

A DEVELOPMENT OF A CURRICULUM FOR TRAINING LOCAL PEOPLE TO IMPROVE THEIR ABILITY TO PRODUCE CERAMICS AT SUKHOThai PROVINCE, THAILAND.

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ABSTRACT

The purpose of this research was to develop a curriculum to train local people to improve their ability to produce ceramics. The need analysis was conducted through the use of focus-group discussion and the literature review. The research was carried out in three phases, and the results of both sources were used to develop a curriculum. The subjects of this study were 22 local people selected from residents of Tung Luang sub-district, Khirimas district of Sukhothai province. The data were collected by using a post-test and a questionnaire. The research results revealed that the local people could improve their competency to produce ceramics at a high level through the use of the developed curriculum. The results also showed that the participants were satisfied with the training course.

Keywords: Development of a curriculum for training, internal assessment, external assessment, appropriate, congruent and curriculum's efficiency.

INTRODUCTION

It has been shown that ceramic producers in Tung Luang sub-district of Kirimas district in Sukhothai province facing several problems in production to meet the market's demand, i.e., product quality control, inappropriate production technology, and lack of success in designing products (Department of Industrial Promotion,

2001). The faculties of Pibulsongkram Rajabhat University are interested in supporting services to local communities in Phitsanulok and Sukhothai provinces. One of interest is to draw up a curriculum for training local people to increase their ability in producing ceramic products.

There was a need to improve the production process of ceramics to increase production efficiency to produce a variety of ceramic products to meet the market's demand. This should be done through a training process that should be appropriated to promote people's capability by increasing their skills, knowledge, and positive attitude that would upgrade their work, standards and would thus result in upgrading their works (Avakul, 1997). Whether the training would achieve its goals or not depended on the curriculum which would include all training activities and clearly state the aims, contents, learning experience, instructional media and measurement as well as evaluation (Buasri, 2000). The success of the training depended on its efficiency. Since there is no such a training program available at this time, the researcher has considered that it is significant to develop a curriculum for training local people to increase their ability in producing ceramic products.

This research was based on the information obtained from well documented information, personal communication, and the focus group consisting of experts (Pattana, 2004b). The contents of the training were developed according to the need of the local people with a specific format.

OBJECTIVE

The objective of this study was to develop a curriculum for training local people to enhance their ability in producing ceramic products.

RESEARCH METHODOLOGY

This study consisted of three-phase developmental processes, as follows:

Phase 1: The information that used in the development of curriculum was obtained from well written document, personal communication, and the focus group consisting of experts. The contents of the curriculum were consisting of identification of the problems, the need of the curriculum, aims, and training module. The training module was consisting of five subcomponents, i.e., objectives, contents, learning experiences, learning media, and evaluation. It was found that glazing and firing using gas kilns

were the most important issue to enhance the capacities of local personnel. In addition to a suitable structure of the curriculum, the subject matter should be consisting of a combination of three parts, i.e., the necessary foundation, the core content that answers the participants' needs, and a section described the uniqueness of the local ceramic products (Pattana, 2004a).

Phase 2: A training program derived from the developed curriculum was done through brainstorming sessions and workshops. There were five drafting committees from purposive sampling to determine the principle and rationale, aims and detail of the training units, and assessing of the curriculum to evaluate its appropriateness and its congruency. It was documented that the assessment of the curriculum should be conducted after the development of the curriculum had been done (Dissara, 1992). The assessment should be done by analyzing the content of the curriculum in order to find out whether it was appropriate or be amended (Wongyai, 1993). The assessment of training program was carried out twice. An internal assessment was carried out by a drafting committee consisting of five members. The internal assessment was served as the first evaluation to see if the drafted curriculum had any incomplete sections to be amended. An external assessment was subsequently carried out by purposive sampling a group of eight assessors consisting of experts in curriculum's content, in ceramic production, and in education administration, in order to obtain comments and suggestions for improving the curriculum to meet its appropriateness and its congruency.

