Research Journal of Applied Sciences 6 (7-12): 427-432, 2011
ISSN: 1815-932X

Core Competencies in Vocational Welder Worker: Based on Thai Welding Industry Participator Perceptions

[1]Pakamas Choosit, [2]Chuchai Sujivarakul and [3]Sak Kongsuwan
[1]Learning Innovation in Technology Program, [2]Department of Civil Education,
Faculty of Industrial Education and Technology,
[3]Faculty of Industrial Education and Technology,
King Mongkut's University of Technology Thonburi, Bangkok, Thailand

Abstract: One of the main concerns of the welding industry is to develop the talent of its human resources since, the quality and innovation of its products and services depend to a great extent on the knowledge, the ability and the talent that vocational welder worker apply in the welding industry. The core competency defines a set of knowledge, skills and behaviors that professionals must have to affect in their careers. A core competency facilitates the identification of training needs and guides the design of a professional development program. Thus this research was to explore and examine the core competencies in vocational welder worker based on Thai welding industry participator perceptions. To synthesize core competencies first used the focus group technique with 17 experts to identify their perspectives on core competencies in vocational welder worker. After that competencies questionnaire survey was developed to collect data from a participator sample consist of 1,206 welding industry participators. Research methods were applied to collect quantitative data using questionnaires, forms interviews, discussion groups and workshops.

Key words: Core competency, Thai welding industry, vocational welding education, human relation, installation, product

INTRODUCTION

The welding industry now faces with many problems such as poorly planned projects, breach of the delivery date, erroneous budget estimation, uncontrolled system functionality changes and inappropriate documentation that all lead to the dissatisfaction of clients. However, the main cause of the failure project is the quality of products and services. These qualities are not only depend on the standards of methodologies and technologies that use in the welding process but also the talent of welding engineers to apply the concept of welding engineering with diverse technologies and working groups.

Key competency and employability are the important parts of vocational education system. The main goal of vocational education is learners can reach their own needs and the society needs in the same time. There are many recognized competency models (SQA, 2003). For example, German dual system provides skills which enable learners to cope with increasing complexity in work tasks. The Mayer Committee of Australia proposed the set of seven key competencies: collecting, analyzing and organizing information; communicating ideas and information; planning and organizing activities; working with organizing activities; using mathematical ideas and techniques; solving problem and using technology (Werner, 1995).

The key competencies form a firm foundation for the identification of skills required to successfully participate in the world of work. However, these models were initiated according to its own circumstance as countries differ in social systems, ideology, historical tradition and cultural background.

There are this study was to revise the key factors affecting competence requirements and to provide practical advice to companies on the way forward. The overall picture in terms of competence requirements and how they may be fulfilled has gradually become clearer. It is believed that now is an appropriate point to examine how the various components and options fit together. Emphasis is placed on two key standards, ISO 3834 and ISO 14731 (Jessop, 2012). With regard to demonstration of compliance with ISO 3834 the same approach as that usually adopted for ISO 9001 certification can be used:

Corresponding Author: Pakamas Choosit, Learning Innovation in Technology Program,
Faculty of Industrial Education and Technology,
King Mongkut's University of Technology Thonburi, Bangkok, Thailand

invite an accredited independent third party organization to audit the company's compliance and thereafter refer potential customers to that third party. The main purpose of ISO 14731 is to provide guidance to fabricators on the specification and allocation of tasks and responsibilities to all their welding personnel. The company must show that people with welding responsibilities possess relevant competence.

As elsewhere, after enjoying a rapidly growing economy for consecutive years, now Thailand began to witness an increasing lack of skilled professionals, especially welding skilled professional. Therefore, researchers conduct a study to this research was to explore and examine the core competencies in vocational welder worker: based on Thai welding industry participator perceptions. Researchers expected that the results from this study will provide a better understanding for educators to develop the appropriate training method. The aim is to serve the qualified welding engineering students to the workplaces in the future.

Literature review

Competence: Competence is the ability of professionals who have the knowledge, expertise and attitude needed to execute the job. Lee (1999) and Huang (1996) stated that competence is the capability of doing their future jobs or activities. This clearly indicates that a competent professional should have necessary knowledge, skills and attitude to do certain activities and jobs. Competency standards describe the knowledge, skills and attitudes that need to be applied to minimize risks. They include units (performance), elements (specific skills) and performance criteria (outcomes). They can include a range of variables to allow for application in different contexts and underpinned by evidence to support the required knowledge, skills and attitudes (Meyer and Work Cover NSW, 1998).

