Chapter V

Discussion, Implications and Recommendations

Introduction

The purpose of this study was to examine factors influencing the degree of implementation of Competency Assessment and Modular Certification (CAMC) of vocational subjects' teachers**,** in secondary schools. Specifically, this study examined the influence of teachers' receptivity, their conceptions and quality assurance measures**,** on teachers' degree of implementation of this assessment reform. This chapter comprises of four sections. It begins with a discussion of significant findings based on the research questions. Then, the conclusions and implications of the findings from this study**,** are presented. In the last section, some recommendations for future research were made.

Discussion

Guided by the research questions, the study was conducted using a structural equation modeling (SEM) approach**,** with the emphasis on testing the fit of the proposed model. This section provides a discussion of the findings regarding teachers' responses to the assessment reform i.e. CAMC**,** and their influence on the levels of their implementation of the reform. In interpreting the results, the conclusions drawn were based on self reported data. From the findings of the study, a number of focal points came to light which were worth discussing in relation to the available literature on the implementation of assessment reform and the factors influencing educational change. This discussion will include the issues of educational reform policies and

implementation, teachers' receptivity to system-wide change and their belief in the context of educational change**,** and monitoring and moderation processes as tools for the enhancement of quality in the assessment reform process**,** and other significant findings. With this purpose in mind, this section has been divided into four subsections. The first deals with factors influencing the degree of implementation of CAMC. The second subsection discusses the moderating effects of the selected demographic variables such as gender, experience, training and field of specialization to the proposed model. The parsimonious model is detailed in the third subsection, and the last subsection discusses the issues and barriers faced by the vocational teachers in implementing Competency Assessment and Modular Certification (CAMC).

Factors Influenced the Degree of Implementation of Competency Assessment and Modular Certification (CAMC).

This study proposed an *a priori* model that included three groups of factors influencing teachers' degree of implementation of the Competency Assessment and Modular Certification (CAMC). These three groups of factors are: (1) teachers' receptivity to CAMC, (2) teachers' conceptions of CAMC and (3) the quality assurance measures of CAMC. There are a total of four main latent constructs in the model namely, 'degree of implementation (DOI)', 'teachers' receptivity to CAMC (TR)', 'teachers' conceptions of CAMC (TC)' and the 'quality assurance measures of CAMC (QA)'. Since, there was some violation of the multivariate normality assumption of the SEM the bootstrap procedure was used to obtain the accuracy of the estimates. The proposed structural equation model (SEM) attempted to identify a process, based on these three

groups of factors that influenced teachers' implementation of the assessment reform. The SEM model showed possible pathways in which these factors influenced teachers' implementation of the assessment reform. Although this study specified an ordering of the influence of these three factors, there may be a possibility of a need to consider two-way effects. Overall, the measurement model and the structural model were found to be acceptable. This study found that Quality Assurance Measures explained 4.8% of variance in Teachers' Receptivity. In addition, Quality Assurance Measures and Teachers' Receptivity explained 66.1% of variance in Teachers' Conceptions. Furthermore, Quality Assurance Measures, Teachers' Receptivity and Teachers' Conceptions explained 77.6% of variance in Degree of Implementation.

Influences of Teachers' Receptivity to CAMC

The discussion on factors influencing teachers' degree of implementation of CAMC starts with "teachers' receptivity to CAMC". This factor appeared to be the most critical one that shaped teachers' assessment practices. There was a high level of correlation between teachers' receptivity to CAMC and the degree of implementation in the measurement model. This meant, the higher the level of receptivity among the teachers, the higher the implementation effort. Similarly, there was a high level of correlation between teachers' receptivity to CAMC and teachers' conceptions of CAMC. This meant, the higher the level of receptivity among the teachers, the higher was the level of conceptions. In the structural model, it was found that there was a significant positive relationship between teachers' receptivity and degree of implementation, and teachers' receptivity and teachers' conceptions. Teachers' receptivity showed a

significant direct effect on the degree of implementation and teachers' conceptions. This showed that teachers' receptivity to assessment reform directly influenced their implementation of the reform and their conceptions about it.

This finding about the importance of teachers' receptiveness to CAMC is consistent with a previous study, that examined teachers with progressive attitudes to education, who were more likely to have more positive attitudes towards the change and vice versa (Hargreaves et al., 1998a, 1998b; McAtee and Punch, 1979; Waugh, 2000; Waugh and Punch, 1987). Waugh and Punch (1987) found that teachers' attitudes towards educational reform were related to their feelings towards the previous system. They also found that teacher-perceived, non-monetary cost benefit of change (that is, the extra work to be done by the teacher against the perceived benefit to the teacher) was positively related to teachers' attitudes to the Certificate of Secondary Education System. Another finding was that if teachers perceived the change to be practical in their classrooms, then they tended to be supportive of the change, and vice versa. Waugh and Godfrey (1995) claimed that these perceptions could be used to help administrators in implementing new proposals. They noted that in all probability, teachers would not implement major curriculum, assessment or certification changes in a centralized educational system exactly as proposed by the administrators, but would instead adapt various aspects of them. They further noted that teachers would adapt changes to suit themselves, their classroom and their schools. Therefore, teachers' receptivity to CAMC, in terms of their perceptions of the important general variables affecting receptivity, can provide important insights into the way teachers relate to assessment reform.

This study also highlighted that teachers' receptivity showed significantly direct effect on teachers' conceptions. This is in accordance with Collins and Waugh's (1998) study which said that receptivity was related to teachers' general belief, and Datnow and Castellano's (2000) study, which said that teachers supported and made adaptations to the reform because they believed it to be beneficial for students. In this study, it was also determined that teachers' receptivity mediates the relationship between quality assurance measures and degree of implementation. Therefore it can be concluded that the success of the reform is mediated by teachers' receptivity to the reform.

While the finding –that there was a significant influence of teachers' receptivity on the implementation of CAMC– was consistent with the prior research, findings from this study extended the literature. First, this study found that teachers' receptivity was the only factor that directly influenced implementation of CAMC. Second, this study determined that teachers' receptivity directly influenced teachers' conceptions of the assessment reform. Third, this study also ascertained that teachers' receptivity mediated the relationship between quality assurance measures and degree of implementation. While previous studies found a significant effect of teachers' receptivity on the implementation of educational reform, they did not examine the importance of teachers' receptivity on their conceptions of the reform nor the mediating effect of teachers' receptivity on educational reform. However, at the point in time when this study was conducted, teachers seemed to be receptive to CAMC and it strongly influenced their implementation of CAMC.

