Innovation in the Assessment of Technical Subjects in Malaysian Secondary Schools

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The technical subjects comprised of Fundamentals of Sustainability (AK), Engineering Drawing (LK) and Invention (RC) have been introduced as electives for Form 4 and Form 5 students in Malaysian Secondary School. Examination results for AK, LK and RC in the Malaysian Certificate of Education (SPM) Examination were less encouraging and show some declination of students' performance. Data from the Ministry of Education also show a decline in student enrolment in AK, LK and RC, between 10 to 17 percent yearly. Hence, this study evaluated the implementation of AK, GKT and RC as to input, process and product. A CIPP model was used as a conceptual framework. The research design was programme evaluation. Stratified random sampling was used to select 335 respondents from national secondary schools in Peninsular Malaysia, consisting of 159 administrators and 176 teachers. Questionnaires, interview protocols and observation checklists were used as instruments. Cronbach Alpha reliability index for the three sets of questionnaires were between 0.77 to 0.95. Descriptive and inferential statistics were used to analyse the data. The empirical data found that staff training aspects need to be improved, especially staff training organised by the Ministry and Department of Education, in terms of teacher knowledge and skills for all three subjects. Interview and observation data were also presented to support the quantitative findings. Implications and recommendations for teaching and learning as well as for future research are presented and discussed.

Key words: *Technical subjects, staff training, CIPP model, national schools, Malaysia.*

Introduction

Technical and Vocational Education (TVET) should be reorganised for sustainable development. Such a change should be not limited to only course content and curriculum development but also cover the entire TVET system. These include implementation, policy development, administration, teacher training and allocation (UNESCO-UNEVOC, 2013). Thus, UNESCO introduced the Sustainable Development Goals (SDG) 2015-2030, to ensure the development of quality and equitable education, and to promote lifelong learning for all (UN, 2015; UNESCO, 2016). The SDG also emphasised that the main goal of technical and vocational education, in the 2030 agenda, is to achieve sustainable development. The seven strategies outlined by UNEVOC are: (i) support for national vision, (ii) reviewing TVET policies, (iii) providing guidelines for planning and implementation, (iv) transforming TVET and building training program capabilities, (v) developing learning materials, resources and equipment, (vi) forging partnerships in TVET, and (vii) carrying out ongoing monitoring, evaluation and research (Asnul et al., 2013). The Bonn Declaration (2004) states that Sustainable Development for TVET must provide an employee with the knowledge, competence, skills, values and attitudes to produce a responsible and productive citizen, one who is always appreciative of the success of the work performed and thus create a sustainable society. Fullan (2014) explained that staff training is a self-learning activity, a reflection and a formal course that can shape individual skills, knowledge and expertise. Staff training is a continuous process organised by the school with specific goals and objectives to enhance teachers' skills and abilities, as they significantly impact student achievement and learning. However, in the implementation of AK, LK and RC subjects, limited infrastructure facilities in most schools have resulted in fewer experiential than theoretical teaching processes. As such, informal training through experience is minimal, and does not improve teacher skills or knowledge.

Innovation in assessment is required, because teachers need to be trained or retrained to perform their work more effectively, to bridge the technological gap (Luck & Peng, 2010; Denson et al., 2016). Staff training programs need to be an organisational culture to enhance the quality of staff professionalism (Mardevan, 1991; Garmston, 1991; Oakland, 1996; Ann Lewis, 2007; Asnul et al., 2013). The study of Azizi (2000), Husin (2005) and Nordin (2011) suggested that a comprehensive training program for teachers is needed, to enhance capability in terms of skills, knowledge and self-confidence. Ornstein and Hunkins (2017) explain that teaching is a professional field that requires a person to undergo training for a certain period. Teachers who take formal courses are found to be able to use a variety of teaching strategies, according to their students' learning needs and styles (Aitken, 2000; Nik Azis, 2008; Kang, 2010; Fullan, 2014). As such, it is worth making investments to improve teacher skills and quality (Ramlee, 1999; Frank & Miles, 2008; Billet, 2011b; Alias et al., 2011; Ruhizan et al., 2012). Therefore the present study was conducted to (i) evaluate the

effectiveness of staff training, from administrators and teachers 'perceptions, (ii) differentiate administrators' and teachers' perceptions of staff training, and (iii) make observations on staff training documents.

