THE PRACTICE OF VOCATIONAL TEACHING METHOD IN AUTOMOTIVE PRACTICAL WORK IN
VOCATIONAL SECONDARY SCHOOL TEACHERS

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requirements for the award of the degree of
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To my beloved late father and mother, children and wife

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ABSTRACT

The purpose of this study is to identify the teaching method practices in Vocational Secondary School specifically to examined the Vocational Teaching Method (VTM) in Automotive Practical Work. Mixed method design was applied for collecting, analyzing and mixing both quantitative and qualitative data in this study. The quantitative data were gathered using collection used researcher-made questionnaire based on the teaching elements in practical work proposed by Gary and competency concept by Malaysia Ministry of Education while the qualitative method applied semi-structured interview and observation used Needham Model five phases of teaching. The five phases of Needham Model are orientation (O), ideas (I), restructuring ideas (R-i), applying ideas (A-i) and reflection (Rf). The random sampling technique and purposive sampling were was used in selecting 283 students and 63 teachers from Automotive Course as respondents. The quantitative data were analyzed using score mean, correlation, T-Test and *Multivariate Analysis of Variance* (MANOVA) while content analysis and discussion were used for qualitative data describing the details. The findings of the research shown that APW teachers exhibited showed their preference in using the demonstration and questioning technique during set induction session. They prefer group monitoring and problem solving during while-teaching, and re-explaining and report writing in the post-teaching session. Based on all investigated factors, this research produced the combination of elements in teaching skills and vocational skills which could be used as the method in the automotive practical work for the school level. Finally this study has concluded that Vocational Teaching Method in Automotive Practical Work (VTM-APW) model is able to be applied in teaching for an improvement to the current practices in VSS. Thus, VSS teachers are proposed to use this method to gain students' knowledge in automotive and also will assist teachers to deliver skills for the current and future workforce in a quality and flexible manner.

ABSTRAK

Kajian ini dijalankan untuk mengenal pasti amalan kaedah pengajaran di Sekolah Menengah Vokasional (SMV) menjurus kepada kaedah pengajaran vokasional *(Vocational Teaching Method-VTM)* dalam mata pelajaran amali Automotif *(Automotive Practical Work- APW)*. Gabungan kaedah tinjauan kuantitatif dan elemen kajian kualitatif diaplikasikan bagi pengumpulan dan analisis data dalam kajian ini. Kaedah pengumpulan data kuantitatif menggunakan set soal selidik yang dibangunkan oleh penyelidik sendiri berdasarkan elemen-elemen dalam pengajaran amali oleh Gary dan konsep kompetensi yang digariskan oleh Kementerian Pelajaran Malaysia manakala kaedah kualitatif berdasarkan temu bual semi-struktur dan pemerhatian terhadap guru semasa sesi pengajaran dengan menggunakan senarai semak kaedah pengajaran lima fasa Model Needham. Fasa-fasa dalam pengajaran Model Needham ialah *orientation (O), ideas (I), restructuring ideas (R-i), applying ideas (A-i) and reflection (Rf).* Teknik persampelan rawak dan persampelan bertujuan digunakan untuk memilih responden kajian seramai 283 orang pelajar dan 63 orang guru dari Kursus Automotif. Data kuantitatif dianalisis menggunakan skor min, korelasi, ujian T dan *Multivariate Analysis of Variance* (MANOVA) manakala bagi kualitatif analisa kandungan dan perbincangan digunakan untuk menghuraikan data-data yang diperolehi. Dapatan kajian menunjukkan semasa sesi permulaan pengajaran guru lebih cenderung menggunakan kaedah tunjuk cara dan teknik menyoal Guru memilih pengawasan kumpulan pelajar dan penyelesaian masalah semasa sesi pengajaran manakala pada akhir pengajaran guru menggunakan penerangan semula dan penyediaan laporan amali. manakala pada akhir pengajaran guru menggunakan penerangan semula dan penyediaan laporan amali. Berdasarkan faktor-faktor yang dikaji, kajian menggabungkan kombinasi elemen dalam pengajaran dan kemahiran vokasional bagi menghasilkan kaedah pengajaran amali Automotif untuk peringkat sekolah. Kesimpulannya, *Vocational Teaching Method in Automotive Practical Work (VTM-APW)* telah dicadangkan bagi menambah baik amalan sedia ada di SMV. Oleh itu, guru-guru dicadangkan untuk menggunakan kaedah ini untuk menambahkan pengetahuan pelajar dalam automotif dan juga dapat membantu guru-guru untuk menyampaikan kemahiran untuk tenaga kerja semasa dan masa depan dengan cara yang fleksibel dan berkualiti.

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LIST OF ABBREVIATIONS

ADTEC	Advanced Technology Training Center
AED	Automotive Electrical Diesel
APW	Automotive Practical Work
AV	Automotive Vehicles
CBC	Competency- based Concept
CIAST	Centre for Instructor & Advanced Skill Training
DTVE	Division of Technical and Vocational Education
EPRD	The Education Planning and Research Department
EFI	Electronic Fuel Engine
MANOVA	Multivariate Analysis of Variance
MOE	Ministry of Education
PBL	Problem Based Learning
TVE	Technical and Vocational Education
VET	Vocational Education and Training
VSS	Vocational Secondary School
VTM	Vocational Teaching Method

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CHAPTER 1

INTRODUCTION

1.0   Introduction

Malaysia has recently completed the first 15-year development phase towards realizing its aspiration of becoming a developed nation by 2020. In this regard, education has been instrumental in building national unity and producing human resources towards the realization of Vision 2020. Much has been achieved in the three main thrusts of education, namely in increasing access to education, increasing equity in education, and increasing the quality of education. In spite of the achievements gained, much more needs to be done in the next phase of our education system for it to leap forward to global standard excellence.   The challenges to education in the Malaysia's Plan differ from previous plans. Now, the plans are focused on producing adequate and quality human capital, a more people-centered development and to bringing out a bigger agenda in developing human capital. This will be of the utmost importance in the achievement of the National Mission.

