Instructional Design for Pre–Service Teacher Training Students Integrating Case Based Learning and Collaborative Learning Approaches

Asst. Prof. Chanasith Sithsungnoen, Ph.D[1]
Curriculum and Supervision Program, Faculty of Education, NakornPathom, Silpakorn University, Thailand[1]
Email: sithchon@hotmail.com[1]

ABSTRACT

The objectives were 1) to develop an instruction integrating Case-Based Learning (CBL) and Collaborative Learning (CL) to promote the instructional design abilities of Pre- Service Teachers (PSTs), 2) to study the effectiveness of the instruction integrating CBL and CL. The sample, purposively selected, were 25 undergraduates PSTs at the Faculty of Education, Silpakorn University, Thailand. The research instruments were: 1) instructional plans of 4 units integrating CBL and CL, 2) the 30-item objective, achievement test on the 4 units of instruction; 3) the 20-items, 5-point scale assessment on instructional design abilities of students; and 4) a 5-point scale survey on students' feedback towards instructions of the 4 units. Statistics for data analysis and comparison included mean, standard deviation, and T-score. The results revealed that 1) the instructional design integrating CBL and CL to promote the instructional design abilities of PSTs employed a 6-step model called DAISI (Define, Analyze, Identify, Search, Share, Implement). 2) The analysis of the effectiveness of the instruction showed that 2.1) the learning outcomes of PSTs on the post-test after the instruction integrating CBL and CL were significantly higher than their pre-test at level of .05. 2.2) PSTs' ability to design instructions integrating CBL and CL were "very good". 2.3) PSTs' satisfaction towards the instructions integrating CBL and CL was high.

KEYWORDS: Case-Based Learning (CBL), Collaborative learning (CL), Instructional abilities, Pre-service teachers

Introduction

Major changes in life skills in the 21st century (Global Megatrends, 2012; Canton, 2006; George & Friedman, 2011) have been underpinned by seven megatrends in teacher roles, student's learning approaches, instructions and development in learning sources. Accordingly, teachers have to update their learning and professional development because of the profound socio-economic and technological changes and, in particular, the rapid flow of information. Wider societal and cultural transformations

– together with greater personal, health and financial expectations and ambitions- have inevitably impacted on the education system. The advancement of technologies has made significant differences in the way we learn or seek knowledge. In the past, students were passive learners, while nowadays, the emphasis is on independent learning–or active learning. Hence, teachers have to improve their ability and proficiency in responding to changes in order to function teachers and administrators' roles efficiently in their institutional responsibilities, be it in a school, educational service area, Ministry of Education (Sithsungnoen C., 2014).

The global ambition exemplified by The Florida Education Standards Commission concluded that teachers in the 21st century must have the capability to use suitable teaching techniques and strategies, understanding of the context, a variety of teaching approaches, and the ability to plan lessons and deliver them effectively. (National Institute for Development of Teachers, Faculty Staff and Educational Personnel (NIDTEP, 2005)

The Faculty of Education at Silpakorn University trains Pre- Service Teachers to be professional teachers who embrace the latest pedagogical and learning strategies. They are trained to have a clear understanding of the teachers' professional standards. Regardless of the school contexts, it is expected that they must be able to perform teachers' roles appropriately: differentiated teaching approaches on subjects, teachers' manners, and the Code of Ethics of Teaching Profession (Sithsungnoen C., 2018). Unquestionably, teachers' knowledge and skills on instructional design and classroom management are the key to promote learners' active learning. Instruction is a system based, comprising pre-teaching, teaching, post teaching phases. For pre-teaching, emphasis is placed on instructional design, including knowing students background, learning materials, learning sources, class activity, assignment, learning measurement and evaluation. An efficient teacher should be proactive, responsive, and supportive. Well-designed instructions, and positive classroom psychology of teaching create optimum learning environments which result in raising student achievements. Moreover, by empowering students under a positive learning environment, learning becomes more of an 'enjoyment' rather than a routine. The "Teacher" is the one who sets the tone within the learning environment - be their personalities, attitudes, teaching behaviors, classroom management techniques and interactions in the classroom. Those elements are not only crucial components of student learning success, but also render student 'enjoyment' of learning experiences.

