

# Developing a Competency Framework to Support Training-Needs for Thailand's Offset Printing Industrial

P. Juntong and W. Wiyaratn

**Abstract**—This research was aimed to develop the competency framework. The sampling group was composed of 294 enterprises in Bangkok and suburban areas. The most critical issues were that they lacked knowledge, skills as well as good attitudes towards working. The results from the discussion group by experts were that printing operators could be classified into 4 levels. Afterwards, the competency of printing operator was defined to specify the course structure of basic level printing operator which had 7 main topics as follow: knowledge about color printing operation, materials and equipment for offset printing, using technician's tools, practice in offset printing, English for printing operator, maintenance of offset printing machine, and safety during work. The draft structure of the course was put into survey by the sampling group. It was found that the sampling group agreed at high and the highest level in terms of the structure of the course. The researchers would use such structure to develop a course for basic level printing operator in the next phase.

**Index Terms**—Competency framework/ offset printing operator/ training-needs.

## I. INTRODUCTION

In 1835, American Board of Commissioners for Foreign Mission bought Thai type from Singapore to Thailand. Dan Beach Bradley M.D. and his group brought it to Thailand. This Thai type and old plate was made of wood and stone which came from Bengal in India. On June 3, 1836 the first book in Thai was printed at the first time. [1] It has been the first about 173 years since. Thailand has developed in terms of printing industry for a long time, both in working process and modern technology which is brought from foreign countries to increase the productivity. Thailand is a free country which develops its potentials in competition all the time because this is an important factor to get advantages in trading. The policy of the government, therefore, focuses on the development of production potential to increase overall value of the product in the country along with the development of exportation, which will lead to the glory of the nation in the long run. The printing and packaging industry is one of the most important industries, which aim for exportation in the form of type and package. Free trade helps extend the distribution of Thai products. In 2004, Thailand could export for around 320 million US dollar and in 2007 Thailand aimed to export for 950 million US dollar. Besides the strategies used for exportation, there needs to be

strategies for the development of the internal structure of printing and packaging industry to meet the expanding area of the exportation which must be done at the same time. To illustrate, a center for the research and development of standards in printing and packaging industry must be established to meet the world's standards, training course and to build new entrepreneurs in the industry. More advantages are about the development of the personnel in educational institutes in the form of co-education, the research and the development in the printing materials as well as the development of competency standards of the national labor in the field of sheet-fed printing operator and other fields related to printing and packaging industry. [2] According to the survey done in 2004, there were 2,463 printing houses which have registered with the Department of Industrial Works, Ministry of Industry or around 90% of all printing houses. The majority or 74% were in Bangkok and suburban areas. The rests were in large cities all around the country. The personnel in the printing and packaging industry are around 120,000 but only 10% graduated with the degrees in printing and packaging. This would result in problems of lacking the knowledge and skills to adopt new technology, which requires ability in language and computer during work. Therefore, printing and packaging industry still suffers from lack of skillful printing operators with direct experience in printing. [3] According to AnekTianbucha[4] it was found that most large-scaled and middle-scaled printing houses provided their staff with external training. However, the problems were that the speakers from outside lacked the knowledge and skills, which the entrepreneurs demanded, that the trainers lacked skills in teaching and allowing their staff to study in higher education required a long time and the skills did not comply with the works. Besides, this lack of the skilled persons in printing industry, it was also found that the personnel in the printing industry at present do not meet the requirements of the enterprises. According to research, the major problems of sheet-fed printing operators were about the lack of knowledge, skills and good attitude towards their work. The most critical problems are lack of knowledge in using printing machine, knowledge and skills in offset printer maintenance as well as other devices. The printing house owners also require responsible workers who like to gain more knowledge and skills in their work and to use the materials efficiently. [5] The researchers also asked the same questions with the sheet-fed printing operators and found that 97.5% of basic level sheet-fed offset printing operators considered the training important for their work. The reason is that they would like to know about technology, more techniques and new working methods. Sheet-fed printing operators need to be trained both in theory and in practice at high level. [6] On according to the importance of such problem, it could be

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seen that there should be competency standards for 4-color sheet-fed offset printing operator as required by the enterprises. This must be done in cooperation with the experts in educational field so that the competency will be used to develop courses or curriculum for the printing operators in the industry. This is also a way for other researchers to develop the personnel according to the real demand of the industry in the future. Therefore, the objective for this research are: 1) to study needs of 4-color sheet-fed offset printing operators as required by the enterprises; 2) to define the competency standards and 3) to develop the draft training course.

