Chapter 19
Using WEDPI Learning Package to Upgrade Teacher's Skills on Information Technology

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ABSTRACT

The change in teaching techniques which applies information technology brings about a paradigm shift in our country's educational system. However, past researches have shown that the application of information technology in classrooms is still at an unsatisfactory level. This is caused by a group of teachers who haven't been able to master the basic skills of information technology application even after attending the courses. Therefore, the purpose of this research is to determine the level of skillfulness of primary school teachers - especially those in the interiors – on information technology, and thereafter develop a multimedia learning package (WEDPI Package for Learning) which will hopefully assist these weak teachers to increase their level of skillfulness in information technology. WEDPI refers to the productivity tools, which includes applications for word-processing (Microsoft Word), electronic spreadsheet (Microsoft Excel), database (Microsoft Access), presentation (Microsoft PowerPoint) and the **I***nternet. This research adopted the quantitative approach and the ADDIE model was used in the development of this multimedia learning package. To obtain information on the level of skillfulness, the researcher carried out a hands-on test. The pre-experimental designs, which are the pre-test and post-test, were executed to determine if there were any difference in the level of skillfulness of the teachers after using the WEDPI Package for Learning. The research findings showed that teachers involved gave positive comments about the experience in using this stand alone learning material. The respondents also stated that the WEDPI Package for Learning is easy to use, flexible and is able to help them increase their level of skills in information technology. This is supported by the t-test results which show that there is a significant difference in the achievement of teachers' scores*

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INTRODUCTION

The development of information and communication technology influences much of our culture and lifestyle. The application of technology in teaching and learning gives a new paradigm in teacher's teaching techniques. Previous studies have proven that the application of ICT has been able to revolutionize teachers' teaching techniques and pupils learning method. Meanwhile the time has come for schools to be informative, creative and wise by applying information and communication technology (ICT) (Ministry of Education, 2003). Smart Schools were established to give a wide place for computer technology in education system in the country. This move will narrow the digital divide between the rich and capable of using the technology at home and the less fortunate group (Ministry of Education, 1997). This facility could give more opportunity to the students to explore, control and develop various skills and knowledge more effectively and further relate the knowledge with the reality. This would finally be able to produce knowledgeable generations and smart competition to realize the country's 2020 vision.

The government's vision to build and develop human capital in the future is very much dependent on the quality of our national education system. Hence, the Education Development Master Plan (PIPP) 2006-2010 has been planned to implement and realize a holistic and world class education system. It was launched by former Prime Minister Abdullah Ahmad Badawi on January 16, 2007 (Ministry of Education, 2007). The plan outlined six cores and one of the main cores, human capital development, focused to produce a competent workforce in science and technology. Accordingly, the emphasis in this case can be seen from the program or the steps taken in the Report Card Education Development Master Plan. Among the steps the Ministry of Education have taken for rural schools are:

- Allocating Ringgit Malaysia (RM) 82 million to provide tele conference equipments, satellite phones and wireless fax facilities to 5800 urban and rural schools
- Allocating RM 113 million to prepare course wares for teachers and pupils
- School Net access to all school including Government funded Religious School
- Expanding computer laboratories buildings by using cabin concept in low enrolment students cum rural schools
- Grouping Indigenous and Penan Schools by using video conference in i) knowledge sharing, based on teaching and learning, ii) data-sharing and iii) increasing achievement by sharing information with each other

In line with this move, it is necessary for teachers to equip themselves with information technology skills in order for the Malaysian Education Ministry initiative to meet the target set.