Producing human capital in technical and vocational education (TVE) should include fulfilling the requirement of skills needed by the country and also to develop the career paths for workers (UNESCO, 2006). Human Resource Policy Thrusts, Malaysia-2000 stated that systems in the production of human capital are based on these factors:

- Improving the quality of education and training delivery systems to ensure that manpower supply is in line with technological change and market demand.
- Expanding the supply of highly skilled and knowledgeable manpower to support the development of a knowledge-based economy
- Increasing the accessibility to quality education and training in order to enhance income generation capabilities and quality of life

Malaysia is concerned that the factors in producing human capital start at the school level. The school system in Malaysia provides the opportunity for students to develop their carrier path as early in sixteen years old. For example, in secondary school, various vocational courses are offered for those students who show more preference in hands on subjects. Thus to accomplish the students' need and to produce skilled industrial workers, 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 goal of the education blueprint is to produce human capital by ensuring quality education for all (EPRD, 2006). 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. MOE also planned to improve the quality of teaching so that the quality of vocational education especially in school level also improves.

The role of teachers should also change. Besides being a tutor, coach or instructor, teachers should make an effort to gain knowledge, especially knowledge in their field of expertise. Effective and positive teaching derived from vocational education programs can have a direct impact especially on students who need hands-on curriculum. Lewis (2000) 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. The primary goal of education is to develop reasoning and problem solving within a field of practice. Effective teachers should try to encourage students to think with higher order questioning techniques and to be more critical in their assessments (Ruthland & Bremer, 2003).

Nowadays, 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. There are no specific delivery system guidelines for teachers of vocational subjects to follow. 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. The unit of staff development in Division of Technical and Vocational Education (DTVE) MOE, planned and implemented certain courses to fulfill the requirement of current students by sending teachers to attend courses and also to prepare them for the changing system in vocational school.

The restructuring of technical schools began in 2008. A greater emphasis on vocational and skills training and education, expansion of vocational and skills stream and refocusing upgrading schools are the main objectives. In order to achieve the objective of upgrading TVE in Malaysia, DTVE must also look into the importance of their technical teachers' skills and knowledge. In TVE, the teacher must be able to deliver skills which match new technologies and practices in the industry, and deliver skills to the current and future workforce in a flexible manner and at a consistent level of quality. In addition, the preparation towards upgrading TVE in Malaysia will start from vocational education in school, emphasizing the role of teachers and role of students. Teachers should know their roles especially in delivering the method of teaching. In TVE the teacher will teach a combination of theory and practical work and also how to relate both in the actual work world. Effective teaching will make students more interested in the TVE field and in the course chosen. There are various methods to deliver the vocational subject besides the classroom method. Students should know their roles when they choose the vocational field. They should know what their pathways are after they complete their Vocational Secondary School (VSS). Research has shown that the most important factor affecting student learning is the teacher. Wright, Horn, and Sanders (1997) reported that more can be done to improve education by improving the effectiveness of teachers than by any other single factor.

The vocational school objective is to produce students in the vocational field with skills and knowledge, besides preparing them for higher education. There are

various courses including trade, hospitality, catering, fashion and child care. Students need to apply their theories in practical work based on the courses chosen. The element of practical work will expose students to how they solve problems in the work environment.

Automotives is one of the courses offered in VSS. Automotives is an industry which has enhanced Malaysia's economy and created a lot of work opportunity for school leavers, training institutions and many automotive-based institutions. In this course, students will learn basic and intermediate levels in automotive, especially car operation. They will learn based on the module provided. They should complete each task to show whether they are competent or not. They will learn theory in the classroom and apply it when they sit for practical class in workshop. In practical session, the teacher will demonstrate the task before they do so under teacher supervision.

Teaching method in automotives should combine teaching skills and vocational skills. The concept of teaching is an act which could be described as giving instructions to or sharing one's knowledge with another person. Teaching can be further described as a means to provide students with knowledge and skills they need in order to function successfully in the world (Brady,1985). The ability to identify students teaching needs, coupled with teaching skills to design explicit lessons, is what distinguishes a professional teacher from just a person who wants to teach. The relation between teaching and method in short is committing to lifelong learning, sharing one's knowledge, directing and facilitating, creating awareness for potential (Evans and Brueckner, 1992). The main roles of the teaching method in automotives are how teachers began the lesson, approach the students, creative in delivering the lessons and any other ways to make learning interesting.

Currently there are various types of methods and materials that can be used in teaching. Students could use various sources of material from the internet or discussion besides the text books provided. Students can explore new knowledge or current trends in automotives so that they can used for another approach of learning and teachers teaching method so that it will contribute to two way communication where the information will come from both parties.

1.1 Problem Background

Knowledge that cannot be applied has little use in today's complex, technologically driven world. For centuries, societies have recognized that a keen understanding of mathematics, science and communications skills were essential to cultural preservation and progress. But historically, such disciplines were taught and perpetuated in isolation of their application in the real world, a world where people must work and make a living. However, with the advent of technology at an ever accelerating pace, there has been a rethinking regarding the most effective methodologies for teaching math, science and communication skills. Teaching these disciplines in the context of where and how people live and work is not only gaining in acceptance, but it is deemed critical to survival in a technology-imbued environment. For example, an automotive technician's job description consists of far more than the performance of manipulative tasks required to service today's complex motor vehicles. The automotive industry has played an important role in the development of the manufacturing sector in Malaysia. With the successful implementation of the first National Car Project, the industry has to widen its perspective to take on the challenges ahead. Table 1.1 presents the production of motor vehicles for PROTON and PERODUA from 1995 until 2003. Overall the production numbers increased year by year with the exception of 2003, where the number decreased.

Table 1.1: Production of National Vehicles

Year	PROTON	PERODUA
1995	141,192	40,386
1996	177,016	49,313
1997	185,021	75,158
1998	85,897	44,119
1999	152,091	80,666
2000	188,604	101,618
2001	233,297	115,677
2002	232,181	132,763
2003	165,018	130,680

Source: Malaysia Automotive Association (2004)

The increase in national vehicles absolutely contributes to increasing employment especially in vehicle components. With the demand for automobiles reaching its peak in 1998, vehicle producers and parts makers were forced to

increase and deploy their manpower in the most optimal and effective manner. Non-national vehicle assemblers utilize more labour intensive processes and foreign contract workers to meet output when demand reaches its peak. Table 1.2 shows the number of automotive employment based on

Table 1.2: Employment in the automotive industries

Year	1998	1999	2000	2001	2002
Vehicles	18 945	12 800	13 600	15 216	16 393
Components	18 156	13 067	15 848	20 408	21 857
Total	37 101	25 867	29 448	35 624	38 250

Source: Malaysia Industrial Development Authority (2004).