A competency is an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation (Spencer and Spencer, 1993). Professional competence should include three factors.

Knowledge: Facts and information needed to be known by professionals in their jobs to promote and achieve certain functions effectively. These include an emphasis on the ability of knowledge, performance, human relationships and knowledge evaluation.

Skills: The ability of using the knowledge to solve the specific problems. The evaluation can be observed from the achievement of the practical performance as well as the professional performance of the processes and social skills.

Attitude: Recognition, emotion and performance are included in attitude. Even though, attitude is hard to evaluate, it should not be neglected (Chisholm and Ely, 1976; Javis, 1983).

Competency research review: In 1973, the professor from Harvard University, McClelland, proposed the concept of competency. He believed that the best performer used specific knowledge, skills and behaviors to achieve excellent performances (McClelland, 1973). Boyatizis argued that competency has the following characteristics: it is measurable and closely related to performance and can distinguish outstanding performance from the general performance using work analyses and key performance interviews (Boyatzis, 1982). Bergenhenegouwen (1990) argued that competencies are used most efficiently when it is combined with business strategic reforms (Bergenhenegouwen, 1990). However, Schuster and Zingheim (1996) believed that the competency model should be developed from looking for principles of individual performance to focus on improvements of organizational performances (Schuster and Zingheim, 1996).

Thai vocational education: Thailand's educational system is divided into four levels, namely pre-school, primary, secondary and tertiary levels. The provision of pre-school, primary and secondary education including vocational and technical education is under the responsibility of the Ministry of Education while the provision of tertiary education is under the supervision of both the Ministry of Education and the Ministry of University Affairs.

According to the 1999 National Education, University Education is available to students who have completed the upper secondary level of education. To cope with thousands of upper secondary school leavers wishing to continue their studies at university level, admission to university is done by a competitive national university entrance examination. Universities are under the responsibility of the Ministry of University Affairs which is also responsible for private higher educational institutions. There are presently 24 state universities in Thailand, 12 of which are in Bangkok while the remainder is located in the provinces. In addition there are 51 private colleges and universities offer undergraduate courses in such fields as agriculture, arts, architecture, business administration, archaeology, education, the humanities, law, social sciences and political science. Programs of studies at Master's degree level are offered at about 46 universities and several doctoral degree programs are being conducted at approximately 20 universities.

Since, there is a necessity to adapt the educational system to the development and labor needs of the country, vocational education and training has been given much promotion. Various types of specialized courses and training programs are offered and administered by the Department of Vocational Education. There are two programs to suit the student's academic background, ranging from 3 year lower certificate courses which entail additional 2 years and are equal to a diploma level of vocational studies. Besides, one can further pursue a degree course at the certain vocational institutes attached to the Ministry of University Affairs (The National Education Commission, 1999).

MATERIALS AND METHODS

This study was to explore and examine the core competencies in vocational welder worker: based on Thai welding industry participator perceptions. It will provide a better understanding for educators to develop the appropriate training method. The aim is to serve the qualified welding engineering students to the workplaces in the future. These data were used to conduct analyses to develop valid and reliable perceived attribute measures.

Population and sample:

- Population of this study was composed of Thai welding industry participators
- Sampling group was composed of 1,206 welding industry participators
- Sampling group is divided to 360 welder engineering, 103 welding factory manager and 743 senior welder worker

Research framework: Based on the literature review of previous core competencies studies this research use focus group technique with 17 experts for synthesize the core competencies and identify perspectives on the core competencies in vocational welder worker. After that competencies questionnaire survey was developed to collect data from 1,206 welding industry participators sample (Fig. 1).

Expert's focus group: Researchers sanded semi-structured interviews utilized to 17 experts for first round: brainstorming of perceptions' experts would be related to competencies from welding industry.

Researcher's analyzed interviews were perceptions' expert towards each idea through questioning. The details of the interview form would be as follows: three core competencies categories, namely: the knowledge and skills generally, the knowledge and skills specific and the attitude.