REVIEW OF LITERATURE

Based on the Malaysian Education Ministry planning, by year 2010, all 10,000 primary and secondary schools in Malaysia will become smart schools (Ministry of Education, 1997). This means that teachers must equip themselves to master the application of information technology and integrate it in teaching and learning. To achieve this objective, the government allocated RM 33.4 billion to the Ministry of Education in 2007 (Treasury of Malaysia, 2007). The allocation of RM 10.1 billion for information technology-based training programs was to provide schools with computer facilities and Internet access. Previous studies showed that government has spent millions of ringgit just for software licenses. For implementation of computer labs in schools, the government paid RM 25 million to Microsoft Corporation in 2001 (for software such as Microsoft Office, Windows

2000 Server, Windows 98 and others). The same amount was paid to Microsoft Corporation in 2002 and 2003 with the expenditure approaching 100 million Malaysian Ringgit for three years (Saad, 2004). Saad (2004) also stated that the government will pay more than 500 million Malaysian Ringgit in the coming three years for various licenses for Microsoft products.

The government's move to implement teaching and learning of science and mathematics in English (PPSMI) in the year 2003 had caused the government to spend RM 15 million on Microsoft Corporation for year 2002 which then accumulated to nearly RM 100 million (Saad, 2004). The payments for these licenses will continue to increase with the update version of every Microsoft product. Therefore, it is highly wasteful if teachers are unable to effectively use and apply it in the classroom. Previous findings by Robiah and Juhana (2002) showed that the minimum application of computers by teachers indicated that the scenario as being less encouraging. The findings also showed that teachers often used word processing programs but rarely used database software, multimedia presentation, graphic presentation, electronic mail and web in teachings. Even the scenario today has not changed much as many teachers have yet to master the skill of information technology.

Mohammed Sani *et al*. (2004) found that teachers who followed the in-service course (KDP) for 14 weeks were still incompetence in selecting and using software, planning and designing learning package. This was also supported by Noor Awanis *et al.* (2006) who studied 21 teachers in a number of schools around Muadzam Shah, Pahang, Malaysia. The research showed that the teachers information technology skills were still at the basic level while their knowledge of information technology was at the moderate level. Norizan (2003 in Megat *et al*, 2008) also found that teacher's failure in using ICT in their teaching and learning process could be attributed to the lack of computer skills. Based on previous studies, it showed that there were teachers who were unable to master the skills of information technology. These situations often referred to teachers serving in rural and remote areas (Mohammed Sani *et al.*, 2004: Noor Awanis, Nora & Nurazariah, 2006; Megat *et al.*, 2008). Contributing factors were distance, lack of accessibility and communications facilities that created problems for the teachers. These issues led to the delay in receiving of computer course invitations and also services required to maintain the computers and programs installed (Johan, 2003).

According to Young (2004), this scenario was alarming considering that teaching using information technology would be ineffective if it is conducted by teachers who do not have the necessary information technology skills. Based on the issues and problems that have been discussed, more measures and initiatives are therefore necessary to help teachers to master the skills of information technology. Furthermore, this study will develop a multimedia study package called WEDPI Learning Packages that use ADDIE instructional model with the objective to help teachers to master the application of information technology. WEDPI stands for Microsoft Word, Microsoft Excel, Microsoft Access (Database), Microsoft PowerPoint and Internet. Meanwhile ADDIE instructional model refers to Analysis, Design, Development, Implementation and Evaluation.

PURPOSE OF STUDY

This study attempted to answer the following questions:

- Are teachers in rural areas able to use word processing, electronic spreadsheet, database, presentation and the Internet?
- Will the teacher's skills in using the five computer applications increase after using the WEDPI Learning Package?

METHODOLOGY

This is a quantitative study involving pre and post tests on a group. The study was conducted in seven primary schools in rural areas in Pitas District, Sabah, Malaysia and involving74 teachers. The demographic data of the sample is shown in Table 1.

The teachers involved were divided into three groups using stratified sampling. The groups were formed based on the result of the hands-on information technology skills test. The three groups are: i) less skilled (respondents completed less than 50% of the overall task), ii) moderate (respondents completed 50% to 79% of the overall task) and iii) skilled (respondents completed more than 80% of the overall task).

