrations from the courseware provided helped the students to learn faster and understand better. She stated that the greatest impact was noted in those instances when she had used the

laptop in conjunction with LCD projectors and screens. The visual stimuli were seen as a particularly valuable way to focus students' attention and keep them 'on task':

> Very helpful. The courseware provided are very colourful with animations and all. It captures the students' attention and helps them to understand the concept much easier. For example, the topic fraction. It illustrates how one unit splits into two units. Students have a better imagination compared to explaining on the board with chalks. It is too abstract. Now that I have the laptop, students learn faster and understand better.
>
> (R3, Teacher Interview)

She added that students show more interest and are more involved in lesson when ICT is in use. They enjoyed constant access to the information available on the courseware. She observed that students were more motivated and attentive whenever she used the laptop in the classroom. Therefore she made an initiative to use the computer laboratory to engage the students in multimedia.

> … when I have the lesson at the computer laboratory, students are given the chance to explore the CD provided in the textbook. They can use and try it themselves … I will make sure that at least once a week, each class that I teach will have the chance to use the computer laboratory.
>
> (R3, Teacher Interview)

Being able to present students with visual stimuli by projecting them onto a white screen from a laptop was seen to be of particular benefit for students with different learning styles:

> There are a few students who borrowed the courseware from me. They want to use … they are visual learners.
>
> (R2, Teacher Interview)
>
> Students from lower secondary prefer visual [stimuli]. They want [the lesson] to be nice and attractive, so I will use the laptop.
>
> (R2, Teacher Interview)

A teacher commented that the ways in which she used the laptop during interlude in her teaching had a positive impact on student attainment. She used the laptop as a way of motivating students:

> … I would display motivational flash videos, jokes and songs to the students to draw their attention. For mathematics, it would be nice if we have background music while doing the exercise sheet. I could not do this before, but now that I have the laptop, I can create a conducive learning environment and the students enjoy it.
>
> (R3, Teacher Interview)

Hence, the laptops initiative has, undoubtedly, provided an impetus for change in the teaching-learning process in the information age. To date, the integration of laptop technology in the classroom for the purpose of teaching-learning seems to be very beneficial.

Laptop Computer Competence

Respondents widely reported, during the interviews, that since receiving their laptop they had become more competent when using ICT. The freedom to take the laptop home had allowed the teachers to explore and learn more about the laptops. Respondents R2 and R3 agreed that the more time spent being familiar with the laptop, the more time would be saved in the future. As the teachers commented:

> I use the laptop [at home] to do my annual plan, create assessment sheets, or additional assessment sheets.
>
> (R1, Teacher Interview)
>
> Definitely [I use the laptop] at least one to two hours a day. It takes time [to learn] but the more we use it [laptop], the more we can explore, and the more we become skilled [hence] knowledge increases.
>
> (R2, Teacher Interview)
>
> We were given the freedom to take the laptop home … I can do many things when I bring it back especially for my annual plan. For example, I will edit the annual plan that has been in use for several years for the year 2008. The content may be the same,

> but I have to edit the dates, examinations, holidays and so on. As the head of lower secondary panel, I am in charge of all the lesson plans for Form 1, 2 and 3. I make the task easier for the teachers.
>
> (Respondent R3, Teacher Interview)

Apart from becoming familiar working with laptops, these teachers reported that they had become competent users of software programmes especially the Microsoft Office package namely, MS Word and MS PowerPoint. They even used MS Excel and other software.

> Since Mathematics requires lots of exercises, I use the teaching courseware and I-bank. The school administration purchases this software for question bank. I use it to set assessment sheets.
>
> (R3, Teacher Interview)
>
> I use MS Word to create assessment sheets, and MS PowerPoint, usually, is for me to create my own presentation for teaching-learning process … I use MS Excel for the topic square root [by using] formulas, graphs and pie charts.
>
> (R3, Teacher Interview)
>
> I use GSP [Geometry Sketch Pad] to create graph … it is a software for Mathematics to create circles, graphs etc. that can animate.
>
> (R2, Teacher Interview)

It is also found that the integration of laptops has helped to develop the teachers' ICT skills, as one teacher reported:

> Sometimes I am like a technician in the school. Teachers who seldom use the laptop ask for my help if they could not perform certain tasks. As an PPSMI teacher, I give them assistance.
>
> (R3, Teacher Interview)

With more laptop usage, teachers have become competent users of specific software packages, such as MS PowerPoint and MS Excel, which are believed to assist the teaching-learning process as well.