Literature Review

The role of teachers has been found to be less effective in and out of the classroom, in the face of rapid changes in the national education system. Therefore, innovation in assessment to improve teacher effectiveness, efficiency and professionalism is important. Teacher training needs to be a part of school culture, to enhance teacher professionalism. Meanwhile, teachers' knowledge in their field has been seen as important, and motivates their students to pursue their learning (Mardevan, 1991; Garmston, 1991; Oakland, 1996; Ann Lewis, 2007; Asnul et al., 2013) . The study of Azizi (2000), Husin (2005) and Nordin (2011) suggested that a comprehensive training program for teachers should be held, to enhance teacher skills, knowledge and self-confidence. Staff training needs to be coordinated by providing a systematic content that meets the needs of teachers (Mohammed Sani, 1992; Alias et al., 2011). Staff training can promote their development, improvement and efficiency, enhance their potential to improve school learning, and enhance the effectiveness of the school as a teacher-based organisation of constructive ability, to achieve school goals. The attitude of always wanting to improve knowledge is one of the characteristics of effective teachers. By attending in-service courses, they can develop their knowledge and skills in education (Mohammed Sani, 1998; Ramlee, 1999; Jamil, 2002; Noor Akmar, 2006; Nordin, 2011).

Staff training is a continuous process organised by the school with specific goals and objectives. It enhances teachers' skills and abilities, which have a significant impact on student achievement and learning. They are also needed to meet the demands of economic, social or government policy. Teachers who acquire formal training have been found able to apply a variety of strategies to their students' learning needs and styles (Aitken, 2000; Nik Azis, 2008; Kang, 2010; Fullan, 2014). Meanwhile, Paris and Winograd (1995) and Ruhizan et al. (2012) found that teachers and schools failed to help students acquire the knowledge, skills and exposure they need outside of school and at work. The challenge that teachers face is to make school learning more meaningful, useful and contextual in real life and work environments, so that high school students have problem-solving skills. The level of training that will be provided by the parties is determined by four main factors. The first is the extent to which the knowledge, skills, attitudes and techniques to be used are not yet available to the teachers, and in what areas these are still lacking. Both relate to the ability and willingness of the parties to learn, gain knowledge and use new ways, and thus turn them into new practices. Third is the logistics ability of the training in performing this role. Fourth is a factor closely related to the logistics of using a university-based accreditation model, whereas to produce or develop successful students depends on good teachers and schools. Therefore, innovation in

the assessment made to develop teachers' skills and quality, as well as school or educational institutions, is worthwhile (Frank & Miles, 2008; Billet 2011b; Alias et al., 2011; Jabarullah et al., 2020).

Namara (1998) states that program evaluation involves gathering information about a program, policy, curriculum, course, educational materials and teaching materials used in a program to achieve its goals. Evaluation can be carried out using the appropriate evaluation model, depending on the purpose or objective of the assessment. He added that it is a process to see the success of a program in terms of its achievement, quality and credibility. According to Rossi and Freeman (1993), the concept of program evaluation is an application to social research procedures for measuring the concept, design, implementation and use of social intervention programs. According to Kennedy and House et al. (in Norasmah, 2002), program evaluation is used to identify its strengths and weaknesses. The resulting information enables decisions about a program, such as determining its continuance or modification.

