Development of National Occupational Skills Standards in Malaysia

Toward an Industry-driven System for Vocational Training and Education

Background

Shortage of skilled manpower in Malaysia

In the late Eighties Malaysia experienced a rapid economic growth which was propelled by its expanding manufacturing sector. However, the increased demand for skilled labor was not being met by the supply side – neither in the public nor the private training sector. As a result of this increasing skill shortage, a report of the Malaysian Cabinet Committee on Training was prepared in 1991[1].

The conclusions:
1. 'While the rapid growth in the industrial activities has resulted in an increased demand for skills, on the supply side, the training institutions have been unable to meet these demands due to various rigidities.
2. Rapid technological changes in the production process require significant changes in the skills required by the affected industries. Consequently, there is a need for flexibility by skill supply mechanism to respond to the changing skill requirements. In particular, skill upgrading/retraining of the existing workforce in addition to pre-employment training needs to be enhanced.
3. In addition to basic formal training, much of the required skills that are short in supply have to be acquired on the job.
4. Existing government training institutions are not market driven. Market demand for skills are not well monitored and the mechanism for ensuring relevance of output is inadequate.2

1 Report of the Cabinet Committee on Training: Training for Industrial Development – Challenges for the Nineties. ECONOMIC PLANNING UNIT/Prime Minister’s Department and Ministry of Education, Kuala Lumpur 1991
Recommendations to overcome the skill shortage

The report makes several recommendations to overcome the skill shortage and manpower requirements:

1. Improving the responsiveness of public training market demands.
   - Reorientation of the Value System
   - Establishing feedback mechanism
   recommended measures:
     - Set up Permanent Advisory Committee
     - Regular conduct of labor market surveys
     - System to monitor technological change
   - Greater flexibility in management
   - Attracting and retaining quality instructors
   - Fuller utilization of education and training institutes
   - Corporation of training institutes
   - Constant review of course design and curriculum
   recommended measures:
     - Regular review of course design and curriculum
     - Private sector participation in planning and development of courses and curriculum
     - Wider dissemination of labor market information

2. Expanding the role of the private (training) sector.
   - Increasing the collaboration with the private sector
   - Improving incentives for training
   - Establishing specialist centers

3. Strengthening linkages between training and technological change
   - Establishing centers of excellence
   - Expanding the accreditation of skills
   recommended measures:
     - Review accreditation of skills to include skills in new and emerging technologies
     - Expand accreditation system to include skills higher than advanced level
     - Expand private sector involvement in the accreditation of skills
     - Explore possibilities of accreditation for master craftsmen
     - Explore avenues for upgrading of skilled workers to technicians
   - Establishing National Information Technology Board

Based on these recommendations, the Malaysian Vocational Training System began to change dramatically in the early Nineties. The newly restructured National Vocational Training Council (NVTC) established under the Ministry of Human Resources was given the task to implement the necessary changes.

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2 Report of the Cabinet ..., pp. 42
3 p. 54 (edited and format changed by the author)
The following will elaborate on the role and the achievements of the NVTC toward the development of a more flexible and industry-driven system for vocational training and education and to the approach in the development of National Occupational Skill Standards.

**National Vocational Training Council (NVTC)**

NVTC was established through reorganization of the National Industrial Trade Testing & Certification Board (NITTCB) in May 1989 (where NITTCB was established in 1971). Purpose of NVTC:
- Formulate
- Coordinate
- Promote
all strategies and implementation of skills training in Malaysia.
The new structure reflects the important role of the private training sector and the involvement of industry in reforming the Malaysian vocational training system.

In response to the recommendations of the Cabinet Committee, a task force was established to revise the National Occupational Skill Standards and to further the development of a more flexible Skill Certification System.
Steps toward Competency-based Training and Education

71 National Trade Standards had been developed from 1971 until 1991. The old format focused mostly on the knowledge-based approach adopted from Europe. In 1991 the format and the procedures were changed to reflect the needs of industry and to meet the requirements of Competency-based Training and Education (CBTE/CBT). During that time, NVTC studied the vocational training systems of Japan, Germany, UK, Canada, USA and Australia. The decision was made to adopt a modular system, suitable for both the private and public training sector, which followed the trends in the USA and Canada for CBTE. Competency Based Training and Education is concentrated on the end product – on what people can do as a result of training.