Lesson Preparation and Planning

Lesson preparation and planning is one of the most common uses of laptops among these teachers. It is found that having a laptop affords greater access to resources for lesson preparation and planning. Teachers commented, during interviews, that personal access to a laptop had an extensive impact on their planning and preparation of resources to be used in lessons – both in terms of their time management and quality of work they were able to produce:

> It helps a lot and saves a great amount of time because when I wanted to do reference, I can just flap open the laptop and I can get everything there. It benefits me a lot.
>
> (R1, Teacher Interview)
>
> … to set the monthly tests using the laptop … the sheet is nicer, neat and clear, but if you use handwriting, it is a mess. I like to see my work looking smart.
>
> (R2, Teacher Interview)
>
> We were provided with lesson plans in the courseware. So I only have to plan for the appropriate activity.
>
> (R3, Teacher Interview)
>
> I print [worksheets] from the I-bank and e-Test. We have worksheets in the Question Bank supplied by the Curriculum Development Center.
>
> (R3, Teacher Interview)

In terms of time, teachers reported that the use of laptop had helped them discharge their duties more efficiently. As one teacher commented:

> What I can say about [the benefit] is in the preparation of assessment sheets. When using the laptop, I can edit, make corrections to the sheets, add or erase questions easily compared to the previous method. This laptop really helps a

> lot in that point … [it] saves time. I can do my work more efficiently … and it gives me work enjoyment.
>
> (R1, Teacher Interview)

Another teacher indicated that she used laptops to create assessment sheets at home:

> I can set assessment sheets earlier. Whenever I am free I can use it, especially if I bring the laptop home.
>
> (R3, Teacher Interview)

In summary, as teachers are becoming more confident and competent with a range of software packages, they are extending their capacity to access resources for lesson preparation and planning.

Use of Resources

Another major use of laptops is in the use of resources. The teachers said that laptop ownership had given them access to a greater range of resources primarily from the Internet. With the Internet access, they could download resources and games that they could use in the classroom.

> … in terms of referring assessment sheets from boarding school, I do surf the Internet for references.
>
> (R1, Teacher Interview)
>
> I use the Google to search for Mathematics [resources]. I download mathematical sheets. I do have games for students which I get from the Internet such as Mathematics Puzzles … they like it … I feel that it has a good impact on the students.
>
> (R2, Teacher Interview)
>
> There are lots of resources compared before, where I only refer from the reference books.
>
> (R2, Teacher Interview)
>
> Apart from the CD in the text book, I download [resources] from the Internet … they provide related websites for each

> topic in the text book. For example, the Pythagoras Theorem. I just follow the link as provided in the text book.
>
> (R3, Teacher Interview)

Not only has teachers' increased use of Internet allowed them to access a vast range of up-to-date, quality resources, but it has also saved them cost. For example, a teacher commented:

> … I have a collection of assessment sheets [that] I store in my laptop. I can directly display it from the laptop [in conjunction with white screen] to my students … they can answer them together … [if] I print it out, it costs a lot. But if I display it directly to the students, everyone can read, copy down and answer the questions.
>
> (R2, Teacher Interview)

Challenges of Implementation of Laptop Integration in Schools

Training

The interviews revealed that none of the respondents received any ICT training prior to their appointment as PPSMI teachers. They received their training after their appointments. There were two types of training; the on the job informal training that the teachers received from their colleagues, and the formal training carried out by the Ministry of Education. In terms of training, all the respondents claimed that the training were inadequate. R2 for example claimed that they have to develop new skills all the time. Therefore, she suggested that the number of training and course be increased. R3 also suggested that the training should be geared to the particular needs of the teachers.

R3 also shared the same opinion. She thought that the training was not adequate. She took her own effort to participate in an in-house training for new teachers to keep abreast of new developments.

> Since I was appointed as PPSMI teacher, I had attended training once, and the second one I joined a group of teachers who have just received their laptops. I just want to refresh my knowledge.
>
> (R3, Teacher Interview)

As a whole, the teachers received training to do their job, although the training may not be adequate and the courses that they have attended were not geared towards the particular needs of the teachers.

Technical Support

During the interviews, all three teachers reported that there is no ICT technician available in their school. They indicated that other than help from colleagues, they did not receive any technical support.

> I get technical assistance from colleagues who are competent in the computer field … we do not have technicians in school yet.
>
> (R1, Teacher Interview)

The respondents pointed to technical problems as hindering the implementation of laptop programme. However, R1, R2 and R3 agreed that as teachers become more familiar with laptops, it is expected that they will be able to solve more technical problems directly in the classroom and thus require less technical support.

