

# CHAPTER 5 SUMMARY; DISCUSSION; CONCLUSION; LIMITATIONS AND CONTRIBUTIONS

## 5.1 Introduction

This chapter provides a summary, discussion, conclusion, limitations, and contributions of the study which identifies and compares the differences between instructors' and students' perceptions of the factors affecting Team-Based Learning (TBL) in universities in Thailand.

## 5.2 Summary of Results

In terms of the profile of the respondents, sixty-three percent (or  $n = 170$ ) of instructors were male and held a bachelor's degree (2.60% or  $n = 7$ ), a master's degree (69.30% or  $n = 187$ ) and a doctoral degree (28.10% or  $n = 76$ ). The instructors' average age was 45 years, and they had an average of 17 years of teaching experience. Seventy-five percent of the participating students were majoring in Industrial Education and 65.30% were male. The programs in Industrial Education were civil technology education (17.70% or  $n = 51$ ), mechanical technology education (22.22% or  $n = 64$ ), production technology education (20.50% or  $n = 59$ ), electrical technology education (19.10% or  $n = 55$ ), electronics and telecommunication technology education (16% or  $n = 46$ ), and computer technology education (4.50% or  $n = 13$ ).

A description of the factors identified as most important by instructors is presented first, and this is followed with a description of those factors identified as important by students. The differences between instructors' and students' perceptions of the factors affecting TBL in Thailand are compared.

### Instructors' Perceptions

The factor analysis of instructors' perceptions revealed seven factors that instructors perceived as most important in TBL. These were 1) *Authentic Assessment*; 2) *Knowledge Construction*; 3) *Active Learning*; 4) *Instructional Design*; 5) *Accountability*; 6) *The Value of Team*; and 7) *Facilitation*. For the second-order correlation coefficients between the seven factors and TBL, the results were 0.52-0.87, which were at a high level. The correlation coefficients within the seven internal factors

were 0.01-0.14, which were at a low level. It can be concluded that these seven factors affected instructor perceptions of TBL.

To confirm those seven factors already identified through factor analysis, a model modification was developed from indices using the method of Joreskog and Sorbom (1996). A model of measurement of second-order factor analysis of instructors' perceptions had highly satisfactory validity and fit the empirical data. The statistical values were as follows:  $\chi^2$  non-significant,  $p = 0.97$ , RMSEA = 0.00, ECVI = 2.42, Model AIC = 603.03, NFI = 0.99, CFI = 0.97, SRMR = 0.40, GFI = 0.93 and AGFI = 0.90. The fit indices were good which implies that the component model developed by the researchers was in accordance with the empirical data at a high level. The second-order factor analysis had factor loadings weighted 0.58-0.89. When the factors were ranked in terms of importance as perceived by instructors, the order was as follows: *Active Learning* (0.89), *Accountability* (0.75), *The Value of Team* (0.75), *Facilitation* (0.75), *Authentic Assessment* (0.66), *Knowledge Construction* (0.65), and *Instructional Design* (0.58).

### **Students' Perceptions**

The factor analysis of students' perceptions revealed six factors that affected TBL. These were: 1) *Active Learning*; 2) *Authentic Assessment*; 3) *The Value of Team*; 4) *Responsibility*; 5) *Problem Solving*; and 6) *Instructional Design*. For the second-order correlation coefficients between the six factors and TBL, the results were 0.52-0.79, which were at a high level. The correlation coefficients within the six internal factors ranged from 0.01-0.09, which were at a low level. It can be concluded that these six factors affected student perceptions of TBL.

To confirm these seven factors which had already been identified through factor analysis, a model of modification indices was developed using the method of Joreskog and Sorbom (1996). A model of measurement of second-order factor analysis of student perceptions had high satisfactory validity and fit the empirical data. The statistical values were as follows:  $\chi^2$  non-significant,  $p = 0.27$ , RMSEA = 0.01, ECVI = 2.01, Model AIC = 558.01, NFI = 0.98, CFI = 1.00, SRMR = 0.04, GFI = 0.92 and AGFI = 0.90. Thus, the fit indices were good. The second-order factor analysis had factor loadings weighted 0.60-0.93. When the factors were ranked in terms of importance as

perceived by students, the order was as follows: *Problem Solving* (0.93), *Responsibility* (0.92), *Active Learning* (0.90), *Authentic Assessment* (0.87), *The Value of Team* (0.81), and *Instructional Design* (0.60).

There were significant differences among instructors and students in their perceptions of the importance of *The Value of Team* and *Instructional Design* in TBL,  $t = -2.63$ ,  $p < .01$  and  $t = -3.82$ ,  $p < .01$ , respectively. Students were more likely than instructors to affirm *The Value of Team* as important. Instructors were more likely than students than to affirm *Instructional Design* as important.

Both instructors and students perceived *Active Learning* and an emphasis on *Authentic Assessment* as important factors affecting TBL. Compared to instructors, students were significantly more likely to value *The Value of Team* than *Instructional Design*. Thus, in TBL classrooms, instructors' perceptions of student learning achievement through TBL may focus less on *Instructional Design* than on *The Value of Team* or *Active Learning* or *Authentic Assessment*.

