Research Journal of Applied Sciences 8 (8): 388-392, 2013
ISSN: 1815-932X

Sustainable Development Elements in the Vocational-Subjects Coursework of the Malaysian Secondary-School Curriculum

[1]Ruhizan M. Yasin, [2]Asnul Dahar Minghat and [1]Saemah Rahman
[1]Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia
[2]Faculty of Education, Universiti Teknologi Malaysia, Bangi, Selangor, Malaysia

Abstract: Developing a high-quality education system in Malaysia is among the country's top priorities. The architects of this system are focused on developing human capital that is experienced, skilled, progressive and exhibits high moral and ethical values. The Education Development Master Plan 2006 to 2010, adopted by the Malaysian Ministry of Education, introduced 22 electives for Vocational Subjects (VS) in the secondary-school curriculum to help students develop vocational skills that will prepare them for skilled and semi-skilled work after they have completed school. It is hoped that the use of these skills will expedite the economic development of Malaysia. This study identifies the key elements that support the sustainability of VSs in secondary schools in Malaysia based on the strategies outlined by the International Centre for Technical and Vocational Education and Training, an organisation based in Bonn, Germany. The study which used methods developed by the Delphi group was undertaken with 12 experts in the field of technical vocational education. An interview and questionnaire were used and. The findings revealed 16 elements that contributed to the framework. These elements are creativity, innovation, networks and partnerships, staff development programmes, teaching methods, generic skills, industrial relations and internships, counselling, entrepreneurship, information and communication technology skills, interest, recognition, knowledge, competency-based training, articulation and the commitment of management. Researchers argue that all these elements are necessary for the sustainability of the subject which further will enhance sustainable development efforts nationally and globally.

Key words: Sustainability education, vocational education, Delphi study, Malaysian school curriculum, study

INTRODUCTION

The concept of sustainability has been part of the discourse of international discussions since the 1980s. According to Pavlova (2009), the term sustainable development has various meanings and definitions depending on their use in different organisations. However, the concept of sustainable development was first defined in the Brundtland Commission Report; the World Commission on Environment and Development. According to Brundtland, sustainable development has been conceptualised in a variety of forms such as:

> Development that meets the needs of the present without compromising the ability of future generation to meet their own needs

Technical Vocational Education and Training (TVET) is a master key to solving the lack of sustainable development, fostering peace and reducing poverty (Pavlova and Chunlin, 2009). Mohamed Jallah also opined that TVET is pivotal to the sustainability of a country's development. According to him sustainable development is a critical issue for the 21st century community mainly because TVET plays an important role in Education for Sustainable Development (ESD).

The International Centre for Technical and Vocational Education and Training (UNEVOC) has outlined several strategies for sustainable development via TVET. These include gaining the support and vision of the country or countries involved, reviewing national policies and development plans writing planning guidelines for the implementation of TVET undertaking capacity-building activities and creating training programs developing materials, resources and equipment for TVET establishing networks and partnerships for TVET and performing monitoring, evaluation and research for TVET.

The Delphi study method makes use of expert opinions. This method of study first began at the RAND Corporation and was pioneered by Olaf Helmer and Norman Dalkey in 1953 to examine specific problems in the military (Helmer, 1968). The main objective of the Delphi

Corresponding Author: Ruhizan M. Yasin, Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia

study method is to obtain valid feedback and agreement regarding high-level problems via questionnaires given to a panel of experts. This is accomplished by providing each individual in the panel an identical questionnaire as well as providing group feedback from earlier rounds (Helmer, 1968).

Delphi studies are often used to consolidate and refine the opinion of a heterogeneous group of experts based on collective information provided in the judging process. The Delphi study conducted by Daresh in the preparation of the principal research instrument involves school principals who were working at the time of the study or had been earlier employed at the university in the greater metropolitan area of El Paso, Texas. This technique is a process that exemplifies the use of written responses rather than bringing individuals together in discussion.