The promotion of effective learning processes depends heavily on suitable principles and approaches used in delivering instructions. Watchara Laoriandee (2010) argued that strategies for teaching thinking skills involve Classroom Assessment Techniques (CATS), Cooperative Learning Strategies, Problem Based Learning, Independent Investigation Learning, and Case-Based Learning. Case-Based Learning approach promotes development and problem-solving skills, teamwork, research and presentation skill. Porranat Kitrungruang (2010) suggested that Case-Based Learning was another teaching approach which encouraged students to analyze social and physical circumstances. The situations used in this approach can be stories or real-life events. The objective of this approach is to allow students to understand and innovate ideas and thoughts. The research results of Hays (2008) showed that the Case-Based Learning approach was useful for role-playing and problem solving by emphasizing teamwork and research skills.

The Collaborative Learning Approach also allows students to work in team to achieve mutual objectives. Teachers are also required to apply teaching strategies to have students

generate what they have learned from doing activities into knowledge. Paitoon et al. also argued that Collaborative Learning focuses more on mutual interests rather than the level of competency. Each team member has a specific role and work collaboratively on researching, operating, and supporting each other. This learning approach underlines the acceptance of each team member's role and comfort in exchanging ideas. Gokhlae (1995) suggested that Collaborative Learning empowers small team working skills with mutual objectives. Students are responsible for each other to achieve the outcomes. So, teachers should use suitable teaching techniques. Students should also be prepared to participate by assuming individual responsibility for the overall success of team's assignment. When the team achieves the objectives, every team member will be able to learn effectively as part of a wider team. Considering the importance of Case-based Learning (CBL) and Collaborative Learning, it is clear that appropriate use of instructional design can develop Pre- Service Teachers' instructional design abilities effectively.

Objectives

1. To develop an instruction using Case-Based Learning and Collaborative Learning to promote instructional design abilities of Pre- Service Teachers

2. To study the effectiveness of the instructions using Case-Based Learning and Collaborative Learning, in particular:

2.1 to compare the learning outcomes of the Pre- Service Teachers enrolled in Methods of Teaching Subject before and after studying,

2.2 to study the instructional design ability of the Pre- Service Teachers enrolled in Methods of Teaching Subject,

2.3 to study the feedback of undergraduate Pre- Service Teachers enrolled in Methods of Teaching Subject, towards the instructions integrating Case Based Learning and Collaborative Learning.

Scope of the study
Samples

Samples were purposively selected. They were 25 undergraduate Pre- Service Teachers at the Faculty of Education, Silpakorn University, studying the Methods of Teaching Subject in the second semester of the academic year 2017.

Variables
Independent Variables is the instruction using Case-Based Learning and Collaborative Learning.
Dependent Variables are: 1) Learning outcomes of Pre- Service Teachers 2) The ability to design instructions of Pre- Service Teachers
Contents

There were 4 units: 1) Techniques and science of Instructional management 2) Material creation and innovation development in instructions 3) Measurement and evaluation 4) Classroom management

Research Methodology

This study uses the Pre-Experimental Research method and One – Group Pretest –Posttest Design.

Pretest	Experiment	Posttest
T_1	X	T_2

Validity, and Reliability of the Instruments
1. Instruction using Case-Based Learning (CBL) and Collaborative Learning (CL)

1.1 Researcher studied and analyzed documents and researches about the instruction using CBL and CL for undergraduate Pre-Service Teachers.

1.2 The instruction integrating CBL and CL was developed. It was a 6-step model called DAISI. The 6 steps were:

1) define a situation or event step is for learners to do a case study in group;

2) analyze the problem of a situation or event step is for learners to work collaboratively;

3) identify alternative solutions step is for students to brainstorm the solutions;

4) search results step is for students to decide on the best solution;

5) share knowledge step is for students to present the solution to others;

6) implement the results step is for students to apply the solution to different cases.

