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A National Survey on the Effective Use of CDRI and Educational TV Programme in Malaysian Schools

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Abstract

The purpose of this study is to evaluate the effectiveness of the teaching and learning materials developed by the Educational Technology Division, Ministry of Education Malaysia. The materials were tested in a variety of teaching and learning modes involving different learners' characteristics. In a nutshell, this study investigates the motivational level of the materials and related issues in developing and using them in the process of teaching and learning in schools. A total of 10 resource materials in the form of compact discs and educational television programmes (Rancangan TV Pendidikan) covering 10 topics in the teaching and learning of Science and Mathematics for year five (primary school) and form two (lower secondary school) were carefully studied. A total of 7,956 learners and 130 teachers involving 130 primary and secondary schools throughout the country and 12 related officers of the Educational Technology Division were chosen through a stratified random sampling method for this evaluative study. A survey, quasi-experimental and semi-structured interview methods were used to yield quantitative and qualitative data respectively. The independent variables for the quasi-experimental design involve two main factors; teaching and learning mode and learners' abilities. The results of this study show that the post-test scores of the content of the resource materials for all topics and categories of materials tested, particularly in the mastery of the difficult, quite difficult, quite easy, and easy concepts show an increase when compared to the pre- test scores. The comparison involves the low, medium and high academic achievers for every tested resource material. However, the increased scores of the mastery of the materials were not the same.

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Introduction

The Ministry of Education Malaysia, through the Educational Technology Division or *Bahagian Teknologi Pendidikan (BTP)*, has been supplying a variety of technological-based educational tools such as radio, television, live educational radio and television programmes (ERTVP), overhead projectors, computers and interactive compact disc educational courseware (CDRI) to schools to support and enhance the teaching and learning processes. Since 1977 one of the division's tasks is to plan and develop resources for educational softwares based on the national curriculum covering subjects such as *Bahasa Melayu* (Malay Language), English, Sciences, Mathematics, Islamic Education, Social S8uciences and Local Studies. The intention of the division is to encourage the use of ICT in enhancing the quality of teaching and learning in all Malaysian schools. The CDRI's materials, also known as *Perisian Kursus Pendidikan Interaktif,* are self-access, self-directed and self-paced in nature.

Statement of the Problem

The Ministry of Education Malaysia has made numerous efforts to encourage the teachers to diversify their teaching and learning strategies and many of them have not given serious attention to the educational materials supplied throughout the years (Abdul Rahman, 1993). This phenomenon, regardless

of teachers' probable reasons, could have been triggered by many factors. The ministry's Educational Technology Division, also known as *Bahagian Teknologi Pendidikan* (BTP), has taken a positive and proactive approach by evaluating the materials empirically in the quest of understanding the effectiveness of the materials in supporting the teaching and learning processes in the classroom. In so doing, the divison aims to understand the obstacles faced by the teachers and students in using the materials which are necessary in improving the quality of the materials.

Research Objectives

The study aims at:

i. Measuring the effectiveness of three kinds of CDRI;s materials, known as *Bestari, PMP and RTVP*, in various modes of teaching and learning involving mixed-ability students in their effort of mastering the content's concepts set at various difficulty levels.
ii. Getting feedback on the motivational level of the materials and related issues in developing and using them in the process of teaching and learning in schools. The motivation was measured using the Instructional Materials Motivational Scales (IMMS).
iii. Exploring the obstacles and challenges faced by the teachers and the students in using the CDRI's materials in the teaching and learning process in schools.

Methodology

A survey, quasi-experimental and semi-structured interview methods were used to yield quantitative and qualitative data respectively. The quasi-experimental method was used to measure the effectiveness of the materials in three different teaching modes namely Mode A, Mode C, and Mode D. A control group, Mode B, was taught with the same topics as in the other three modes by the same teachers but without the materials (See, Table 1). The pre-test was conducted two weeks before the treatment and the post-test was done immediately after teaching each material in all of the four modes.

The data used for comparing the effectiveness of the tested materials, taught in the four teaching modes, were the differences in the percentage of the students who demonstrated mastery of the quite difficult and difficult concepts taught. Thus, the differences were obtained by comparing the percentage of the students, in the pre-test and post-test, in mastering the quite difficult and difficult concepts.

