Developing a Method of Teaching Architectural Project Design: A Case Study of Third Year Studio Project, Faculty of Architecture, Sriburapha University, Thailand

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Declaration

I, Ajaphol Dusitnanond, declare that the Doctor of Education dissertation entitled *Developing a Method of Teaching Architectural Project Design: A Case Study of Third Year Studio Project, Faculty of Architecture, Sriburapha University, Thailand*, is not more than 60 000 words in length, exclusive of tables, figures, appendices, references and footnotes. This dissertation contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this dissertation is my own work.

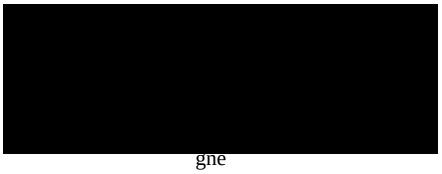

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Table of Contents

Declaration ..... **ii**

Acknowledgements ..... **iii**

Table of Contents ..... **iv**

List of Tables ..... **ix**

List of Figures ..... **x**

Abstract ..... **xi**

CHAPTER 1

INTRODUCTION **1**

Background 1
Development of the Thematic Concern 4
Objective of the Study 5
Action Research 5
Cooperative Learning 7
Problem-based Learning 10
The Current Setting 11
Statement of the Problem 13
Significance of the Study 14
Scope and Limitation of the Study 14
Definition of Key Terms 14
Structure of the Thesis 17
Conclusion 17

CHAPTER 2

LITERATURE REVIEW **18**

Introduction 18
Cooperative Learning 18
The cooperative learning approach 19
Engaging in cooperative instruction 23
Teaching cooperative learning skills 23
Cooperative learning strategies 24
Jigsaw I 24
Jigsaw II 25
Student team and achievement divisions (STAD) 25
Group Investigation (GI) 25
Student responses to cooperative learning 25
Rethinking the Pedagogy 26
A paradigm shift: From teacher- to student-centred learning 26
Student-centred pedagogy and learning 27
Student-centred versus teacher-centred teaching 30

Related Approaches to Learning 30
Problem-based learning 30
Problem-based learning in architecture 35
PBL implementation at Delft 37
PBL implementation at Newcastle 40
Institutional and educational change 41
Constructivism vs. constructionism 43
Action learning 45
Active learning 45
Active learning methods 47
Benefits of active learning to students 50
Collaborative learning 52
Task structure 52
Student evaluation 53
Group structure 53
Collaborative learning in architecture 53
Advantages of collaborative learning 54
Developing social skills 54
Stimulating individual capacities 55
Arousing critical thinking 55
Collaborative approaches around the world 55
A study of collaborative learning styles and team learning performance 57
The Professional Development of Teachers 58
Concepts of competence and their Implications 60
Leadership for Change 60
Educational leadership 61
Teaching repertoire 61
Mentoring and coaching 62
Intensive workshops 62
Teacher induction 63
Appraisal of teachers 63
Teacher training 63
Changing teachers' practice 64
Effective Teaching in Higher Education 65
Professional Learning: The Architectural Studio as a Paradigm for Reflection in Action 66
Action Research 68
Qualitative Research Design 71
Program Evaluation 72
Forms of evaluation 74
Interactive evaluation 74
Theory of Change 75
Adult Training 83
Lifelong learning 86
The need for lifelong learning 88
Assessment and Accreditation in Architecture 88
Conclusion 90

CHAPTER 3

RESEARCH METHODOLOGY 91
Introduction 91
Details of the Research Process 93
Semi-structured interviews 93
Action research phases 94
Action research Phase 1 94
Action research Phase 2 95
Student questionnaire 95
Ethical Issues 96
Respondents in the Study 96
Sources of Data 97
Conclusion 99

CHAPTER 4

THE ACTION RESEARCH CYCLES: QUALITATIVE ANALYSIS 100
Introduction 100
Basis of this Analysis 100
Background of the Studio Project Design 101
Background of students entering third year project design 103
My discussion with studio project design teachers: Ajarn Pensri, Ajarn Sanan, and Ajarn Apirak 104
My first overall plan for studio project design 106
First Cycle of Action Research: Project Design 1 - Kindergarten 106
Plan to teach kindergarten project 107
Action and observation 1 107
In-Depth interview with three volunteer students 108
The Developer's Daughter 109
The Landscape Architect's Daughter 109
The Tailor's Son 110
Reflection 1 111
Action and observation 2: The way I taught the kindergarten project 111
First week 111
Second week 111
Third week 114
Fourth week 114
Fifth week 115
Target group responses: Kindergarten project design 117
Students' opinion: Strengths of this new method of teaching 118
Students' opinion: Weaknesses of the new method of teaching -1 119
Students' recommendations: Changes in the studio project design course – 1 119
Reflection 2 120
An interview with Ajarn Pensri 120
Second Cycle of Action Research: Project Design 2 – Office Building 122
Action and observation 3 123
Reflection 3 124
In-depth interview: Three volunteers from the second group 125