What is Competency?

The concept of competency focuses on what is expected of an employee in the workplace rather than on the learning process; and embodies the ability to transfer and apply skills and knowledge to new situations and environments. Competency is a broad concept that includes all aspects of work performance and not only narrow task skills. Competency includes the requirement to:
- perform individual tasks (task skills)
- manage a number of different tasks within the job (task management skills)
- respond to irregularities and breakdowns in routine (contingency management skills)
- deal with the responsibilities and expectations of the work environment, including working with others (job/role environment skills)

Five Essential Elements of Competency-Based Training & Education

1. Competencies identified, verified and made public:
National Occupational Skill Standard (NOSS): A NOSS is defined as a specification of the competencies expected of a skilled worker/professional who is

4 The development of the new concept was carried out mainly by NVTC officers with assistance from the Ohio State University, Columbus Ohio, USA for DACUM training, and Humber College, Rexdale, Ontario, Canada, for development of NOSS and CBTE. From 1992 to 1996 Malaysian personnel was trained in the USA and Canada, and regular workshops for the implementation of NOSS and the development of learning packages were conducted in Malaysia with input especially from Humber College.
gainfully employed in Malaysia for an occupation area & level as required by industries (cf. figure ‘Level of Job Description’).

- **Occupational Title and Definition**: Based on the ILO’s International Standard Classification of Occupations (ISCO 88), and the Malaysian Standard Classification of Occupations (MASCO 98) and Occupational Analysis Workshops conducted by NVTC.

- **Competency Profile**: Duties and Tasks reflecting the world of work in the form of Job Competency Profile Charts (DACUM charts)

- **Task Profile**: Performance Standards, Steps to carry out Task, and Enabling Requirements: Knowledge, Abilities, Attitudes & Safety

2. **Criteria and conditions of performance (performance standards) explicitly stated and made public**
   - Criterion-referenced approach
   - Emphasis on the actual performance of competencies
   - Modularized with the awarding of Statements of Achievements, and Malaysian Skill Certificates (SKM)
   - Concept of cumulative assessment
   - Accreditation of prior working experiences

3. **Instructional program provided for the individual development and evaluation of competencies**
   - Development of Training Packages (Training Guidelines or Modules) to ensure quality of training
- Development of instructional materials and on-the-job training programs to foster the development of workplace competencies.
- Designed to help Learner achieve each specified competency
- Provides for different learning styles
- Provides for a range of Learner’s abilities

4. Assessment of Learner’s Competencies
- Assessment considers knowledge and attitudes
- Requires performance as the primary source of evidence

5. Progress in the Achievement of Competencies
- Learners progress at their own rate
- Progress measured by demonstration the attainment of specified competencies rather than time or course completion.
- Make Learning the Constant and Time the Variable

Classification of Malaysian National Occupational Skill Standard Levels 1-5

As recommended by the Cabinet Committee, the existing three-tier (basic, intermediate, advanced) skill certification system was replaced by a system with five levels, known as Sijil Kemahiran Malaysia or SKM (Malaysian Skill Certificate) which ranges from operator (level 1) to manager (level 5). (Cf. figure next page)

The Accreditation Approach to National Skill Certification in Malaysia

Main Features:
1. Appointment of ‘Accredited Centers’ by the Awarding Body (NVTC): Accredited Centers (either companies or training centers) undertake training and assessment and verification leading to the award of Malaysian Skill Certificates/ ‘Statement of Achievements’ based on NOSS.

Benefits of the NVTC’s SKM Accreditation System:
- Accessibility
  - The National Skill Certification System provides better access to learners and workers
- Flexibility
  - Assessment takes place during training and on-the-job

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5 Source: National Vocational Training Council, Ministry of Human Resources, Malaysia, 1998
- Assessment is modular in nature and
- supports credit accumulation and credit transfer
- Supportive to learners
- Emphasis on formative evaluation
- Recognition of previous achievement of competencies
- Motivating
- Promotes lifelong learning and upward mobility
- Catering for underprivileged groups like women and school drop-outs.