Other than the post-test (O2) administered in all of the teaching modes, all of the students in Mode C were given the IMMS survey form. The Likert Scale's items of the IMMS asked 36 questions on the motivational components of the tested materials which were based on Toh & Fattawi (2001) which is an adaptation of Keller's (1986) Instructional Materials Motivational Scales. The scales measured the motivational aspects of the materials such as the attention, relevance, confidence, and satisfaction of the users. Semi-structured interviews were conducted on selected teachers and students in gathering their experiences and views in using the materials. The interviews were conducted to understand the nature of the obstacles, and hindrances faced in using the CDRIs and the overcoming strategies and suggestions to improve the materials

Sampling

Purposive sampling technique (Mertens, 1998; Babbie, 2001; Krejcie and Morgan, 1970) being used in identifying the targeted samples throughout the 13 states and 2 Federal Territories in Malaysia. Out of the 7529 schools in Malaysia a total of 131 primary and secondary schools were chosen involving 131 teachers and 7956 year five and form 2 students (Ministry of Education, 2004). 15 of the identified teachers and 33 of the students were interviewed. Table 2 displays the distribution of the samples based on states, types of school and the three types of the tested materials.

Table 1 Quasi-Experimental Research Design for Modes A,B,C, and D

Mode A	O_1 → X_A → O_2	Experimental Group
Mode B	O_1 → X_B → O_2	Control Group
Mode C	O_1 → X_C → O_2	Experimental Group
Mode D	O_1 → X_D → O_2	Experimental Group

Note:

O_1 = Pre-test
O_2 = Post-test
X_A = Teacher teaching selected topics using the materials in the classroom
X_B = Teacher teaching selected topics without the materials in the classroom
X_C = Student's individual learning using the materials in the computer lab.
X_D = Teacher teaching selected topics using the materials in the computer lab.

Table 2 Distribution of Samples Based on State, School Level and Type of Material

Educational Resource Materials	States	Primary Schools Year 5 (Age 11) SK	SJKC	SJKT	Secondary Schools Form 2 (Age 14) SMK	SMKA	SB	No. of Teachers	No. of Students
	SELANGOR	*Excluded from the study*							
CDRI	PAHANG					1	5	**6**	**324**
Bestari	LABUAN						2	**2**	**108**
(3 Modes)	TERENGGANU					1	3	**4**	**216**
	KUALA LUMPUR	1					6	**7**	**378**
	PERAK	5			5	1		**11**	**792**
CDRI	NEGERI SEMBILAN	3			3	1		**7**	**504**
PMP	PULAU PINANG	5			4	1		**10**	**720**
(4 Modes)	PERLIS	4			4	1		**9**	**648**
	SABAH	5			5	2		**12**	**864**
	KELANTAN	2	2	1	2	2		**9**	**486**
RTVP	JOHOR	2	2	2	2	2		**10**	**540**
(3 Mod)	MELAKA	4	2	2	4	2		**14**	**756**
	SARAWAK	5	2		5	1		**13**	**702**
	KEDAH	5	2	3	5	2		**17**	**918**
Total		**41**	**10**	**8**	**39**	**17**	**16**	**131**	**7956**

Note :	*SK*	-	*Sekolah Kebangsaan (National Primary School)*
	SJKC	-	*Sekolah Jenis Kebangsaan Cina (National Primary School-Chinese)*
	SJKT	-	*Sekolah Jenis Kebangsaan Tamil (National Primary School-Tamil)*
	SMK	-	*Sekolah Menengah Kebangsaan (National Secondary School)*
	SMKA	-	*Sekolah Menengah Kebangsaan Agama (National Secondary School- Religious)*
	SB	-	*Sekolah Bestari (Bestari School- Smart School)*
	RTVP	-	*Rancangan TV Pendidikan (Educational TV Programme)*
	CDRI PMP	-	*Multimedia Interactive Educational Course Software for difficult to teach topics (PMP= Pelbagai Media Pendidikan)*
	CDRI Bestari	-	*Multimedia Interactive Educational Course Software designed based on the primary and secondary school's Integrated national curriculum which is self-access, self-paced and self-directed (Bestari= Smart). Wider adoption of ICT by the government to boost capabilities in every field including education .*

Instrument

The data gathered in this study involves four (4) different sets of instruments:

1. Pre-test and Post-test materials. A 20-MCQ-item test based on selected topics in Mathematics (Year 5 and Form 2), and, Science (Year 5 and Form 2). The items, developed by selected expert teachers, tested easy, fairly easy, fairly difficult and difficult concepts of the topics.
2. IMMS Survey. This survey is based on Keller (1987) and
3. Toh and Fattawi (2001). It consists of 36 Likert scale items on four motivational components namely *Attention, Relevance, Confidence and Satisfaction*, shortly ARCS. This test was given to all of the students in Mode C only.
4. Semi-structured Interview Protocol for Student. 9 interview questions probing into the students' perceptions on their understanding, use, learning effects, the best way to utilize the materials, problems encountered while using the materials and ways to solve them, and the use of English language in the materials.
5. Semi-structured Interview Protocol for Teacher. 15 interview questions comprising teacher's understanding, the process of utilizing the materials, obstacles faced, and suggestions to improve the quality and use of the materials.

Data Analysis

The scores from the pre and post tests and the IMMS survey were analyzed by utilizing the *MS Excell,WINSTEPS* version 3.0 and the *SPSS* version 11.5 respectively. The interview data were transcribed, analyzed, coded and the main ideas were extracted rigorously (Miles and Huberman, 1994).

Research Findings

The Effectiveness of the *CDRI Bestari, CDRI PMP & RTVP* –Quasi- Experiment

1. In all of the above tested materials the percentages of students who surpassed the mastery level (quite difficult and difficult concepts) in the post-tests are higher and significant than the pre-tests ones.
2. The percentages of students who show an increase in mastering the quite difficult and difficult concepts in Mode A (teachers using the three materials in an ordinary classroom) are much higher and significant than the other teaching and learning modes. In fact, the same result, where Mode A is far better, appears in all of the tested materials. Please refer to Figures 1, 2, and 3.

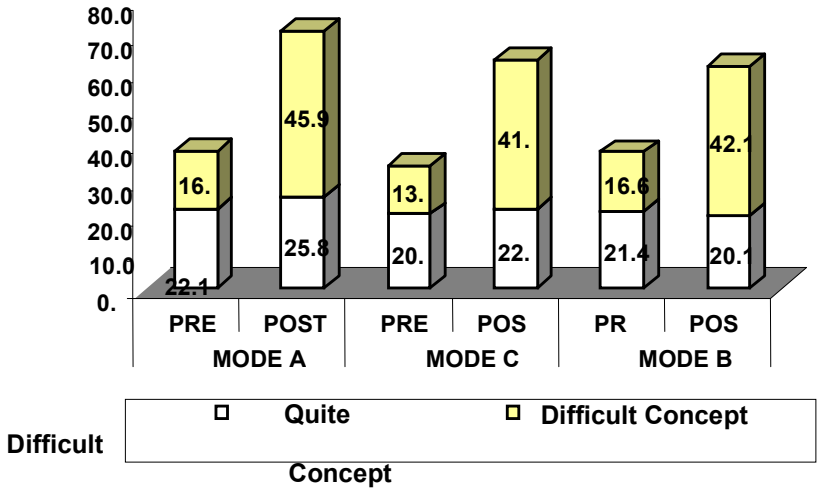

Figure 1 *CDRI Bestari*: Students' Percentage Differences in Mastering the Difficult and Quite Difficult Concepts in Various Teaching and Learning Modes (Mode A, Mode C, and Mode B)

Note: The differences between the pre and post-tests are significant at p≤0.05. The differences in mastering the concepts among the modes are also significant at p≤0.05.

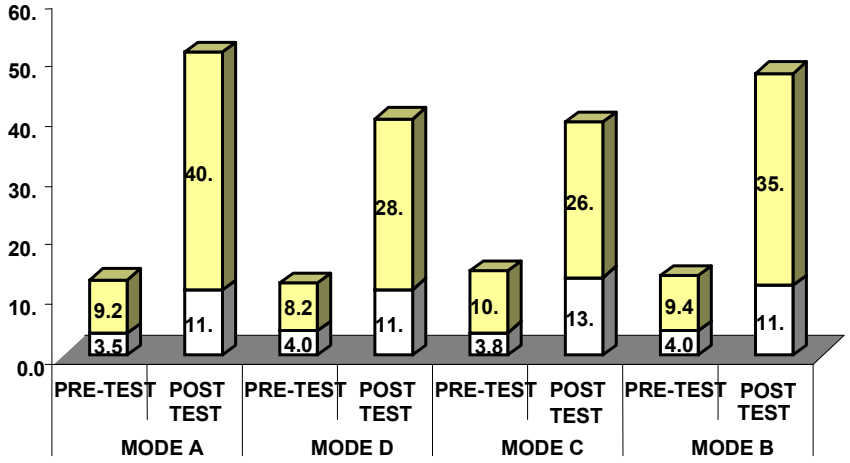

Figure 2 *CDRI PMP*: Students' Percentage Differences in Mastering the Difficult and Quite Difficult Concepts in Various Teaching and Learning Modes (Mode A, Mode D, Mode C, and Mode B)