The research instrument that required for the assessment of the training program to evaluate its appropriateness was based on the five-level rating scale questionnaire and its congruency from the three-level rating scale questionnaire. Data analysis of the curriculum to determine its appropriateness was done by using mean (\bar{x}) and standard deviation (SD), where the assessment of the curriculum to evaluate its congruency was done by using IOC value (Index of Item Objective Congruency)

Phase 3: An experimental trial of the training program derived from the developed curriculum was done by means of Randomized Control-Group Post-test Only Design. The sample obtained by purposive sampling was consisted of the experimental group of 22 local people selected from residents of Tung Luang sub-district, Khirimas district of Sukhothai province. Research instruments were prepared before the training process. They were consisting of instructor's handbook and the instruction media. The instruction media used for

this unit were composed of examples of ceramic products, power-point slides of different kinds of ceramic products, supplementary documents for the training, examples of earthenware, examples of stoneware, and example of porcelain. The achievement of training was evaluated from the test of four choices to choose form. The five-level rating scale questionnaire was used to determine the satisfaction of the training curriculum. The data analysis of the curriculum's efficiency was done by using MANOVA, mean (\bar{x}), and standard deviation (SD).

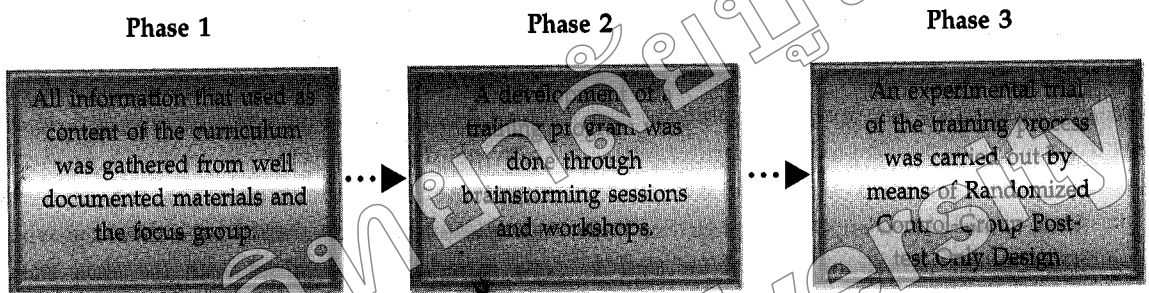


Figure 1. The schematic diagram of research methodology used in this study.

Developmental process of the curriculum.

A developmental process of the curriculum was done by drafting the contents of the curriculum through brainstorming sessions and workshops. There were five drafting committees to examine the contents of the curriculum. The brainstorming sessions and workshops were carried out resulting in four topics of the content, i.e., basic knowledge concerning ceramic production, the preparation of clay, skill in glazing and firing the products, and creative thinking of a positive attitude towards preparation of clay, glazing and product firing. The name of the curriculum was coined as "The Training Program to Improve Local People's Ability in Ceramic Production, in Tung Luang sub-district, Kirimas district in Sukhothai province".

The rationale behind the development of this curriculum was to promote and increase the self-reliance of trainee. This effort is also served as a part of public service in ceramic production that has been offered to people in the peripheral areas

of Pibulsongkram Rajabhat University. Since this university is an institution of higher education responsible for developing the communities in its vicinity and transferring technology to the private sectors in Phitsanulok and Sukhothai provinces. The preliminary investigation on ceramic production in Tung Luang sub-district revealed that the products available in the market were of low quality, and there is no quality control of products. They had low market value; the production technology was inappropriate, and the use of raw material was inefficient. This was due to the fact that producers lacked of the ability to produce high quality of ceramic production. To meet the demand of high quality ceramics, the producers have to understand the basic knowledge concerning ceramic production, the preparation of clay, skill in glazing and firing the products, and creative thinking of a positive attitude towards preparation of clay, glazing and firing of the products. It was also found that local people needed to improve their abilities in glazing

for value-added products. This curriculum, thus, placed emphasis on glazing. However, glazing is a part of the ceramic production process, which is directly related to other steps. Therefore, other stages of ceramic production should be included; namely, introduction to ceramics, clay and firing of products.

