

Vocational Teaching Method: A Conceptual Model in Teaching Automotive Practical Work

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Abstract—The purpose of this study is to identify the teaching method practices of the practical work subject in Vocational Secondary School. This study examined the practice of Vocational Teaching Method in Automotive Practical Work. The quantitative method used the sets of the questionnaire. 283 students and 63 teachers involved from ten VSS involved in this research. Research finding showed in conducting the introduction session teachers prefer used the demonstration method and questioning technique. While in deliver the content of practical task, teachers applied group monitoring and problem solving approach. To conclude the task of automotive practical work, teachers choose re-explain and report writing to make sure students really understand all the process of teaching. VTM-APW also involved the competency-based concept to embed in the model. Derived from factors investigated, research produced the combination of elements in teaching skills and vocational skills which could be used as the best teaching method in automotive practical work for school level. As conclusion this study has concluded that the VTM-APW model is able to apply in teaching to make an improvement with current practices in Vocational Secondary School. Hence, teachers are suggested to use this method to enhance student's knowledge in Automotive and teachers will deliver skills to the current and future workforce relevant with the required competency skilled in workplace.

Keywords—Vocational Teaching Method, Practical Task, Teacher Preferences, Student Preferences.

I. INTRODUCTION

THE school system in Malaysia provides the opportunity for students to develop their carrier path as early in sixteen years old. Vocational Colleges in Malaysia provide various vocational courses are offered for those students who show more preference in hands on subjects. Therefore, to accomplish the students' need and to workforce for skilled area, the Ministry of Education (MOE) has developed a blueprint for an educational reformation plan which sets the policies, priorities, strategies and action plans for improving the education system from preschool up to tertiary education. The image uplift of vocational education is due to the corresponding increased importance of employment in industrial sectors, the efforts at promoting vocational education by the government and the changing nature of vocational programs. The responsibility of teachers should also change. Effective teachers should try to encourage students to think with higher order questioning techniques and to be more critical in their assessments [1]. Besides being a

tutor, coach or instructor, teachers should make an effort to gain knowledge, especially knowledge in their field of expertise. Reference [2] indicates learning is acquiring facts or procedures that are to be used. Effective and positive teaching derived from vocational education programs can have a direct impact especially on students who need hands-on curriculum. Reference [3] believes that secondary vocational classes need to be more flexible and aligned with the reality of students' development and the growing technological concerns of modern society. Today, teachers in schools are provided with facilities to make teaching process easier. They will deliver the course content based on teaching aids, text books and other learning materials using a variety of teaching methods. The lack of how the best way to teach practical task need to identified. Teachers should make their own effort to explore the best way and prepare themselves with what their students need while being more creative in delivering the subject content. Reference [4] believes teachers in the vocational field should have alternative certification options especially in occupational areas because there is a lack of teachers for occupational education.

II. PROBLEM OF STATEMENT

Teachers have the ability to teach practical work but they can function more efficiently if they had specialized guidance on how to deliver the subject matter that can match student needs. It also will support teachers to develop their teaching and automotive skills if they had a model they can refer to. However, most teaching activities can be divided into three broad categories to bring about desired learning, changes in student behavior and to enhance student development. In Technical and Vocational Education (TVE), the teacher must be able to deliver skills which match new technologies and practices in industry, and deliver skills to the current and future workforce in a flexible manner and at a consistent level of quality. Teachers need support to develop and carry out the necessary knowledge and skills related to the curriculum. Research analyzed one of the course offered in Vocational Colleges and the examination result analysis of Automotive showed that all students can achieve the minimum grade, yet it still not enough to represents that students are able to do the best job practical task. The role of teachers are very important to make sure students will perform well while complete the practical task. Research taking into account the analysis of the study and specializes in Automotive field and results can be applied to other areas. Hence, this study was conducted is to identify the practice of VTM in APW. Taking from factors

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selected, research suggested the blended elements in teaching skills and vocational skills which could be applied as teaching method in APW for specific method in teaching skills.

III. RESEARCH OBJECTIVES

- i. To know the relationship between teaching methods; introduction, body and conclusion
- ii. To examine how teachers implement competency concepts in automotive practical work which contain knowledge and understanding, skills and attitudes
- iii. To identify on how do students explore knowledge in automotive practical work based on knowledge and understanding, skills and attitudes?

IV. RESEARCH METHODS

The quantitative method used the sets of the questionnaire. 283 students and 63 teachers involved from ten vocational schools involved in this research. Based on the Division of Technical and Vocational Education statistics there are 70 VSS in Malaysia and 58 of these offered Automotive Courses. There are 1132 students in automotives. Research samples used random sampling based on [5] sampling procedure which refers to 283 students as samples. Ten VSS were chosen and represent the VSS in Malaysia. The numbers of automotive teachers in these schools are 63 teachers. This study applied the descriptive analysis, inferential and discussion analysis to elaborate the data.