Table 1. Demographic data

	Frequency (N)	Percentage (%)
Gender		
Male	29	39.19
Female	45	60.81
Total	74	100
Age		
19 to 29 years	17	22.97
30 to 39 years	39	52.70
40 to 49 years	14	18.92
50 years and above	4	5.41
Total	74	100
Opsyen		
Language	46	62.16
Science and Mathematics	17	22.98
Etc	11	14.86
Total	74	100
Status		
Permenant	65	87.84
Temporary	6	8.11
Contract	3	4.05
Total	74	100
Length of Services		
Less than 1 year	8	10.82
1 to 4 years	11	14.86
5 to 10 years	25	33.78
11 to 15 years	17	22.97
16 years and above	13	17.57
Total	74	100

Teachers who were less skilled were exposed to the WEDPI learning package for three weeks. After which, a post test was conducted. The information technology skills test was divided into five parts, namely word processing, electronic spreadsheet, database, presentation and the Internet. The items were categorized into three tasks, namely basic operation, manipulation and design. The internal consistency of the instrument for the actual study was calculated. The score of each item was summed up and the KR-20 values showed the value of good consistency with each parts recording above 0.7.

OVERVIEW: WEDPI LEARNING PACKAGE DESIGN

The WEDPI Learning Package was developed using ADDIE model. This is a step by step model consisting of five steps. The steps are Analyzing, Design, Develop, Implementation and Evaluation. In the analyzing step, the researcher analyzed the needs of the teachers by conducting interviews and a pilot test. The interviews involved two information technology officers from Pitas and Kota Marudu District Education Office, Sabah, Malaysia. The pilot test that measured information skills was conducted on 35 primary school teachers. The test showed the existence of teachers who were still unable to master the basic skills of productivity tools. In this research, productivity tools refered to five major computer applications consists of word processing, electronic spreadsheet, database, presentation and Internet. The datas were supported by the interview with the Information Technology officers. Hence, based

on the results and input from the interview, the content of the learning package was drafted and the expert's views were taken into consideration.

Based on the data collected and feedback obtained, the team agreed that the learning package should emphasize on learning five of the major computer applications namely word processing, electronic spreadsheet, database, presentation and Internet with a minor modification. Selection of topics for each application of information technology was made based on Patricia and William (2003). The content of WEDPI Learning Package was designed to engage the user actively. Each section of interface in this package is not overloaded with information. Furthermore, the designs of multimedia elements such as texts, graphics, audio and videos are easy to understand and also user friendly. For the video elements, Microsoft Office 2003 and Internet Explorer were used as a platform. The video contents for each application are shown in Table 2.

The users were also provided with the module of WEDPI Learning Package. These enable users to use this package more effectively. The andragogy principles by Knowles (1990:54) and constructivism learning principles by Baharuddin *et al.* (2002:71-74) were integrated in the design and development of the learning package. Andragogy consist of learning strategies that focus on adults. It is often interpreted as the process of engaging adult learners with the structure of learning experience. Meanwhile, constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding. Therefore, it is simply the process of adjusting our mental models to accommodate new experiences. Tables 3 and 4 explain the key principles of andragogy and constructivism and the researchers' justification.

Furthermore, the designs of multimedia elements such as texts, graphics, audio and videos are easy to understand and also user friendly. For the video elements, Microsoft Office 2003 and Internet Explorer were used as a platform. Figures 1, 2 ,3 and 4 shows the interface of WEDPI package.

The WEDPI learning package was developed using *Authorware Macromedia version 7.0*. The software was chosen because of its flexibility, easy to manage and its ability to support texts, graphics, videos and audio. Other software that has been used in designing the learning package are *Adobe Photoshop 7.0, Camtasia Studio 5.0, Microsoft Word 2003, Microsoft Excel 2003, Microsoft PowerPoint 2003, Microsoft Access 2003, Internet Explorer 6.0 and ScreenCam 3.0.* After the WEDPI Learning package was devel-

