

THE BACHELOR OF SCIENCE IN INDUSTRIAL EDUCATION PROGRAM DEVELOPMENT

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ABSTRACT

The Bachelor of Science degree in Industrial Education is typically aimed at producing proficient technical teachers by preparing the above program under four public institutes including King Mongkut's University of Technology Thonburi, King Mongkut's Institute of Technology Ladkrabang, King Mongkut's Institute of Technology North Bangkok, and Rajamangala Institute of Technology. Most programs are set for 2-3 years with few credits for major subjects in which are insufficient for building up professional expertise and technical knowledge. According to primary data analysis, it reveals that the above program structure is inefficient and unable to produce qualified graduates with competency and proficiency as principle requirement.

This research is, therefore, prepared in order to develop the Bachelor of Science degree in Industrial Education program structure for maximum efficiency and concurrently for preparing qualified graduates as the principle requirement.

The research procedure was divided into two stages. The first stage was to study the Bachelor of Science degree in Industrial Education program structure through 171 samples who were executives and instructors of Industrial Education Faculties from four Institutes. The sample was specifically selected from executives and instructors in the first semester of academic year 2002 who had over five years experience in this field. Research instrument was a questionnaire concerning opinions toward the Bachelor of Science degree in Industrial Education program structure and analyzed by frequency and percentage. The research result was the new program structure of the Bachelor of Science degree in Industrial Education. The second stage was prepared for program development and evaluation by developing program structure based upon the research result of the first stage. The program structure was afterward evaluated by 13 expert educators and professionals in education, research, administration, and industrial fields. Evaluation instrument was questions concerning the Bachelor of Science degree in Industrial Education program structure. The research findings point out that the experts are in consensus

with the program structure in the first stage, and that the Bachelor of Science degree in Industrial Education program structure is efficient and suitable for higher developing those graduates accordingly.

Keywords : Industrial education, program development, program structure, cooperative education.

INTRODUCTION

National education program has presently encountered many problems concerning new entrant qualification, program and instruction procedure, as well as teachers and graduates qualification. One of the major problems nowadays is program structure that has few credits for major subjects, in which is insufficient for building up professional expertise and technical knowledge (Mongklong, 2001). The National Education Act of 1999 Section 52, additionally, indicates that the government has intended to upgrade the teachers' career as high standard (Office of National Education Commission, 2001).

The Bachelor of Science degree in Industrial Education (B.Sc. Ind. Ed.) is basically aimed at producing technical teachers by preparing the degree under four public institutes including King Mongkut's University of Technology Thonburi (KMUTT), King Mongkut's Institute of Technology Ladkrabang (KMITL), King Mongkut's Institute of Technology North Bangkok (KMITNB), and Rajamangala Institute of Technology (RIT). Recently, such degree is comprised of two programs: continuous program (2-3 years) that admits students from technical diploma level and full program (4 years) that admits students from technical certificate level (equivalent to M 6). In fact, KMITNB and RIT (some campus) conduct both programs, but KMUTT and KMITL conduct only continuous program. Moreover, KMITNB and RIT call the degree Bachelor of Science in Technical Education (B.Sc. Tech. Ed.), but KMUTT and KMITL call it Bachelor of Science in Industrial

Education. Most are 2-3 years program. Regarding the development plan of four institutes, many additional programs are concurrently provided for creating proficient technical teachers with expertise and vocational knowledge for teaching industrial education students according to market demand (Faculty of Industrial Education under four institutes, 2001a). Technical teachers are presently inefficient in terms of capability, expertise, and qualification (Faculty of Industrial Education under four institutes, 2001b).

The above four institutes have individually set up the Bachelor of Science degree in Industrial Education with different standards. Most programs are set for 2-3 years, with few credits for major subjects, in which are insufficient for building up professional expertise and technical knowledge. Therefore, the program structure has concurrently been improved in accordance with the National Education Act of 1999 Section 52. The Act indicates development program for qualified teacher production and appropriate to be regarded as high standard, as well as the teacher production and reformation program under the Office of National Education Commission of 2001, in which stated that a new program for qualified teacher production should be set for five years (4 years in classroom and 1 year field study) (Faculty of Industrial Education under four institutes, 2001c). The program significantly indicates direction and qualification of graduates (Tonsriwong, 1996).

According to the above statements, the arising crisis requires urgent resolution. Therefore,

the objective of this research was to develop the Bachelor of Science degree in Industrial Education program structure for maximum efficiency and concurrently for preparing qualified graduates as the principle requirement.