Influences of Quality Assurance Measures of CAMC

Previous literature suggests that there was a high correlation between quality assurance measures of assessment and the implementation of the assessment process. Toop et al. (1994) found that monitoring could influence the quality implementation of an assessment process. They further suggested that monitoring was the main tool in the quality assurance mechanism, in improving educational assessment. They found that monitoring increased teachers' commitments to improved assessment processes, and raised the standards of the assessment outcome. They also stressed that the overall purpose of both internal moderation and external moderation, was not just to adjust marks and settle disputes, but to improve the quality of assessment implementation process as well.

Contrary to common belief that quality assurance measures had a high level of correlation to the degree of implementation, this study demonstrated the association to be insignificant. In the structural model, the quality assurance measures of CAMC showed an insignificant direct effect on the degree of implementation. These findings were supported by the teachers' responses on issues and barriers they faced in implementing CAMC. Some of the teachers had responded that the MOE did not monitor the implementation of CAMC in their schools and that their scores for the CAMC were not moderated by the MOE or personnel appointed by the MOE. Some disclosed that although there were personnel who visited and monitored the implementation of CAMC in. their schools, no action was taken on their problems and the feedback that was given. They also stated that the quality assurance procedures increased their work load and

incurred too much paper work. It can be concluded then, that in the implementation of CAMC, quality assurance measures did not have a significant effect.

This conclusion is in accordance with Bloch and Thomson (1994), who found that in low accountability situations, actual implementation of verification or moderation procedures in Vocational and Technical Education, was relatively scarce. Harman (2000) stated that quality assurance also required achieving a balance between the burdens placed on institutions with legitimate external information and reporting requirements. He pointed out that what was regarded as a light-touch approach by government could easily be construed by staff, as an unreasonable intrusion into internal institutional affairs. There was also perhaps dissatisfaction that quality assurance mechanisms added pressure and workload and also created more stress.

This study also highlighted that the correlation between quality assurance measures of CAMC and teachers' receptivity was rather weak. This was in contrast to earlier studies by Gift and Hutchinson (2007), who found that academic staff were receptive and increasingly inclined to implementing the recommendations of review teams facilitated by the university's monitoring mechanism. Hargraves et al., (1996) submitted that most medical practitioners preferred an internal review to an external one to make them more receptive to the change.

While this study's results were inconsistent with previous research –where findings affirmed a weak relationship between quality assurance measures and the degree of implementation, and between quality assurance measures and teachers' receptivity – this study has extended the literature. First, this study found that the quality assurance measures for CAMC had a weak influence on the degree of implementation of CAMC.

Second, this study also found that quality assurance measures for CAMC had a weak influence on teachers' conceptions of the assessment reform. Third, this study found that quality assurance measures for CAMC showed a significant indirect effect on the degree of implementation of CAMC through teachers' receptivity. While previous studies found significant effects of quality assurance measures on the implementation of educational reform, they did not examine the indirect effect.

This insignificant influence of quality assurance measures of CAMC could be caused by the lack of consistency in the quality assurance process. In a study conducted by Booth et al. (2002), they found that many assessors were concerned about the lack of consistency in assessment practice and assessment decisions, the new demands that were being placed on their assessment practices with the introduction of training packages, and the lack of rigorous quality assurance processes. Their study also revealed that assessors were concerned about the quality of assessor training and the lack of ongoing support and professional development.

Another possible explanation for the insignificant influence of quality assurance measures of CAMC is that this study was conducted in the Malaysian context, while the previous research studies were in America, United Kingdom, Australia and New Zealand. Context differences could lead one to expect different patterns of influence.

Influences of Teachers' Conceptions of CAMC

Previous studies suggested that in the implementation of any new assessment policy, tool or practice, whether at the national or local school level, teachers' conceptions of assessment should be taken into account to ensure success. Many studies also showed that there were significant relationships between teachers' beliefs and their practices in educational reform (Basturkmen, Loewen, & Ellis, 2004; Brown, 2003; Cohen & Hill ,2000; Kahn , 2000; McAllister & Irvine, 2002; Tardy & Snyder, 2004; Yung, 2002). Contrary to the commonly-held belief that teachers' conceptions had a high level of correlation to the implementation of educational reform, this study proved the association to be insignificant. It was also found that the indirect effect of quality assurance measures on degree of implementation through teachers' conceptions, was not significant. This study also determined that the indirect effect of teachers' receptivity on degree of implementation through teachers' conceptions was not significant. These showed that teachers' conceptions did not mediate the relationship between quality assurance measures and degree of implementation and it also did not mediate the relationship between teachers' receptivity and degree of implementation. Therefore it can be concluded that teachers' conceptions was not a mediator.

The insignificant influence of teachers' conceptions of CAMC could be caused by the lack of professional development. Almost half the number of teachers' who responded said, that they had not attended all the training programs designed by the Malaysian Examinations Syndicate (MES). According to Powell and Anderson (2002), in most educational reform, substantial professional development effort –such as training – needed to be provided to the teachers on the usage of the new curriculum materials and

activities. The role of professional development cannot be considered unimportant, because adoption of a new curriculum entailed changes in practices that result in improved student learning and attitudes. There is a complex relationship among knowledge, practices and beliefs. Guskey (1986) found that professional development activities were most effective at changing beliefs when teachers could be helped to adopt a new practice, and argued that changes in belief were followed by changes in practice.

Another possible explanation for the insignificant influence of teachers' conceptions of CAMC is that this study was conducted in the Malaysian context while the previous research was in the western context. Therefore, these context differences could lead one to expect different patterns of influence.

Based on the recommendations by Guskey (1986), there was still a considerable amount of work to be done in developing the necessary skills of teachers to successfully implement assessment reform in Malaysia.

The Moderating Effects of the Demographic Variables

Literature on the implementation of educational reform showed little research has been done on demographic factors that moderate the effect of such variables as teachers' receptivity, quality assurance measures and teachers' conceptions on implementation of educational reform. To address this gap, this study proposed to study the moderating effects of such demographic variables as, the teacher's gender, experience, training and field of specializations. Multiple group analyses were performed to test the moderating effects of these variables. Each demographic variable was tested one at a time.

In testing the 'gender' variable as a moderator, the structural model for male teachers was found to be an acceptably fit [χ^2/df = 1.651, TLI=0.903, CFI=0.908, RMSEA=0.050, AIC =3274.1], and the structural model for females was also found to be a reasonable fit [χ^2/df = 1.721, TLI=0.859, CFI=0.865, RMSEA=0.056, AIC =3401.1]. The 95% confidence intervals were obtained based on 1000 bootstrap resampling technique. It was found that the confidence intervals between the groups overlapped, indicating that statistically, there was no significant difference in all the relationships between the groups.