1.3 The instructional design integrating CBL and CL was submitted to 3 experts in instructions and method of teaching, measurement and evaluation to audit validity. The Likert's Five Rating Scale (highest, high, fair, low, and lowest) survey was used to collect students' feedback towards instructions integrating CBL and CL. The feedbacks were interpreted according to the concept of Best.

1.4 The researcher modified and improved the instruction integrating CBL and CL according to the experts' suggestions.

1.5 The researcher used the revised version of the instructional design integrating CBL and CL with the samples.

2. Construction of the assessment tools

2.1 Achievement test

1) The researcher studied and analyzed documents and researches about the test construction, measurement and evaluation.

2) The researcher constructed an objective test with 4 choices covering the 4 units of instructions with a total of 30 items, consisting of 1) 12 items on the techniques and science of instructional management unit, 2) 5 items on the

material creation and innovation development in instructions unit, 3) 8 items on the measurement and evaluation unit, and 4) 2 items on the classroom management unit. One point for correct answer, and zero point for an incorrect answer. The overall obtained scores of individual students were rated according to the scale: i.e. very good, good, fair, poor, and improvement needed.

3) The researcher submitted the draft of objective achievement test on the 4 units of instructions to three experts to examine and determine the Index of Item Objective Congruence (IOC) of the items. The IOC results were between 0.66-1.00. Therefore, the quality of the objective test on the 4 units of instructions was acceptable.

4) The test was tried out with 23 third-year students of the academic year 2017 to verify the instrument quality.

5) The results were analyzed item by item to verify the difficulty level of the objective test. The discrimination index of the objective test items that distinguished the students' high and low proficiency levels must have the value of 0.20 or higher.

6) Reliability of the test is the verification of the consistency of the measurement. The researcher examined the reliability of the qualified objective test items by using Kuder-Richardson's formula called KR-20. The reliability should be at least 0.75. The researcher amended and improved the constructed test as recommended.

2.2 Assessment on the instructional design abilities

1) The researcher studied and analyzed documents and researches related to instructions, instructional design, and lesson planning techniques.

2) The researcher constructed 20 items of the 5-point scale assessment on the instructional design abilities. The assessment tool used the Likert's 5 Rating Scale from highest, high, fair, low, and lowest level.

3) The instructional design abilities' assessment tool was submitted to 3 experts to verify the content validity, language used, and measurement and evaluation. The Index of Objective Congruence (IOC) value must be ≥ 0.50.

4) The researcher used the revised assessment tool with the samples.

2.3 Survey on students' feedback towards the instruction

1) The researcher studied the format and method to develop a survey questionnaire on students' feedback towards the instructions using CBL and CL.

2) The researcher constructed a survey questionnaire on students' feedback towards the instructions using CBL and CL. The questionnaire comprised 2 sections:

Section 1: Survey on students' opinions towards the instructions in Methods of Teaching subject of the 4 units of the course description. There were questions regarding material creation, innovation development in instructions, measurement and evaluation, and classroom management. 1) Five questions about instructions using CBL and CL, 2) Five questions about materials and case study, 3) Five questions about measurement and evaluation, and 4) Five questions about the benefits of taking this course, altogether 20 questions in total. Likert's Five Rating Scales is used for this survey, in which the scales vary from highest, high, fair, low, and lowest.

Section 2: One open-ended question on students' feedback towards the instructions for their comments or their preferences on the instructions using CBL and CL.

Submission of the feedback survey to 3 experts to verify the accuracy of its contents and take suggestions of the experts to find Index of Item Objective Congruence (IOC) of the instrument by choosing the questions that has IOC value of ≥0.50.

Use this feedback survey as a research instrument.

The Conduction of Research

The study was divided into 3 stages:

1. The Pre-Research Stage was the stage where the researcher prepared the following:

1.1 The researcher explained the 4 units of the course content, course plan and instructional design integrating CBL and CL, the roles of teacher and students, and learning evaluation to students. Before class instruction begins, students took the pre-test.

