

CHAPTER 3 METHODOLOGY

3.1 Research Perspective

This chapter describes the research methodology which was used to gather data in the study. The population and sample are described, and the research instruments used in the data collection, the data collection procedures, and the statistical methods used for data analysis are explained.

3.2 Population and sample

The population in this study was 391 instructors and 288 fourth year students from the faculties of Industrial Education at six universities in Bangkok metropolitan area. These universities were King Mongkut's University of Technology Thonburi, King Mongkut's Institute of Technology Ladkrabang, King Mongkut's University of Technology North Bangkok, Rajamangala University of Technology Thanyaburi, Rajamangala University of Technology Phra Nakorn, Rajamangala University of Technology Krungthep Thailand. The population included no students from King Mongkut's University of Technology North Bangkok and Rajamangala University of Technology Krungthep.

The sample in this study was selected randomly and comprised 270 out of 391 instructors and 288 out of 381 fourth year students from faculties of Industrial Education in six universities in the Bangkok metropolitan area. These universities were King Mongkut's University of Technology Thonburi (28 instructors and 162 students), King Mongkut's Institute of Technology Ladkrabang (90 instructors and 37 students), King Mongkut's University of Technology North Bangkok (52 instructors), Rajamangala University of Technology Thanyaburi (43 instructors and 47 students), Rajamangala University of Technology Phra Nakorn (27 instructors and 42 students), Rajamangala University of Technology Krungthep Thailand (30 instructors). The sample included no students from King Mongkut's University of Technology North Bangkok and Rajamangala University of Technology Krungthep because a change in the teaching program across the country had taken place. The change meant that the students were required to take a four year course that included one year of teacher training. This newly launched curriculum in Industrial Education resulted in several

universities suspending the offering of this program for some time. The population and sample for this study are shown in Table 3.1.

Table 3.1 The survey population and sample

Universities	Instructors		Students	
	Population	Sample	Population	Sample
1. King Mongkut's University of Technology Thonburi	59	28	201	162
2. King Mongkut's Institute of Technology Ladkrabang	126	90	44	37
3. King Mongkut's University of Technology North Bangkok	72	52	-	-
4. Rajamangala University of Technology Thanyaburi	65	43	71	47
5. Rajamangala University of Technology Phra Nakorn	33	27	65	42
6. Rajamangala University of Technology Krungthep	36	30	-	-
Total	391	270	381	288

Table 3.1 shows 270 out of 391 instructors or 69.05% of the population and 288 out of 381 students or 75.59% of the population.

3.3 Research Design

The survey used five out of seven steps of design outlined by Kirkpatrick and Hood (1990). They are:

1. Determine the type of survey needed to collect data and who will be the respondents.
2. Ensure that respondents have adequate skills and knowledge of what is required and the technology to complete the evaluation.
3. Establish the sample size for the data collection process.

4. Provide participants with confidentiality and privacy for giving sensitive information.

5. Time the survey according to the information gathered. Pre-implementation data can be used to guide program development while post-implementation data can be used to monitor program success and make recommendations for change.

The steps that the researcher did not use were:

1. Provide incentives for participants to complete the survey.
2. Consider if participant assistance is required to complete the survey.

The survey of the perceptions of instructors and students on a seven-point Likert scale questionnaire on TBL (Strongly Agree, Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, Disagree, Strongly Disagree) (Warr, Cook, & Wall, 1979) required approximately 30 minutes to complete.

The levels of agreement from respondents were as follows:

Average Score		
7	means	strongly agree
6	means	agree
5	means	somewhat agree
4	means	neither agree nor disagree
3	means	somewhat disagree
2	means	disagree
1	means	strongly disagree

3.4 Research Instruments

The survey of this study is divided into two parts as follows:

Part I: General data relating to respondents

Part II: Team-Based Learning (TBL) for students in higher education questionnaire

The questionnaire was developed specifically for the context of the study and contained 35 items (see Appendix A.). These items were elements of a TBL theoretical framework

derived from Michaelsen (2004). For the questionnaire, the word ‘perceptions’ refers to the perceptions or considered judgments of both students and instructors of the elements or components of TBL that would help the students to collaborate in learning. The questionnaire’s 35 items were grouped into nine categories as follows:

1. *Responsibility* use included 5 items
2. *Instructional Design* included 4 items
3. *Authentic Assessment* included 3 items
4. *Active Learning* included 3 items
5. *Accountability* included 4 items
6. *Facilitation* included 3 items
7. *The Value of Team* included 3 items
8. *Knowledge Construction* included 6 items
9. *Problem Solving* included 4 items