In addition, the chi-square difference test was performed between the constrained and the unconstrained models. The chi-square, df, change in chi-square, change in df and p-value for the constrained and unconstrained model comparing gender, were calculated. The resultant p-value of 0.423 –which is greater 0.05 –concluded that gender was not a moderator. This study indicated that there was no significant difference in the relationships of factors influencing the degree of implementation between male and female teachers.

In testing the "teachers' experience" variable as a moderator, the structural model for less experienced teachers was found to be a reasonable fit [χ^2/df = 1.730, TLI=0.894, CFI=0.898, RMSEA=0.050, AIC =3417.8], and the structural model for the more experienced teachers was also found to be of a reasonable fit [χ^2/df = 1.700, TLI=0.863, CFI=0.869, RMSEA=0.060, AIC =3363.5]. The 95% confidence intervals was obtained based on a 1000 bootstrap resampling technique. It was found that the confidence intervals between the groups overlapped, indicating that statistically, there was no significant difference in all the relationships between the groups.

In addition, the chi-square difference test was performed between the constrained and the unconstrained models. The chi-square, df, change in chi-square, change in df and p-value for the constrained and unconstrained model comparing teachers' experience, were calculated. The resultant p-value of 0.294 – which is greater 0.05– concluded that teachers' experience was not a moderator. This study showed that there was no significant difference in the relationships of factors influencing the degree of implementation, between the lesser, and the more experienced teachers.

In testing the "teachers' training" variable as a moderator, the structural model for the fully trained teachers was found to be of reasonable fit [χ^2/df = 1.722, TLI=0.877, CFI=0.882, RMSEA=0.057, AIC =3402.4] and the structural model for the partially trained teachers was also found to be a reasonable fit [χ^2/df = 1.701, TLI=0.883, CFI=0.888, RMSEA=0.051, AIC =3364.3]. The 95% confidence intervals was obtained based on a 1000 bootstrap resampling technique. It was found that the confidence intervals between the groups overlapped, indicating that statistically, there was no significant difference in all the relationships between the groups.

In addition, the chi-square difference test was performed between the constrained and the unconstrained models. The chi-square, df, change in chi-square, change in df and p-value for the constrained and unconstrained model comparing teachers' training were calculated. The resultant p-value of 0.412 –which is greater 0.05 –concluded that teachers' training was not a moderator. This study demonstrated that there was no significant difference in the relationships of factors influencing the degree of implementation, between the fully and partially trained teachers.

In testing the 'field of specialization' variable as a moderator, the structural model for the Information Technology teachers was found to be a reasonable fit [χ^2/df = 1.756, TLI=0.742, CFI=0.753, RMSEA=0.086, AIC =3463.7], the structural model for the Home Science teachers was of reasonable fit [χ^2/df = 1.762, TLI=0.828, CFI=0.835, RMSEA=0.068, AIC =3475.6], the structural model for the Engineering was of reasonable fit [χ^2/df = 1.697, TLI=0.791, CFI=0.800, RMSEA=0.078, AIC =3357.6] and the structural model for the Agriculture teachers was also found to be of reasonable fit [χ^2/df = 1.831, TLI=0.734, CFI=0.746, RMSEA=0.088, AIC =3486.9]. The 95% confidence intervals was obtained based on a 1000 bootstrap resampling technique. It was found that the confidence intervals between the groups overlapped, indicating that statistically, there was no significant difference in all the relationships between the groups.

In addition, the chi-square difference test was performed between the constrained and the unconstrained models. The chi-square, df, change in chi-square, change in df and p-value for the constrained and unconstrained model comparing the fields of specialization were calculated. The resultant the p-value of 0.7211 –which is greater than 0.05–concluded that the teachers' field of specialization was not a moderator. This study indicated that there was no significant difference in the relationships of factors, influencing the degree of implementation between Information Technology teachers, Home Science teachers, Engineering teachers or the Agriculture teachers.

This study, also showed, with the multiple group analysis, that there was no significant difference in the structural model, across groups for all the four demographic variables i.e. gender, experience, training and teachers' field of specialization. First, all

models showed a reasonable fit to the data. A large overlap in the confidence intervals for all the relationship in the structure indicated that there could be no significant difference between groups. In addition, the model fit did not become significantly worse, when the constrained model was compared to the unconstrained model. Furthermore, the p-value for all the groups were more that 0.05**.** So, it can be concluded that all the four demographic variables i.e. gender, experience, training and teachers' field of specialization were not moderating variables.

In the assessment reform literature, few studies have examined the moderating effects of the selected demographic variables especially in the Malaysian context. Mok's (2005) study yielded information that teachers' gender and teaching experiences moderated their concern and educational innovation. His study among Hong Kong primary teachers indicated that females and teachers with longer years of teaching experience were more likely to adapt to educational innovation. While in this study the selected demographic do not moderate the model.

To the researcher's knowledge, no local study has yet empirically tested the moderating effect of gender, teachers experience, training and field of specialization on teachers' receptivity, teachers' conceptions or quality assurance measure outcomes. Hence, testing of the moderating and mediating effects of the selected variables can provide empirical evidence for future research.

The Parsimonious Model

A model with relatively few parameters and relatively many degrees of freedom, is sometimes said to be high in parsimony, or simplicity (Arbuckle & Wothke, 1999) Figure 5.1, shows the parsimonious model for only those factors influencing the degree of implementation of CAMC with significant effects. Several goodness-of-fit indices were used to see if the structural model fitted the data. Based on the model indices, the overall fit was acceptable [χ^2/df = 1.951, TLI=0.917, CFI=0.920, PCFI=0.882, RMSEA=0.044, AIC =3817.0].

As illustrated in Figure 5.1, only 'teachers' receptivity' had significant direct effects on the degree of implementation of CAMC. Quality assurance measures did have direct effects on teachers' receptivity, but the effects were mediated through teachers' receptivity. Moreover, teachers' receptivity had significant effects on teachers' conceptions. In the comparison of goodness-of-fit between the structural model and the parsimonious model – (refer Table 4.47, chapter 4)– a slight increase was found in PCFI [0.881 to 0.882], as also a slight difference in AIC indices [3820.9 to 3817.0]. Therefore, the parsimonious model was a better model to predict the effects of factors influencing the degree of implementation of CAMC.