The automotive industry in Malaysia can be considered as one of the most important and strategic industries in the manufacturing sector. Compared with other industries in the manufacturing sector in Malaysia, the automotive industry has been earmarked to boost the industrialization process so that Malaysia can be a developed nation by 2020. The rapid growth in this industry shows the importance of exposing younger generations, especially students in VSS to this industry, so they know that one of the main economic contributions in Malaysia comes from automotive. When they choose the automotive course in VSS they will be interested to learn more and teachers should play their role on how to deliver the subject so that teaching and learning in automotives will be more effective.

To accomplish the growth of the automotive industries, the government had to review various policies including educational policies to strengthen it. Besides the role of training institutions to encourage students to choose automotive industries as their carrier path, VSS as the root of VET in school level, VSS had their own role. MOE introduced a new curriculum which emphasized approximately 80% on skill and 20% on theory. This implementation requires all teachers at school to be versatile and adaptive to effective teaching approaches. Vocational teachers are required to be highly skilled, be knowledgeable in new technology, be eager to explore knowledge instruction, and most important know how to conduct effective and safe demonstrations (Barbazette, 2006). Because of an increase in accountability, teachers at all levels are required to base their instructional techniques on various strategies which have been proven to improve student

learning. Related to the changing process, vocational programs need improved teaching methods The improvement must accommodate societal changes and meets the changing needs of the employment market, including the dynamic nature of a technological society. Vocational educators must prepare students with adequate training to be competent in the job market (Buzzell, 1993).

In Automotive course in VSS, students will learn at basic and intermediate levels in automotives, especially car operation. They will learn based on the module provided. They should complete each task to show whether they are competent or not. They will learn theory in the classroom and apply it when they sit for practical class in workshop. Teacher will demonstrate the task before they do the task with teacher supervision. Improvements in knowledge including skills and teaching methods are needed to cope with the changing vocational system. Teachers will evaluate the students' competencies based on the module in each course, and therefore the teachers themselves must be more than competent and be an expert in their field.

1.1.1   Students' learning in Automotive

Learning is something of which have an understanding and participated. In practical work subjects students have to participate fully so that the tasks given will be completed. The effectiveness of automotive programs encourages students to be productive, innovative and enterprising. This involves generating ideas and taking action, as well as developing competencies that satisfy social demands, wants, opportunities and extend human capabilities. Students learn about training materials, technical information and systems and technology practice by which they are known. They consider the resources, teaching and training methods, equipment, and techniques that are relevant to the context in which they are working. Students examine the context of a task or learning activity to solve problems, and relate what is known to what might be done.

Students will often view learning as something done to them by teachers rather than as something they do for themselves. Learning is memorizing. Learning

is about getting it into your head. George (2004) indicates learning is acquiring facts or procedures that are to be used. It's about learning something so that you can do it again when you're asked to, like in an exam. Learning is making sense. Learning is about trying to understand things so you can see what's going on. You've got to be able to explain things, not just remember them. Learning is understanding reality. Learning enables you to perceive the world differently. This has also been termed personally meaningful learning.

Students learn, with varying degrees of success, through reading, memorizing, thinking, writing, note-taking in lectures, observing, listening to and talking with others and by doing things. They may learn in structured situations such as lectures, courses or learning packages; in informal situations, such as browsing through books or on the Net; and through casual conversations with peers. However, these above descriptions of how students learn do not explain how students learn, nor do they account for why students learn. For answers to these questions one has to turn to various perspectives and theories of learning. These may be placed on a continuum with behaviorism at one end and radical humanistic approaches at the other. In between are Gestalt psychology, cognitive psychology, studies of student learning, and constructivist, reflective, and humanist theories. As one moves along the continuum, the theories become less positivistic, less concerned with control and prediction and more ostensibly concerned with social values.

Figure 1.1 describes how most students learn based on Glasser (1988) research findings. 10% will learn by hearing, 30% by seeing, 50% by hearing and seeing, 70% when they talk it over with others, 80% from real life experiences and 95% when they teach someone else.
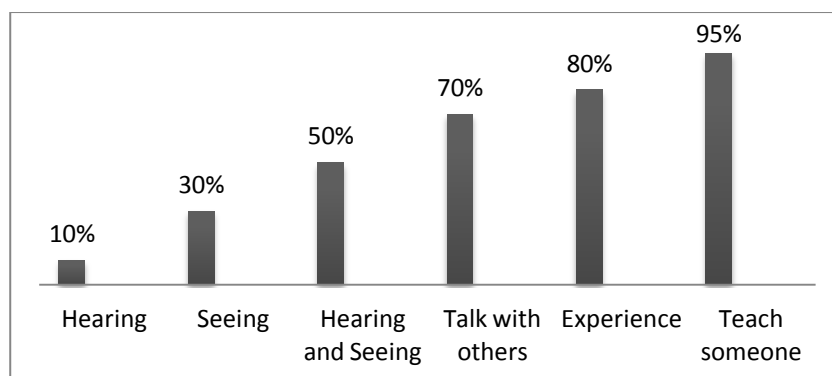
Source: Glasser (1988)