1.2 Students did the 30-item objective pre-test on the 4 units of instructions. The same test was used in the post-test.

2. The Research Stage was the stage where the researcher conducted the instruction using CBL and CL. Details were as follows:

2.1 The 4 units of instructions took 7 weeks in total, 2 hours per day.

2.2 The content was the Methods of Teaching subject. The instruction was delivered following the DAISI steps. Time allocation to the 4 units of instructions was divided as follows: 3 weeks for the techniques and science of instructional management unit, 1 week for the material creation and innovation development in instructions unit; 2 weeks for the measurement and evaluation unit, and one week for the classroom management unit.

2.3 Students worked in small groups participating in instructional design activities.

2.4 The researcher assessed each group's instructional design.

3. The Post-Research Stage required the students to do the 30-item achievement test on the 4 units of the instructions. Students completed the survey on students' feedback towards the instructions. The results of the feedback were then calculated statistically.

Research Results

1. Instruction integrating CBL and CL to promote the instructional design abilities of Pre- Service Teachers in the Faculty of Education at Silpakorn University employed the 6-step approach called DAISI.

Step 1: Define a situation or event

Teachers divided students into small groups of 4-5 and presented a case study of a situation or real-life event from newspapers, online social media, or websites. The content could be either positive or negative.

Step 2: Analyze problems of the situation or event

Team members analyzed the case collaboratively. The big picture would encourage more research from various learning sources using information technology. The teacher advised students to use the 5W1H (What Who When Where Why How) technique to discuss the causes of the problems.

Step 3: Identify alternative solutions

Team members brainstormed possible solutions based on the principles, concepts, and theory.

Step 4: Search for results

Team members used the agreed principles to search for the best results.

Step 5: Share

Students checked their answers or their final solutions before presenting them to class. The teacher and Pre- Service Teachers discussed the answers.

Step 6: Implement

Each team could try applying the solutions of other teams for their cases.

2. The results of the DAISI 6-step implementation showed that:

2.1 The learning outcomes of the undergraduate students in the Methods of Teaching Subject, was significantly higher (0.5) after attending the instruction using CBL and CL.

Table 1: Comparing learning outcomes of Pre- Service Teachers before and after Studying

Test	Number of Students	Average $\bar{x}$	Standard deviation (S.D)	T-Score
30	25	15.48	1.80	39.45*
30	25	23.92	1.89	

2.2 The ability of students in Methods of Teaching subject, where the CBL and CL was applied, was in a very good level ($\bar{x}$ = 86.66), see Table 2.

Table 2: The ability to design instructions of Pre- Service Teachers

Evaluation Items	Level of Ability					
	Group no.					
	1	2	3	4	5	6
Instructional design	86	89	90	84	89	82
Quality level	Very good	Very good	Very good	Good	Very good	Good
Average $\bar{x}$	86.66					
Quality Level	Very good					

2.3 Feedback of undergraduate students in taking Methods of Teaching Subject where CBL and CL approaches applied was high ($\overline{x}$ = 4.28, S.D = 0.71).

Discussion and Conclusion

Results of the development of instructions integrating Case-Based Learning and Collaborative Learning to promote the instructional design abilities of Pre- Service Teachers in the Faculty of Education at Silpakorn University could be concluded as follows:

1. The development of instructions using Case-Based Learning and Collaborative Learning to promote the instructional design abilities of Pre-Service Teachers in the Faculty of Education at Silpakorn University was the 6-step model called DAISI. The term was synthesized from core principles of Case-Based Learning and Collaborative Learning by many scholars. Case-Based Learning approach offers the opportunity to learn new knowledge through implementation and discussion. Since it was an integrated education, students are responsible for gathering information, analyzing the main idea, and segmenting unnecessary details. Similar to Herman (2014), Case-Based Learning allowed students to learn from problems. The general definition of a case study for this professional development was to empower students' cognition from what they learned in the classroom. This approach allowed students to find solutions for problems of real-world scenarios through Collaborative Learning. It allowed students with different levels of proficiency to work together as a team and take responsibility for their roles to achieve shared objectives Geoff E. (1995) also argued that this approach allowed students to work in small groups, usually in a group of four. Each group member had different levels of proficiency. Each of them was responsible for a given assignment and support each other in the same group. This allowed them to work collaboratively to achieve the same goal.