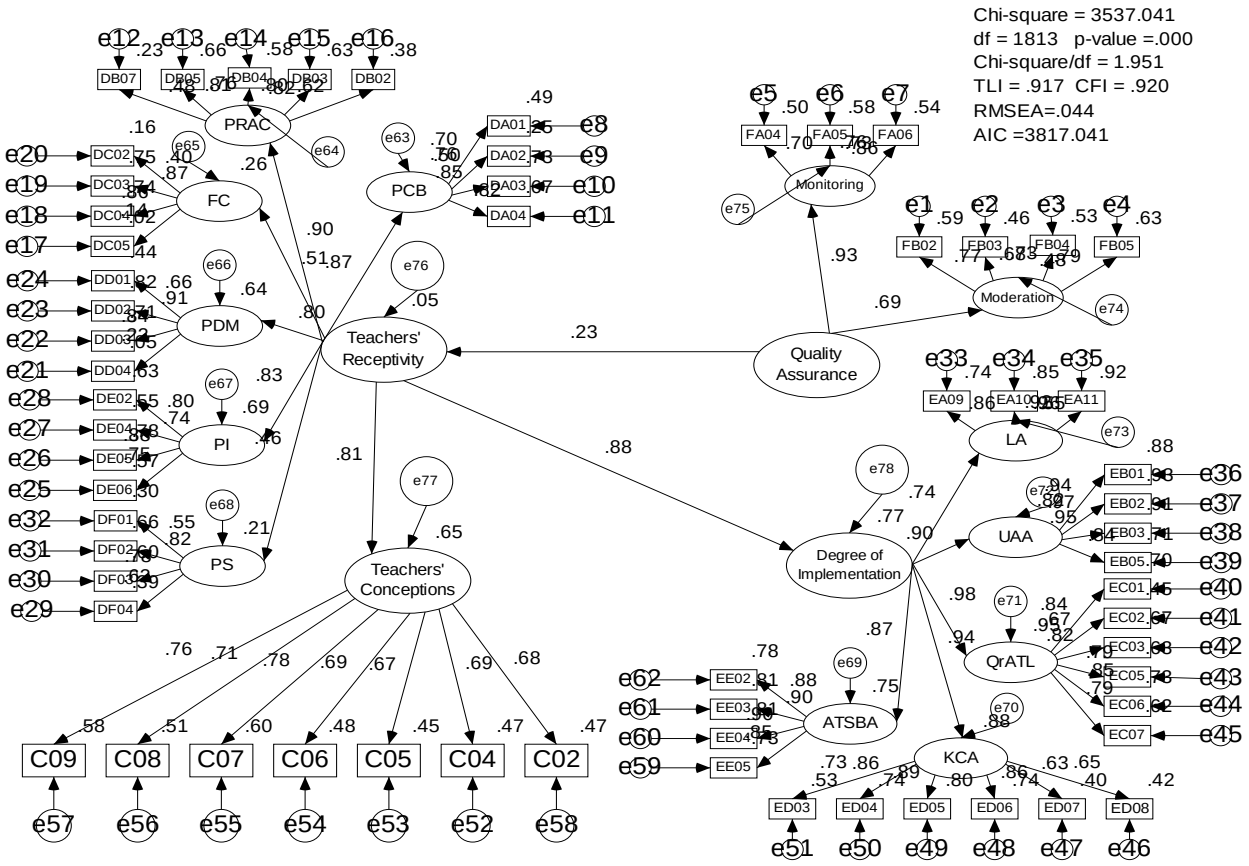

Figure 5.1 The parsimonious model

Issues and Barriers Faced by the Vocational Teachers in Implementing Competency Assessment and Modular Certification (CAMC).

It was found that vocational teachers faced six main issues and barriers in implementing CAMC. They are related to infrastructure, funding, curriculum documents, assessment, teachers and students. This section discusses the issues, and suggestions on how to overcome them.

The lack of infrastructural facilities for teaching, learning and the assessment of the vocational subjects was found to be a major barrier faced by teachers. The issues were, the lack of equipment, supplied tools were of low quality and did not follow the specifications outlined by MOE, the lack of workshops and workshop facilities in their schools, existing workshops were too small and cramped and the power supply to their workshops was insufficient.

The shortage of equipment and facilities could affect the quality of teaching and learning –quality diminished when facilities required for the imparting of knowledge and learning were inadequate or sometimes were not available. Olaitan (1996) remarked that the conditions under which vocational education is imparted was considered poor, when most secondary schools and tertiary institutions lacked equipment for training, workshop and workshop facilities or had ill-equipped laboratories. Vocational technical education is the type of education that prepares its recipients for the world of work, and so the students were supposed to be exposed to work environment which would enable them fit in, outside the school environment.

Funding was found to be the second major issue. The per capita grant (PCG) allocated for vocational subjects was said to be insufficient, as most of the raw materials had increased in price and some of the materials had become too expensive for the school to purchase. In this study, it was also found that there were was no fund allocated for the maintenance of the machines and equipments nor any fund allocated to replace spoilt machines and equipments. This low level of funding of vocational and technical education has been a problem in the implementation of quality teaching and examination of vocational and technical education in Malaysian schools (Kandar et.al. 2007). The absence of equipment and facilities due to poor funding, was bound to affect the competence of the modules and subsequently the implementation of the vocational subjects in secondary schools. Vocational and technical education needed to be funded adequately, to enable the program to achieve its aim of ensuring quality in education. The funding needs of vocational and technical education are quite enormous and needed to be addressed promptly.

The curriculum document was found to be the third major issue. This study highlighted some problems with the curriculum document. The curriculum documents for some subjects was found to require revision, and curriculum document for some subjects were not in accordance with industrial needs and standards. It was also found that the terminology used in the modules of certain subjects was old and outdated. Therefore, there was a need to ensure that the curriculum documents are up-to-date and in accordance with standards, in order to produce competent and skilled man-power for economic, industrial and social development.

Issues related to the assessment process were found to be the fourth major issue. This study discovered that there was too much paper work in this assessment system, with many forms to be filled in, to record the scores, that the re-assessment cases incurred extra cost, that the assessment process was not moderated by the MOE or any personnel appointed by MOE and that no action had been taken by the MOE on problems and feedback provided to the personnel who monitored their school. There was also a lack of qualified moderators and quality assurance guidelines. Therefore, the MOE, and specifically the MES would need to look into the methodology of CAMC and try to reduce the paper work involved. On the issues related to feedback on monitoring or moderation processes, the MES should look to setting a new approach to obtaining the Monitoring and Moderation report and action needed to be taken to improve the quality of the moderation process, such as engaging more qualified moderators.