Figure 1.1: How Most Students Learning

Student learning contributes to the environment of teaching and how teachers accomplish effective teaching. John & Ross (1990) explained the 3P Model in students' learning. Figure 1.2 illustrates the personal characteristics of students' learning. The 3P model modified from John & Ross (1990) are the personal characteristics of students and the situational constraints performance by two different routes; directly (the black arrows) and as mediated by the student's approaches to learning process (the shaded arrow). Presage is characteristics and constraints, process is learning style and product is outcomes. Evaluations of students conducted before or during instruction to enhance student's learning is known as formative evaluation. For the purpose of this study, student learning is defined as factors which will influence the teachers approach in teaching. Student learning is also influenced by teachers' characteristics
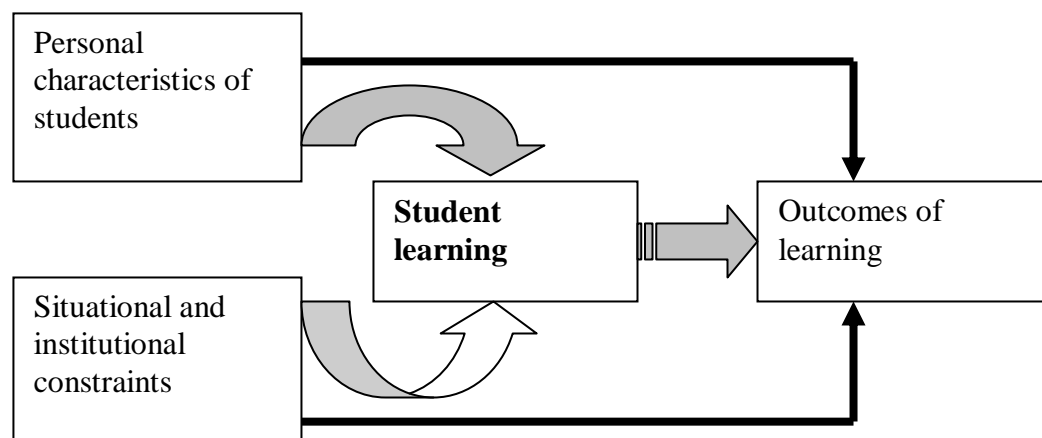
Source: John and Ross (1990)

Figure 1.2: The 3P Model; Presage, Process and Product

Students need the learning activity in their orientation of learning to better understand the subject content. Learning activities can help an individual to become a good learner. Table 1.3 shows that common learning activities in classrooms may help students to understand the learning content effectively (Richard and Stephen, 1998). Learning activities include asking questions, planning, monitoring, checking, revising and self testing.

Table1.3: Common Learning Activities

Type	Description
Asking questions	Defining hypotheses, establishing aims and the parameters of task, discovering audience, relating a task to a previous piece of work
Planning	Deciding on tactics and timetables, reduction of task or problem into components, identification of skills or competencies required
Monitoring	A continuous attempt to match effort, answers and discoveries to initial questions or purposes
Checking	Carrying out a preliminary assessment of performance and results at particular stages of an activity
Revising	A review response to assessment involving redrafting or re calculating or the revision of set goals
Self-testing	Final assessment of both results and performance on task

Source: Richard and Stephen (1998).

Table 1.4: Examination Result Analysis in APW

SCHOOLS	YEAR	PERCENTAGE (%) GRADE								
		1A	2A	3B	4B	5C	6C	7D	8E	9G
SMV A	**2006**	3.03	3.03	33.33	3.03	57.58	0.00	0.00	0.00	0.00
	2007	8.07	13.04	26.09	30.43	8.70	8.70	4.35	0.00	0.00
	2008	0.00	6.06	18.18	30.30	21.21	12.12	12.12	0.00	0.00
	2009	0.00	8.09	21.50	27.30	18.76	10.31	14.04	0.00	0.00
SMV B	**2006**	15.7	0.00	18.42	2.6	33.28	28.9	1.1	0.00	0.00
	2007	7.06	14.04	28.09	31.44	19.37	0.00	0.00	0.00	0.00
	2008	5.7	16	30.3	22.5	25.5	0.00	0.00	0.00	0.00
	2009	8.6	17.3	25.7	19.7	18.5	10.2	0.00	0.00	0.00
SMV C	**2006**	2.85	15.07	32.3	24.3	25.48	0.00	0.00	0.00	0.00
	2007	5.71	15.72	47.15	7.86	8.70	14.86	0.00	0.00	0.00
	2008	8.7	10.2	21.5	34.15	24.15	10.00	0.00	0.00	0.00
	2009	10.6	17.04	23.09	24.62	10.70	7.60	4.35	0.00	0.00

Source: Unit Penilaian dan Pentaksiran Sekolah (2010)

Automotives involves more hands on learning activities especially in practical work. The assessment of hands on subjects is different but the method of teaching and learning can be assessed in common learning activities. Even the current type of student learning is not the big issue in automotives; the students' achievements are still not at the excellent level in practical task. Based on the examination analysis in Automotive Practical Work (APW), the results show that the number of students with excellent scores is still few. Results presented in Table 1.4 from three VSS were analyzed. The number of students scoring A1 and A2 was less than the number of students scoring 3B and 6C grades. The achievements are influenced by various factors. Based on a non-formal discussion, a few teachers agreed that students' learning and teachers' teaching are among these factors. To examine the factors involved, this research was conducted based on particular issues in vocational learning especially in APW.

1.1.2   Teachers' teaching in Automotive

The concept of teaching is an act which could be described as giving instructions to or sharing one's knowledge with another person. Teaching can be further described as a means of providing students with knowledge and skills they need to function successfully in the world (Brady,1985) In a very practical sense, teaching is diagnosing and prescribing. Teachers diagnose what specific learning needs to be prescribed in the particular strategies and activities. This is an important factor of teaching. The ability to identify student learning needs, and the teaching skills to design explicit lessons are what distinguish the professional teacher from a person who just wants to teach. The relation between teaching and pedagogy in short is commitment to lifelong learning, sharing one's knowledge, directing and facilitating, creating awareness for potential (Evans and Brueckner, 1992).

Effective practical work should contain the introduction where teachers state the learners' session topic, objective and scope. Identify interested learners by linking the demonstration to previous work and to what they will be subsequently required to do. The body of the task should work to standards which are realistic for

learners to achieve but also acceptable to the workplace. Teachers should check students' understanding by asking questions and avoid time wasting delays by getting equipment and systems operational. At the end of the session teachers will make a conclusion with the topic taught and relate it to the next topic and ask the students to prepare. The purpose of practical work has its own characteristics; the learning outcomes are clear, if specific skills is necessary for a task, students need to be competent and they must have scaffold thinking. In APW the task conducted is related to basic workplace situations. Figure 1.3 illustrates the relationship between teaching practical work subjects and its uses in real world situations as proposed by Gierre (1992) and Robin Millar (2004).
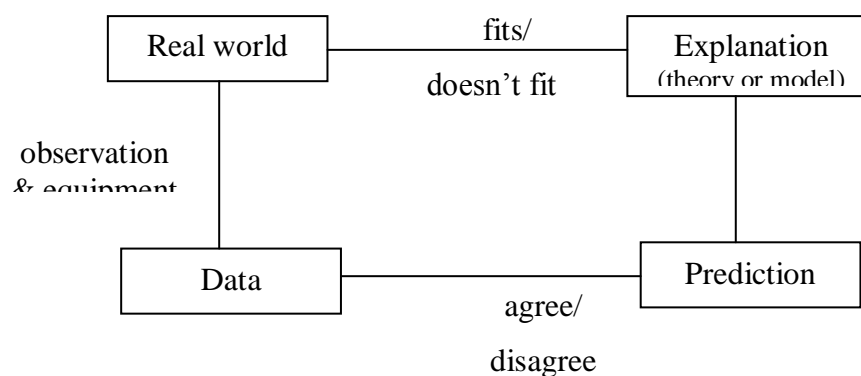
Source: Gierre (1992) and Robin Millar (2004).