Since the objectives of the curriculum were aimed at promoting basic knowledge concerning ceramic production, to provide knowledge in preparation of clay, glazing and product firing, to boost skills in product glazing, and to create a positive attitude towards preparation of clay, glazing and product firing. Thus, the training manuals were developed for the training program. It consisted of four training units, i.e., basic knowledge in ceramic products, preparation of clay, glaze solutions and how to glaze products, and product firing.

Unit 1. Basic knowledge in ceramic.

The content of training manual for Unit 1 was emphasized on methods of how to enable students' ability to define the meaning and scope of ceramic products and to identify characteristics of earthenware, stoneware, and porcelain. All definitions of ceramic products, scope of ceramic products, basis classification of ceramic products, and ceramic products of Tung Luang sub-district were described. The learning experience of this unit was done through lecture and question-answer sessions. The instruction media used for this unit were consisting of examples of ceramic products, power-point slides of different kinds of ceramic products, supplementary documents for the training, examples of earthenware, examples of stoneware and example of porcelain. The trainees were required to take three post-tests at the end of training of Unit 1, each of which had four choices to choose from.

Unit 2. Preparation of clay.

The learning objectives of Unit 2 were to enable students' ability to explain characteristics of the clay obtained from Tung Luang sub-district, to learn how to consistently control the quality of the clay that is made into a shape by a rotating wheel,

and to consistently control the quality of a mud solution that is used for molding. The contents of Unit 2 were consisting of characteristics of the clay obtained from Tung Luang sub-district, characteristics of clay after being baked, guidelines for improving clay setting the proportion of ingredients, measuring raw materials, mixing the clay, sifting the clay, curing the clay, setting the proportion of ingredients, mixing a mud solution, and adjusting the flow of the mud solution. The learning experiences of this unit were done through lecture, question-answer sessions, demonstration of clay preparation, and demonstration of mud solution preparation. The instruction media used for this unit were consisting of examples of products of Tung Luang sub-district, power-point slides showing different types of ceramic products, supplementary documents for the training, examples of products shaped by a throwing wheel, raw materials to be mixed with the clay, simple equipment for the preparation of clay, supplementary documents for the training, examples of products shaped by molding, and raw materials to be mixed in a mud solution. The trainees were required to take three post-tests at the end of training in Unit 2, each of which had four choices to choose from.

Unit 3. Glaze solutions and how to glaze products.

The learning objectives of Unit 3 were to enable students' ability to define the glaze products and the benefit of glazing as well as classify its types, to identify major raw materials used in producing a feldspar glaze, to prepare glaze solutions, and to glaze the products. The contents of Unit 3 were consisting of basic knowledge concerning glazed ceramics, feldspar glaze suitable for the Tung Luang sub-district ceramic products, how to prepare glaze solutions, and knowledge about glazing. The learning experiences of this unit were done through lecture, question-answer sessions, demonstration, and practice. The instruction media used for this unit were consisting of examples of glazed products from Tung Luang sub-district, power-point slides, supplementary

documents for the training, raw materials for preparation of a glaze solution, simple equipment for preparation of a glaze solution, supplementary documents for the training, different formulas of solutions prepared by the trainers of the training, products that were baked raw and equipment used for glazing—buckets, sponge, air pumps, and sprays. The trainees were required to take three post-tests at the end of training in Unit 3, each of which had four choices to choose from.

Unit 4. Product firing.