Note: The differences between the pre and post-tests are significant at p≤0.05. The differences in mastering the concepts among the modes are also significant at p≤0.05

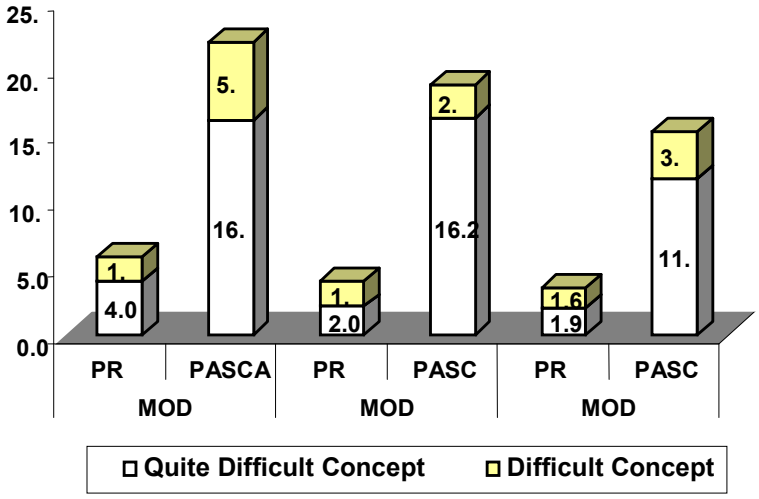

Figure 3 *RTVP*: Students' Percentage Differences in Mastering the Difficult and Quite Difficult Concepts in Various Teaching and Learning Modes (Mode A, Mode C, and Mode B)

Note: The differences between the pre and post-tests are significant at $p \leq 0.05$. The differences in mastering the concepts among the modes are also significant at $p \leq 0.05$.

The Elements of Motivation in the Teaching and Learning Materials (*CDRI Bestari, CDRI PMP,* and *RTVP*): Survey

The students perceived that the motivational components in all of the tested materials comprising of Attention, Relevance, Confidence, and, Satisfaction as high. Please refer to Figures 4, 5, and 6.

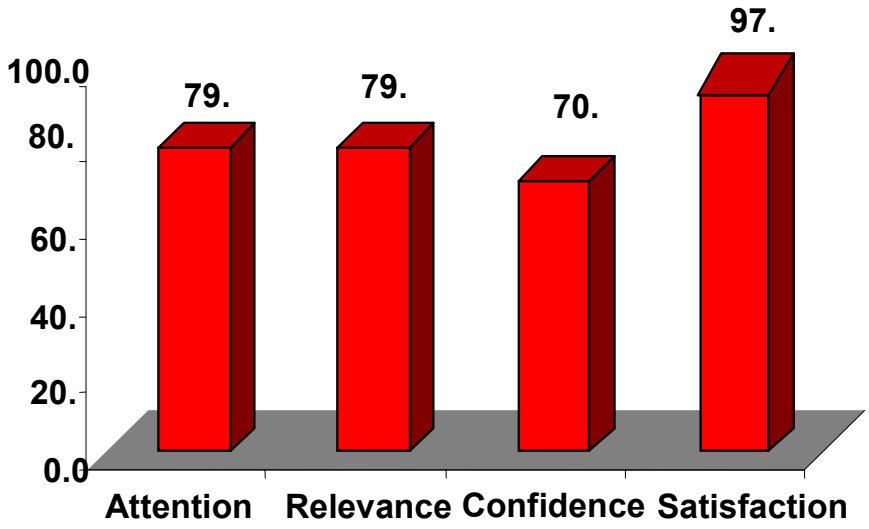

Figure 4 *CDRI Bestari*: Students' Perceptions on the Motivational Components of the Teaching and Learning Materials