3.5 Validity and Reliability

The content validity was verified by five experts, based on Yaghmaie’s (2003) method. The experts were five instructors in industrial technology education. All of these experts held doctoral degrees or associate professor positions. The experts were separated from the research team. The experts were:

1. Asst. Prof. Dr. Lertlak Klimhom, Department of Industrial Education, Faculty of Industrial Education, King Mongkut’s Institute of Technology Ladkrabang, Bangkok, Thailand.
2. Asst. Prof. Dr. Jirasek Trimetsoontorn, Dean of Administration and Management College, King Mongkut’s Institute of Technology Ladkrabang, Bangkok, Thailand.
3. Asst. Prof. Dr. Anchalee Dusitsutirat, Department of Tourism and Hospitality, Faculty of Liberal Arts, Rajamangala University of Technology, Krungthep, Bangkok, Thailand.
4. Dr. Phadungchai Papat, Department of Industrial Education, Faculty of Industrial Education, King Mongkut’s Institute of Technology Ladkrabang, Bangkok, Thailand.
5. Dr. Ratee Siripan, Department of Agricultural Education, Faculty of Industrial Education, King Mongkut’s Institute of Technology Ladkrabang, Bangkok, Thailand.

Thirty instructors and 30 students were invited to test the reliability of the questionnaire. Results of the Cronbach alpha reliability coefficients of the first and the second questionnaires were 0.95 and 0.95 respectively. The index of item-objective congruence (IOC) of each item was ≥ 0.50 (Turner & Carlson, 2003).

3.6 Data Collection

The study began with the selection of a sample. Recruitment was facilitated by the fact that researchers were instructors in Industrial Education from universities in the Bangkok metropolitan area, Thailand.

The researcher mailed the 391 questionnaires for instructors to the faculties of Industrial Education in universities in the Bangkok metropolitan area, together with a document indicating approval to conduct the study. Each mailing consisted of a cover letter requesting the faculty director's permission to conduct the study, copies of the questionnaire, and a time-frame reminder requesting the return of the questionnaire. A self-addressed, stamped envelope was also included for the return of the completed questionnaire. After the deadline of twenty days, the researchers contacted the head of the faculties of Industrial Education by phone to request the return of any completed questionnaires. Sixty-nine percent of those who received the questionnaire completed and returned it.

The researcher sent the 381 questionnaires were distributed to all students who were attending their fourth year in the faculties of Industrial Education in four universities in the Bangkok metropolitan area. Students could return the questionnaire in person to one of the researchers. Seventy five percent of those who received the questionnaire completed and returned it.

3.7 Data Analysis

The data from questionnaires were analyzed by statistical techniques.

1. Personal data were analyzed by mean and percentages.
2. The data analysis of Thai instructors' and students' perceptions of the factors affecting TBL in universities in Thailand began with an exploratory factor analysis by

testing the adequacy of the 270 instructors and 284 students with Kaiser–Meyer–Olkin (KMO). The KMO test for measuring sampling adequacy and Barlett’s test of sphericity displayed satisfactory results. The KMO value of 0.89 and 0.94 is greater than 0.5 which means the data set is likely to factor well (Kaiser, 1974). The data were first analyzed using descriptive statistics. Next, the Pearson product-moment correlation coefficient of each variable was used to show the relation matrix and to test significance. To test which method could best describe the variance and to determine the best method to extract factors, the significant variables with the factor extraction method by principal component analysis and maximum likelihood estimation was used (i.e., Gorsuch, 1983; Harman, 1976).

The variables were analyzed using principal component analysis and factor rotation with orthogonal rotation axis (Varimax). Factors were identified by eigenvalues which are higher or equal to 1-0 and have at least three variables describing that factor with each variable having a weight value of more than 0.50 (Schene, Wijngarden, & Koete, 1998). The interpretation of factors and their labeling with new variables required experience in labeling and in giving meaningful names to each factor by considering variables for such factors. Those involved in this step were the principal investigator and co-investigator, as well as five experts.

The researchers also relied on structural equation modeling using LISREL™ for the confirmatory model of instructor and student perceptions. LISREL™ is perceived as the most general method for carrying out confirmatory factor analysis (CFA) and the causal relationships among latent variables. Confirmatory factor analysis (CFA) is a tool that is used to confirm the measurement theory (Timothy, 2006).

3. Analysis compared the differences between Thai instructors’ and students’ perceptions of the factors affecting TBL in universities in Thailand by using t-test.

4. A statistically significant level in this study would be ≤ 0.05 level.