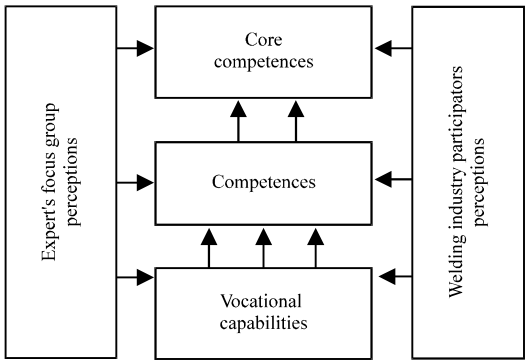

Fig. 1: Research framework

Researchers synthesized perceptions' experts for the questionnaire 1 that it's using a Likert's five-rating scale. After that the questionnaire has to check the validity by 17 experts based on IOC (Item Objective Congruence index).

Welding industry participators perceptions data analysis: An initial study was conducted and explores core competencies in vocational welder worker: based on Thai welding industry participator perceptions. The survey was on a 5-point Likert-type scale. Data collection was done by questionnaires then the questionnaires were analyzed to find out the conclusion. Data analysis was done using SPSS/FW (Statistic Package for Social Science/for Windows) software. The part with selection items was analyzed using frequency and percentage. The part with five scales was analyzed using mean (X) Standard Deviation (SD) and correlation. The levels of agreement from respondents were as follows:

Average score:

- 4.50-5.00 means definitely agree
- 3.50-4.49 means strongly agree
- 2.50-3.49 means quite agree
- 1.50-2.49 means quite disagree
- 1.00-1.49 means strongly disagree

RESULTS AND DISCUSSION

This study was to explore and examine the core competencies in vocational welder worker: based on Thai welding industry participator perceptions. The questionnaire was synthesized via perceptions' experts (focus group technique). After that collection questionnaires data was done by 1,206 welding industry participators divided to 360 welder engineering, 103 welding factory manager and 743 senior welder worker. The perceived of core competencies in vocational welder worker as shown in Table 1.

Table 1: Welder engineering's perceived of core competencies in vocational welder worker

Items	Mean	SD
The knowledge and skills generally		
Basic skills	3.9384	0.7656
Information technology skills	4.0000	0.7382
The knowledge and skills specific		
Connection and control	3.6611	0.8038
Welding process design	3.5938	0.8213
Metal structuring	3.6387	0.7796
The selection of proper welding process	3.8207	0.7392
Welding control	3.5490	0.8114
Inspection and testing process piece	3.8571	0.8033
Drawing and design product	3.6667	0.7520
Handmade sheet metal product	3.5630	0.8035
Produce and control manufacturing	3.4820	0.8092
Pipe installation	3.6443	0.8343
The attitude		
Personalities	3.7423	0.8452
Human relation	3.8151	0.8343
Total	3.7123	0.7958

Table 2: Welding factory manager's perceived of core competencies in vocational welder worker

Items	Mean	SD
The knowledge and skills generally		
Basic skills	3.4375	0.9279
Information technology skills	3.7589	0.9515
The knowledge and skills specific		
Connection and control	3.3929	0.7021
Welding process design	3.1875	0.7773
Metal structuring		
The selection of proper welding process	3.6696	0.8317
Welding control	3.7321	0.7350
Inspection and testing process piece	3.4821	0.6973
Drawing and design product	3.5000	0.8490
Handmade sheet metal product	3.2680	0.7350
Produce and control manufacturing	3.7679	0.7591
Pipe installation	3.6518	0.6536
The attitude		
Personalities	3.9554	0.6061
Human relation	3.9286	0.6807
Total	3.5948	0.7620

The overall perceived of core competencies in vocational welder worker was also conducted to identify perceived level of vocational welder worker. The level of perceived was determined through relative advantage of core competencies model, these showed means of 3.7123 (SD = 0.7958) (Table 2).

The overall perceived of core competencies in vocational welder worker was also conducted to identify perceived level of vocational welder worker. The level of perceived was determined through relative advantage of core competencies model, these showed means of 3.5948 (SD = 0.7620) (Table 3).

The overall perceived of core competencies in vocational welder worker was also conducted to identify perceived level of vocational welder worker. The level of perceived was determined through relative advantage of core competencies model, these showed means of 3.6970 (SD = 0.9387). Finally core competencies in vocational welder worker can conclusion (Table 4).