The vocational subject's teachers' themselves, was found to be an issue. This study found that teachers were over-loaded with work in teaching and assessing the CAMC. The teachers suggested that they be given the critical allowances as their workload was heavier compared to the teachers who were teaching mathematics and science in English. This study also revealed that the MOE had not sent a laboratory or workshop assistant to certain schools. Some of the teachers who answered the questionnaire, had responded that they had not attended any of the briefings or trainings conducted by Malaysia Examination Syndicate (MES), and that they were given duties in addition to teaching the vocational subjects. This has added to the to the already heavy workload, and the ineffectiveness in carrying out their duties in school. The teachers' routine workload, other responsibilities and obligations can not be ignored. Much

consideration must be taken into account regarding the arrangement of work schedules for teachers, or the delegation of non-academic work and responsibilities to other non-teaching, support personnel. Therefore, it is strongly recommended that measures be introduced to relieve school teachers from non-academic duties and clerical works and that proportionate allocation of teaching workload and other responsibilities be negotiated with allowance for teacher development activities.

The final issue related to the students. This study detected the absenteeism rate to be very high among these students. These students had discipline problems and most of them were not academically inclined. They showed no interest and were not motivated to study the vocational subject offered to them. Schools needed to be able to choose students who are interested in taking up the offered vocational subjects, in order to produce skilled and competent manpower.

Conclusions

The structural equation modeling technique employed yielded interesting results. The measurement and structural model fitted adequately to the data. Teachers' Receptivity (TR) showed significant direct effect on Degree of Implementation (DOI). There were another two pairs of latent variables that showed significant direct effects – The Quality Assurance Measures (QA) on Teachers' Receptivity (TR) and the Teachers' Receptivity (TR) on Teachers' Conceptions (TC). On the other hand, only the Quality Assurance Measures (QA) showed significant indirect effect on Degree of Implementation (DOI) through Teachers' Receptivity (TR). Teachers' Receptivity (TR)

mediated the relationship between Quality Assurance Measures (QA) and Degree of Implementation (DOI). Therefore Teachers' Receptivity (TR) is a mediator.

The multiple group analysis for the four demographic variables i.e. gender, experience, training and teachers' field of specialization, indicated that there was no significant difference in the structural model across groups. All the models showed a reasonable fit to the data and the p-value for all the groups was more than 0.05**.** So, none of the four demographic variables i.e. gender, experience, training and teachers' field of specialization were moderating variables. This study also proposed a parsimonious model which was found to be the better model, to predict the effects of the factors influencing the degree of implementation of CAMC.

Based on the findings, it can be concluded that teachers' receptivity was the most important variable affecting the degree of implementation of CAMC. This finding supported the 'Teachers' Receptivity to System-wide Change'. Several other variables postulated to have significant direct effects on the degree of implementation of CAMC, turned out to be weak predictors. These included the 'quality assurance measures' and 'teachers' conceptions'. There were six main issues and barriers found to be faced by the vocational teachers in implementing CAMC. They were issues related to infrastructure, funding, curriculum documents, assessment, teachers and students.

Implications

This study has made several major contributions to academic research in the implementation of assessment reform.

First, the proposed model provides a simple but robust framework for the existing factors in the literature. It will also be useful for guiding the identification of new factors in future studies in the implementation of assessment reform. Second, the research model on the factors influencing the degree of implementation of CAMC by the vocational teachers, proposed and empirically tested in this study, will not only enhance our knowledge of the pattern of implementation of the CAMC by vocational teachers, but will also improve our understanding of vocational teachers' receptiveness to CAMC, their conceptions and the quality assurance measures of CAMC in general. Third, the measures that were developed and validated for this study could be useful for future studies of assessment reform, particularly in the Competency Assessment and Modular Certification (CAMC). Finally, the study could help trigger interest among researchers, in assessment reform and topics related to assessment reform, such as reform in school based assessment.

This study took a theoretical modeling approach, based on a survey assessing psychological variables (such as 'teachers' receptivity', and 'teachers' conceptions') and the quality assurance measures as factors to discover a basic mechanism, that could explain their influence on teachers' implementation of CAMC. The theoretical approach in this study is new, with reference to studies of implementation of assessment reform, which thus far has been limited to reporting teachers' demographic characteristics, and/or contextual factors influencing its implementation, among teachers. This study attempted

to develop measurement and structural models that could be replicated by other researchers similarly interested in the factors influencing teachers' implementation of assessment reform.

The current study was able to propose a specific model for predicting the vocational teachers' implementation of CAMC, composed of three major predictors. Multiple statistical analysis techniques were used to assess the model that demonstrated the model adequately fit the data. The model was further improved by parsimony where weak influences were removed. Finally, teachers' implementation of CAMC was strongly influenced by teachers' receptivity, and was indirectly influenced by quality assurance measures through teachers' receptivity, and teachers' conception was strongly influenced by teachers' receptivity. This study is significant in that it strove to develop items that could measure the variables in the model. The developed items were shown to be statistically valid and reliable for measuring "teachers' receptivity", "teachers' conception", quality assurance measures and the degree of implementation of CAMC.

This study has significant implications for practices as well. The examination of the implementation of CAMC among vocational teachers provided empirical evidence regarding which factors had the greatest influence –**"**teachers' receptivity**".** This in turn will help facilitate better decision-making by the policy makers or relevant departments in the MOE, to improve the implementation of this assessment reform by first focusing on strategies that enhance teachers' receptivity to CAMC.

Taking into consideration the circumstances of the teachers' receptivity to competency assessment and modular certification (CAMC) framework and practices, as revealed by this study, the approach to policy implementation adopted in assessment

reform in the Malaysian context, can be described as ‘top-down’, (Elmore & McLaughlin, 1981; Van Meter & Van Horn 1975; Weatherly & Lipsky, 1997; Winter, 1990). School administrators and teachers were provided with information deemed appropriate and adequate to perform their required roles in implementing the reform policies. Specific instructions and working procedures, along with timeframes and deadlines, were passed down to them. Workshops and trainings were provided by the central agencies to introduce them to the reform innovations and prepare them for new assessment criteria. Very little attention was given to the involvement of local implementers in the policy-making stages and the choices in implementation were mostly structured by the mandated change policies (see Chapter II). Various studies and reports (Cuban, 1984, 1990; Darling-Hammond & McLaughlin, 1995; Fullan & Miles, 1992; Hoban, 2002, Odden, 1991), found that many attempts at reforms, particularly mandated ones, failed due to resistance to this local implementation and failure on the part of the policy-makers to take into consideration the complexities of change, and the complex nature of the teaching profession with issues such as school- and teacher-resistance to mandated changes.