Two Sets of questionnaires for students represent the items construct based on subject specification in Automotive Module. It was focused on practical work content in Electrical Automotive Diesel and Automotive Vehicle. There is submodule in this subject which covers practical tasks. It also refers to module objectives. Table I presents the learning outcomes in Electrical Automotive Diesel which are used to construct the items in Set I.

TABLE I
 LEARNING OUTCOME IN ELECTRICAL AUTOMOTIVE DIESEL

	Tasks
Learning Outcome	Doing the tracing diagram of electrical, examine, service and repair the vehicles system
	Using tools and workshop equipment
	Procedure in problem solution
	Decision making in tracing, examine, and problem solving in vehicle component
	Knowledge and skill application related with task and automotive industry
	Work ethic
	Knowledge and skills development for preparation in place of work and ability to cater to new knowledge and skills

Table II illustrates learning outcomes in Automotive Vehicles used to construct items in Set II.

TABLE II
 LEARNING OUTCOME IN AUTOMOTIVE VEHICLES

	Tasks
Learning Outcome	Diagnose, examine, service and identify the failure of engine system and vehicles
	Using the electronic tester and workshop equipment
	Procedure in problem solution
	Decision making with rational reason in examining, testing and repairing the vehicle component
	Knowledge and skill application related with task and automotive industry
	Work ethic
	Knowledge and skills development for preparation in place of work and ability to cater to new knowledge and skills

TABLE III
 TEACHERS' PREFERENCES

Categories	Items	No of Items
Part A	Gender	2
	Teaching experience	4
	Academic qualification	5
	Other qualification	2
	Industrial experience	1
	Industrial attachment	1
	Teaching improvement courses	1
Part B	Introduction	6
	Body	9
	Conclusion	6

Set IV is the questions related to competency-based concept as proposed by MOE embedded in automotive curriculum. The focus of this concept is knowledge, skills and attitudes. Table IV presents the items in this set.

TABLE IV
 CBC IMPLEMENTATION

Competency-based	Items
Knowledge	1,2,3,4,5 and 7
Skills	8,9,10,11,12,13 and 14
Attitudes	15,16,17,18,19 and 20

V. RESULTS

A. To Know the Relationship between Teaching Methods; Introduction, Body and Conclusion

Table V shows the result which; $r=.85$ shows strongly positive correlation between demonstration and questions technique; $r=-.48$ shows weak negative correlation between questions technique and sketching; $r=-.56$ shows medium negative correlation between demonstration and sketching.

TABLE V
INTRODUCTION TEACHING SESSION

		Demonstration	Questioning technique	Sketching
Demonstration	Pearson correlations	1	.848(**)	-.569 (**)
	Sig. (2-tailed)	.	.000	.001
	N	63	63	63
Questioning technique	Pearson correlations	.848 (**)	1	-.477(**)
	Sig. (2-tailed)	.000	.	.009
	N	63	63	63
Sketching	Pearson correlations	-.569(**)	-.477(**)	1
	Sig. (2-tailed)	.001	.009	.000
	N	63	300	63

Table VI describes the result in $r=.73$ shows strongly positive correlation between small group monitoring and problem solution; $r=-.38$ shows weak negative correlation between small group and module guide; $r=-.48$ shows weak negative correlation between module guide and problem solution.

TABLE VI
DURING TEACHING SESSION

		Small group monitoring	Problem solution (trouble shooting)	Module guide
Small group monitoring	Pearson correlations	1	.729(*)	-.379 (**)
	Sig. (2-tailed)	.	.000	.001
	N	63	63	63
Problem solution (trouble shooting)	Pearson correlations	.729 (*)	1	-.477(*)
	Sig. (2-tailed)	.019	.	.029
	N	63	63	63
Module guide	Pearson correlations	-.379(**)	-.477(*)	1
	Sig. (2-tailed)	.000	.019	.
	N	63	300	63

In conclusion part the result illustrated in Table VII; $r=.73$ positive strong correlation between teacher re-explain and report writing; $r=.64$ medium positive correlation between teacher re-explain and summarize the task; $r=.63$ medium positive correlation summarize the task and report writing.

TABLE VII
CONCLUSION PART

		Teacher re-explain	Report writing	Summarize the task
Teacher re-explain	Pearson correlations	1	.729(**)	.634 (**)
	Sig. (2-tailed)	.	.000	.001
	N	63	63	63
Report writing	Pearson correlations	.729 (**)	1	.637(**)
	Sig. (2-tailed)	.000	.	.009
	N	63	.300	63
Summarize the task	Pearson correlations	.634 (**)	.637(*)	1
	Sig. (2-tailed)	.001	.009	.000
	N	63	63	63

B. To Examine How Teachers Implement Competency Concepts in Automotive Practical Work Which Contain Knowledge and Understanding, Skills and Attitudes

The next objective is examined how teachers implement CBC in their teaching. The result shows applying knowledge shows that significant value is $p < .05$, skills; $p > .05$ and attitude; $p > .05$. From the significant level in can be concluded that there is a significant difference between experience in industries with applying knowledge in APW but no significant difference between experiences in industries with applying skills and attitudes in APW. The number of teachers with and without industrial experience is in Table VIII.