RESEARCH METHODOLOGY

This research consisted of two stages: stage one concerned with studying the Bachelor of Science degree in Industrial Education program and stage two concerned with the structure development and evaluation of the Bachelor of Science degree in Industrial Education program.

For stage one, the samples consisted of 171 persons who were top executives, heads of departments, assistant deans, associate deans, deans, and lecturers from four institutes (KMUTT, KMUTL, KMUTNB, and RIT). They were specifically sampled with condition that they taught during the first semester of academic year 2002 and had over five years of teaching experience. Questionnaire concerning opinions toward the Bachelor of Science degree in Industrial Education program structure was used as research instrument. The questionnaire was divided into two sections: section one consisted of questionnaire concerning general information of respondents in the form of checklists and filling

in the blanks, and section two consisted of questionnaire concerning the Bachelor of Science degree in Industrial Education program structure pertaining to the teacher production and reformation program under the Office of National Education Commission of 2001, the Bachelor degree standard criteria of Ministry of University Affairs of 1999, and the Regulation of Engineer Council Committee of 2001, including research reference in the form of checklists and filling in the blanks.

Questionnaire had been submitted to four experts for verification. Thereafter, questionnaire was distributed to respondents by the researcher. The numbers of completed questionnaires were 139 or 81.28%. Finally, both sections of questionnaire were analyzed by frequency and percentage.

For stage two, the result of stage one was used to develop the Bachelor of Science degree in Industrial Education program structure, which was later evaluated by the Focus group. The samples consisted of 13 educators, researchers, executives, and industrial experts. Questions concerning program structure were used as evaluation instrument. The data were collected using tape recorder and note taking of responses. The data were then analyzed and evaluated. The methodology of this research is shown in Figure 1.