### 5.3 Discussion of Results

According to the results obtained in this study, both instructors and students consider *Active Learning* as important in TBL. This result is similar to the study of Koles, Nelson, Stolfi, Parmelee, and DeStephen (2005) who demonstrated that TBL and Case-Based Group Discussion (CBGD) are equally effective as active learning strategies. The results of the present study also relate to the results of Vasan, DeFouw, and Holland (2008) who found that a TBL approach in teaching anatomy allowed instructors to create an active learning environment that helped students improve their performance. Furthermore, Nieder, Parmelee, Stolfi, and Hudes (2005) reported that

Team-based Learning ...is a very "active learning" process that promotes both the learning of factual material as well as higher-level cognitive skills; it uses small groups and requires team members to work collaboratively. (p. 57)

Levine et al. (2004) found that team learning is an instructional strategy that fosters active learning through small-group interaction. According to the National Education

Act B.E. 2542 and Amendments (Second National Education Act B.E.2545), active learning is also encouraged to “...provide training in (the) thinking process, management, how to face various situations and application of knowledge for obviating and solving problems” (Office of the National Education Commission 2003, Section 24, p. 11).

*Authentic Assessment* was identified as important in both instructors’ and students’ perceptions. Such forms of assessment usually include a task for students to perform and a rubric by which their performance on the task is evaluated (Muller, 2011). In authentic assessment, assessment drives the curriculum. That is, teachers first determine the tasks that students will perform to demonstrate their mastery, and then a curriculum is developed that will enable students to perform those tasks well and which will include the acquisition of essential knowledge and skills. This approach has been referred to as planning backwards (McDonald, 1992). Wellington, Thomas, Powell, and Clarke (2002) suggested that in authentic assessment strategies, instructors can employ a range of assessment techniques: performance evaluations, criterion referenced appraisals, systematic observations by instructors, peers, self and portfolios and also use the Individual Readiness Assurance Test (I-RAT) from their assignment to check student knowledge. Nider, Parmelee, Stolfi, and Hudes (2005) suggested that, in correlation analysis of TBL and examination performance, individual readiness assurance test performance is a good predictor of examination performance and further, that student performance, TBL may most benefit academically at-risk students who are forced to study more consistently.

The comparison between instructors’ and students’ perceptions of TBL revealed that students are significantly more likely to favor *The Value of Team* than *Instructional Design*. Kirschner, Paas and Kirschner (2009) found that the type of task determines student preference to work in a collaborative or individual manner and that group-based learning can be detrimental in certain situations. For tasks which require memory, students as a group obviously outperformed individual students. When each group member had to recall, however, those who worked alone out performed them all. Therefore, it could be argued that a higher number of retention tasks are suitable for group learning because students can help one another to remember, but they are detrimental for individual development as social loafing can take place. However,

Kirschner et al. (2009) suggested that difficult problem-solving tasks assigned to group of students are beneficial for both individual development and group performance because the cognitive load imposed by the problem is shared by members, resulting in the interdependence among team members. In this manner, each student engages in social interaction to collaborate and as such the team can produce more than the sum of its parts. Katzenbach and Smith (1993) found that as a team, students can reach the common goal and responsibility on their own, are interdependent and responsible for working and solving problems together in a team when they are committed to each other to build effectively power to work. Collaborative learning helps students to develop social relationships, social and communication skills, positive attitudes in teams, group cohesion and to solve problems together (Johnson & Johnson, 1999).

Another intriguing question is why instructors are significantly more likely to favor *Instructional Design* than *The Value of Team*. This might be explained by the premise that a TBL instructor is a manager who determines the teams (Michaelsen, 2004). Fink (2004) argued that TBL is "...a particular instructional strategy that is designed (a) to support the development of high-performance learning teams, and (b) to provide opportunities for these teams to engage in significant learning tasks" (p. 9). Tai and Koh (2008) also suggested that TBL instructors are to help consolidate and help the teams to focus on learning by stimulating an energetic, total-class discussion with teams to form a consensus. Furthermore, Nider, Parmalee, Stolfi, & Hudes (2005) found that TBL helps students understand course content and concepts, makes them study more consistently and encourages interaction, discussion, and problem solving. From this perspective, TBL is under the direct control of instructors. If a task is poorly designed by instructors, it is unlikely that such a task will contribute to learning (Sweller, Kirschner, & Clark, 2007).

## 5.4 Conclusion

The purpose of the study reported on in this paper was to identify and compare instructors' and students' perceptions of TBL in universities in Thailand. The results of the study indicated that both instructors and students perceived *Active Learning* and an emphasis on *Authentic Assessment* as important factors. When compared to instructors, students were significantly more likely to value *The Value of Team* than *Instructional*

*Design* in TBL. This emphasis on *The Value of Team* and on the important role of the student in the classroom is congruent with the reforms targeted in Thailand's Education Act. As such, TBL may serve as an effective vehicle in Thailand's universities in helping the country to achieve educational reform and move towards student-centeredness.

## **5.5 Limitations**

The study's context was limited to universities in the metropolitan area of Bangkok in Thailand. The questionnaire was predetermined and the respondents were limited in number. If students and instructors had been given open-ended questions, it is possible that they may have identified a different set of factors as important. The results of the questionnaire were obtained from students in faculties of Industrial Education, but the responses might have been different had students in other faculties been surveyed.

## **5.6 Contributions**

This research is a study of team-based learning (TBL), an approach that is inherently learner-centered, in a cultural context that has traditionally been teacher-centered. The instructors are facilitators who provide advice and guidance to students to promote and stimulate the motivation of learners in order to replace passive learning as well as to manage the students' participation in classroom. Social Media is adopted in the teaching process. The instructors are responsible for an initial plan of the project's content and provide the opportunities for teams to engage in significant learning tasks. Moreover, the students learn self-responsibility and deal with the problem solving protocols. These processes positively affect the development of students' knowledge that results from the exchange of each individual student's experience. In this way, the students are involved in a process of self-discovery and an understanding of their own abilities. In addition, they also receive real-life experience and practice learning skills, thinking skills, management skills and skills of expression which can lead to life-long learning which can be applied in everyday life and lead to more efficient work.