Table 2. Video contents for each application

Applications	Video Contents
Microsoft Word	1. Video 1: Basic knowledge 2. Video 2: Document 3. Video 3: Edit text 4. Video 4: Text format 5. Video 5: Paragraph format 6. Video 6: Style 7. Video 7: Table 8. Video 8: Print 9. Video 9: File management
Microsoft Excel	1. Video 1: Basic knowledge 2. Video 2: Introduction of workbook 3. Video 2: Format electronic spreadsheet 4. Video 3: Formula basis 5. Video 4: Move and copy data / text 6. Video 5: Build chart 7. Video 6: Print 8. Video 7: File management
Microsoft Access	1. Video 1: Basic Knowledge 2. Video 2: Database (Database) 3. Video 3: Report 4. Video 4: Print Report 5. Video 5: Keep data base file
Microsoft PowerPoint	1. Video 1: Basic knowledge 2. Video 2: Presentation 3. Video 3: Format (Formatting) 4. Video 4: Template 5. Video 5: Importing Images 6. Video 6: Slide show 7. Video 7: Print slide
Internet	1. Video 1: Basic knowledge 2. Video 2: Data searching 3. Video 3: Electronic mail 4. Video 4: Download files from Internet

Table 3. Key principles of andragogy

Key Principles	Justification
1. Adults have a self concept of being responsible for their own decisions and can be self directed learner.	• WEDPI Learning Package is self-learning materials. • This package is included with the module providing information about the entire package and contents in each video.
2. Adults prefer to learn individually and people around them are their motivators.	
3. Adults prefer structured task and the contents that are not complicated.	• WEDPI Learning Package consists of videos collected by computer applications and is broken into specific videos that lead to real purpose.
4. Adults need to know why they need to learn	• The interface for each display in the main menu displays the objectives for each section.
5. Adults are ready to learn those things that they need to know and are able to do in order to cope effectively with their real life situations.	• Mastery of information technology especially in word processing, electronic spreadsheets, databases, presentations and the Internet is a requirement today.
6. Adults are task centred in their orentation of learning.	• WEDPI Learning Package allows users to move from one part to another by selecting the section on the menu bar. • Pull down menu allows users to move independently from one section to another and to skip the information if the information irrelevant.

Table 4. Key principles of constructivism

Key Principles	Justification
1. Computer based learning (CBL) must base on learner experience and provide a condusive learning environment.	• Pull down menu allows users to move independently from one section to another and to skip the information if the information is irrelevant. • The interface and videos in the WEDPI learning package are not loaded with too much information that would overwhelm and confuse users. • The pull down menu allows users to move independently from one section to another and to skip the information if the information is irrelevant.
2. CBL must be designed in a structured manner so that is easy to follow by the student.	• The pull down menu allows users to move independently from one section to another and to skip the information if the information is irrelevant.
3. CBL must be designed to facilitate extrapolation and fill in the blank space in the knowledge of students.	• The videos presented provide specific examples and explanations and step by step guides to the user. • WEDPI Learning Package also provides with and electronic notes.
4. CBL is student-centered where students can choose a topic to study, generate their own questions and plan their own learning.	• The pull down menu allows users to move independently from one section to another and to skip the information if the information is irrelevant.
5. CBL must allow students in and out of the learning environment at any time.	• The user can exit the software at any time by clicking on the image of a CD or pull-down menu.
6. CBL allows user to control their learning, including what to learn, when to maximize opportunities and associate new knowledge with previous knowledge.	• WEDPI Learning Package allows users to move from one section to another by selecting from the menu bar. • It also gives control to user by providing a control panel for each video. The user can stop, accelerate and play back video.
7.CBL encourages discovery learning. Students should be given activities that allow them to meet the principles of education and not giving principles to students.	• The pull down menu allows users to move independently from one section to another and to skip the information if the information is irrelevant.