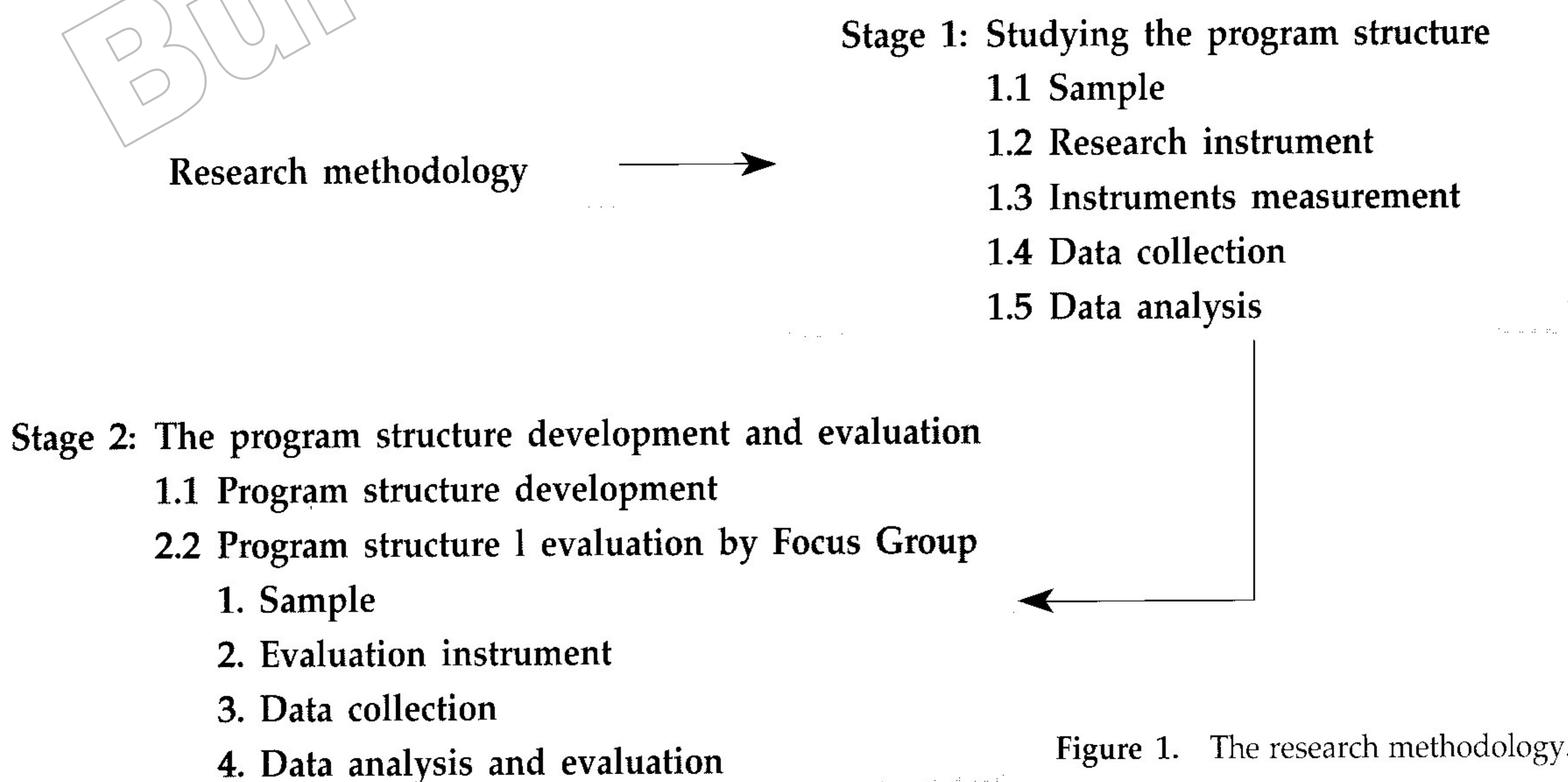


Figure 1. The research methodology.

RESULTS

Results of the first stage concerning the new program structure of the Bachelor of Science degree in Industrial Education are shown in Figure 2.

**The Bachelor of Science degree in Industrial Education
program structure
(174 credits to be completed within 5 years)**

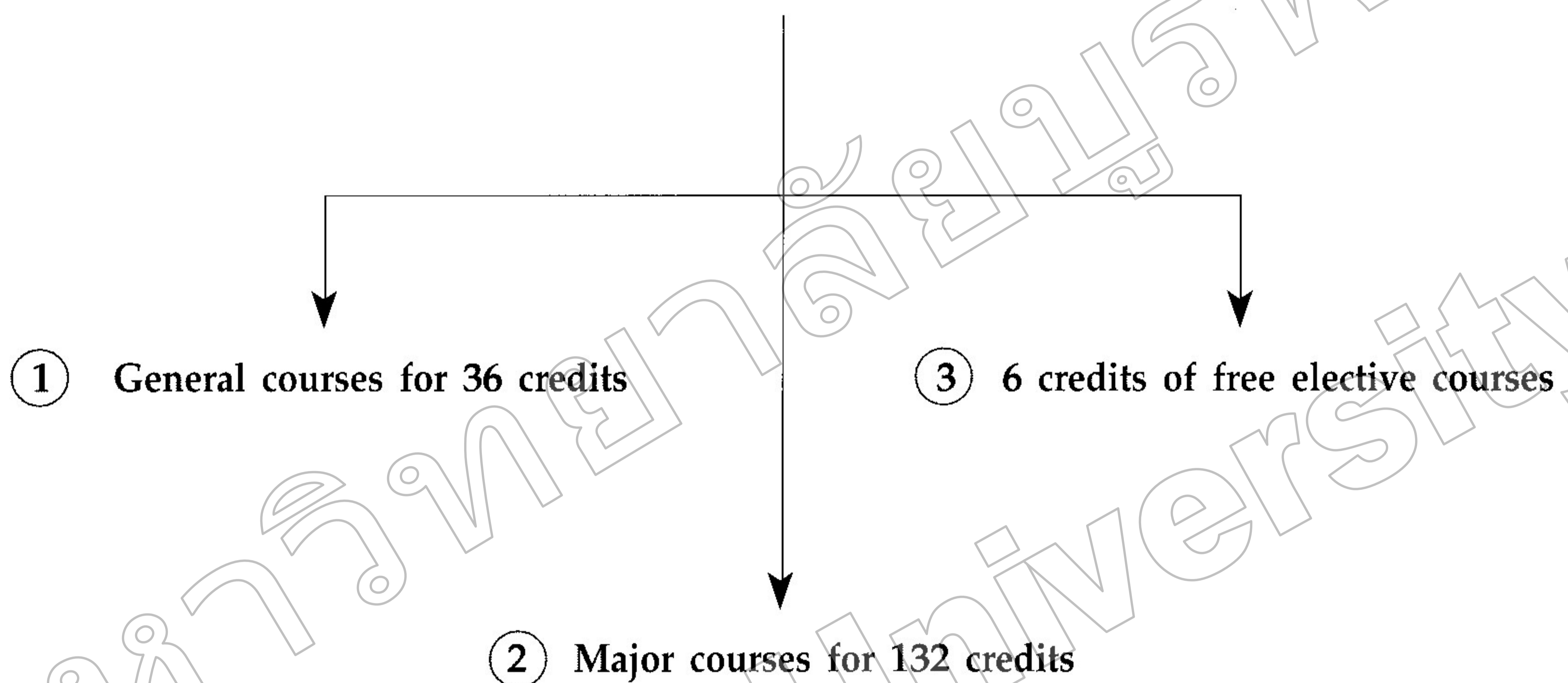


Figure 2. The new program structure of the Bachelor of Science degree in Industrial Education.