The learning objectives of Unit 4 were to enable students' ability to identify different types of ovens, to explain different parts of gas stoves with hot air passages, to explain the method of raw bake, and to explain the method of glazing bake. The contents of Unit 4 were consisting of basic knowledge concerning different types of ovens for

firing ceramics, basic knowledge of gas stoves with hot air passages, raw bake of the Tung Luang sub-district products, and glaze firing of the products. The learning experience of this unit was done through lecture, question-answer sessions, demonstration, and practice. The instruction media used for this unit were consisting of power-point slides, down draft gas kiln of Tung Luang sub-district, graphic chart of the plan for firing, and products that had been through the glaze-firing process. The trainees were required to take three post-tests at the end of the training in Unit 4, each of which had four choices to choose from.

The analysis of the appropriateness of the curriculum's contents was done by a curriculum drafting committee using the five-level rating scale questionnaire. The data analysis was done by using mean and standard deviation. Results are summarized in Table 1.

Table 1. Results of the analysis of the appropriateness of the curriculum's contents made by the internal assessment.

Element of the curriculum	Mean		SD					
Principle and rationale	5.00		.00					
Aims	4.84		.36					
Training unit	Unit 1		Unit 2		Unit 3		Unit 4	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Objectives	4.75	.43	4.20	.48	4.55	.37	4.55	.37
Contents	4.40	.38	4.63	.30	4.70	.18	4.57	.25
Learning experience	4.33	.49	4.35	.46	4.83	.27	4.28	.45
Instruction media	4.56	.39	4.28	.39	4.36	.52	4.44	.43
Measurement and evaluation	4.40	.43	4.67	.41	4.61	.33	4.45	.37

It was found that the mean of rating scale was quite high, ranging from 4.20 to 5.00. This finding suggested that the curriculum's content was appropriate for the experimental group. The acceptable value was 3.51.

The congruency of the curriculum's content was also determined by the internal assessment of a curriculum drafting committee. The IOC values were estimated from the three-level rating scale questionnaire and the results are summarized in Table 2.

Table 2. Results of the analysis of the curriculum's congruency using data obtained from the three-level rating scale questionnaire that was done by internal assessment committee.

Item	IOC value			
	Training unit	Training unit	Training unit	Training unit
	1	2	3	4
Principle and rationale of the program and learning objectives of the training unit	1.0	0.8	1.0	1.0
Principle and rationale of the program and the contents of the training unit	1.0	1.0	0.8	1.0
Principle and rationale of the program and learning experience	1.0	0.8	0.8	0.8
Principle and rationale of the program and instruction media of the training unit	1.0	1.0	0.8	1.0
Principle and rationale of the program and measurement and evaluation of the training unit	1.0	1.0	1.0	1.0
Internal congruency of the training unit	1.0	1.0	1.0	1.0
Principle and rationale of the program and its aim			1.0	

It was shown that the IOC values were ranging from 0.8 to 1.0. Thus, the committee considered the level of congruency of the curriculum's contents was very good because the IOC value was higher than 0.5.

All of the curriculum's contents were subsequently submitted to the external experts for the assessment and suggestions. The assessment was done by using data from the five-level rating scale questionnaire. The analysis was carried out by using mean and standard deviation and results are summarized in Table 3.

Table 3. Results of the analysis of the appropriateness of the curriculum carried out by the external experts.

Elements of the curriculum	\bar{x}		SD					
Principle and rationale	4.88		.35					
Aims	4.50		1.07					
Training units	Training unit 1		Training unit 2		Training unit 3		Training unit 4	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Objectives	4.50	1.07	4.50	.76	4.25	.76	4.25	.92
Contents	4.63	.74	4.50	1.07	4.25	.76	4.38	.92
Learning experience	4.00	.53	3.88	.83	4.50	.76	4.38	.92
Instruction media	4.38	.92	4.25	1.16	4.50	.76	4.38	.92
Measurement and evaluation	4.00	.53	3.88	.83	4.40	.53	4.38	.92

It was found that the values of mean were quite high ranging from 3.88 to 4.88. These findings suggested that the developed curriculum was appropriate for training of the local people because the values of mean and standard deviation were in the acceptable ranges, above 3.51.

The developed curriculum was further analyzed by the external experts using IOC values that derived from the three-level rating scale questionnaire. Results are summarized in Table 4.