2. The effectiveness of the instructions integrating Case Based Learning and Collaborative Learning to promote the ability of Pre- Service Teachers were discussed below

2.1 The comparison of the pre-test and post-test results revealed that the learning outcomes of the Pre-Service Teachers after instructions integrating Case-Based Learning and Collaborative Learning in the post-test were significantly (0.5) higher than the pre-test. The score was at a good level ($\overline{x}$=23.92, S.D 1.89). This might be because the instruction using DAISI 6-Step responded to the students' learning needs. The instruction also allowed students to use technology to research for information, exchanged the findings with other students, verified, and recorded the information. Bergmann Jonathan and Aron Sams (2012) argued that the implementation of new technologies in a classroom could improve the learning environment where students studied their assignments. They could study from videos at home for preparation before the class. Accordingly, they would have more time to engage in class activities, exchanged knowledge with classmates, and encouraged more note-taking and communication skills. Other scholars such as Easton, Geoff (1992), Tissana Kammanee (2012), Watchara Laoriandee et al. (2017), and Sithsungnoen, C. (2018) also suggested that this instructional approach allowed students inquire more information by themselves and solved problems that might arise. It also encouraged students to think critically and learned from others which could widen their visions.

2.2 The Pre- Service Teachers' instructional design abilities using Case-Based Learning and Collaborative Learning were at a "very good" level ($\overline{x}$= 86.66). This might be from the prior knowledge learned from the class's

Facebook group, where the teacher regularly posted news, example cases, and discussion topics. The contents shared by the researcher were mixed of the positive and negative sides of teachers. They were from different learning sources available online such as published materials, and teacher television. The contents were about techniques and science of instructional management, material creation and innovation development in instructions, measurement and evaluation, and classroom management. These posts allowed students learn from case studies of good teachers. Mellish and Brink (1990) also proposed that Case-Based Learning allowed students to study and understand the problems, analyzed the causes of the problems, prepare solutions to a given case study. They could brainstorm with other students and showed their teamwork efforts. They could present different views of the problems and solutions among members. Brett (2004: 4) argued that Case-Based Learning was the process of exchanging knowledge on the verification of the hypothesis. At this stage, they could present their ideas to other students in different groups who could adopt the ideas that most of them agreed on.

2.3 Feedback of undergraduate students in Methods of Teaching subject where Case-Based Learning and Collaborative Learning approaches were used and DAISI 6 Steps applied was high ($\bar{x}$=4.28, S.D = 0.71). This could be attributed to researcher allowing students work, interact, and exchange knowledge independently. Tissana Kammanee (2012), Watchara Laoriandee et al (2017), and Sithsungnoen, C. (2018) reinforced the value of Case-Based Learning as it enabled students to encounter and solve problems. This allowed students to think critically and to meaningfully engage with others. A holistic experience could widen student learning and teaching capabilities. By encouraging teamwork and knowledge exchange, the student experience could be measurably improved.

Overall, the strength of the model enhanced higher-order thinking skills as 'power questions' were continually used during the teaching and learning process. Students could also gain more ideas from various sources of information, for example, from positive and negative cases whilst developing alternative choices from peer discussions.

However, updating resources - peer discussions have to include an awareness of contemporary resources and their validity. Reflection activities must be continuous so that up to date information could be exchanged.

Recommendations

Recommendations for Improving Program Implementation

1. The implementation of the "DAISI 6-Step" requires a well-selected case study from various sources of information such as online social media, news, publications, or teacher television. The contents either positive or negative depend on the context of instructions. Teachers should have research abilities to inquire information from various sources. Also, students can prepare themselves before class from the media or contents provided.

2. In applying "DAISI 6-Step", teachers should share the conditions, planned learning objectives, and assessment with the students at the beginning.

Recommendations for Future Research

1. There should be more research on Integrating Case-Based Learning (CBL) and Collaborative Learning (CL) for other subjects.

2. There should be more research on Integrating Case-Based Learning (CBL) and Collaborative Learning (CL) to promote development of other skills of students such as analytical skills, problem-solving skills, or critical thinking skills.

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