## II. RESEARCH METHODS.

This research focused on the key requirement of professional competence for the sheet-fed offset printing operator. The survey was conducted on owners, printing house managers, and supervisors of the press operators from 294 enterprises in Bangkok and suburban areas. Questions were related to the national labor skill standards for sheet-fed offset printing operator and required basic theory. The questionnaire was constructed using Likert 5 scale, which asked respondent to rate between 1 to 5 with being the least and 5 being the most desirable skill. Based on the survey results and classification of offset printing operator skill professional competence, which including key purpose, key role, key function and unit of competence, was developed. The developed professional competence was evaluated by professor and offset printing specialist and modified according to the comments of professor and offset printing specialists. The training course framework was developed based on professional competence and was evaluated by printing enterprises. The training course framework was then used of create the training course for sheet-fed offset printing operator.

## III. RESEARCH RESULT

### A. Comparison of Needs about Skills of Offset Printing Operators

The comparison between problems and needs of offset technicians was indicated that Thai printing industry still have the needs for printers who had knowledge, skill, and good attitude toward work. Therefore, printer development courses that follow the requirement of the printing house are still needed in Thailand at this time.

### B. Develop Professional Competence

Develop professional competence from the focus group discussion the panel, which consists of offset printing operators classified into 4 levels as followed:

- 1) Basic level printing operator means a person who is interested in working as a multi-colored offset printing operator who has no knowledge, skills and working experience.
- 2) Middle level printing operator means a person who has knowledge, abilities, experience and basic skills for working with a multi-colored printer. He or she has had

- an experience as a basic level printing operator before.
- 3) High level printing operator means a person who has knowledge, abilities, experience and good skills for working with a multi-colored printer. He or she has had an experience as a middle level printing operator before.
- 4) Expert printing operator means a person who has knowledge, abilities, experience and good skills for working with a multi-colored printer. He or she can solve and analyze the problems about printing. He or she has had an experience as a high level printing operator before.

TABLE I: COMPARISON OF NEED ABOUT SKILLS OF OFFSET PRINTING OPERATOR.

Title of skill	Small		Medium		Large	
	Mean	S.E.	Mean	S.E.	Mean	S.E.
1. Mix fountain solution	3.83	.07	3.80	.10	3.58	.10
2. Prepare printing stock	3.90	.07	3.94	.09	3.65	.09
3. Prepare ink	3.83	.06	3.86	.09	3.47	.09
4. Prepare printing plate	3.84	.07	3.84	.10	3.51	.10
5. Prepare and adjust feeding unit	3.91	.07	3.87	.10	3.65	.09
6. Prepare and adjust delivery unit	3.81	.07	3.84	.11	3.44	.09
7. Setting ink roller	3.77	.07	3.74	.11	3.15	.11
8. Setting fountain roller	3.73	.07	3.70	.10	3.35	.10
9. Basic Control of the ink system	3.83	.07	3.70	.11	3.57	.10
10. Basic Control of the dampening system	3.79	.08	3.67	.10	3.57	.10
11. Basic standard operation procedure	3.80	.08	3.69	.11	3.51	.11
12. Calculate the thickness of packing and adjust printing pressure	3.64	.08	3.64	.12	3.40	.12
13. Install printing plate	3.80	.07	3.83	.11	3.35	.11
14. Install blanket	3.77	.07	3.73	.10	3.33	.09
15. Adjust position of images	3.92	.07	3.80	.10	3.44	.10
16. Operate 1-color offset printer step-by-step	3.81	.07	3.67	.11	3.50	.11
17. Check and adjust position of 1-color printing	3.82	.07	3.79	.10	3.51	.11
18. Check and control the water balance	3.81	.07	3.74	.10	3.68	.09
19. Check and control 1-color printed work	3.83	.08	3.74	.11	3.72	.10
20. Check and control image quality	3.85	.07	3.83	.11	3.74	.11
21. Use tool specific	3.77	.07	3.76	.10	3.61	.12
22. Use manual for operation	3.81	.07	3.79	.10	3.67	.09
23. Use manual for maintenance	3.79	.07	3.73	.10	3.64	.09
Average Total	3.81	.06	3.76	.08	3.52	.08