Table 4. Results of the analysis of the developed curriculum for its congruency using IOC values that carried out by external experts.

Item	IOC value			
	Training unit 1	Training unit 2	Training unit 3	Training unit 4
Principle and rationale of the program and learning objectives of each unit	1.0	0.8	1.0	1.0
Principle and rationale of the program and the contents of the training units	1.0	1.0	0.8	1.0
Principle and rationale of the program and leaning experience	1.0	0.8	0.8	0.8
Principle and rationale of the program and instruction media of the training units	1.0	1.0	1.0	1.0

Item	IOC value			
	Training unit 1	Training unit 2	Training unit 3	Training unit 4
Principle and rationale of the program, measurement, and evaluation of the training units	1.0	1.0	0.8	1.0
The appropriateness of contents of the training unit	0.9	0.9	0.9	0.9
Principle and rationale of the program and its aim	1.0			

It was found that the IOC values obtained by external experts were ranging from 0.8 to 1.0. This finding indicated that the developed curriculum was appropriate for training local people because the IOC values were higher than 0.5.

In addition, the experts suggested that the developed curriculum had several advantages, i.e., it emphasizes skills and attitude, use discussion on activities to allow more participation, and use appropriate technical terms that comply with the trainee's background of knowledge.

The developed curriculum was subsequently used in the training program of randomized control group. The post-test was carried out only for designed group as shown in the following diagram.



- When ER = Experimental group
 CR = Control group
 X = Experimental process
 T2 = Post-test

The sample of local people consisted of 22 participants in the training program that obtained by purposive sampling method, and control group that obtained by simple random sampling method. These people were recruited from Thung Luang sub-district, Khirimas district, Sukhothai province.

Pre-training activities were carried out by distributing the advertising brochure for public relation through the chairpersons of local ceramic producing group, while all documents, training manuals, guideline materials, teaching aids (e.g., power-point, slides), instruction media (e.g., ceramic-raw material, tools and equipments) for demonstration and practice, test-paper, and questionnaires were made. A small workshop was set up for all trainers and assistants to prepare themselves and get ready for the training session. Trainers were consisted of three lecturers and seven assistants recruited from teachers and students in the ceramic - technology - program of Phibulsongkhram Rajabhat University. All expenses were prepared for the training program which was estimated approximately 80,000 baht.

The training program was carried out at Pottery Production Center of Ban Thung Luang, Khirimas district, Sukhothai province for 6-day period during September 10 - 15, 2004 for a total actual interval of 36 hours.

Instrument used in data collection.

The research instrument used in data collection was an achievement test that consisted of four choices to choose form in which the total amounts of 45 items were included. The questionnaire consisted of 20 items of basic knowledge, 10 items concerning attitude, and 15 items concerning skills. The examples of

questionnaire are shown in Tables 5-7. The questionnaire used for evaluation of the curriculum's suitability was also required the

trainees' opinions concerning their satisfaction in the training program. It was consisted of 10 items made as 5-level scale type.

Table 5. Example of knowledge-test items.

Unit	Item no.	Question
1	2	What is the main property of stoneware? Which one ?
	3	What types of BanThung Luang's ceramic products are classified, at present ?
2	8	What is the outstanding characteristic of clay having high plasticity ?
	10	What should you do to mix clay body to have the most constant property ?
3	21	Which is the choice that helps in melting enamel ?
	23	Which raw material is not suitable for making the enamel to become a solution because it is very dangerous ?
4	36	What kind of material is used for making kiln - wall of gas kiln with hot air passage for Luang pottery of Ban Thung Luang ?
	37	What is the oxidation firing ?

Table 6. Examples of attitude-test items.

Unit	Item no.	Question
1	6	Which item is used to appropriately describe ceramic products of Ban Thung Luang ?
		What category of product do you think that Ban Thung Luang's ceramic products can be developed into ?
2	12	Which item that mentions correctly about the plastic clay ?
	14	Which item that mentions correctly about the plastic clay preparation ?
3	17	Which item that mentions the suitable way to glaze Ban Thung Luang's products ?
	18	Which item describes the correct idea to glaze the product ?
4	39	Which item is the correct way of product firing ?
	40	Which item is the correct way of product firing with gas kiln ?