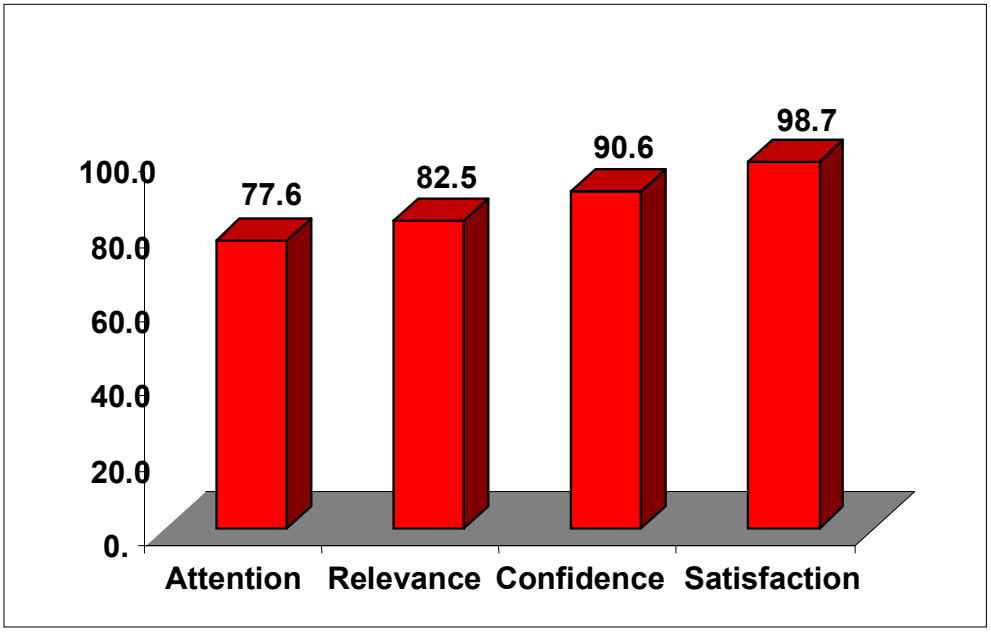

Figure 5 CDRI PMP: Students' Perceptions on the Motivational Components of the Teaching and Learning Materials

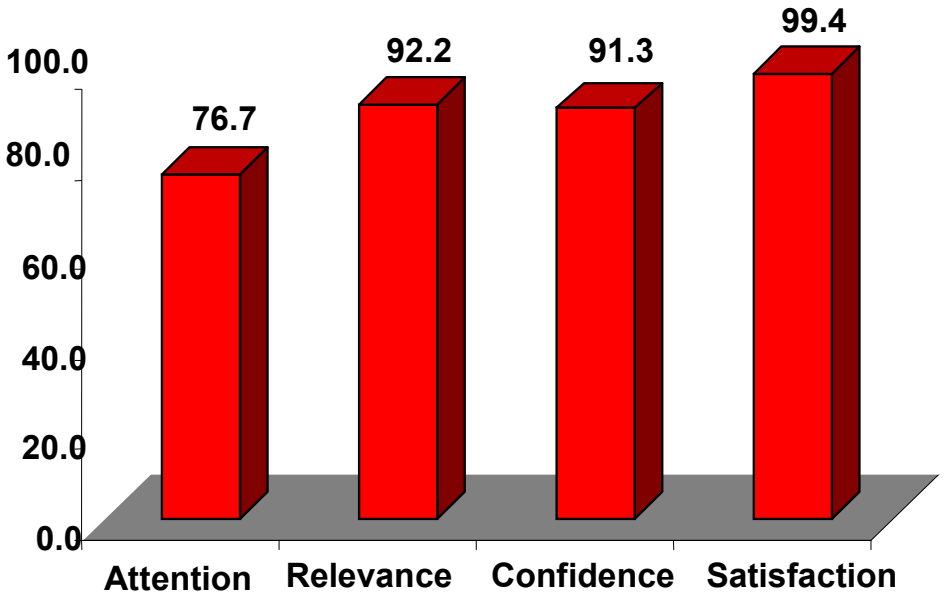

Figure 6 *RTVP*: Students' Perceptions on the Motivational Components of the Teaching and Learning Materials.

Students and Teachers' Views on the Use of the Teaching and Learning Materials (CDRIs and RTVP): Semi-Structured Interviews

A total of 33 students and 15 teachers were interviewed on various questions on fact, belief, attitude, and behavior related to the use of the supplied materials in their schools. The distribution of the selected informants is in Table 3.