However, Fullan (1994) found, reviewing studies that used different reform strategies, that both the ‘top-down’ and ‘bottom-up’ strategies were weak in changing practices. Even when the reform operated as a compulsion to change beliefs and practices, merely mandating a reform would not guarantee these desired changes in teachers’ conceptions and practices. Thus, it would better to find ways in which both strategies could be balanced. Firestone, Monflis and Camilli (2001), suggested that when pressure was well-harmonized with support, teachers would adopt reforms successfully.

While, the assessment reform mandated by the Malaysian Ministry of Education made it possible for teachers to move from their previous assessment practices to the new system, teachers' needed support to move to the next step of the intended outcome of the new system. The MOE needs to provide –what may be termed as– "scaffolding instruments", that operated as supports for teachers to learn and change in their practices. This study suggests that the quality, and the sufficient provision, of the opportunities to learn about the reform was the best 'scaffolding instrument' for changing teachers' beliefs and practices.

Since current reform efforts required teachers to do something new or unfamiliar to them, teacher learning was necessary for them to implement the reforms successfully. To integrate new ideas into classrooms, teachers first needed to understand the new ideas. Thus to move from policy changes toward real changes in practices, teachers should have sufficient learning opportunities of high quality. The 'scaffolding instruments' that MOE needs to provide are, professional development programs that integrate specific content and assessment methods, better quality training and learning opportunities for vocational teachers and for relevant MOE personnel. These opportunities could promote teachers' receptivity to implementing reforms, as well as help them to change their conceptions and practices at a deeper level.

Teachers' receptivity to CAMC was a critical factor in implementing this assessment reform, and this factor influenced the degree of implementation directly**.** Quality assurance measures also were important factors because the quality assurance measures of CAMC played an important role in augmenting teachers' receptivity to implementing the assessment reform as it indirectly influenced teachers' implementation

of CAMC through teachers' receptivity. Providing quality assurance measures would be a good strategy to help teachers to better implement the assessment reform.

Using the findings of this study, the Malaysia Examinations Syndicate (MES) could consolidate its quality assurance documents and disseminate them to the administrators and teachers, in the form of published documents, comprising a manual(s) of key documents on the quality assurance system in general, and the assessment process in particular. This would provide a common, consistent guide to administrators, teachers and even students. It is equally crucial that ways be found to minimize additional paper work.

What emerged clearly from the research was that the respondents' perspective, assessment processes and requirements needed to be kept simple, with an emphasis on clarity. Over time, with maintenance, a more precise understanding could be developed of the types of information that should be recorded and kept.

While the majority of teachers did not express negative views about the quality assurance measures of CAMC, they believed that much of the problem in the implementation, stemmed from the policy makers. While this problem did not always relate to actual processes, there was often a sense of confusion, due to a lack of clarity in the information and guidelines on the quality assurance procedures. However, bearing in mind the dissatisfaction with the current quality assurance measures, in particular with the lack of a structured comprehensive quality assurance system, it is reasonable to assume that administrators and teachers would welcome improvements in quality practices.

Providing an awareness of the importance of quality assurance early in the planning stage could assist teachers in understanding the need for change, as most teachers in this study appeared unaware of the established procedures and practices, whether across schools or even in their own school. According to Dale et.al. (1997), employees would willingly participate in the change process only if they felt the change was required. Introducing training programs at the planning stage of any quality assurance initiative would assist in easing teachers into the implementing stage. In order to increase teachers' awareness of the importance of these quality assurance measures, the MES needs to organize briefing sessions for the relevant staff in the Ministry of Education (MOE) and schools, on the concepts of quality assurance measures to enlighten them about the purpose of the measures, the underlying assumptions and the intended outcomes. The reasons for monitoring academic activities and managing the quality assurance also needed to be made clear**.** The levels of participation of vocational and technical education stakeholders should be increased, for example, by consulting and involving more teachers, as well as experts from both the public and private sectors, in the formulation of the quality assurance system. Regular, formal and informal conferences could be held with MOE personnel at various levels, to share management problems, thereby establishing good communication and rapport between teachers and MOE personnel.

Other issues that stood out in the course of this study where teachers felt either an ineffectiveness or insufficiency, were in the areas of planning and monitoring, communication and decision making, evaluation and feedback, infrastructure and funding, staffing and support services. The MES needs to develop a management

structure and processes, with defined accountabilities for individuals and teams. The policies on moderation and monitoring the assessment processes and the quality assurance measures, needs to undergo further clarification, especially with respect to those concerning the type and frequency of monitoring, the agency or personnel responsible for carrying out this process and the type of strategies to be practiced for the best outcomes.

The MES could consider setting up a quality improvement team, with the specific responsibility of reviewing quality across the schools, and to help foster a culture of quality in which individuals would take on the responsibility for quality themselves, rather that rely on formal systems and procedures. This body should be given the job of overseeing quality in academic and administrative areas. Its primary role would be to assists schools and the MES to establish good practices in assessing and improving existing quality systems.

The MOE could also look at strengthening local expertise by creating a Malaysia-wide pool of recognized academic staff from which schools could select their external moderators. It is suggested that the pool be managed by the MES, who would also be responsible for selecting its members. This recommendation is consistent with Hannan and Silver's (2004) description of an approach suggested, in the United Kingdom. In order to achieve consistency of approach by moderators, the United Kingdom system has suggested that moderators undergo a training process which would include thorough familiarization, training and preparation, including a trainee/ apprenticeship model for new moderators.

Besides making recommendations to policy makers on ways to improve the

overall implementation of CAMC, it is important to first solve the issues and to remove barriers blocking teachers' implementation of CAMC **.** This would not necessarily improve the implementation immediately, but would encourage teachers to be more receptive to the CAMC. To sustain teachers' momentum in implementing the new assessment practices, policymakers should resolving these issues and correcting the inadequacies.

Recommendations for future research

In Malaysia, the issue of 'teachers' receptivity', 'teachers' conceptions' and 'quality assurance on implementation of assessment reform' had previously received little attention. Consequently, the findings of this study are intended to provide valuable baseline information for the policy makers and researchers on the implementation of CAMC in vocational subjects in Malaysia.