There are numerous approaches in the twenty-first century. They include the Objectives-Oriented Approach, Management-Oriented Approach, Consumer-Oriented Approach, Expertise-Oriented Approach, Adversary-Oriented Approach and Participant-Oriented Approach. In addition, several specific assessment approaches emerge as a result of researchers and practitioners emphasis, such as: (a) CIPP, (b) CIRO, (c) Kirkpatrick's Evaluation Approach, and (d) Philip's Evaluation Approach (Hogan, 2007). The Objectives-Oriented Approach was pioneered by Ralph Tyler (1950), Benjamin Bloom (1956), Jim Popham (1969) and Mal Provus (1971). It aims to determine the extent to which goals and objectives are achieved (Worthen & Sanders, 1987; Ornstein & Hunskin, 2017). The Management-Oriented Approach is designed to inform organisational leaders' decisions. The valuation approach developed by Danial Stufflebeam (CIPP) is a well-known Management-Oriented Approach (Mathews & Hudson, 2001; Fitzpatrick, Sander & Worthen, 2004).

The Subsequently Consumer-Oriented Approach was supported by Scriven (1967) and Komoski, and it is often used by government agencies and consumer associations to inform the assessment of a product's effectiveness (Brown & Gerhardt, 2002). The Expertise-Oriented Approach is the oldest and most widely used approach for evaluating programs, activities or institutions (Worthen et al., 1997; Rossi et al., 2004). Its forerunner is Eisner (1976). The Adversary-Oriented Approach was pioneered by Wolf (1973), Owens (1973), Levine et al. (1978) and Kourilsky (1973). It provided a balanced study of all aspects and highlighted programs' strengths and weaknesses. The Participant-Oriented Approach, highlighted by Stake (1973), Patton (1987), Guba and Lincoln (1989), Rippey (1977), Parlett and Hamilton (1972), emphasises the first experience and importance of participants in a process (Royse et al., 2006). Different assessment methods are driven by different

perspectives. Every person believes that just one approach is not appropriate for all purposes (Worthern et al., 2004).

Statement of the Problem

In the era of globalisation and rapid technological development, based on economic changes, TVET innovation has become an agenda in most developing countries. Issues related to quality of education, lifelong learning, entrepreneurial skills, infrastructure as well as sustainable development, are the main focus of the transformation and innovation in technical and vocational education (UNESCO, 2015; UNESCO, 2016). In Malaysia generally, the achievement of technical stream students and the decline in student enrolment has been a factor in the transformation's success. Malaysian Examination Board (LPM) data for AK, LK and RC subjects indicate that students' achievement was weak. Previous studies also found that teachers are still less exposed to proper training and skills, and that their ICT skills are weak. Staff training is also decreasing, ad retraining and skills training are needed (Azizi & Roslan, 2000; Rashidah, 2001, Jamil; 2008, Nordin, 2011; Asnul et al., 2013).

Methodology

The research design in this study was a programme evaluation study, using part of the Context, Input, Process and Product (CIPP) model by Stufflebeam et. al (1971). The sample size of the study was based on Krejcie & Morgan's sample size table, in which 335 survey respondents were randomly selected based on zones. A total of 12, Secondary School respondents were interviewed. Stratified random sampling was used to select 335 respondents from national secondary schools in Peninsular Malaysia, consisting of 159 administrators and 176 teachers. Because the respondents are numerous but require minimal interaction, the questionnaire is suitable for use. Although the data obtained through the survey in this study were numerical and analysed according to descriptive statistical procedures and inferences, some require more in-depth explanations, through interviews from a small number of respondents. Further observations using the checklists were also conducted, to see the general teaching and learning process through school visits.

Questionnaires, interview protocols and observation checklists were used as instruments in this study. Cronbach Alpha reliability index figures for the three sets of questionnaires ranged between 0.77 and 0.95. Descriptive and inferential statistics were used to analyse the data. Figure 1 shows the conceptual framework of the study, based on several models selected to construct the appropriate input dimension construct including Stake (1967), Hammond (1973), Bushnel (1990) and Husted (2003). The dimensions of the process follow Hammond (1973), Bushnel (1990) and Kirkpatrick (1996). Furthermore, product dimensions are shaped

by the models of Tyler (1949), Stake (1967), Hammond (1973), Bushnel (1990), Kirkpatrics (1996), Husted (2003).