### C. Develop Training Course Framework

According to the survey on the opinions of the enterprise sampling group about the draft training course for basic level printing operator (printing operator assistant), it was

found that the majority of the enterprises agreed with the developed training course (Mean = 4.18). The items which the enterprise agreed at the lowest level were English for parts of offset printer, English for offset printer maintenance and English for safety in the printing house. The researchers will use such opinions to consider the details in data presentation of the training course in the future.

TABLE II: TITLE OF TRAINING COURSE FRAMEWORK.

Key Role	Key Function	Unit of Competency
1. Knowledge about printing process	1. Meaning and principles	1. Meaning and principles of offset printing 2. Publications in offset printing system 3. Visibility and color combination in printing
	2. 4-color offset printer 3. Printing process	1. Types of 4-color offset printer 2. Parts of 4-color offset printer 1. Pre-press 2. Press/ production 3. Post-press
2. Materials and tools for offset printing	1. Materials and tools	1. Paper 2. Ink 3. Plates 4. Blankets
	2. Chemicals	1. Fountain 2. Gum Arabic 3. Other chemicals
3. Using technicians' tools	1. General tools	1. General tools for technicians 2. Measuring tools
	2. Tools for printing operators	1. Tools for printing operators 2. Tools for printer maintenance 3. Densitometer
4. Operation for offset printing process	1. Preparation before operation	1. Reading orders 2. Checking and preparing materials 3. Preparing printing papers, wasted papers 4. Adjusting paper feeder
	2. Printing operation	1. Checking plates 2. Cleaning plates, blankets and Impression 3. Preparation and job changes
	3. Operation after printing finishes	1. Cleaning printing units 2. Cleaning water unit and fountain container 3. Cleaning printer and tools 4. Cleaning plates and keeping plates in good condition
5. English for basic level printing operator	1. English for basic level printing operator	1. English for technician's tools 2. English for occupational safety
	2. English for offset printing operator	1. English for parts of offset printer 2. English for offset printer maintenance 3. English for caution sign for operation around printer
6. Offset printer maintenance	1. Basics about maintenance	1. Cleaning printer 2. 5S activities
	2. Offset printer maintenance	1. Lubricating the printer 2. Maintaining the printer by one self
7. Safety at the workplace	1. Safety in the printing house	1. Causes of work accidents 2. Dangers from chemicals during 3. Tools for preventing accidents during work 4. Fire and how to prevent
	2. Safety rules	1. Safety rules in the factory 2. Labor's law

#### IV. CONCLUSION

The most critical issues were that they lacked knowledge, skills as well as good attitudes towards working. From the focus group of experts printing operators can be classified into 4 levels including basic level, middle level, high level and expert printing operator. Afterwards, the competency of 4-color sheet-fed printing operator was defined for all 4 levels and the course structure of basic level printing operator which had 7 main topics. The drafted training course was put into survey by the sampling group. It was found that the sampling group agreed at high and the highest level in terms of the structure of the course. The use of competencies has been described as part of a process to manage or improve human performance at work through training or education. The design of learning programs may be based on the inputs needed or the outputs demanded. The output-based competency approach appears to be well suited to relatively straightforward jobs that can use on the job training as the main learning method. When broken down into a hierarchy of skills, apprentices learn to use machinery by moving from simple to complex exercises. The progressive increase in difficulty of the task is relatively easy to manage.[7]

Application to educational institution could be a new method to improve the curriculum, skills teaching and add the data about attitude towards work. Moreover industrial sector such as printing house could use this to train and develop competency skill of workers and reading to achieve high performance efficiency in each level in the short period of time to used standard vocational competency course as a guide to developing knowledge and skills of offset printing operators. Improve course training package in the enterprises. Beside the development of printing competency skill would be apply by human resource development in order to set a criteria for career path. This would be used to the real problem that occurs in the Thai printing industrial.

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