Table 7. Examples of questionnaire for skill-test items.

Unit	Item no.	Question
3	25	In order to prevent confusion in weighing the glazing substance, what should you do?
	28	Glazing dip always faces the problem of finger-mark stain on the product, how can you solve this problem ?
	32	Before glazing coat, how do you prepare the products ?
4	41	Which item is correct concerning lighting the gas kiln ?
	42	In burning with gas kiln if the gas pressure is lower while there is some gas left over so the temperature is not high enough to the desirable level, how can you solve this problem ?
	43	When you bring products into the kiln, how do you do it ?

Table 8. Results of the analysis of the curriculum's efficiency that made by using MANOVA.

Competency	Sum squares	Df	Mean square	F	P
Knowledge	1050.568	1	1050.568	578.846	.000
Attitude	484.455	1	484.455	376.465	.000
Skills	1924.568	1	1924.568	3336.400	.000

*P < .05

Results in Table 8 suggested that the curriculum was efficient because the trainees in the training program showed a good relation to knowledge, attitude and skills which was highly significant level and was higher than those of the control group.

Table 9. Results of the analysis on the satisfaction with the training curriculum.

Items	Mean	Std. deviation	Level of satisfaction
Curriculum contents	4.71	.46	highest
Training time	4.57	.60	highest
Venue	4.52	.60	highest
Making use of the knowledge gained from the training	4.52	.60	highest
Training process and activities	4.76	.44	highest
Trainer staff	4.81	.40	highest
Training handouts/material	4.48	.44	highly
Training aids	4.76	.44	highest
Training environment	4.9	.30	highest
Trainee's participation	4.86	.36	highest
Total	4.69	0.46	highest

<u>Level of satisfaction</u>	4.51-5.00 = highest
	3.51-4.50 = highly
	2.51-3.50 = moderately
	1.51-2.50 = low
	1.00-1.50 = very low

Results in Table 9 suggested that the trainees in the training group were very satisfied with the training curriculum because the mean values are ranging from 4.48 to 4.90.

DISCUSSION

The production of ceramic in Sukhothai province is facing the problems in terms of inconsistency of the product's quality resulting in low quality and low income. The capability of the local people in producing ceramic is still under the average. This is probably due to lacking of knowledge and experiences in ceramic production technology. There is a need to help local people to improve the production process of ceramics in order to increase their abilities in producing ceramic products. This in turn will lead to value-added products of OTOP in Sukhothai province.

The developmental process of the curriculum was carried out according to the good practice rule documented by Buasri (Buasri, 2000). All information that used in the development of curriculum's contents is based on well written document, personal communication, and the focus group consisting of experts (Pattana, 2004b). Since the glazing and firing using gas kilns are the most important issue to deal with, the contents of the curriculum are emphasized on these issues. Results of evaluation by trainers suggested that the developed curriculum is relevant to the need of local people. This suggestion is based on the positive outcome of all analysis made by our internal assessment group and external assessment group. This implies that the procedure in this curriculum development is stick to the appropriate rule, i.e., gathering all necessary information, organized the workshop and brain storming of drafting committee, and subsequently evaluated by internal assessment group and external assessment

group. All comments and suggestions were taken into consideration. The developed curriculum was modified according to the suggestion and comment. All documents, training manuals, guideline materials, teaching aids, instruction media for demonstration and practice, test-paper, questionnaires, trainers and assistant trainers were well prepared prior to the training program.

After conducting this experiment, it is assumed that the research has met the objective resulting in an efficient curriculum has been developed. It is very useful for the mission of Phibulsongkhram Rajabhat University to fulfill the needs of local people in promoting the economy of the country. Other universities can adopt this research finding to promote local people's productivity.

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