Table 3 The Distribution of the Informants by Types of Material, State and School

Educational Resource Materials	States	Primary Teachers	Secondary Teachers	Primary Students	Secondary Students	Total No. Informants
CDRI Bestari	Labuan	0	2	0	4	6
	Terengganu	0	2	0	4	6
	K. Lumpur	1	2	3	3	9
CDRI PMP	N. Sembilan	1	1	4	3	9
RTVP	Sabah	1	1	2	3	7
	Johor	1	1	1	2	5
	Kelantan	1	1	2	2	6
Total		5	10	12	21	48

CDRI Bestari

(a) Students

A total of 14 students (3 students from primary school, 11 from secondary school), were interviewed based on eight semi-structured interview questions. The students said that the use of the *CDRI Bestari* softwares in their schools is still low but with the belief that it can be enhanced. The students gave positive views on the effect of the *CDRI Bestari* on their learning especially in supporting their understanding of the topics and enhancing their knowledge. It is also thought that the supplied softwares have additional advantages than the textbooks such as interesting graphical display, animation, and audio. Still, some of the informants thought that it would boring if teachers rely solely on this kind of material in their teaching process.

(b) Teachers

A primary school teacher and six secondary school teachers gave positive reaction to the *Bestari*'s materials: able to clarify students' understanding, stimulate student's self-access learning and assist the non English teachers to deliver the content. This is true in the teaching of Mathematics and Sciences in English. All of the informants thought that the understanding and concentration of the learners are better due to the attractive elements such as graphic, animation and the audio output of the materials.

Some informants, in the context of teaching and learning, claimed that the CDs are rarely used and some used them often depending on the needs and appropriateness of the topic. The materials are not thought as the prime motivator in motivating the students to learn but are able to stimulate the students to seek other information or new learning materials. The use of English in the CDs had triggered mixed reaction. Some of the informants thought that some of the words, sentences and utterances were difficult for some students to understand. They claimed that some teachers translated them to the Malay language. This connotes the importance of teachers to master the kind of English specific to a particular subject.

CDRI PMP

(a) Students

A total of 12 students were interviewed. The majority of them is of the view that the *CDRI PMP*'s materials can assist their learning. Still, most of the informants rarely use them and a few did not use the CDs at all. Most of them said that learning aided by the materials is fun and improve their understanding than learning without ones. A few of them felt that there is no difference in their understanding when earning with the CDs.

In short, the use of the *CDRI PMP* in learning process shows the notion that learning motivation can be enhanced. The students' attentions were caught by the graphic, pictures, colour, animation and music used in the CDs. Furthermore, added elements such as exercises, challenging questions, clear presentation of notes, simple language and repetition were regarded as useful in catching their attention to the topics. The informants thought that self-access learning, cooperative learning and teacher-assisted learning are the best methods of utilizing the materials.

(b) Teachers

The informants believed that teachers should undergo basic training in the know-how of media and technology in teaching and learning. This would equip them with the appropriate skills in using the materials effectively. The researchers found that the informants' competency varies in using the *CDRI PMP* .

The informants said the supplied CDs are in concordance with the Mathematics and Sciences' syllabus and relevance with the various level of cognitive development of the learners particularly the medium and high levels. However, the teachers said that the weak students faced problems such as language when using the materials and may only understand the graphic and animated elements without concrete understanding. Some of the teachers claimed that the loud background music of the materials may interfere the content's explanation.

Thus, it is clear that the *CDRI PMP* 's materials are able to assist the teaching of the teachers and the learning of the learners except for weak learners for some reasons such as weak English language foundation. Some informants rarely used the materials in the teaching and learning processes due to the nature of topics taught and teaching style. Nonetheless, all informants acknowledged the advantages of using the CDs as self-access learning materials and in motivating the thinking process and understanding of the learners. The CDs were thought able to motivate the learners' inquisitive attitudes on the topic learned and conducting experiment. The teachers felt the importance of early exposure to basic computer skills that may motivate teachers and students to use the CDs.

RTVP (Educational Television Programme)

(a) Students

All of the interviewees think that the programme improves their understanding and knowledge. They claimed that certain facts are easy to be remembered due to the graphic effects of the materials. Interestingly enough, albeit being seldom or had never watched the programme in their learning process in the school, the students acknowledged the advantages of using the programme in easing their learning process, adding more knowledge and learning motivation.They said that the effects of the language, graphic and music could eliminate their boring feelings.