Figure 1. The conceptual framework of the study
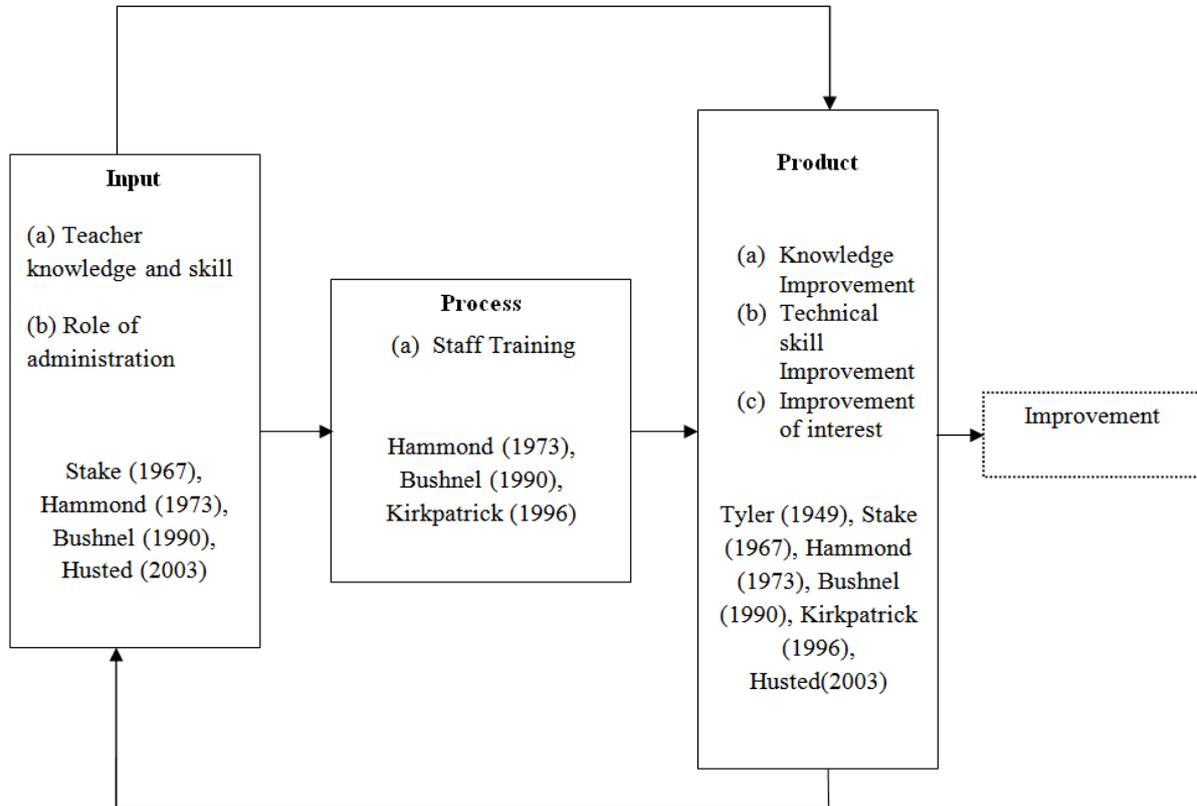
The justification for using the CIPP Model (Stufflebeam et al., 1971) in this study is to obtain information through a comprehensive approach regarding providing information to decision-makers. Improvements in the quality of the education system must be made, to meet the challenges of the changing world through the application of Science, Technology, Engineering and Mathematics (STEM). In order to realize GTP and ETP, the needs of skilled workers and k-workers need to be increased by 2020 (Posavac, 2015; JPM, 2015). The CIPP Model has special features such as overall improvement orientation, quantitative and qualitative data collection methods and flexibility. Therefore it is well-suited to the evaluation of AK, LK and RC subjects. Given these justifications, the researchers chose the CIPP Model of Stufflebeam et al. (1971) when focusing only on input dimensions (teachers' knowledge and administrators' skills and role), process dimensions (staff training process implementation) and product dimensions (subject products). The contextual dimension was dropped because the study did not focus on needs analysis, assuming that needs analysis was conducted before the subject was launched in 1995.