Delphi studies generally exhibit three characteristics, namely, transparency, feedback control and a statistical-analysis group (Dalkey *et al*., 1972). According to Linstone and Turoff, the five fundamental elements of Delphi studies are that participants are individually selected with each being unaware of the answers provided by their counterpart; participants are only informed of answers submitted by their counterparts in the second round of data analysis in which research findings are submitted to all panel members; participants receive no pressure from any party including other participants to reveal or change their questionnaire responses; data is analyzed statistically and data samples are unbiased, playing a pivotal role in the panel's quest for a solution.

A study was conducted to identify the elements that would ensure the continuity of VS in tandem with achieving the goals and objectives of VS in secondary schools. Elements of sustainability are very important in maintaining VS and improving the quality of life in Malaysia regarding to post-VS-based secondary-school education.

Vocational subjects: The Ministry of Education (MOE) recognizes the importance of Technical and Vocational Education (TVE) in promoting the aspirations of Malaysia to become a developed nation by the year 2020.

Thus, TVE which encompasses a wide range of subjects has been developed widely in secondary schools. Further, Vocational Subjects (VS) are composed of 22 elective subjects in which one of the subjects in TVE has been given emphasis in the Education Development Master Plan (EDMP, 2010) 2006 to 2010 by the Ministry of Education. Table 1 indicates those vocational subjects which are grouped according to key subject areas.

Table 1: Base area vocational subjects

Field	Vocational subjects
Engineering services	Servicing of domestic electrical equipment
	Domestic wiring
	Repair of refrigerator and air-conditioning equipment
	Gas and arc welding
	Motorcycle servicing
	Automobile servicing
Construction	Domestic construction
	Furniture making
	Domestic plumbing
	Architectural signs
	Basic interior design
Home economics	Clothing design and sewing
	Catering and food service
	Food processing
	Home hair care and use of toiletries
	Child care and early childhood education
	Basic gerontology and related services
Agriculture	Landscape and nursery
	Food crops
	Aquaculture and animal for entertainment
Computer applications	Computer graphics
	Multimedia production

Concept Paper outlining vocational subjects, Curriculum Development Centre (2001)

Research problems: The MOE has set a National Key Performance Indicator (NKPI) specifically to expand access to quality and affordable education. In the fifth NKPI which was released in 2009, TVE played a more important role in the Malaysian agenda. The Minister of Key Performance Indicators (MKPIs) within the Ministry of Education has set a target of 100% student participation in vocational skills building by the end of 2015. According to Jab (2009), VS was one of the subjects in the technical and vocational education group in secondary schools which was addressed in terms of achieving the NKPI-5 goals. It is predicted that the number of students who will take VS coursework from 2010 through 2015 will significantly increase. Figure 1 indicates the key performance indicator as anticipated by the MOE to be an increase to 100% in the participation of students in vocational courses and in the building of vocational skills during the years 2010 through 2015.

A case study was conducted by the Johore State Education Department (JSED) in 2004 to detect the direction of the students who had obtained the VS graduate Malaysian Certificate of Education (MCE) in 2004. Three schools were selected; questionnaires were used with participants. Table 2 indicates that only 15 (14.29%) of the 105 students who sat for the VS pursued similar education in public and private institutes of higher learning. This amount was 8.57% lower (i.e., 9 less of 105 students) who continued working in the same field after sitting for their MCE examinations. The higher percentage, 45.7%, represented post-MCE students in 2004 who were engaged in different areas of VS coursework taken during forms 4 (16 years old) and 5 (17 years old).