TABLE VIII
TEACHERS' BACKGROUND

Competency based concept	Teachers	N
Knowledge	Without industrial experience	7
	With industrial experience	17
Skills	Without industrial experience	7
	With industrial experience	17
Attitudes	Without industrial experience	7
	With industrial experience	17

C. To Identify on How Do Students Explore Knowledge in Automotive Practical Work Based On Knowledge and Understanding, Skills and Attitudes?

Table IX illustrates the students' achievement in APW. They are graded as standard grading used in examinations. Students' scores are mostly in the moderate level with the achievement of 40 students ranging between C5-C6; Students who score high (excellent) number 29 and there are 38 B3-B4 students. Multivariate analysis of variance (MANOVA) was used to determine the differences between students' achievement and how they satisfy their needs of exploring knowledge in automotives. There are three dependent variables: knowledge, skills and attitudes and independent variable is students' achievement. Table X shows the results of multivariate test.

TABLE IX
STATISTIC GRADE AND EXPLORING KNOWLEDGE

Grade	Mean	SD	N
Knowledge			
Excellent (A1-A2)	21.58	1.993	29
Good (B3-B4)	19.73`	3.430	38
Moderate (C5-C6)	20.45	2.659	40
Skills			
Excellent (A1-A2)	20.55	1.723	29
Good (B3-B4)	19.63	3.412	38
Moderate (C5-C6)	20.27	3.063	40
Attitude			
Excellent (A1-A2)	19.82	1.670	29
Good (B3-B4)	19.73	1.057	38
Moderate (C5-C6)	19.47	1.176	40

TABLE X
 MULTIVARIATE TEST

Effect		Value	F	Sig.	Partial Eta Squared
GRED	Pillai's Trace	.081	1.445	.199	.040
	Wilks' Lambda	.920	1.444	.199	.041

a. Exact statistic
 b. Design: Intercept + GRED

Table XI illustrates the results of tests between subjects to determine whether the groups differ on each of these variables. From the results MANOVA indicated that there are no significant differences between students' achievement with the ability to explore knowledge in automotives. Details show for knowledge $F=3.569$, $p=.032$ ($p<.05$), skills $F=.912$, $p=.405$ ($p>.05$) and attitudes $F=.712$, $p=.489$ ($p>.05$).

TABLE XI
 TESTS OF BETWEEN-SUBJECTS EFFECTS (GRADE)

Source	Dependent Variable	df	F	Sig.	Partial Eta Squared
Intercept	Knowledge	1	5.625	.000	.982
	Skills	1	5.035	.000	.980
	Attitude	1	2.435	.000	.996
GRADE	Knowledge	2	3.569	.032	.064
	Skills	2	.912	.405	.017
	Attitude	2	.721	.489	.014

VI. CONCLUSION

Students in VET learn that students learned when something was done by teachers rather than as something they do by themselves. In practical subjects teachers conclude they should use demonstration method at the beginning followed by monitoring while students complete the task, giving comments or short conclusions at to what is right and wrong with their work [6]. This is supported by Robin Millar (2004) [7] who described the practical work by the figure. They relate the practical work in education and its uses in the job situation. Teachers did not use one single approach in their teaching to make students pay more attention or motivate the in the beginning of teaching session. Teachers will use various methods to make teaching more effective. The previous discussion explained what methods teachers used in each teaching session in APW. For introduction teachers prefer to use demonstration, sketching on whiteboard and questioning technique. These three methods are related to each other and it is this strong relation that makes teachers use them in their teaching. From the research analysis teachers preferred using demonstration with questioning technique during introduction session. Teachers demonstrated step by step followed by oral questioning techniques. Enough emphasis cannot be placed on the important of questioning in any teaching situation. The ability to direct thought-through questioning is recognized as one of the most valid proofs of teaching skill. It is similar as in self-directed learning as stated by [8]. It will encourage students to take more responsibility for their own learning and

enable students to bring their own experiences to new a learning situation. Reference [9] suggested during demonstration in teaching that teachers should involve students by asking them to assist with the demonstration procedure followed by questioning others because good questioning is an excellent aid to teaching. The purpose of questioning during teaching is to help students participate actively during lessons and provides an opportunity for students to express their ideas and thoughts. In introduction session when teachers ask students questions they will sometimes give a wrong answer and teachers are responsible for correcting mistakes and guiding the students in a proper direction. These are delicate moments in teacher-student interactions and deserve to be dealt with carefully.

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