Reflection 4 126
Interview with Ajarn Sanan 127
Reflection 5 130
Students' opinion: Strengths of this new method of teaching – 2 131
Students' Recommendations: Changes in the studio project design course – 2 132
Project Design 3 – Hospital 132
Action and observation 4 133
In-depth Interview with three volunteers 133
Reflection 6 134
Action and observation 5 134
Reflection 7 135
Feedback on cooperative learning methods from three volunteers 136
Students' opinion: Strengths of the new method of teaching 137
Students' opinion: Weaknesses of the new method of teaching 138
Students' Recommendations: Changes in studio design course 138
Project Design 4 – Department Store 138
Action and observation 6 138
In-depth interview with three volunteer students 139
Reflection 8 140
Action and observation 7 141
An interview with Ajarn Ratchada 142
Action and observation 8 149
Final interview with Ajarn Sanan 151
Reflection 8 152
Students' opinion; Strengths of the new method of teaching 152
Students' opinion: Weaknesses of the new method of teaching 153
Students' Recommendations: changes in studio design course 153
Group discussion with focus group 154

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS 158
Introduction 158
Validation of Answers to the Research Questions 159
What is this new method of teaching trying to achieve? 159
How is the new method of teaching going? 165
Is the delivery of the new program working? 167
Is the delivery consistent with the program plan? 170
How could the delivery of the new program be more effective? 172
Andragogy 174
The need to know 174
The learners' self-concept 174
The role of the learner's experience 174
Orientation to learning 175
Motivation 175
Life-long learning 176
Training needs in professional architecture 176
How could the organisation of Third Year Architectural Design be changed to make it more effective? 177

Concluding Comments 185
REFERENCES 189
ATTACHMENT 1 208
ATTACHMENT A 242
ATTACHMENT B 244
ATTACHMENT C 247
ATTACHMENT D 244
ATTACHMENT E 249
ATTACHMENT F 251

List of Tables

Table 3.3	Frequency Distribution of Respondents by Sex	97
Table 4.1	Summary of Respondents' Impressions of the Studio Design Course Using a Likert Scale Questionnaire	157
Table 5.1	Program achievement outcomes	160
Table 5.2	Outcomes from the new program	166
Table 5.3	Outcomes on the delivery of the new program	169
Table 5.4	Changes made in the delivery of the program during this research	171
Table 5.5	Changes recommended to make the new program more effective	173
Table 5.6	Basic principles of change	178

List of Figures

Figure 3.1 Sample Questions for the Semi-structured Interviews with Students 94
Figure 3.2 Sample Questions for the Semi-structured Interviews with Teachers..... 94
Figure 3.3 Typical 5-point, Likert scale questionnaire items in Action Research phase 95
Figure 4.1 Ajarn Ajaphol interviews one of the volunteer students..... 108
Figure 4.2 Ajarn Ajaphol in Round table where students shared ideas 112
Figure 4.3 Ajarn Pensri discusses a project with one student while others waited for their turn 113
Figure 4.4 A student experiences Ajarn Sanan's old method of teaching the kindergarten project. 114
Figure 4.5 Students transferred their projects from three to two dimensions 115
Figure 4.6 Four teachers evaluate a students' project..... 116
Figure 4.7 Specialist advised students during problem-based learning 117
Figure 4.8 Interview with Ajarn Sanan..... 127
Figure 4.9 Ajarn Ajaphol guides Ajarn Sanan in the use of cooperative learning in the studio 129
Figure 4.10 Ajarn Sanan teaching after experiencing the cooperative learning approach 135
Figure 4.11 Ajarn Ratchada discussed with one student while others did not participate 141
Figure 4.12 Students organised the studio discussion by themselves 150
Figure 4.13 Group discussion with the focus group 154

Abstract

This research was concerned with an Interactive Evaluation, using an Action Research approach, of the effectiveness of using a Student-Centred Cooperative Approach – as opposed to the more traditional teacher-centred method – in the teaching of a Third Year Architecture subject, 'Studio Project Design'. The four steps of Action Research – plan, act, observe and reflect – were used to make judgements and recommendations about this new approach. The respondents of this study were forty-six students – of whom twelve were also volunteer participant-interviewees – enrolled in Studio Design, together with three teachers, at the Faculty of Architecture, Sriburapha[1] University, Bangkok, Thailand. A qualitative approach was used to collect and analyse student and staff opinion.

The concepts of cooperative learning – including co-operative learning approaches, cooperative instruction, teaching cooperative learning skills, and responses to cooperative learning – were all shown to be relevant in student-centred learning. My Studio Design students and I, jointly, engaged in this research – improving students' abilities in all components of Studio Design, as well as developing a positive attitude towards design, in general. Most significantly, all students 'switched on' to study as a result of the cooperative learning approach used in Studio Project Design.