Figure 1. Interface that show the video selection button for word processing application

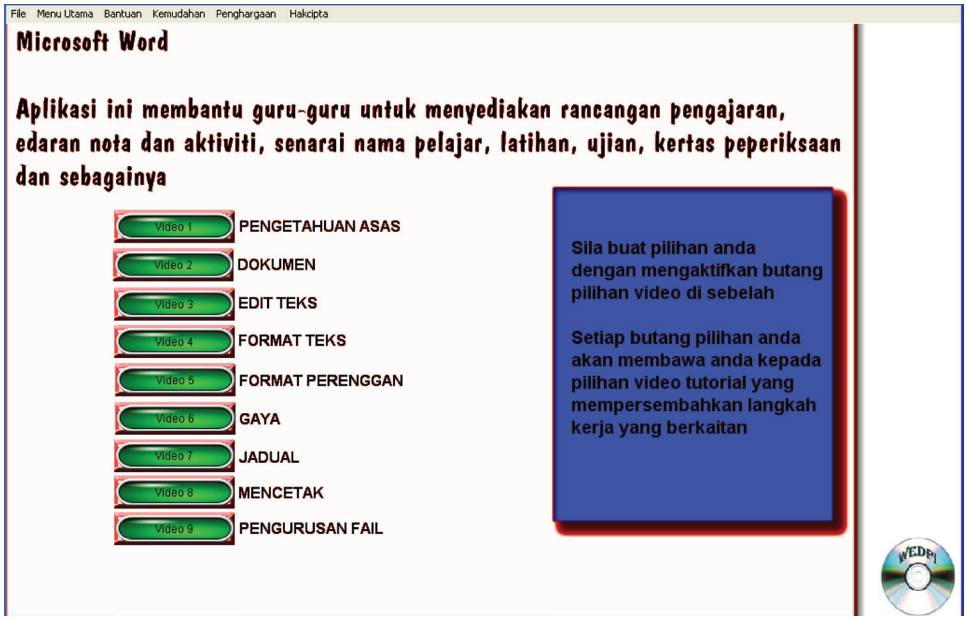

Figure 2. The opening interface for WEDPI learning package

Figure 3. The interface of video control panel

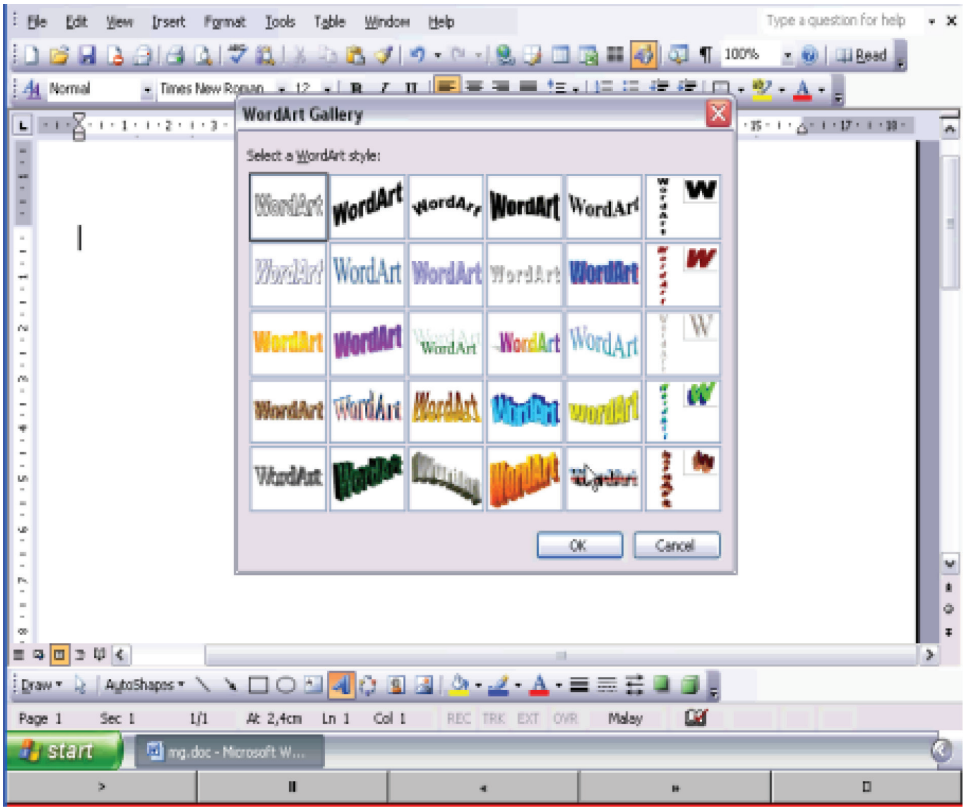

Figure 4. The drop-down menu of WEDPI

Table 5. Skills level frequency respondents against five computer application

Skill Level (n = 74)	**Computer application**									
	Processing Word		**Electronic spreadsheet**		**Database**		**Presentation**		**Internet**	
	n	*%*	**n**	*%*	**n**	*%*	**n**	*%*	**n**	*%*
Skilled	37	50.00	17	22.97	4	5.41	21	28.38	23	31.08
Moderate	30	40.54	24	32.43	23	31.08	19	25.67	18	24.32
Less skilled	7	9.46	33	44.60	47	63.51	34	45.95	33	44.60
Total	74	100	74	100	74	100	74	100	74	100

oped, a formative evaluation was conducted. During formative evaluation, six persons consisting of three teachers and three experts evaluated the learning package. All their comments and feedbacks to improve the learning package were taken into consideration.

During the implementation stage, teachers in the less skilled category were exposed to the WEDPI Learning Package for three weeks. A demonstration on how to use the learning package was made. After three weeks a post test was conducted. The teacher's scores during pre and post tests were analyzed statistically using SPSS *(Statistically package for social sciences)* Version 15.0. The output of t-test is considered summative evaluation for this package.

RESULTS AND DISCUSSION

To obtain information on the level of skillfulness, the researcher carried out a hands-on test on word-processing (Microsoft Word), electronic spreadsheet (Microsoft Excel), database (Microsoft Access), presentation (Microsoft Powerpoint) and the Internet. Findings in Table 5 shows the word processing application recorded the most number of respondents with a high level of skills (37 respondents), while the application database recorded the most number of respondents with a less skills (47 respondents).