According to the program structure development and evaluation in stage two, it reveals that the Bachelor of Science degree in Industrial Education program structure requires 174 credits to be completed within five years. Graduates will get a teaching vocational license. The whole program structure can be categorized as follows:

1. General courses for 36 credits include 18 credits of science courses (9 credits of mathematics, 6 credits of physics, and 3 credits of chemistry), 12 credits of English courses (emphasizing vocational English and practices), and 6 credits of social science courses.

2. Major courses for 132 credits include 30 credits of industrial education courses, 18 credits of basic engineering courses, 12 credits of core engineering courses, 42 credits of major courses, 12 credits of specific major courses (industrial education or specific major courses), 9 credits of cooperative education (1 semester for training in industries and evaluation for pass/fail), and 9 credits of teaching courses (1 semester for practice and evaluation for pass/fail).

3. Six credits of free elective courses.

The Bachelor of Science degree in Industrial Education program structure is shown in Figure 3.

1. General courses for 36 credits include:
 - 18 credits of science courses
 - 9 credits of mathematics
 - 6 credits of physics
 - 3 credits of chemistry
 - 12 credits of English courses
(emphasizing vocational English and practices)
 - 6 credits of social science courses



2. Major courses for 132 credits include:
 - 30 credits of industrial education courses
 - 18 credits of basic engineering courses
 - 12 credits of core engineering courses
 - 42 credits of major courses
 - 12 credits of specific major courses
(industrial education or specific major courses)
 - 9 credits of cooperative education
(1 semester for training in industries, pass/fail)
 - 9 credits of teaching courses
(1 semester for practicum, pass/fail)



3. Six credits of free electives courses

Figure 3. The Bachelor of Science degree in Industrial Education program structure.

DISCUSSION

Table 1 shows the comparison between the current program and developed program structure of the Bachelor of Science degree in Industrial Education program.

Table 1. Comparison between the current program structure and developed program structure of the Bachelor of Science degree in Industrial Education program.

Program structure	The Bachelor of Science degree in Industrial Education program		
	Current program 2-3 years	4 years	Developed program 5 years
1. General courses	12	33	36
Science courses	6	18	18
English courses	4	6	12
Social science courses	2	9	6
2. Major courses	71	106	132
Industrial Education courses	35	45	72
Engineering courses	36	61	60
3. Free elective courses	3	6	6
Total	86	145	174

The 5-year program structure is typically consistent with the system reformation and teacher production process of the Office of National Education Commission of 2001 (Faculty of Industrial Education under four institutes, 2001d). This underscores the point of view of Chiraworaphong (2001), Chairman of the Council of Deans of Faculty of Education.

The developed program for teacher production requires 174 credits to be completed within five years in accordance with the announcement of the Ministry of University Affairs in 2001 which stated that students are required to take a minimum

of 150 credits and a maximum of 180 credits within five years for the Bachelor degree (Ministry of University Affairs, 1999).

The strength of this program is that 18 credits of science courses would increasingly strengthen learners' more basic scientific knowledge, vocational theory improvement and problem solving than the current program. Moreover, 12 credits of English courses would help graduates understand better other English documents and texts. The 132 credits of major courses would strengthen graduates' efficiency and enhance their experience in vocational knowledge by having opportunity

to be trained and practiced in the field before going to work in industries.

In conclusion, the Bachelor of Science degree in Industrial Education program management of four institutes in Thailand should be concurrently improved and developed in order to enhance graduates' qualification and competency with technical know-how, expertise, and positive attitude toward professional according to market requirement. The researcher has studied and suggested some ideas concerning technical teacher training in Thailand. There are other influential factors that are not mentioned here. Hopefully, the above suggestion could be applied for the Bachelor of Science degree in Industrial Education program improvement in order to promote technical teacher profession to be higher qualified and comparable to international standard in the future.

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