<table>
<thead>
<tr>
<th>NOSS Definition: A NOSS is defined as a specification of the competencies expected of a skilled worker/professional who is gainfully employed in Malaysia for an occupation area and level as required by industries.</th>
<th>Level of Education</th>
<th>Job Function</th>
<th>Example Job Title</th>
<th>SKM Level</th>
<th>Sijil Kemahiran Malaysia (SKM) Malaysian Skill Certificate Definition of Levels 1-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Diploma</td>
<td>Management Stage</td>
<td>Manager, Engineer</td>
<td>Level 5</td>
<td>Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation.</td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>Supervising Stage</td>
<td>Executive, Assistant Engineer</td>
<td>Level 4</td>
<td>Competent in performing a broad range of complex technical or professional work activities, performed in a wide variety of contexts with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources is often present.</td>
<td></td>
</tr>
<tr>
<td>Advanced Certificate</td>
<td></td>
<td>Supervisor, Technician</td>
<td>Level 3</td>
<td>Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>Operations &amp; Production Stage</td>
<td>Assistant Technician</td>
<td>Level 2</td>
<td>Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and require individual responsibility and autonomy</td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td></td>
<td>Operator</td>
<td>Level 1</td>
<td>Competent in performing a range of varied work activities, most of which are routine and predictable.</td>
<td></td>
</tr>
</tbody>
</table>
National Occupational Skill Standards

What is expected of the learner as a result of training?
- Being able to perform ‘Whole’ work roles. Perform! – not just know or understand
- Performance to the standards expected in employment not standards divorced from work expectations
- Ability to perform in real working environments including all related pressures and variances of work

These questions led to the decision to use a new approach in the development of NOSS. The skills and competencies trained for must be job or process specific, if they are to meet the companies’ production and quality goals. This can only be achieved through the active participation of business and industry right from the beginning in the process of describing the National Occupational Skill Standards. MLVK has adopted the DACUM process\(^6\) of Occupational and Job Analysis as the most appropriate tool to identify Workplace Competencies.

DACUM Occupational/Job Analysis\(^7\)

The DACUM philosophy:
- Expert workers/professionals are better able than anyone else to describe their occupation
- An occupation can be described effectively in terms of the tasks successful workers/professionals perform
- Successful task performance is directly related to the knowledge, skills, attitudes, and tools, that workers/professionals must possess to perform the tasks correctly.

Job Competency Profile

The DACUM process for occupational analysis involves local men and women with reputations for being the ‘top performers’ at their jobs, working on a committee assignment with a qualified DACUM facilitator. These workers/professionals are recruited directly from business and industry and become

\(^6\) DACUM, an acronym for Develop A CUrriculuM, has been used around the world for three decades to analyze occupations, processes, systems and job areas.

the panel of experts who collectively and cooperatively describe the occupation in the language of the occupation. The Panel works under the guidance of a trained facilitator for 2 to 3 days to develop the Job Profile Chart. The chart contains a list of general areas of competence called Duties and several Tasks for each duty (one Job Profile usually consists of 6-12 Duties and one Duty comprises of 6-20 Tasks).

Job Tasks
- are the smallest unit of job activity that result in a meaningful outcome (product, service, or decision)
- represent a typical job assignment for which an employer or customer would pay
- have a definite beginning and ending point
- can be performed over a short period of time
- can be performed independent of other work
- Consist of two or more steps
- can usually be observed/measured (decisions are not often directly observable, but can be determined)

Brainstorming techniques are used to obtain the collective expertise and consensus of the committee. If appropriate, input from other Job Profiles or standards is considered. As the Panel determines each task, it is written on a
card. To visualize the outcome of the brainstorming, the cards are attached to the wall in front of the Panel.

Job Profiles with SKM-Levels

Depending on the requirements set during an occupational analysis or by the Skill Advisory Committee (SAC), one Job Analysis workshop can cover SKM-level 1 to 3 or level 4 and 5, or other combinations. To determine the different levels of the Malaysian Skill Certificate System SKM, the last step of the Job Analysis identifies the level of the individual Task according to the SKM classification. The completed Job Profile Chart (DACUM-Chart) is a graphic profile of the Duties and Tasks performed by successful workers/professionals in the occupation and arranged according to SKM-levels.