Findings of this study are consistent with Mohammed Sani *et al*. (2004); Noor Awanis *et al.* (2006) which stated that the level of information technology skills of teachers were still at basic level. Statistical data showed more than 60% of teachers have not mastered application database consistent with Weiss (2003) and Jewitt (2006: 25) which stated that this application was not utilized by a large number of teachers due to the functions that are less relevant in the teaching and learning process. Meanwhile, word processing application recorded a high number of skilled respondents. The finding is consistent with previous studies (Vockell & Schwartz, 1988; Morrison, 2000; Su Luan 2002; Patricia & William 2003:22) which stressed on the positive effect by educator group using this application. At the same time, the level of skills of teachers in spreadsheet applications support the previous studies (Neiss, 1994; Paul & Keizer, 2000; Weiss, 2003) which stated that it was able to assist teachers in the management of students marks. Findings showed presentation and Internet applications were on the moderate level and consistent with previous studies (Jewitt, 2006; Vallance and Towndrow, 2007; Rozinah Jamaludin, 2007; Buckley & Smith, 2008) which stated that the usage of this applications were driven by an increasing awareness of teachers that it is beneficial to students teaching and learning process.

T-tests were conducted to determine whether there are differences between the scores of pre and post test on teacher's information technology skills after using the WEDPI Learning Package for three weeks. The t-test for word processing application (Microsoft Word) was not significant to interpret because there were only 7 respondents. This finding concluded that most respondents are skilled in word processing applications.

Result of pre and post tests for the application of electronic spreadsheet, database, presentation and the Internet are shown in Table 6. Data showed respondent scores in the post-test is higher than that obtained in the pre-test for all applications.