The study was intended to be broad in scope, to probe the depth of understanding the degree of implementation of the CAMC and the significance of factors influencing its implementation such as teachers' receptivity, teachers' conceptions and quality assurance measures. It assessed the extent to which these factors influenced the implementation of CAMC and also examined the challenges faced by the vocational teachers in implementing CAMC. In future research, a more in-depth study of specific areas in the implementation of CAMC is recommended, involving other factors and wider categories of stakeholders such as students, school administrators, vocational and technical education stakeholders, and possibly even employers, in order to provide an even more comprehensive view of this area of investigation. It would also be required if a new

assessment system is to be successfully developed and implemented. Further qualitative studies are suggested.

The main outcome of this study was the gathering of data and the utilization of the resultant information to make recommendations for the improvement of existing practices in the implementation of CAMC, particularly the assessment process. Of almost equal importance would be the formulation of professional development strategies and the quality assurance policies, which are more relevant and desirable for the future needs of Malaysia. Future research should be conducted that will build on the results of this study to determine appropriate "scaffolding instruments" and a quality assurance system for vocational and technical education in Malaysia, in line with the needs of the government, society, employers and students.

This study also acknowledged teachers' dissatisfaction with the current quality assurance mechanism, especially with the absence of a structured comprehensive quality assurance system. It also highlighted the lack of qualified moderators and quality assurance guidelines. Further research should be carried out to improve the quality assurance mechanism in order to successfully implement this new assessment reform.

The study also revealed that teachers had issues and barriers that challenged them in the successful implementation of CAMC. There is much scope for further study on how these issues and barriers can be overcome in order to effectively implement the new assessment reform in general and CAMC in particular.

The factors chosen in this study accounted for approximately 77.6% of variance in degree of implementation of CAMC**.** Other factors could also be considered in future research, like parent-teacher-school collaboration, school climate and community could

also be examined to determine how they could contribute to improve the implementation of a new assessment reform.

Finally, the study revealed that "teachers' receptivity" had a major influence on the implementation of CAMC and that quality assurance measures indirectly influenced the implementation of CAMC. It was found that the successful implementation of this new assessment reform depended on teachers' receptiveness to the change and the quality assurance mechanism used. It is therefore recommended that further research be conducted on these factors and appropriate solutions found to enhance them.

Summary

Teachers, the main actors on this stage of change, are expected to deliver the performance according to the scripts written by others and to fulfill the audience' expectations and satisfaction as well as their own. Change is a very personal experience. Teachers must clearly understand their parts and what is expected of them before they can make decisions on how to interpret and execute their performance, befitting their roles. Not only do they need to have the ability and sensitivity to perform their roles, but they must also feel inclined to do so. Thus, for any effort in educational change or reform on any scale, to yield substantial success and bring about the desired objectives and sustain continued development of the system, all concerned must make certain that the adopters of change policies have the required abilities, sensitivity and inclination to implement the policies as planned.

It is hoped that that this detailed examination of teacher-related factors and the quality assurance measures influencing the implementation of CAMC in Malaysia, and

its implications, will be carefully reviewed by the nation's vocational education decision makers for the future direction of assessment of vocational and technical education. Given the findings of the present study, there is reason to be optimistic about the future of the new assessment reform in general, and the CAMC of vocational subjects in Malaysia. However, there is always room for improvement and that requires courage, hard work, and commitment at all levels of the education community in the vocational and technical education, to transform the dream of excellence in education through a high quality assessment system, into reality.

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APPENDIX A

SYNOPSIS OF VOCATIONAL SUBJECTS OFFERED IN SECONDARY ACADEMIC SCHOOLS YEAR 2002 – 2005

1 DOMESTIC CONSTRUCTION

This subject aims at equipping students with basic skills for brick and concrete work required in the building or construction industry, especially house construction. Students practice laying and cementing bricks and concrete work. Students need to master skills to do finishing work using emulsion paint and tiles. The technique of fixing and removing scaffolding is also exposed with the emphasis on the safety measures during working. Students who have taken up this subject can indulge in various vocations pertaining to the construction field such as brick laying or cementing floors or walls and venturing on their own in this area.

2 FURNITURE MAKING

This subject aims at producing students who are able to design, make and refurbish furniture. Students master the skills of producing woodwork at medium finishing level, through projects throughout their learning. Among the products produced are chairs, racks, small tables, photo frames as well as various interior decoration items using wood such as wall panel, kitchen cabinets, ceilings and windows. Among the skills taught are usage, maintenance of woodwork equipment and portables, production of various joins and building projects using plan. Career opportunity includes opening up one's own business or working in the furniture shop as an apprentice.

3 SIGNAGE DESIGNING

This subject is formulated to equip students with skills and be outstanding in the field of designing and making signage as a form of communication media product. Students are exposed to various aspects of designing with the focus on typography, use of graphic symbols and standard colours in work production. Students can master the skills of preparing projects starting from preparation of plan on paper to signboard and techniques of installation. Students' learning experience include the production of 2D and 3D signage ; skills in using various manual techniques such as paint spraying and artwork in various media: papers, cards, polystyrenes and Perspex. Computer-aided signage is also introduced. Through this subject students can now become artist or graphic apprentice in graphic and advertising industry or venture into their own business.

4. SERVICING OF DOMESTIC ELECTRICAL APPLIANCES

The aim of this subject is to enable the students to repair domestic electrical appliances. Students are trained to use hand tools and multi-tester with emphasis on safety and the correct and effective methods. The students master the skills of testing and identifying the fault and maintain electrical appliances in houses such as iron, electric kettle, fan, refrigerator and audio-visual appliances. The students' career prospects includes opening up a shop of servicing and supplying electrical appliances or work as an operator in electronic factories.

5. CATERING AND FOOD SERVICE

The aim of this subject is to produce students who have skills in the field of management and dining. In learning catering, students put to use the skills of preparing, cooking, garnishing, serving and packing food from various basic recipes. In the learning of dining, students need to identify dining sets, table skirting, flower arrangement, folding of napkin and practise procedures to serve customers. With the skills that they have obtained, they can involve themselves in catering fields by becoming chefs, waiters or waitresses or catering apprentice.

6. FASHION DESIGNING AND TAILORING

This subject is formulated to produce students who are skilful and outstanding in the field of clothe-making. Students design and sketch clothes, draft patterns and make amendments as well as sew clothes such as blouse, skirt, slack and traditional clothes (*Baju Kurung and Kebaya*). They need to master the skill of using tailoring equipment, identify, select and use tailoring materials for clothes; and estimate the cost. With these basic skills students can run their own business as tailors, fashion designers or work in clothes and fashion industry.