Table 3: Senior welder worker's perceived of core competencies in vocational welder worker

Items	Mean	SD
The knowledge and skills generally		
Basic skills	3.8843	0.9317
Information technology skills	3.7349	0.8647
The knowledge and skills specific		
Connection and control	3.5424	0.9115
Welding process design	3.5236	0.9398
Metal structuring	3.8694	0.9304
The selection of proper welding process	3.5357	1.0179
Welding control	3.5970	0.9427
Inspection and testing process piece	3.6649	0.9765
Drawing and design product	3.5585	0.9831
Handmade sheet metal product	3.5720	0.9767
Produce and control manufacturing	3.8268	0.9363
Pipe installation	3.8080	0.9278
The attitude		
Personalities	3.7820	0.8967
Human relation	3.7470	0.9174
Total	3.6970	0.9387

Table 4: Perceived of core competencies in vocational welder worker

Items	Mean	SD
The knowledge and skills generally		
Basic skills	4.4375	0.0877
Information technology skills	3.7589	0.0899
The knowledge and skills specific		
Connection and control	4.3929	0.0663
Welding process design	4.1875	0.0734
Metal structuring	3.6696	0.0786
The selection of proper welding process	4.4821	0.0659
Welding control	3.5000	0.0802
Inspection and testing process piece	4.2679	0.0695
Drawing and design product	3.7679	0.0717
Handmade sheet metal product	4.6518	0.0618
Produce and control manufacturing	3.9554	0.0573
Pipe installation	3.9286	0.0643
The attitude		
Personalities	3.7768	0.0680
Human relation	4.6339	0.0717
Total	4.0293	0.0709

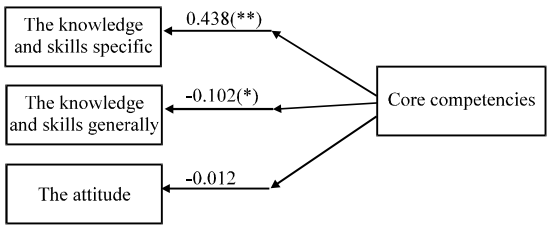

Fig. 2: The correlations core competencies and competencies attributes

The overall perceived of core competencies in vocational welder worker was also conducted to identify perceived level of vocational welder worker. The level of perceived was determined through relative advantage of core competencies model, these showed means of 4.0293 (SD = 0.0709). The correlations of core competencies and competencies attributes shown that the knowledge and skills specific most significantly correlate with vocational welder core competencies (Fig. 2). It estimated as strongly