Findings

Questionnaire

The questionnaire was based on research questions to evaluate and determine the perceptions of administrators and teachers on staff training, as well as on observations regarding staff training documents. The findings show the analysis of mean scores and standard deviations as shown in Table 1. Administrators (M = 3.64, S.P. = 0.56) found that staff training was adequate, whereas teachers were not sure (M = 3.38, S.P. = 0.65) whether staff training was adequate.

Table 1: Staff Training Mean Scores among Administrators and Teachers

Variable	Administrators (n=159)			Teachers (n=176)		
	Mean	S.D.	Interpretation of Mean	Mean	S.D.	Interpretation of Mean
Staff Training	3.64	0.56	Setuju	3.38	0.65	Not sure

The mean score and standard deviation analysis were also used to look at differences in perceptions among AK, LK and RC administrators and teachers on staff training. Meanwhile, one-way ANOVA analysis determined whether there were significant differences among AK, LK and RC administrators and teachers in staff training. Table 2 shows that overall administrators and teachers of Engineering Drawing were somewhat agreeable (M = 3.41, SP = 0.65), whereas administrators and teachers of AK (M = 3.35, SP = 0.71) and RC (M = 3.36, SP = 0.51) did not agree whether the staff training is adequate.

In the details for items 1.1 to 1.5, perceptions of administrators and teachers on staff training are not sure, with mean scores of M = 2.99 to M = 3.27. Item 1.1 had the lowest mean score (M = 2.99, S.P. = 1.06). That indicates there are still aspects of staff training that need improvement. Furthermore, among administrators and teachers for items 1.6 to 1.9, it cagreed with the mean score of M = 3.81 to M = 4.10, with item 1.8 having the highest mean score (M = 4.10, S.P. = 0.65).

Furthermore, administrators and teachers for all three subjects LK (M = 3.07, SP = 1.02), AK (M = 2.88, SP = 1.10) and RC (M = 3.04, SP = 1.05) were not sure whether the Ministry of Education regularly provides content-related training (item 1.1). LK administrators and teachers (M = 3.24, SP = 1.04), AK (M = 2.97, SP = 1.12) and RC (M = 3.13, SP = 1.10) were also not sure whether the State Department of Education regularly provides training on content lessons over time (item 1.2). This indicates that staff training organised by the

Ministry of Education and the State Department of Education on teacher knowledge, for all three subjects, is still ineffective and needs improvement.

Further, internal training on pedagogy aspects organised by school still can be improved. That is so, given that LK administrators and teachers (M = 3.29, SP = 1.01), AK (M = 3.23, SP = 1.09) and RC (M = 3.33, SP = 1.04) are not sure whether the school has implemented internal training to enhance the professionalism of teachers implementing the teaching and learning process (item 1.3). Next, for item 1.4, LK administrators and teachers (M = 3.12, SP = 1.09), AK (M = 2.98, SP = 1.16), and RC (M = 3.01, SP = 1.12) were not sure whether specific training was provided to improve teachers' skills in the use of tools and machines. This indicates that training to improve teachers' skills also needs re-evaluation. Likewise, administrators and teachers of GKT (M = 3.29, SP = 0.98), AK (M = 3.18, SP = 1.04) and RC (M = 3.16, SP = 1.04) are also not sure about the effectiveness of motivational training to improve self-confidence for teachers who teach this subject (item 1.5). This explains why motivational training also needs to be improved in the future.

Table 2: Mean Scores among Administrators and Teachers on Staff Training by Subject.