<table>
<thead>
<tr>
<th>Develop and Modify Automation Concepts</th>
<th>Determine Automation Layout Concepts</th>
<th>Determine Automation Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>02.01 L5</td>
<td>02.02 L5</td>
</tr>
</tbody>
</table>

Duty

Tasks

Level

Task Profile

After a process of verification, the Job Competency Profile is developed by a panel of trade experts, trainers, and educators in a second workshop. The Tasks in the Job Competency Profile are broken down into Steps and described in detail. This includes the ‘best practice’ as applied by industry, future trends, and the related enabling requirements, tools, equipment and materials.

One complete NOSS Document consists of both the Job Profile Chart and the Task Profile.
NOSS Endorsement

The NOSS is then presented to the Standards and Certification Committee for accreditation and endorsement. The NOSS is discussed, mended if necessary, and endorsed. The list of endorsed NOSS is published on a quarter-yearly basis, individual NOSS are available for Industry, training providers or individuals for a nominal fee (app. 3.00US$). An accreditation document based on NOSS is also available for NVTC-approved training providers.

NOSS Revision

Since the first NOSS were developed in 1993, there is a need to revise the older ones and/or to combine and simplify certain NOSS. This activity is presently being carried out with the input from the Skills Advisory Committee, using a simplified DACUM-approach.

The author has initiated a simplification of the NOSS structure by identifying Generic Tasks and common Core Abilities (Core/Key Competencies), to facilitate credit transfer and the wider coverage of training based on NOSS. This work is currently being carried out and it is expected to reduce the effort in developing new NOSS by incorporating the Generic Tasks and the Core Abilities as building blocks into the process. This will be supported by a data-
base that contains a library of Generic Tasks, Core Abilities, Performance Standards, and related academic skills.

Coverage of NOSS

Presently, NOSS covers a wide spectrum of Jobs in the service sector, manufacturing, aviation, IT and telecommunication, textile, tourism, handicraft, even including jobs found in the armed forces. By January 1999, more than 350 individual Job Titles had been developed and endorsed (one Job Title represents one SKM level). One NOSS-Document usually covers up to three levels and Job Titles. New NOSS are developed as required by Industry. This list (cf. next page) of the developed Job Titles represents to a certain extend the structure in the Malaysian industry. The majority of the titles are in SKM level 1-3, with only less than 10 per cent in higher levels (SKM 4 and 5). The service, business, and financial sector are not represented enough. Efforts are now being made to include these in the development of NOSS as well as to venture into higher levels for the existing Job areas.
Application of NOSS

The NVTC system is conceptually sound.

It is crucial that the important work of developing an industry relevant skills training system based on NOSS continues – but action is needed to ensure that it is more widely understood and used. NOSS in the present format is a relatively new concept to Malaysian industry and private training providers. But those actively involved in the development of NOSS have accepted the concept and are applying it for their specific needs. (Cf. figure next page)

Even though there are more than 370 Job Titles now available, only a few NOSS have been developed into training packages (Training Guidelines and/or Modules), because of the shortage of qualified Malaysian personnel to develop NOSS-based curriculum and training packages.