The informants who followed the programme, identified *Maritime, Science, Nature and Discovery Channel* as their top choices. They suggested that the effective ways of utilising the programme in their learning is through note taking and guided by teacher. Technically, they could not see major difficulties while watching the programme unless if they could not understand what being said and the monotonous

voice of explanation. All informants suggested that if they could not watch the scheduled on-air programme, the information could be recorded which would be useful to them later. This is due to the fact that there is a mismatch between their schooling timetables and the airing hours.

(b) Teachers

The main reaction of the teachers was on the fixed on-air schedules and thus, in many cases, the telecasted topics were in conflict with their teaching periods. They believed that the programme should be watched because it can enhance the teaching and learning processes and attract the interest of the learners. Still, the informants had not gone through any formal training on the effective use of *RTVP* in classroom.

The teachers expressed mixed views on the content of the *RTVP*:

i) Sometimes it met the needs of the national curriculum.
ii) Recent facts, figures and terminologies being used.
iii) Interesting graphical display.
iv) Being focused on the discussed topic
v) Relevant with the cognitive development of the learners.
vi) Some facts and terminologies must be improved
vii) Some activities mismatch with learners'ability
viii) Unsatified with the quality of the pictures.

Nevertheless, all of the interviewees agreed that the programme's ability in assisting their teaching and support students' understanding on the given topics.

Ironically, all of the teachers are aware of the advantages of the programme in the teaching-learning processes in school BUT seldom or had never use it at all.

The Main Obstacles Faced by the Students and Teachers in Using the *CDRI Bestari, CDRI PMP,* and *RTVP*.

Students

Basic computer skills, technical problems such as '*computer hang'*, could not understand English terms/words and electrical blackout, back-up power supply are some of the problems encountered whilst using/viewing the materials.

Teachers

Inadequate teaching period's time, preparation time prior to teaching, the operation of the computers prior to teaching and while teaching sometimes affect and hinder them from being efficient. Lack of basic skills on the know-how of using the materials, limited classroom timetable, the appropriateness of the materials in suiting the students' cognitive levels were the main obvious obstacles vented by the teachers.

All of the informants were aware of the strengths of using *RTVP* in the teaching and learning process. Ironically, they seldom or failed to utilize the programme due to time factor, the load of syllabus which must be completed, the clash of teaching hours with the on-air *RTVP*'s timetables, and, the *unfriendly* supplied materials due to faulty and other reasons.

Implications and Recommendations

Finding 1

All of the above three materials (*CDRI Bestari, CDRI PMP, and RTVP*) developed by the Educational Technology Division, also known as *BTP*, are proven effective in enhancing the students' mastery of the concepts learned. In general, the materials' motivational elements, based on the IMMS scale, are high.

Recommendation

The BTP should continue the effort of developing the teaching and learning materials, assess the materials' effectiveness in the context of real classroom teaching and learning. Effective strategies should

be forwarded in encouraging more teachers to use the materials. In fact, similar studies should be conducted on the effectiveness and appropriateness of the developed educational resource materials covering other topics. In-depth study should be done to identify the obstacles faced by the school teachers in using the supplied materials.

Finding 2
In this study the tested materials produced different mastery levels based on the students' abilities, the difficulty level of the concepts and the modes of the teaching and learning process.

Recommendation
The process of developing the courseware materials can be enhanced and should support the various ability levels of mastering.

Finding 3
The results of the study show that the students' mastery of the selected topics through Mode A (teaching the materials in normal class) is far better than Mode D (teaching the materials in computer laboratory).

Recommendation
Teachers need additional training in using and managing the materials effectively in the computer laboratory.

Finding 4
In general, the students' mastery through Mode C (Student's individual learning (self-access), using the materials in the computer laboratory is lower than the other modes which involve the materials and the teacher.

Recommendation
The students needs the necessary individual learning skills through this mode of learning. The materials for individual learning (self-access) should be developed by integrating more principles of this kind of learning.

Conclusion

The effectiveness of using the ICT's materials (*CDRI Bestari,CDRI PMP, and,RTVP*) in teaching and learning processes is empirically proven in this study. It is hoped that the results would bring more confidence and motivation to the affected parties to generate more efforts in encouraging teachers and students to use the supplied *CDRI*s in their schools. The success of the efforts relies on the affected personnel particularly teachers. Changes are inevitable and teachers' attitudinal changes towards the supplied materials, support and high commitment by all parties are crucial in optimizing the use of media and technology in the teaching and learning processes. All these changes would contribute to the achievement of knowledge economy and Malaysia's Vision 2020.

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