Figure 1.3: A model of scientific in practical work

Teachers can plan their teaching method because they know how important practical work is in the teaching and learning component in automotives. It will develop students' scientific knowledge, and is likely to be most effective. Such a strategy is used to stimulate the students' thinking beforehand, so that the practical task involves answering questions the students is already thinking about. Figure 1.4 describes the process of developing and implementing practical work tasks (Millar et al.,2005). Teachers will set the objectives on what students are expected to learn. In Automotive practical work, teachers had explained the theory part in class, so in the workshop students should know at the end of the lesson what they should achieve. Teachers will give students a practical task. Before students do the task, teachers will demonstrate and explain how to complete it. This usually happens when teaching a practical subject. The combination of each element in

Figure 1.4 will come out from effective teaching and learning. Students could have more effective minds as well as hands- on, when they feel that they understand how the given task will be completed and the equipment they are using works in the right order.
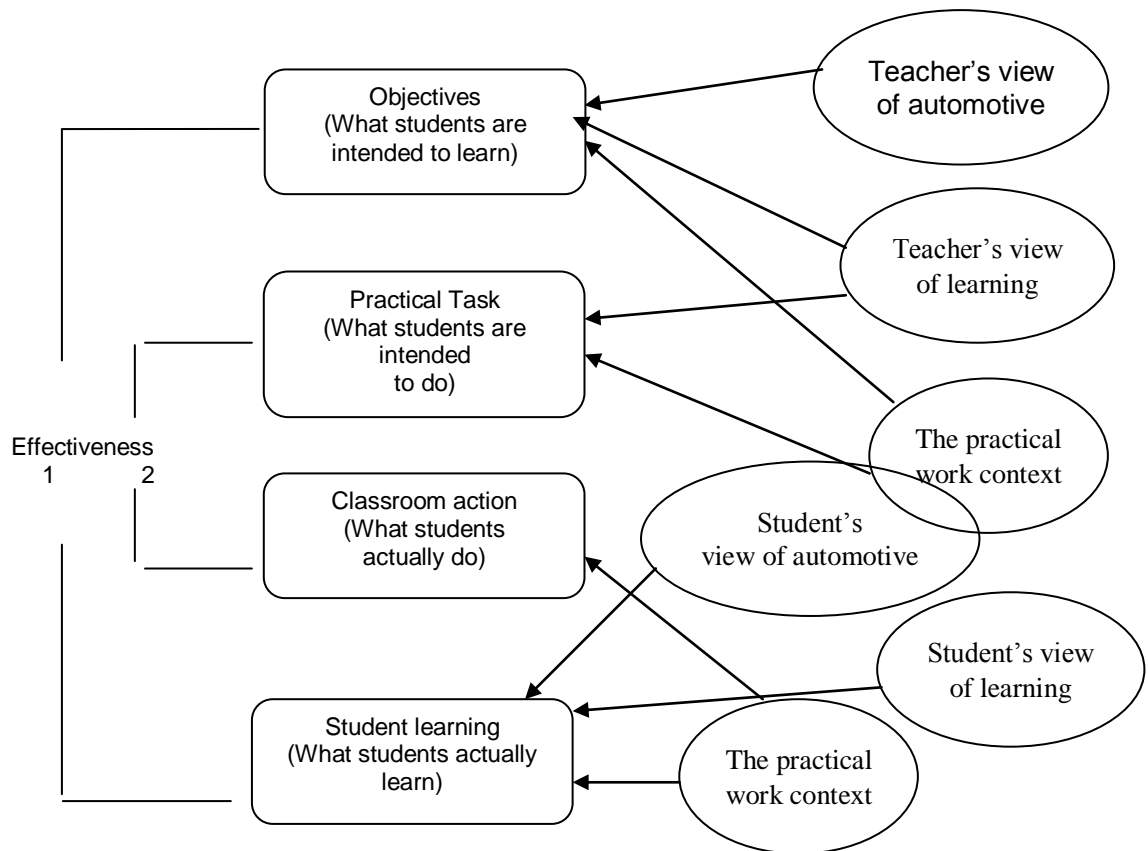
Source: Millar et al.(2005).

Figure 1.4 : The process of developing and implementing a practical task

Research indicates that there is a direct relationship between teacher quality and student learning (Darling-Hamond & Berry, 2006). The focus of powerful teaching should be on what is happening with learners in the classroom (Easton, 2006). In automotives, teachers should prepare the teaching method such as simulation before students start practical work. Cummings (1996) states that the classroom teacher, more than any other single variable in the education equation, can enable students to learn. Ruhland and Bremer (2003) believe that teachers need a support method to focus on their effective delivery in the classroom so that they can share ideas about teaching and work cooperatively. To achieve the goals of successful pathways in automotives, teachers should improve their teaching skills to encourage students to be good learners in class. Besides the existing model and

teaching methods that they have, they should put more effort into improving their teaching skills and knowledge according to what the outcome demands.

1.1.3 Teachers' characteristics

In addition to all the factors discussed in teaching method of APW, teacher characteristics are one of the issues of concern. Robin (2008) claims that teachers' characteristics are the factors that most influence students' learning. The teachers' characteristics can be the teachers' background and personalities. This research focused on the teachers' background characteristics because they contribute to elements in teaching APW.