7. LANDSCAPE AND NURSERY

This subject aims at producing students who are able to produce seedlings of decorative plants, planning and building using current technology. Students are involved in practical work at nurseries and in landscaping areas. Students need to plan, construct and maintain landscape areas in school and related industry during the school term holidays. Among the skills exposed are to identify decorative plants in landscaping industry; carrying out reproduction of plants; planning; drawing plans and designing landscape patterns; constructing soft and curvy landscapes; maintaining landscape areas and administering business. Career prospects include running ones own nursery or working in a nursery or landscaping company.

8 FOOD CROPS CULTIVATION

This subject aims at producing students who are able to manage food cultivation such as fruit, vegetables, herbs, "ulam" (vegetables are eaten raw) and mushrooms. Students carry out practical work pertaining to planting techniques which covers preparation of sites, fertilisation, irrigation system, pest control and diseases, after-harvest management and record-keeping of estate. Students need to be involved in the planting and care-taking of several types of crops such as banana, watermelon, mustard, "pegaga and ulam raja" and oyster mushroom. Malaysian Certificate of Education leavers who have taken up the subject can operate orchards and vegetable farms or work in estates related to this field as assistant agricultural technician.

9 DOMESTIC PIPE WORK

This subject aims at equipping students with skills and knowledge in fixing and extending various types of pipes such as PVC, G.I and poly pipes. Students also carry out maintenance work of domestic pipe equipment such as sink, basin, shower and tap. Through this subject, students can work as plumbers or venture on their own.

10 DOMESTIC WIRING

This subject aims at equipping students with the basic knowledge of theory and practice in electrical wiring field. Students observe safety measures and master skills in identifying sizes and cable connections and connecting main circuits, draw and interpret phase 1 circuit diagram, using testing equipment and installing domestic circuit. Through this subject students can work with wiring contractors or venture on their own.

11 ARC AND GAS WELDING

This subject aims to equip students with knowledge and skill in various welding work. Students observe safety measures and carry out welding work using hand equipment and machines. The skills that are learnt by the students include cutting processes using oxy-acythelene gas, material preparation process and extension of welding plate and carbonised pipes. Through this subject students can venture on their own or work in industries related to welding works.

12 AUTOMOBILE SERVICING

This subject aims to equip students with the knowledge and skills in the field of servicing vehicles. Students observe safety measures and carry out preparatory works and also use various servicing equipment. Students master the skills of servicing various systems available in vehicle such as ignition system, cooling, lubrication system and work as vehicle servicing mechanics.

13 MOTORCYCLE SERVICING

This subject aims to equip students with the knowledge and skills in motorcycle servicing. Students observe safety measures and carry out preparatory works and also use various servicing equipment. Students master the skills of servicing various systems available in motorcycle such as ignition system, lubrication system and work as motorcycle servicing mechanics. Through this subject students can venture on their own or work in motorcycle workshops.

14 SERVICING OF REFRIGERATION AND AIR-CONDITIONING EQUIPMENT

This subject aims to equip students with the knowledge and skills in servicing. Students observe safety measures and carry-out preparatory works, connection and treatment as well as charging various refrigerator and air-conditioning equipment. Students also learn of fault defection work pertaining to refrigeration and air-condition equipment. Through this subject, students can venture on their own or work in servicing fields involving servicing of various refrigeration and air-conditioning equipment servicing fields or involve in refrigeration and domestic air-conditioning as servicing mechanics.

15 FOOD PROCESSING

This subject enables students to master the skills of food processing. Students practise the skills in preparation, storage and packaging of various food such as confectionery, drinks, fermented products, fish, meat and dairy products as well as snacks. Students also do cost estimation. The basic skills in this subject enable them to venture on their own or work in snack industries.

16 FACIAL CARE AND HAIR STYLING

In this subject, students master skills and gain experience using make-up sets and hair-styling. They observe safety measures. The skill encompasses hair wash, hair care, hair treatment, hair cut, perm and dyeing hair. Students also learn the skills of facial care and treatment, basic and special make-up as well as nail care. The basic skills in this subject enable students to venture on their own or work in the make-up and hair-styling industries.

17 BASIC INTERIOR DECORATION

This subject enables students to master the skills in managing and arrangement of furniture as well as to decorate home by observing safety measures. These skills encompass the selection of colour scheme, pattern design and lighting effects. Students practise the skills of painting technique, wall paper setting, flower arrangement and curtains. They also produce interior design articles creatively. The basic skills in this subject enable students to venture on their own in the interior decoration industry or work as assistant or apprentice interior designer.

18 BASIC EARLY CHILDHOOD EDUCATION

Students are exposed to the basic skills and knowledge in childcare. Students are given service orientation in nursery and kindergarten. At the same time, they observe child development and growth. This subject encompasses the skills of preparing creative games that are safe and also to prepare a balanced meal for children. The child's personal hygiene, clean and safe environment are emphasised. The students learn resource and financial management and foster positive relationship in children, parents and society. Through this subject, students can venture on their own or work in a nursery or kindergarten.

19 BASIC GERONTOLOGY AND GERIATRIC CARE

This subject aims at providing early exposure to students on services towards the care and well-being of elderly people. Students learn the skills of aiding the elders in their food, personal hygiene, movements, exercise and recreation. They also prepare a safe environment. This subject includes the skill of loving and caring for the mental-emotional needs of the elderly, fostering a positive relationship, verbal

and non-verbal communication. Through this subject, students can get involved in geriatric care service industry, work as an assistant in a welfare or health centre or venture on their own.

20 AQUACULTURE AND RECREATIONAL ANIMAL

This subject aims at producing students who are able to master breeding of freshwater fish, decorative fish and recreational animals. Students design pet houses, ponds, aquariums and also build waste and water filter system. They carry out fish seeding, breeding recreational animal species and aquatic plants. Students also learn ways to choose and prepare food. The career prospects include managing aquaculture breeding centre, supplying seeding and accessories or working in an aquaculture and recreational company.

21 MULTIMEDIA PRODUCTION

This subject provides theoretical knowledge, process and production of quality and interesting multimedia materials. Students will master several skills like operating computers, video camera recorders, cameras (still picture), audio recording equipments and scanners. Students are also provided various skills in changing video and audio format from analogue signals to digital and vice versa. They are also exposed in using various graphic editing software, video and also editing tools. Upon completing their studies, students can get involved in jobs related to advertising and recording studios.

22 COMPUTER GRAPHICS

This subject provides knowledge to the students on various forms of graphic as well as the methods to produce them using computers. Students will also acquire the skills of using and operating computers as well as various relevant graphic designing software. Besides this, students can master the skills of using and operating other applications such as scanners, printers and digital cameras. The vocation students can join upon completing of the studies includes advertising and studio recording.