No.	Item	Engineering Drawing (n=127)		Fundamental of Sustainability (n=125)		Invention (n=83)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1.1	The Ministry of Education regularly provides content related training.	3.07	1.02	2.88	1.10	3.04	1.05
1.2	The State Department of Education regularly provides content-based training over time.	3.24	1.04	2.97	1.12	3.13	1.10
1.3	Schools regularly provide internal training to enhance the professionalism of teachers in implementing the teaching and learning process.	3.29	1.01	3.23	1.09	3.33	1.04
1.4	Special training is provided to improve teachers' skills in using tools and machines.	3.12	1.09	2.98	1.16	3.01	1.12
1.5	Motivational training to increase self-confidence is also provided to this subject teacher.	3.29	0.98	3.18	1.04	3.16	1.04
1.6	Colleagues also regularly share their experiences in teaching and learning	3.85	0.86	3.73	0.89	3.84	0.80
1.7	Colleagues also regularly share their skills in teaching and learning.	3.93	0.74	3.84	0.79	3.84	0.82
1.8	Teachers regularly increase their knowledge and skills through reading.	4.12	0.65	4.08	0.70	4.06	0.55
1.9	Self-confidence in the subject is enhanced through the courses attended.	4.14	0.73	4.06	0.63	4.02	0.56
	Average	**3.41**	**0.65**	**3.35**	**0.71**	**3.36**	**0.51**

Table 3 shows the ANOVA test to determine differences between administrators, teachers and students in staff training. The null hypothesis test shows that the hypothesis is accepted. This means there were no significant differences between LK, AK and RC administrators and teachers in staff training (F = 1.322 and p = 0.268> 0.050).

Table 3: ANOVA of Staff Training by Subject

Dependent Variable	Group	Sum of Square	df	Mean Square	F	Sig.
Staff Training	Between Group	1.022	2	0.511	1.322	0.268
	Within Group	128.381	332	0.387		
	Total	**129.403**	**334**			

* Significant p = 0.050

Staff training was also identified as a key issue, by administrators and teachers in open-ended questionnaires. This included there being no training for teachers on how to use software Auto-CAD, and teachers were not trained for the skills required in accordance with R&D. Very few courses are conducted to enhance teacher professionalism. There are also teachers who are afraid to use tools like welding machines because they are not trained.

Interview

Interviews with administrators are in line with the questionnaire on staff training, where the training organised by the Ministry of Education was not enough, as stated by administrators (PT1RC):

'saya nampak tak ada lah, sebab saya merekodkan minit-minit, surat yang masuk, tak ada saya nampak lah, latihan di peringkat staf pun kita tak dapat nak buat, sebab mereka pun tak ramai, cuma dua orang guru sahaja, apa yang saya nak buat… dua orang guru kan (ketawa kecil), ya lah, sepatutnya komuniti di peringkat daerah dia, panitia dia harus rancang lah kan. Tapi kebelakangan ni berkurangan lah, aa..saya nampak memang berkurangan' (PT1RC).

In agreement with the administrators, teachers (G1LK) revealed that training in the form of professionalism has been delayed. As noted by the teachers (G1AK), the declining amount of training is being organised by the Ministry of Education and the State Department of Education:

'Ok, dulu tahun 2007 dulu, kalau guru LKTK ni memang mewah lah sentiasa pergi kursus profesionalisma guru tapi sejak 2007 tu, last lah tu, lepas tu tak ada lagi dah, mungkin masalah kewangan' (G1GKT).

'nak kira, diberi…aa…pengalaman atau latihan, tidak sama sekali, sebab pihak…kementerian pernah beri dulu sekali dua, masa awal 2000, 2000…kemudian, 14 tahun dah yang lepas, a…yes...kemudian tak dipanggil, even JPN pun tak ni lah, ok, jadi maksudnya bilangan latihan tu…amat…tidak mencukupi…yes...yes...amat

sedikit…a…memang tak dapat membantu lah' (G1AK).

But interviews from administrators (PT1LK, PT2AK) are still showing that in staff training activities organised by the Ministry of Education and the Education Department, there are also some teachers who have received ongoing training as examination papers. It was also pointed out by the teachers (G1RC) that the amount of training was less, and more dependent on the preparation of coursework, as they said:

'Ok, berkaitan dengan guru, rasanya guru ni memang dah cukup berpengalaman, dah banyak didedahkan dengan latihan-latihan, pelbagai aa...Kementerian ataupun Jabatan dah beberapa kali memberi latihan dalaman' (PT1LK).