Effective teachers not only have a strong knowledge of teaching skills and pedagogical concepts, but they also have strong subject knowledge (Campbell, Kyriakides & Robinson, 2003). Robin (2008) reported that technical educators may be able to attribute their subject knowledge to the completion of related career and industry experience. Teacher's education level is conflicting. Cakir (2006) found from the research that teacher's education level did not have a statistically significant impact on student learning. But in VSS, experienced teachers who have more than 10 years teaching experience are mostly graduates from Technical Teachers Training College with an additional certificate in vocational skill besides their diploma. The certificate was awarded by National Vocational Training Council (NVTC) Malaysia Ministry of Human Resource, and this certificate was based on the vocational field that they had chosen. Naylor (1997) 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.

The following characteristics in this research examined the impact of teaching experience in students learning, occupational experience, education level, teacher certification and research-based instructional strategies on student learning. They should have teaching skills which can be combined with vocational skills so that they can deliver subjects which can fulfill the learning objectives. In

automotive practical work, teachers should have both qualifications; academic and skills. They could improve their skills by attending related courses and it will either come from their own effort or they have to attend a course as a requirement of their service. They should improve their existing teaching methods and be aware of developments in the industry so that they can relate the content of their teaching in the actual work. Wary et. al (2000) stated that teachers with more teaching experience are likely to use their planning time more wisely because more experienced teachers are more likely to perform complex procedures. Vocational teachers who are more familiar with exposure to the industry will have more subject knowledge besides knowledge of teaching skills and teaching method concepts (Campbell, Kyriakides & Robinson, 2003).

To investigate how the teachers' characteristics' influence how teachers teach, this research used Needham Model of teaching to investigate how teachers teach in a few levels. It also requires teachers to explore the students' skills and knowledge in their learning. Classroom observation was conducted and the learning content was related with competency APW. The focuses in this concept are skills, knowledge and attitudes which will be embedded in APW.

1.2   Statement of Problem

In Malaysia, there is no specific guide such as a model or framework on how to teach practical automotive work. 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 encourage teachers to improve 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 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. 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. Therefore this study was conducted is to identify the practice of Vocational Teaching Method (VTM) in Automotive Practical Work (APW). Derived from factors selected, research produced the combination of elements in teaching skills and vocational skills which could be applied as teaching method in automotive practical work for school level.

1.3 Research Objectives

i) To identify what the students' preferences in learning automotive practical work are based on introduction, body and task conclusion.

ii) To investigate what teachers' preferences conducting automotive practical work are based on teaching introduction, body and task conclusion.

iii) To identify the relationship between teaching preferences in automotive practical work

iv) To investigate how teachers implement competency concepts in automotive practical work which contain knowledge and understanding, skills and attitudes.

v) To investigate what student needs by exploring knowledge in APW based on knowledge and understanding, skills and attitudes

vi) To identify how teachers' conduct practical tasks in teaching automotive practical work.

vii)   To produce the element of Vocational Teaching Method in Automotive Practical Work as practices in Vocational Secondary School

1.4   Research Questions

i)   What are students' preferences to learn automotive practical work based on introduction, body and task conclusion?

ii)   How are teachers' preferences conducting automotive practical work based on teaching introduction, body and task conclusion?

iii)   Is there a relationship among the highest three types of teaching methods in the introduction session?

iv)   Is there a relationship among the highest three types of teaching methods during teaching session?

v)   Is there a relationship among the highest three types of teaching methods at the end of teaching session?

vi)   How do teachers who attended special courses implement competency concepts in automotive practical work which contain knowledge and understanding, skills and attitudes?

vii)   How do students explore knowledge in APW based on knowledge and understanding, skills and attitudes?

viii)   How do teachers conduct practical tasks in teaching automotive practical work?

viii)   What are the elements of Vocational Teaching Method in Automotive Practical Work as practices in Vocational Secondary School?

1.5   Research hypothesis:

Research hypothesis for research question (vi):

How do teachers who attended special courses implement competency concepts in automotive practical work which contain knowledge and understanding, skills and attitudes?

Hypotheses (i)

Ho   :   There is no significant difference between experiences in industries with applying knowledge in APW

Ha   :   There is a significant difference between experiences in industries with applying knowledge in APW

Hypotheses (ii)

Ho   :   There is no significant difference between experiences in industries with applying skills in APW

Ha   :   There is significant difference between experience in industries with applying skills in APW

Hypotheses (iii)

Ho   :   There is no significant difference between experiences in industries with applying attitudes in APW

Ha   :   There is significant difference between experience in industries with applying attitudes in APW

Research hypothesis for research question (vii):

How do students explore knowledge in APW based on knowledge and understanding, skills and attitudes?

Hypothesis (i)

Ho   :   There is no significant difference between students' achievement in examinations with ability to explore knowledge in automotive

Ha   :   There is a significant difference between students' achievements in examination with the ability to explore knowledge in automotives

Hypothesis (ii)

Ho   :   There is no significant difference between students' achievement in examinations with the ability to explore knowledge in skills in automotives

Ha   :   There is a significant difference between students' achievements in examinations with the ability to explore knowledge in skills in automotives

Hypothesis (iii)

Ho   :   There is no significant difference between students' achievement in examinations with the ability to explore knowledge in attitudes in automotives

Ha   :   There is a significant difference between students' achievements in examination with the ability to explore knowledge in attitudes in automotives

Hypothesis (iv)

Ho   :   There is no significant difference between teaching experiences
                   with the ability of students to explore knowledge in automotives

Ha   :   There is a significant difference between teaching experiences
                   with the ability of students to explore knowledge in automotives

Hypothesis (vi)

Ho   :   There is no significant difference between teaching experiences
                   With the ability of students to explore knowledge in skills in
                   automotives

Ha   :   There is a significant difference between teaching experiences
                   with the ability of students to explore knowledge in skills in
                   automotives

Hypothesis (vii)

Ho   :   There is no significant difference between teaching experiences
                   with the ability of students to explore knowledge in attitudes in
                   automotives

Ha   :   There is a significant difference between teaching experiences
                   with the ability of students to explore knowledge in attitudes in
                   automotives

1.6   Scope of the study

This research involved ten VSS groups consisting of teachers who specialized in automotives and students in automotive courses. Preliminary study was conducted to identify the existing teaching approach used in automotive practical work. The topics concerned are mechanical and electrical systems in automotives. The element of teaching skill was focused on how teachers conduct the practical work, including the introduction, body and conclusion. Other than this purpose, the study focused on the characteristics of TVE teachers, and the combination of teaching approaches and vocational skills that they possessed. Exploring students' knowledge in automotives was a new method introduced in this research using the content of students' ability to solve automotive problems.