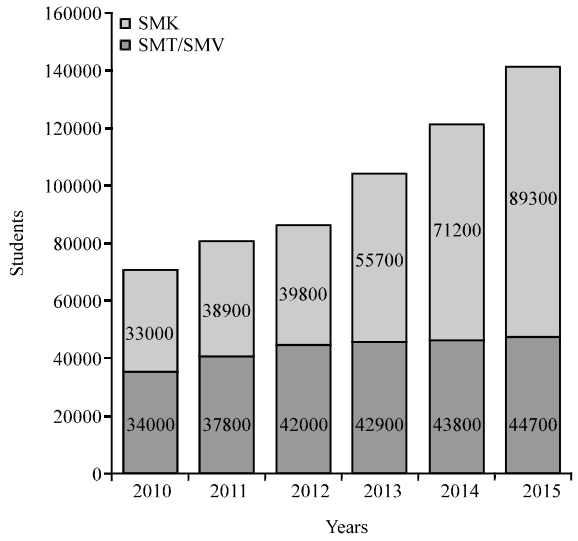

Fig. 1: Key Performance Indicator (KPI) of Malaysian Ministry of Education (MOE). Student recruitment in SMT/SMV and SMK points for technical and vocational education from 2010 through 2015. Technical and Vocational Education Department, MOE (2009), SMT/SMV indicates technical secondary school/vocational secondary school; SMK, secondary academic school

Table 2: The directions of the students who had obtained the VS. Graduate MCE in 2004 from three secondary academic schools in Johore, Malaysia

Variables	Students No. (%)[b]
Continued education through form 6 (18 years old)	6 (5.71)
Continued education into public or private institutes in the same field of study	15 (14.29)
Continued education into public or private institutes in different fields of study	7 (6.67)
Pursued careers related to	9 (8.57)
Pursued careers not related to	48 (45.70)
Worked independently	3 (2.86)
Did not work in their field	17 (16.19)
Total	105 (100.00)

The Technical and Vocational Education Unit, Johore State Education Department in 2007. The sample was based on three schools that offer the VS, namely; Sekolah Menengah Kebangsaan (SMK) Pekan Baru, Muar; SMK Perling, Johor Bahru and SMK Bandar Tenggara, Kulai

A study was conducted to identify the elements that would ensure the continuity of in tandem with achieving the goals and objectives of in secondary schools. Elements of sustainability are very important in maintaining and improving the quality of life in Malaysia through post VS based secondary-school education.

MATERIALS AND METHODS

Research design: The Delphi Method was used in tandem with this qualitative study. It was chosen to achieve a high level of consensus on the correct elements as viewed by an expert panel. Interviews were conducted to obtained elements for the sustainable development element of the. Elements of sustainable were obtained using NVivo analysis. The results (i.e., elements) achieved in the first phase of the study will be further used in the second round of the Delphi-based study in which they will developed into questionnaire items. The field of educational research methodology has been used extensively to predict and to identify needs in education. For example in clinical education, Delphi studies have been used in various ways including predicting, planning and curriculum development (Thangaratinam and Redman, 2005).

The study sample: The participants in this study were Malaysian individuals who embodied a high level of technical and vocational education. However, Helmer (1968), quoted in Steward *et al.* (1999), stated the difficulty researchers faced when imposing the title of expert on an individual based solely on the communal assessment of his or her academic qualifications, level of contribution and career achievements. For the purpose of uniformity among the individuals in the sample, the following criteria were used as a basic guide in determining which would take part in expert panel review:

- Individuals should hold a Doctor of Philosophy (PhD) degree in TVE; lecturers in the Institute for Teacher Education (ITE) should have served between 10-15 years in the field of TVE or should have taught for >10 years on the subjects of TVE
- Individuals should possess knowledge of the curriculum and implementation of TVE topics at the university, ITE or secondary-school level
- Individuals, particularly if from the Ministry of Education should be directly involved in the implementation of VS

Panel experts were selected on the basis of their willingness and ability to express an opinion and to bring extensive experience to bear on the matters being discussed (French *et al.*, 2002). In accordance with the criteria set, the panel of 12 experts was selected (Dalkey *et al.*, 1972). To acquire the elements of sustainable development in VS, researchers conducted personal interviews based on the interview protocols provided by the researcher.

RESULTS AND DISCUSSION

Delphi study participant profile: The twelve panel experts were eight academic staff members from Institutes of

Higher Education, a lecturer from the ITE, two education officers from the Ministry of Education and a specialist teacher.

Delphi interview findings: The results of the interviews were analysed using NVivo analysis which used a thematic approach. A framework of sustainable development for the VS has been established as shown in Fig. 2. These elements necessary for sustainable development will ensure the success of the implementation of VS in secondary academic schools and beyond; consequently this implementation will help to achieve sustainable development.