'...banyak tahun dah, tapi dari segi latihan tu, latihan saya rasa, a...ada banyak latihan juga yang dia lalui, dan dia pun menyemak kertas soalan..ehm...' (PT2AK).

'Ok, dari segi latihan untuk reka cipta ni...aa...dalam setahun tu kita akan ada at least, sekali tu paling sikit, aa...tapi biasanya dua ke tiga kali latihan untuk aa…especially dalam untuk kerja kursus, folio, Ok, dan teknik untuk bina soalan, teknik jawab soalan, ha…ha...dan juga baru ni saya ada terima latihan mengenai autocad lah' (G1RC).

Observation

Table 4 shows the analysis of observations regarding staff training documents. The findings indicate that only 12 (66.7%) schools are able to provided staff training documents. The findings indicate that the documents regarding the staff training aspect are still incomplete. This also has implications for teachers' knowledge and skills, teaching and learning processes and student achievement.

Table 4: Staff Training Observation Analysis

	Document Available		No Document	
	No.	Percentage(%)	No.	Percentage(%)
Staff Training Document				
i) School Trainer	12	66.7	6	33.3
ii) Course Timetable	12	66.7	6	33.3
iii) Course Material	12	66.7	6	33.3

Discussion

Administrators agreed that staff training was adequate, while teachers were not sure whether staff training was adequate. Furthermore, perceptions among administrators and teachers, by subject, revealed that GKT administrators and teachers agreed that staff training was adequate. However, among administrators and kindergarten teachers and RCs there was uncertainty as to whether staff training was adequate. One-way ANOVA analysis revealed no significant differences among AK, LK and RC administrators and teachers in staff training.

Some aspects of staff training need innovation. That is especially true of staff training organised by the Ministry of Education and the Department of Education to increase subject matter content, internal training that can improve the skills of the teacher as well as the school. Further training to improve the skills and management of teacher equipment should also be evaluated, in addition to motivational training in accordance with the recommendation of Campbell et al. (2004) that teacher can develop professionally by attending short-term and long-term courses. Innovation is needed in schools because teachers need to be trained or retrained, since the skills they possess are no longer suitable for effective teaching (Cascio, 1995; Luck & Peng, 2010). It is also found that knowledge sharing and skills among teachers are limited because in general, only one subject teacher is placed in a school, while the knowledge of teachers in their field or field is seen as important and motivating for their students (Ann Lewis, 2007; Asnul et al., 2013).

Some themes also emerged, based on respondents' answers in open-ended questions. They included subject teachers not attending any related courses for a given subject, no courses to enhance teacher professionalism, no courses for AK teachers since 2010, and the majority of AK and RC teachers have no equipment and machine maintenance skills. The interview also made it clear that there are still administrators who agree that staff training is poorly organised at the school and district levels. Staff training is one factor that needs to be given the main focus on vocational education and training, towards the industrial revolution 4.0 (Klaus, 2017).

The teachers provided feedback that was consistent with the findings of the questionnaire. But surprisingly, there was a response from the teacher respondents stating that a staff training program for this subject had not been implemented in the past five to 14 years. The findings of staff training in this study, in line with Zahba's (1999) study of in-service training towards effective school success, found that weaknesses in the implementation of staff training in schools needed to be improved in terms of training planning, objectives, curriculum, environment and evaluation. Rashidah (2001) found that teachers are still less exposed to proper training and skills that would enable them to improve R&D. Therefore, innovation in staff training should be conducted more effectively as suggested by Ramlee

(1999) and Jamil (2002). The findings of this study are also in line with those of Nordin (2011) which found that the series of courses organised by the Ministry of Education Malaysia was inadequate, as teachers were expected to benefit greatly after completing the course.