Table 7 shows t-test results of electronic spreadsheet, presentation, database and Internet application after using WEDPI Learning Package and findings show there is a statistically significant difference ($p < 0.001$) between pre and post test mean. This explains that WEDPI Learning Package was able to help respondents to enhance their skills in information technology applications specified. Study findings indicated that WEDPI Learning Package was able to assist teachers in rural primary schools that were less skilled to increase their information technology skills, par-

Table 6. Descriptive statistics pre and post test

Application		Mean	Frequency	Standard deviation	Standard error min
Spreadsheet	Pre Test	38.42	33	5.42	0.94
	Post Test	52.48	33	7.95	1.38
Presentation	Pre Test	37.90	34	5.37	0.92
	Post Test	52.76	34	10.98	1.88
Database	Pre Test	38.74	47	6.15	0.89
	Post Test	54.67	47	7.59	1.10
Internet	Pre Test	37.06	33	8.26	1.43
	Post Test	53.40	33	12.33	2.14

ticularly in the application of electronic spreadsheets, presentations, databases and the Internet.

CONCLUSION AND LESSON LEARNED

The group of respondents in the less skilled categories showed that they were able to complete tasks in the skill tests during post-tests that they failed to complete during pre-test. There are even some respondents in the less skilled category, who were able to complete more tasks after using the WEDPI Package Learning. This shows that the WEDPI Learning Package was able to help respondents to improve their information technology skills. Overall, the findings are consistent with previous studies (Wan Fatimah, 2004; Supyan, 2000; Tugba, 2004; Huann & Houn, 2004; Seng & Fraser, 2008) that stated computer based learning material are able to increase the level of skills in information technology. Respondents' awareness of the necessity to acquire information technology skills to upgrade self competency is a contributing factor to the findings. The andragogy concept stated by Knowles (1990:54) and constructivism principles (Baharuddin *et al.*, 2002: 71-74) integrated in the WEDPI Learning Package design also contributed to the findings of this study. Selection of content for the WEDPI Learning Package also led to the findings of this study. Perceptions of a positive attitude among the respondents on computer applications also contribute to the study findings. According to Hovland (1959), attitude is the main factor that influenced act and behaviour. Therefore, positive attitude facilitates the change of act and positive behaviour among teachers to master the application of information technology.

Table 7. T-test results

Application		Difference Pair Samples					t	Df	Significant level (2-tail)
		Mean	Standard deviation	Standard error min	Difference Confidence level 95% Below	Upper			
Spreadsheet	**Pre –Post test**	-14.06	7.13	1.24	-16.59	-11.53	-11.32	32	P<0.001
Presentation	**Pre –Post test**	-14.85	9.36	1.60	-18.12	-11.58	-9.25	33	p<0.001
Database	**Pre –Post test**	-15.93	6.94	1.01	-17.96	-13.89	-15.73	46	p<0.001
Internet	**Pre –Post test**	-16.33	9.39962	1.63	-19.66	-13.00	-9.98	32	p<0.001

The findings indicated that WEDPI Learning Package was able to assist teachers in rural primary schools who are less skilled to increase their information technology skills, particularly in the application of electronic spreadsheets, presentations, databases and the Internet. Meanwhile, the study also had given clear contribution of successfully combining adult students learning principle (andragogy) and constructivism in designing and developing computer based learning material. This study also gave an alternative resource to help the less skilled teachers in information technology application, and especially those serving in rural school with minimum opportunity to attend courses due to restraints of distance accessibility.

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KEY TERMS AND DEFINITIONS:

Andragogy: Learning strategies approach focused on adults.

Constructivism: Paradigm or views posits that learning is an active, constructive process where people actively construct or create their own subjective representations of objective reality.

Database: Software design to store, organize and manage information.

Information Technology: Knowledge of computer and telecommunications in order to retrieve, store and transmit information.

Internet: Worldwide system of computer networks that uses web as a medium of communication and accessing information.

Multimedia: Integration of more than one media type, such as that involving text, audio, graphics, animated graphics and full motion video.

Presentation: Software used to display information, normally in the form of slide show.

Spreadsheet: Software design with two axes: Row and Column. Spreadsheets make it easy to display information, and people can insert formulas to work with the data.

Word Processing: Software design to make computer a useful electronic writing tool for editing, storing and printing material.