Teacher's Concerns

This section deals with other problems and challenges that were not anticipated prior to the interview. For example, from the interviews, the researcher found that there are three types of concerns that the teachers address. The first concern is about the virus attack, the second is about laptop security while the third is about their credibility in handling ICT equipments.

About the first concern, although laptops have afforded the teachers a greater range of resources for lesson preparation and planning primarily via the Internet access, it poses problems to the teachers as respondent R1 commented:

> The most common [problem] is when I was about to surf the Internet, it [laptop] hangs due to the virus attack in the laptop.
>
> (R1, Teacher Interview)

Secondly, the potential threat of theft can act as a deterrent to teachers considering bringing their laptops home. The teachers lamented that transporting laptops between home and school poses a potential security risk.

> If I bring the laptop back home, I have to take care of it under my own risk … [if there were] theft and so on, then I have to replace it. Most of the teachers do not bring it back home.
>
> (R2, Teacher Interview)

On the third concern, the teachers point out that technical problems are hindering their competence in handling the laptops and other ICT gadgets. They feel that their credibility is being undermined whenever technical problems occur, especially in front of their students or principal.

> I will feel so tensed up if the technical problems occur when I am being observed by the principal, the head of department or external observer. It is really frustrating because I have made the necessary effort to give my best, but yet I have to give up on it because of technical problems.
>
> (R3, Teacher Interview)

The teachers feel irritated when they cannot troubleshoot or overcome the problem. They commented:

> I feel stressed because it interferes with my teaching and delays my work.
>
> (R1, Teacher Interview)
>
> I am frustrated, because the objectives of the lesson cannot be achieved and I feel frustrated because the materials are all gone … I would like to have training on repairing [laptops] because sometimes it is just a simple technical problem and actually it can be fixed.
>
> (R2, Teacher Interview)

Teachers who have yet to benefit from the laptops and ICT facilities are often frustrated because they could not realize the pedagogic potential of using these tools, as one of the respondents stated:

> The Government did provide us with laptops, but then we have to learn on our own. It demotivates us. At least they should have a refresher course on how to repair the laptop, or install new systems in the laptop.
>
> (R2, Teacher Interview)

DISCUSSION

In this section, the analyzed data will be discussed so that a satisfactory conclusion can be reached. The discussion will be divided into two sections. The first section deals with the benefits of having laptops that include teaching-learning, laptop competence, lesson preparation and planning, and the use of resources. The second deals with the problems and challenges such as training and technical support while the third is teacher's concerns of laptop ownership. In this discussion, the problems and challenges are viewed as constraining factors that may prevent the teachers from discharging their duties to the best of their ability.

Benefits

Laptops are used in a wide range of ways but overall these three teachers use the laptops mainly in the teaching-learning process, preparing and planning of lessons, and in finding resources. R2 and R3 agreed that their continuous use of laptops has substantially increased their competency in handling the ICT equipments.

In the context of teaching-learning, all the teachers except R1 agreed that when laptop was being used, it increased student attainment and they were more engaged in learning. These findings are similar with the evaluation of Fullerton School District Laptop programme by Warschauer and Grimes (2005) and Maine's One-to-One laptop programme (Silvernail & Lane, 2004). They found that the use of this mobile technology during the teaching-learning process raises students' interests and that they are more actively involved in the learning process.

On preparation and planning of lesson, the teachers had extensively expressed how the laptop had significantly improved their time management and quality of work. Previous studies have confirmed that teachers enjoyed preparing lesson plans using laptop because it saved time (Cunningham et. al, 2004) and helped produce a higher quality of work (Silvernail & Lane, 2004).

In terms of the use of resources, teachers reported that laptop ownership had given them access to a greater range of resources primarily from the Internet. The ability to download resources and games was positively endorsed by these teachers who valued the greater choice and access to a range of resources that personal access to a laptop had afforded them. These findings are similar with a research by Cunningham et. al (2004) who found that personal access to laptops had allowed teachers greater freedom in accessing the Internet to search for resources.

Problems and Challenges

Training

With regards to training, the research findings showed that generally R1 and R2 are quite well trained. Although they did not receive any ICT training prior to their appointment as PPSMI teacher, they received informal hands-on training from their colleagues. Besides that, they were given formal training by the MOE. While these courses and training are adequate for handling basic computer applications, refresher courses and training should be carried out from time to time. The refresher course is necessary for teachers to keep abreast of current developments. Table 1 shows the types of training that the teachers received after their appointment.