According to Ornstein and Hunkins (2017), teaching is a professional field that requires a person to practice for a certain period of time. Staff training is a continuous process organised by the school, with specific goals and objectives to enhance teachers' skills and abilities as they significant impact on student achievement and learning. However, the survey conducted using the observational checklist of this study found that 33.3% of the schools visited did not have documents relating to school coaches, course schedules and course materials. Therefore, the implementation of staff training in this subject at school should be implemented periodically, and further enhanced by taking into account the facilities of the faculty, teachers' knowledge and skills, and students' readiness. Administrators need to increase the number of staff training, to increase teacher knowledge and skills in the subject matter. In general, it can be concluded that the training of staff in the implementation of Engineering Technology, Drawing and Design subjects in daily high schools is poorly conducted. According to Pratt (1980; 1994), wherever the curriculum is formulated, it is the teacher who determines whether it works. Providing innovative training or retraining is a solution that needs to be addressed, to address teacher inefficiencies.

It is undeniable that a teacher's experience in implementing the teaching and learning process can be regarded as informal training. Kang (2010) and Fullan (2014) point out that staff training is a self-learning activity and a reflection on shaping individual skills, knowledge and expertise. Staff training is a process the school organises with specific goals and objectives, to enhance teacher skills and abilities as mentioned above. However, in the implementation of these subjects, the limited facilities available in most schools make the teaching process only theoretically possible. Teachers' knowledge and skills can be said to be at a minimum, because most of these subjects are from various fields of engineering and technology that are derived from the Graduate Teaching Course (KPLI) program, which is given a pedagogical exposure of only 12 months at the Institute of Teacher Education (IPG). As a result, they have not yet mastered the curriculum. The unclear role of the subject, as well as the urge to maintain school performance, have made staff training among teachers impossible. This finding is supported by a study conducted by Ruhizan et al. (2012). It found that teachers and schools failed to help students acquire the knowledge, skills and exposure they needed outside of school and at work. This will eventually lead to academic and vocational integration that emphasises the harmony of theoretical and practical constraints in the curriculum (Ramlee et al., 2003; Lauglo & Maclean, 2005; UNESCO-UNIVOC, 2013).

Conclusion

While administrators concluded that staff training is acceptable, teachers were not sure if staff training is adequate. Furthermore, LK administrators and teachers agreed on staff training, whereas AK and RC teachers and teachers were not sure whether staff training was adequate. One-way ANOVA analysis revealed no significant differences between LK, AK and RC teachers and staff training. In the open-ended questions some themes emerged. They included that staff training had not been carried out for the last five years, and a lack of training in the use of tools and technical skills. The results also show that administrators and teachers have reiterated that in the last five years the amount of staff training organised by the Ministry of Education, the Education Department and the Education Office has decreased. In addition, several themes emerged in areas of staff training such as the training of teachers and administrators, and training regarding equipment and machinery and workshop management. In addition, innovative training on the development of interpersonal skills also needs to be conducted. Observations also found that, as to documents related to curriculum implementation, only 66.7% of schools were able to submit documents related to school coaches, course schedules and course materials. Nonetheless, the implementation of the teaching ledger is a good way for all schools to provide such documents.

Empirical data showed that aspects of staff training need to be improved, especially staff training organised by the Ministry of Education and the Department of Education on the knowledge and skills of teachers for all three subjects. The school also needs to organise internal training on aspects of pedagogy. Further training to improve teachers' skills also needs to be evaluated, and motivational training also needs to be improved over time. As such, those involved in staff training at the Ministry of Education Malaysia need to change their staff training strategies to a more systematic staff training system. This would start at the university level and the Teacher Education Institute which trains prospective teachers, and continue through the on-the-job training system. Innovation on job training would be based on regular skills for teachers who have served. The training should be based on skills using the latest technology and carried out periodically. Further training of administrators and for teacher professionalism also needs to be conducted by the Ministry so that teachers can improve the quality of teaching. Innovative internal training at the zone level or District Committee by the Teacher Activities Center (PKG) needs to be enhanced, as it is a platform for sharing knowledge and experience between AK, GKT and RC teachers.

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