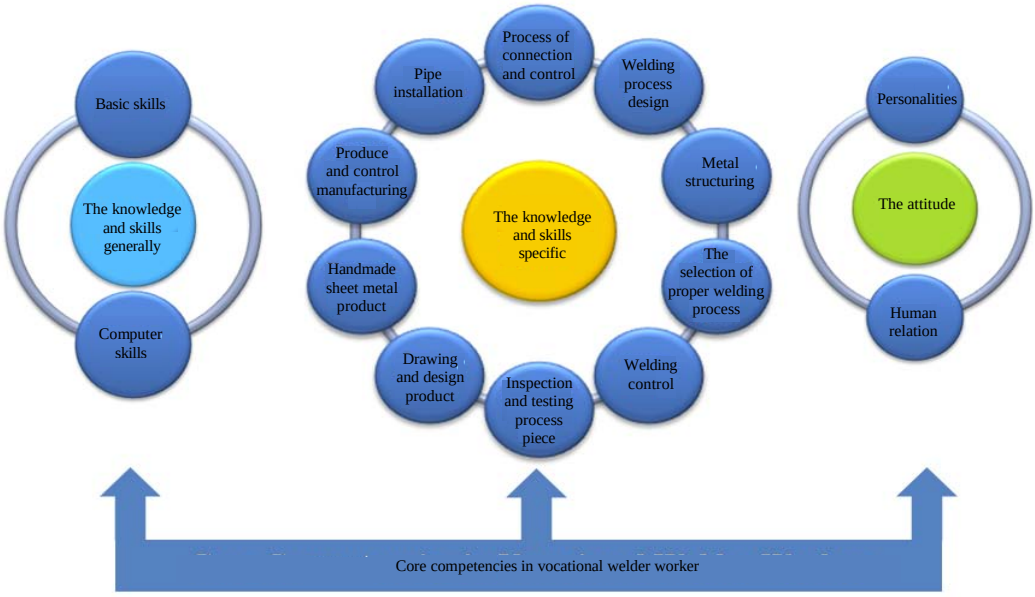

Fig. 3: Core competencies in vocational welder worker

agree and the degree of clarity of system was rated higher than target levels. According to the study, competencies required by welding industry participators can be divided into three attributes: the knowledge and skills generally, the knowledge and skills specific and the attitude. And use the focus group technique with 17 experts to identify their perspectives on the core competencies in vocational welder worker. The item objective congruence or IOC for all three attributes was high as the value was 0.82. After that competencies questionnaire survey was developed to collect data from a participator sample consist of 1,206 welding industry participators. Research methods were applied to collect quantitative data using questionnaires, forms interviews as well as discussion groups and workshops. The conclusion of analysis revealed that the main elements of the competencies in vocational welder worker (Fig. 3).

However, the welding industry is to develop the talent of its human resources since, the quality and innovation of its products and services depend to a great extent on the knowledge, the ability and the talent that vocational welder worker apply in the welding industry. The core competency defines a set of knowledge, skills and behaviors that professionals must have to affect in their careers. A core competency facilitates the identification of training needs and guides the design of a professional development program. Thus, this research was to explore and examine the core competencies in vocational welder worker: based on Thai welding industry participator perceptions.

The knowledge and skills generally: basic skills and computer and information technology skills. The knowledge and skills specific: process of connection and control, welding process design, metal structuring, the selection of proper welding process, welding control inspection and testing process piece, drawing and design product, handmade sheet metal product, produce and control manufacturing and pipe installation. The attitude, personalities and human relation.

CONCLUSION

This study revealed that the main elements of the competencies in vocational welder worker could be divided into three core competencies categories, namely; the knowledge and skills generally; basic skills and Information technology skills; the knowledge and skills specific: process of connection and control, welding process design, metal structuring, the selection of proper welding process, welding control inspection and testing process piece, drawing and design product, handmade sheet metal product, produce and control manufacturing and pipe installation the attitude, personalities and human relation.

ACKNOWLEDGEMENTS

This research has been done thanks to the funding of the Rajamanala University of Technology Phranakorn, Thailand. Thanks to King Mongkut's University of Technology Thonburi, Faculty of Industrial Education and Technology, KMUTT, Thailand. I would sincerely like to thank Vocational institutes of Thailand and thanks also to Dr. Settachai Chaisanit for making some useful comments on both the concept of the evolutionary approach and a draft of the study.

REFERENCES

Bergenhenegouwen, G., 1990. The management and effectiveness of corporate training programmes. Br. J. Educ. Technol., 21: 196-202.

Boyatzis, R.E., 1982. The Competent Manager: A Model for Effective Performance. John Wiley and Sons, New York.

Chisholm, M.E. and D.P. Ely, 1976. Reflections from a crystal ball. Audiovisual Instruction 21, 1. ERIC Document Reproduction Service No. EJ131254.

Huang, C., 1996. Increasing the quality of vocational: Education technological and vocational education. Bimonthly, 49: 6-13.

Javis, P., 1983. Professional Education. Caron Publications, London.

Jessop, T.J., 2012. The welding institute. Competence in Welding-For People and Companies. Available from: http://www.twiprofessional.com/content/en719en729.html.

Lee, L., 1999. The Cross of Technology and Vocational Education. National Taiwan Normal University, Taipei, Taiwan.

McClelland, D.C., 1973. Testing for competence rather than intelligence. Am. Psychol., 28: 1-14.

Meyer, L. and Work Cover NSW, 1998. Manual Handling Competencies for Nurses. NSW Nurses' Association, Camperdown, New South Wales, pp: 54.

SQA, 2003. Key competencies-some international comparisons. http://www.sqa.org.uk/files_ccc/Key_Competencies.pdf.

Schuster, J.R., and P.K. Zingheim, 1996. The New Pay: Linking Employee and Organizational Performance. Lexington/Macmillan, New York, ISBN: 9780787902735, Pages: 366.

Spencer, L.M. and S.M. Spencer, 1993. Competence at Work: Models for Superior Performance. John Wiley and Sons, New York, ISBN-13: 9780471548096, Pages: 372.

The National Education Commission, 1999. National education act B.E. 2542. Office of the Prime Minister, Kingdom of Thailand.

Werner, M.C., 1995. Australian Key Competencies in an International Perspective. National Centre for Vocational Education Research, Aurtralia, pp: 57-65.