For brevity, researchers will discuss only a few elements herein. Creativity, teaching methods and industrial relations are the most important elements of sustainable development efforts in a particular subject. This is consistent with the recommendations of Dirin (2009) who stated that sustainable development, articularly pertaining to the development of teaching methods interaction, participation and collaboration in teaching and learning should focus on hands-on experiences, visits to factories, field-work, laboratory work and placement in specific industries. Mohd Zanal also ascertained that these methods would provide students with the necessary exposure to real-world work environments and strengthen the sustainability of technical and vocational education. Supplementary teaching methods should also incorporate problem-solving skills as well as creativity and innovation.

Mohammad Sani considers that teachers undergo continuous education. This is prevalent particularly when viewed in contexts of change such as in the educational environment itself in the perceived value of school and personal values and in school management. This view was also supported by Salleh (2006). The state training programs and courses in this service are pivotal in enhancing the level of teaching professionalism in facing challenges that stem from outside the profession such as the changing aspirations of society and changes in technology. Internal challenges faced by teaching staff would occur in educational organizations (i.e., governance) such as changes in curriculum, pedagogy and governmental educational policies. In lieu of this, staff development programs are a key element in improving the implementation of VS, particularly improving the knowledge and skills of teachers specializing in VS.

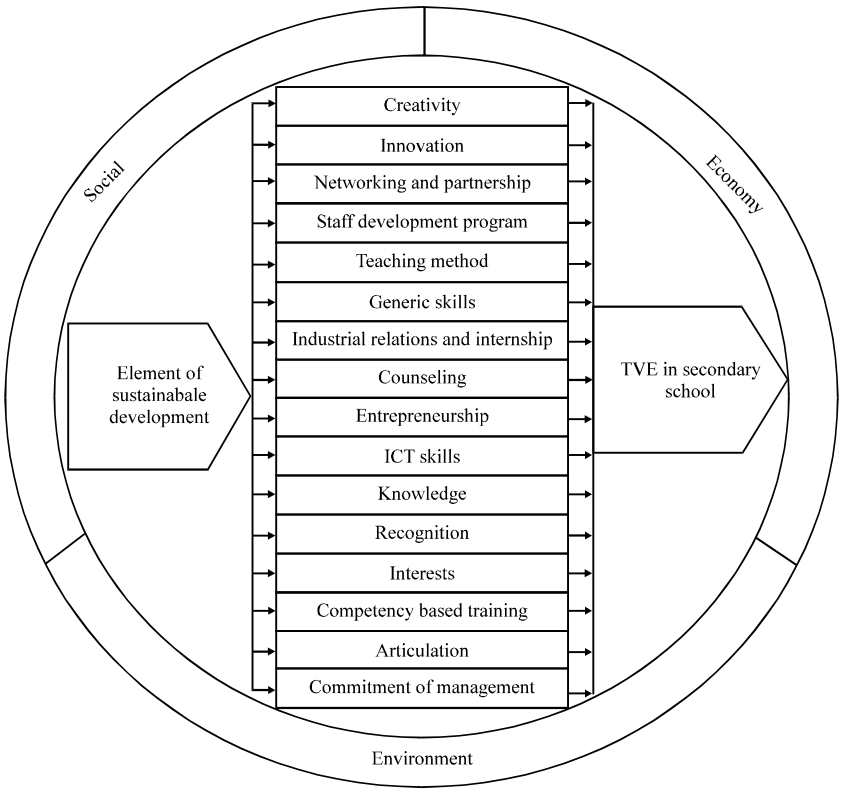

Fig. 2: A framework of sustainable development in vocational subjects

The expert panel unanimously agreed that industrial relations were a key sustainable element for the development of VS. Each student for a certain period will be placed in an industry related to his or her field of study. Billet (2001a, b) viewed learning in the workplace as not only being very useful to students but a matter that could not be avoided. Many students found the experience of working, partaking in conversation and gaining advice and knowledge from experienced employees to be pivotal in their acquisition of the knowledge and skills necessary for carrying out actual tasks. Further studies of learning in the workplace by Billet (1996, 1999, 2001a, b) found that day to day activities in the work environment were an important source of learning and experience. It was found that students received guidance in direct form through interaction with other employees and in indirect form through observation and discussion of activities in the workplace. Workplace learning is also important to teachers and trainers and should become an in-service activity as part of their lifelong learning (Ruhizan, 2010).