Table 1: Types of Training Received by the Teachers

Type of Training	*Type of Skills Received*
Informal Training	i. Consists of hands on training from colleagues ii. Training that the teachers received in their student days when pursuing their degree
Formal Training	Consists of training and courses conducted by the Ministry of Education that include the following i. Induction course ii. Basic computer training and courseware handling

The teachers think that there are three things that ought to be considered when planning a course or training. First, the course should be geared towards the particular needs of the teachers. As R3 stated, every teacher has a particular need of their own. She cited that teachers only learned on their own to handle and repair desktop computers while using laptops in their daily duties. She therefore suggested that the training of PPSMI teachers must be tailored

towards the management and repair of laptops while not excluding other ICT gadgets and software as well.

Secondly, R2 suggested that besides hands-on training on managing the hardware ICT tools, teachers should be given systematic and continuous training on how to operate software and applications to create and prepare teaching materials.

> I would like to undergo more training programmes because sometimes we want [to learn] new software. And the best training is to do it systematically and continuously. I hope to have something more challenging, preparation of materials per se.

Another significant point that the researchers would like to propose is that besides learning about theory, courses conducted should emphasise on the integration of ICT in the teaching of Science or Mathematics. To enhance effectiveness, future courses should be conducted in smaller groups so that participants are more focused and specialized in order to facilitate better understanding.

Technical Support

During the interviews, all three teachers noted that there were no technicians in their school. They sought technical assistance from their colleagues whenever they faced technical problems such as malfunctioning of laptops. The teachers agreed that they need more time to familiarize themselves with the machine in order to become competent users of such technologies. These findings are in congruence with that of Maine's One-to-One Laptop programme. The programme reported that the teachers need more technical support. It was also reported that teachers also lack the time to explore and learn more about the uses of laptops which consequently, hinders the integration of the technology into the teaching-learning process (Silvernail & Lane, 2004).

Concerns of Laptop Ownership

The main cause for concern for teachers in relation to the use of laptop is security. This finding, as the researcher noted, is similar to the research by Cunnningham et. al. (2004) who found that 88% of the teachers involved in the evaluation of Laptop for Teachers (LfT) initiative were concerned about laptop theft or loss while transporting the machines.

The respondents are also concerned about virus attack. They lamented that their work are disrupted when this happens. Apart from that, the teaching-learning process is also further disrupted when the lesson objectives cannot be met.

CONCLUSION

The objective of the research is to explore the benefits and challenges of using laptops among three schools teachers in Malaysia. The findings of this research reveal that there is no doubt that laptop has played an important role in teaching-learning as well as a powerful tool in helping the teachers discharging their daily duties such as preparing lessons, searching for resources and had consequently improved their proficiency in handling ICT tools. These findings confirmed studies by Windschilt and Sahl (2002), Cunningham et. al. (2003) and Cowie and Jones (2005) that noted technology can develop the professionalism of teachers. In short, teachers benefit a great deal from the implementation of the laptop initiative for the teaching of Mathematics subject.

However, problems and challenges in the daily duties of the teachers come in many forms. Lack of competency (Noh, 2005) on the latest technology, reconceptualization of teaching methods (Becker and Ravitz) and scheduling problems (Warschauer & Grimes, 2005) may be hindering the full utilization of laptops by teachers. Apart from these, Chong et al. (2005) reported that there are still teachers who are reluctant to use technology. Noh (2005) indicated that teachers may be unwilling to use technology because they lack the skills to use such tools. Noh (2005) further stated that teachers are not keen to advance their professional development although there are such training courses available. However, the findings of this study contradict with those by Noh (2005). The research findings of this study found that professional development training programmes are quite limited, thus teachers have very little opportunity to acquire new knowledge and skills to use the laptops more effectively in the teaching-learning environments.

The research findings have been extensively analyzed and discussed and comparisons were made to similar or parallel literature researches. Teachers' needs and concerns are discussed pertaining their problems in using the portable technology. In some parts of the discussion, some suggestions were also advocated for future considerations. In the aforementioned discussion, it was pointed out that the problems and challenges discussed are viewed as constraining factors that may hinder teachers from discharging their duties to the best of their ability. The findings of this research confirmed the existence of

these constraining factors. On the other hand, the interviews also revealed that there were many exciting and positive impacts of using laptops in the learning environments.

The findings of this research have suggested that teachers have reaped the benefits of mobile technologies for their professional development. Indeed, this exploratory research has paved the way for further research to be conducted to better understand the benefits and drawbacks of such laptop immersion programmes in national schools. There are many areas that need to be explored more deeply or more extensively. It is hoped that more research whether qualitative or quantitative in nature could be carried out to enhance our knowledge on this exciting topic.

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