1.7   Research Conceptual Framework

This research used a model from Gary (1996) to observe teachers during teaching and learning sessions in the workshop. According to Figure 1.4, this research used a framework as a guidance to complete the research questions. To make the objectives of the research relevant, this model was modified to serve the purpose of the research. Competency concept proposed by the Ministry of Education (MOE, 2006) required teachers and students on how APW was conducted. Competency is a statement which describes the integrated demonstration of a cluster of related knowledge, skills and attitudes that are observable and measurable, necessary to perform a job independently at a prescribed proficiency level (Joshua Earnest, 2001).The focus was on mechanical and electrical systems in automotives. Researcher observed teacher during the practical work session in workshop. Nedham Model (1987) was used during observation. The factors concerned in the observation were how the teacher conducted the class and the inclusion of the introduction of the topic. When the teacher started to explain the body of the subject, the researcher will see the method being used. Demonstration is usually used in practical lessons so the teacher will demonstrate before the task is given to students.

The process of developing and implementing a practical work task was illustrated in the framework. Teachers will set the objectives on what students are intended to learn. In Automotive practical work, teachers explained the theory part in class so in the workshop students should know at the end of the lesson what they should achieve. Teachers will give students practical tasks. Before students do the task, teachers will demonstrate and explain how to complete it. This usually happens when teaching a practical subject. The combination of each element in Figure 1.3 will come out from effective teaching and learning. Students would have more effective minds as well as hands-on when they feel that they understand how the given task will be completed and that the equipment they are using works in the right order.

Researcher observed the role of teachers when students did the practical work. At the end of the session, teachers should conclude the task, and researcher observed how teachers did it. Interview was conducted to get more information and a few factors were identified. The survey on teachers' characteristics and the combination of teaching skills and vocational skills was conducted after the observation and interview session was completed. To enhance students learning, the research also examined how students explore their knowledge in automotives, knowledge which is relevant to current needs in industries. In the last phase of the research, the researcher will combine all the findings and this research will produce a new model of teaching method in automotive practical work.
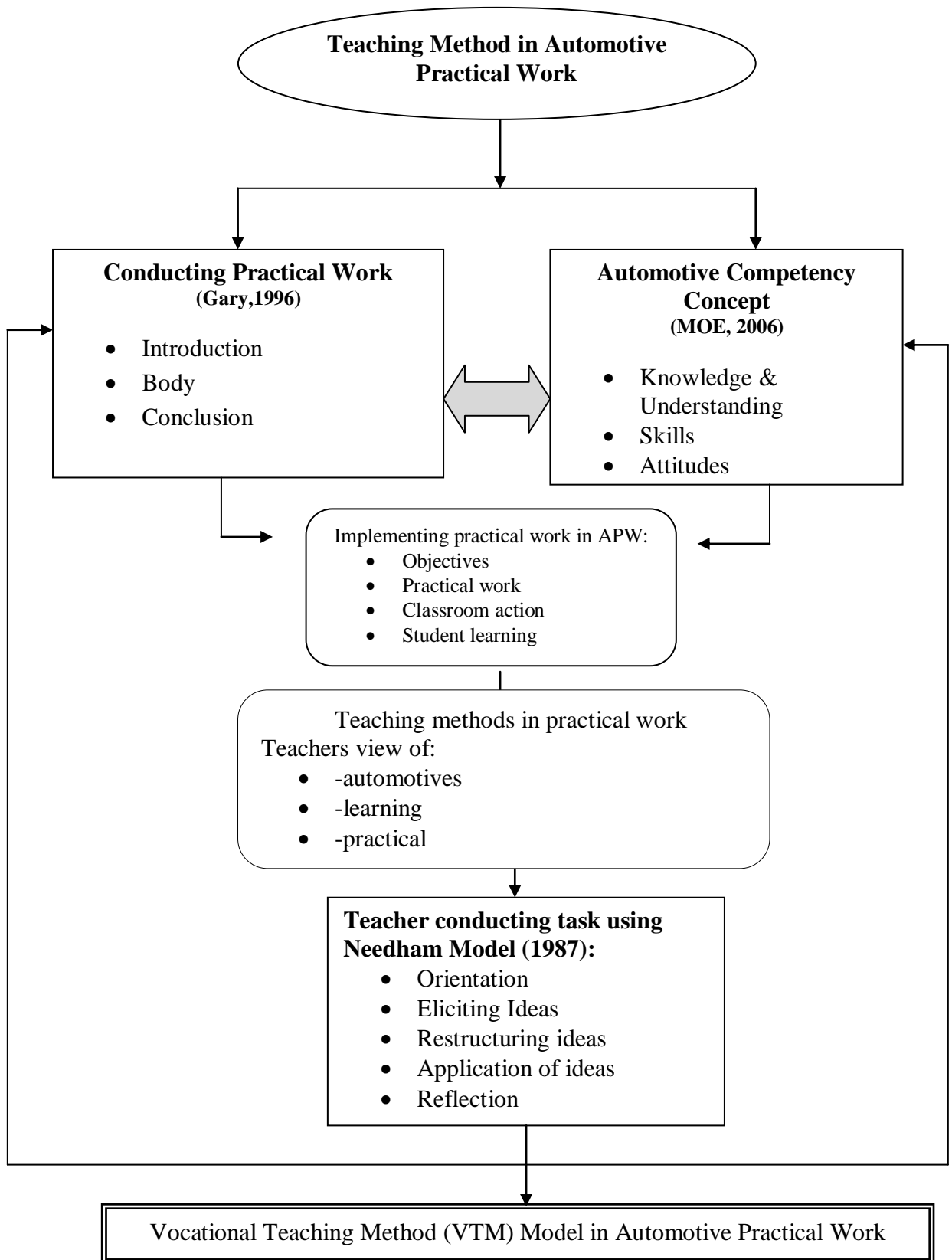
Figure 1.4: Research Conceptual Framework

1.8   Significance of the study

The significance of this study is that it can contribute to an important component in vocational education especially in APW. Teachers, students and DTVE can derive benefits from the research findings and suggestions proposed. The VTM in APW will support teachers in changing or improving the current teaching method skills to deliver the content of learning in a meaningful and interesting way. It also encourages teachers to improve their vocational skills relevant to what industry needs. They will make an effort to attend short and long term courses. With the factors investigated it will create an awareness that teachers need to be sensitive to current issues and trends and to anticipate what the students' need. Therefore their teaching method will improve by using the model proposed.