<table>
<thead>
<tr>
<th>Occupational Area</th>
<th>No. of Job Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draughtsman</td>
<td>10</td>
</tr>
<tr>
<td>Building Construction</td>
<td>9</td>
</tr>
<tr>
<td>Woodworking and Furniture Making</td>
<td>7</td>
</tr>
<tr>
<td>Tourism and Travel</td>
<td>28</td>
</tr>
<tr>
<td>Hotel</td>
<td>29</td>
</tr>
<tr>
<td>Theme Park</td>
<td>8</td>
</tr>
<tr>
<td>Welding Technology and Metal Fabrication</td>
<td>22</td>
</tr>
<tr>
<td>Non-destructive Testing</td>
<td>23</td>
</tr>
<tr>
<td>Heavy Machinery and Land Transportation</td>
<td>27</td>
</tr>
<tr>
<td>Motor Vehicle Assembly</td>
<td>14</td>
</tr>
<tr>
<td>Motorcycle Assembly</td>
<td>14</td>
</tr>
<tr>
<td>Crane Operator</td>
<td>3</td>
</tr>
<tr>
<td>Maritime Mechanics</td>
<td>9</td>
</tr>
<tr>
<td>Aeronautic Mechanics</td>
<td>6</td>
</tr>
<tr>
<td>Printing Technology</td>
<td>19</td>
</tr>
<tr>
<td>Personal Services</td>
<td>5</td>
</tr>
<tr>
<td>Business And Financial Services</td>
<td>8</td>
</tr>
<tr>
<td>Textile Apparel</td>
<td>6</td>
</tr>
<tr>
<td>Handicraft</td>
<td>12</td>
</tr>
<tr>
<td>Electric</td>
<td>14</td>
</tr>
<tr>
<td>Industrial Electronics, Audio, Video Service Technicians</td>
<td>6</td>
</tr>
<tr>
<td>Precision Instrument Mechanics</td>
<td>6</td>
</tr>
<tr>
<td>Information Technology</td>
<td>13</td>
</tr>
<tr>
<td>Telecommunication</td>
<td>4</td>
</tr>
<tr>
<td>Plastic Industry</td>
<td>9</td>
</tr>
<tr>
<td>Machining Technology</td>
<td>11</td>
</tr>
<tr>
<td>Mechanical Maintenance</td>
<td>9</td>
</tr>
<tr>
<td>Tool &amp; Die Making</td>
<td>9</td>
</tr>
<tr>
<td>Foundry Technology</td>
<td>6</td>
</tr>
<tr>
<td>Mechatronic</td>
<td>2</td>
</tr>
<tr>
<td>Weapon Technology</td>
<td>3</td>
</tr>
<tr>
<td>Supplementary</td>
<td>2</td>
</tr>
</tbody>
</table>

Total of NVTC endorsed Job Titles (as of December 1998) 353
Application of NOSS in the Public Training Sector

So far, NOSS has not found its way into most of the public training institutes, vocational schools, colleges and polytechnic institutes. This is caused by several factors:
- the shortage of qualified course developers with a background in industry
- the lack of appropriate training material available on the Malaysian market
- the general shortage of Malaysian vocational teachers
- the inadequate training of Malaysian vocational teachers for CBTE
- the inadequate training of Malaysian vocational teachers for training according CBTE

In general, the public schools under the Ministry of Education are focused on the development of academic skills to boost the output in the science stream. The curriculum division attached to MoE has not been involved in the development of NOSS-based learning packages. There is, however, strong evidence that NOSS will be used in the future as a guideline for the curriculum in the vocational middle schools. These 75 schools in Malaysia with a student output of app. 25,000 students per year are now considered an important provider for basic training. Up until the middle of 1998, these schools were to withdraw from any vocational training activities and it was planned to focus on science and general technical education. This decision however, was reversed and the Ministry of Education is planning now to offer level 1 of the SKM (Malaysian Skill System) based on NOSS for various trades to the students enrolled in the vocational middle schools. To foster these activities, a school-to-work programs was introduced in the technical middle schools, using the ‘Tech-Prep’ approach and training material from the USA.\(^8\)

Presently there are discussions between the Ministry of Education, Ministry of Human Resources, Industry, and private training providers for closer cooperation in the sharing of facilities, training material and manpower. At the same time, University Science Malaysia is developing skills training courses for the IT-sector based on NOSS to be marketed as an additional service to industry and individuals, especially for further training of the existing workforce.

Outlook for NOSS

The latest development in the application of Malaysian NOSS is the proposed Skills Training Act, which will regulate skills training for the private sector on

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\(^8\) The ‘Tech-Prep’ (Technical Preparation) approach was developed with CORD Communications in Waco, Texas, USA and the training material was adopted to the Malaysian environment. At the same time, Malaysian teachers were trained for the requirements of the implementation of ‘Tech-Prep’ in Malaysia and USA.
a legal basis and will make NOSS (or its equivalent) the major guideline for the development of learning packages, for accreditation of skills training activities and the registration of private training providers with the National Vocational Training Council.

Development of Malaysian National Occupational Skill Standards (NOSS)
In general, there is resistance to change, from the more academically oriented knowledge based system to Competency-based Training and Education – especially as long as the new system remains alien to many parents, trainers, educators and decision-makers. Greater efforts have to be made to sell NOSS to the public and private training providers and to educate business and industry on the advantages of using NOSS.