CONCLUSION

Elements of sustainable development for VS as identified through the Delphi study methods will be used as a guide to improve the implementation of VS. In tandem with the Tenth Malaysia Plan (10th MP), TVE with the implementation of VS coursework, exhibits high potential in the development and maintenance of human capital. The economic aspects of sustainable development can be achieved to improve the quality of life for the people of Malaysia. In other words, TVE plays an important role in the economic development of the nation and consequently, it will contribute to a prosperous society with high as envisioned by the Prime Minister of Malaysia. Hence, with all these elements in place, a sustainable environment in which TVE skills thrive should also be promoted.

REFERENCES

Billet, S., 1996. Towords a model of workplace learning: The learning curriculum. Studies Continuing Educat., 18: 43-58.

Billet, S., 1999. Guided Learning in the Workplace. In: Understanding Learning at Work, Boud, D. and J. Garrick (Eds.). Routledge, London, pp: 151-164.

Billet, S., 2001b. Increasing small business participation in VET : A hard ask. Educ. Training, 43: 416-425.

Billet, S., 2001a. Learn ing through work: Workplace affordances and individual learning enggagement. J. Workplace Learn., 13: 209-214.

Curriculum Development Centre, 2001. Information and guidance vocational subjects in secondary school daily. Ministray of Education, Kuala Lumpur, Malaysia.

Dalkey, N.C., D.L. Rourke, R. Lewis and D. Snyder, 1972. Studies in the Quality of Life: Delphi and Decision-Making. Lexington Books, Lexington, MA., ISBN: 13-9780669814972, Pages: 161.

Dirin, M.Z., 2009. Sustainable development and TVET. Proceedings of the 6th Annual National Technical and Vocational Education and Training Conference, May 12-13, 2009, Concorde Hotel, Kuala Lumpur, Malaysia.

EDMP, 2010. Education development master plan 2006-2010. Ministry of Education, 10 Malaysia Plan, Malaysia.

French, P., Y.Y. Ho and L.S. Lee, 2002. A Delphi survey of evidence-based nursing priorities in Hong Kong. J. Nurs. Manage., 10: 265-273.

Helmer, O., 1968. Analysis of the Future: The Delphi Method. In: Technological Forecasting for Industry and Government: Method and Application, Bright, J.R. (Ed.). Prentice-Hall Inc., New Jersey, USA.

Jab, A.T., 2009. TVET managing in the global economic downturn. Proceedings of the 6th Annual National Technical and Vocational Education and Training Conference, May 12-13, 2009, Concorde Hotel, Kuala Lumpur, Malaysia.

Pavlova, M. and H. Chunlin, 2009. Final report on project of developing innovative approaches in education for sustainable development in TVET curriculum reform in China. Zhejiang Technology Institute of Economy, Hangzhou, China.

Pavlova, M., 2009. Technology and Vocational Education for Sustainable Development: Empowering Individuals For The Future. Springer, UK.

Ruhizan, M.Y., 2010. Features of industry-education collaboration in promoting lifelong learning for engineering educators of Malaysian polytechnics. Proceedings of the 7th WSEAS International Conference on Engineering Education, July 22-24, 2010, Corfu Island, Greece, pp: 459-464.

Salleh, H.M., 2006. Evaluation of the effectiveness of school administration in-service training to improve teaching skills. M.Sc. Thesis, Sultan Idris Education University, Malaysia.

Steward, J., C. O'Halloran, P. Harrigan, J. Spencer, J.R. Barton and S.J. Singlwton, 1999. Identifying appropriate tasks for the preregistration year: Modified delphi technique. British Med. J., 319: 224-229.

Thangaratinam, S. and C.W.E. Redman, 2005. The delphi technique. Obstetrician Gynaecol. J., 7: 120-125.