The model proposed also help students have the opportunity to explore knowledge on their own and to share this knowledge with teachers in class. From the factors investigated the students will freely give their opinion and ideas on how to solve problems as one learning activity. The proposed teaching model can help students manage their learning to achieve excellent scores in APW.

The result can also help curriculum developer in producing a curriculum of vocational education, especially at school level, DTVE should also focus on how to teach vocational subjects especially practical tasks. The model proposed in this research may help DTVE become a specific method of teaching and help to create a teaching method guideline. DTVE can also provide courses especially in teaching method for teachers so that they can follow the trend of teaching in VE. School facilities can be improved; according to the survey, schools need classrooms that can facilitate the teaching and learning requirements.

This research focuses on the development of practical elements of automotive courses in vocational schools. Investigation practices in VSS will identify what the current issues are especially in teaching skills, vocational skills for teachers and students' learning style. The outcome of the evaluation study will help improve knowledge about the current and proposed application practices in VSS. In addition, the knowledge will contribute to new improvements in teaching methods in

the automotive courses, making the learning environment more interesting and TVE as the first choice of education. This study will provide a guideline for Technical and Vocational Education Division in MOE on what are the need of teachers and students in VSS. Moreover this research will assist teachers to understand the importance of improving the teaching methods and skills so that students will gain more knowledge.

1.9   Definition of terms

1.9.1 Teaching method

The teacher has many options to choose from different teaching techniques designed specifically for teaching and learning. Gary (1996) stated teaching method should be adopted on the basis of certain criteria like the knowledge of the students, the environment and the set of learning goals decided in the academic curriculum. According to Frankael (1973), teaching method represent the combinations of specific procedures or operations, grouped and ordered in definite sequence that teachers can use in the classroom to implement both cognitive and affective objectives. Another definition of teaching strategy was given by McClosky (1971): teaching method is a teaching approach that is used either in solving a classroom problem or in improving instruction.

1.9.2 Teaching skills

The teacher brings out positive outcomes using a variety of styles to master the content to deliver new ways about subject matter and curriculum to students and the context where they are teaching. (Sussela, 2007). In this research context, the teaching skills are the ability of the teacher to deliver the content of practical work in automotives and the new teaching skills that they need to do so.

1.9.3   Vocational

According to (International Labour Organization,2000), vocational education is a wide range of courses or skills which help students prepare to enter employment or workplace. Vocational in terms of this research focuses on secondary school teachers and students especially in automotive courses.

1.9.4   Automotive Course in VSS

MOE Curriculum Development Centre (2000) defined automotives in VSS as basic courses for early exposure in upper secondary school which is divided into three components: theory in automotives, practical work in workshop and geometrical drawing in automotives.

1.9.5   Vocational skill

Vocational skill refers to the mastery in certain fields of skill to job oriented in specific content (International Labour Organization,2000), The term vocational skill for teachers in this research is defined as the combination of skills which teachers have and how they deliver the skill to students using suitable methods.

1.9.6   Vocational Teaching Method

According to Rashid (2008) vocational teaching method is the method of teaching used by teachers in vocational subjects related to their vocational knowledge using the behavior context and psychomotor elements in practical work. In this research the findings will introduce a new teaching method in automotive practical work.Cullen et al 2002, defined teaching in vocational as VET pedagogy can be characterized as becoming more learner-centered, work-centered and attribute focused

1.9.7   Practical work

Robin Millar (2004) defined practical work as teaching and learning activities which involve at some point the students observing or manipulating real objects and materials. Practical work in automotive <<omit: is>> concern**s** learning by doing the task given and in this research the focus is engine operation, mechanical body and electrical systems in automotives.

1.9.8   Teachers**'** Characteristics

Cannon (2006) stated that teachers' characteristics include the collaboration of learning methods in order to implement the best practices in classroom. The elements of teachers' characteristics in this research will be investigated based on teaching experience in students learning, occupational experience, education level, teacher certification and research-based instructional strategies on students learning. It also will conclude what the actual teachers' characteristics in automotives are.

1.9.9   Students' Preferences

A distinctive and behavior manner of acquiring knowledge, skills or attitudes through study or experience; individual tends to be more stable across different learning task (Smith & Dalton, 2005). In this research, students' preferences refer to what they want in learning especially in automotive practical work.

1.9.10   Knowledge

Knowledge in competency based concept (United Nation Development Organization, 2002) is the fundamental element in certain competency requires student engage the theory into practical task. Knowledge in automotive is defined as an expertise, and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject. It is also known in a particular

field or in total; facts and information or awareness or familiarity gained by experience of a fact or situation. In education, knowledge acquisition involves complex cognitive processes: perception, learning, communication, association and reasoning. The term knowledge is also used to mean the confident understanding of a subject with the ability to use it for a specific purpose if appropriate. In this research knowledge, knowledge refers to fundamental content in vocational education particularly in APW (Ministry of Education, 2006).

1.9.11 Skill

International Labour Organization (2000), defined skill as a measure of a worker's expertise, specialization, wages, and supervisory capacity. Skilled workers are generally more trained, higher paid, and have more responsibilities than unskilled workers. These research skills focused on the ability of the teachers to apply knowledge in their teaching APW.

1.9.12 Attitude

Attitude in competency based concept (United Nation Development Organization, 2002) covered the ethics, moral and culture in certain competency. Attitudes are generally positive or negative views of a person, place, thing, or event—this is often referred to as the attitude object. People can also be conflicted or ambivalent toward an object, meaning that they simultaneously possess both positive and negative attitudes toward the item in question. In this research attitude represents how teachers embed moral values, lifelong learning and professionalism in their teaching APW.

19.13 Exploring knowledge

Exploring knowledge is the term created by researcher based on variables investigated and the needs to add something new in teaching APW. Based on the

element of APW and CBC exploring knowledge is knowing something in depth knowledge is defined as an expertise, skills acquired by a person through experience or education; the theoretical or practical understanding of a subject This research investigated how students can explore knowledge in APW so that they will know the growth of related industries.

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