The research was concerned with determining whether or not a Student-Centred Cooperative Approach – which used cooperative and problem-based learning methods – resulted in improved student outcomes. Positive affective outcomes included development of a positive attitude towards design, and an increase in students' technical and academic competencies that helped them

[1] 'Sriburapha' is a pseudonym.

to meet design demands.

The outcome was positive. Students increased their learning competencies, enhanced their social skills, were more motivated to study, developed a higher level of interdependence, enjoyed the freedom to think ‘outside the square’, and increased their creativity when exposed to a Student-Centred Approach. To make a Student-Centred Cooperative Approach work more effectively, teachers and administrators within the School of Architecture need to embrace two key elements: first, by seeking to adapt themselves to change by engaging in lifelong learning; second, by undertaking special professional training courses in architecture.

CHAPTER 1

Introduction

Background

Traditionally, teaching and learning in Thailand has been a teacher-dominated process operating within a rigid structure offering little or no flexibility. The learning process is one that is passive and tends to be boring to both students and teachers.

Under this circumstance, I was inspired to do this research knowing that I could do something to rectify the situation. Two papers, *Developing the Method of Teaching Project Design* and *Evaluating the Method of Teaching Architectural Project Design,* referred to the coursework that I wrote in 2001 and 2002 respectively under Investigating Professional Practice 1 and 2 (HER 8504, HER 8506) encouraged me to go on with this research. The objective of these two papers, copies of which can be found in Attachments 1.1 and 1.2, was to change the method of instruction from a teacher-centred to that of a student-centred process.

The fundamental principles of cooperative learning were used as a model to develop the method. Action Research was used as an approach to improving the system of education in Third Year Project Design. By changing the current system in place and learning from the consequences of the changes implemented was how this was achieved. The outcome of these two pieces of research was positive. Eventually, the first paper saw print in the journal of the Faculty of Architecture a year after; I used the second paper in presentations made to teachers and students in Architecture in different

Thai universities. As a result, my goal of giving significant contribution in the improvement of education in the field of architecture came to fruition through this dissertation, specifically, in Sriburapha University (all place and given names used in this thesis are pseudonyms).

Recently, the *National Education Act B.E. 2542 (1999)* (ONEC, 1999) has served as a piece of master legislation on education reform in Thailand. One of the major objectives of the reform has been the development of a 'learner-centred teaching-learning process'. This teaching-learning process is aimed at enabling learners to develop themselves at their own pace and to the best of their ability.

The current rote system would therefore be abandoned in favour of this analytical learning structure. This initiative by the government, intended to involve many teachers undergoing intensive re-training, was seen as important in the context of my research. It was hoped that it might be used as a starting point for future educational planning objectives currently being promoted by the Thai educational sector for the betterment of students and teachers alike.

The Faculty of Architecture at Sriburapha University is one of the most famous architectural schools in Thailand and has been established for almost fifty years. It is composed of approximately four hundred students who are enrolled at the bachelor degree level. The program of study is separated into a five-year academic term in which students must learn both theory and practice. Studio Project Design, normally composed of four projects per year, is a major subject to which the students must give serious consideration. The program is very strict; students must follow and meet all requirements.

The current method of teaching Studio Project Design to third year architect students at Sriburapha University has been very much based on a teacher-centred approach. The process of learning by students is best described as being mostly a passive exercise. This allows students very little – if any – input into the process of teaching and learning. As a visiting lecturer and teacher of this component of the course since 1984, I believe that

the current teaching process in project design limits the student's ability.

In the studio, students have little opportunity to express and share ideas about their work with the teacher and other students in the class. The relationship and role of student and teacher are clearly defined, with input of ideas and solutions coming mainly from the teacher. If the learning process could be based on a student-centred approach, this would allow greater input and thought from the students. Perhaps students would then have a greater opportunity to think 'outside the square' with the help of input from other students and guidance from their teacher.

There was an expressed interest by the students and the teacher to improve the system in a way that would allow students to have a greater input of how the course was conducted and structured. Initially, when I took a course in education, I had an opportunity to read about cooperative learning, a process that interested me greatly. Johnson & Johnson (1975) suggest that students need to learn how to work cooperatively, for no skills are more important to human beings than those of the cooperative interaction, interpersonal group, and organisational skills. Slavin (1991) states that cooperative learning usually supplements the teacher's instruction by giving students an opportunity to discuss information or practice skills originally presented by the teacher; sometimes cooperative methods require students to find or discover information on their own.

In addition, Lang, et al. (1995) state that cooperative instruction involves dividing a class into heterogeneous groups that perform assigned or self-selected tasks. Under this method, students obtain and apply communication, interpersonal and group skills, employing them to situations in which they learn through cooperative games, peer tutoring, and/or group investigation.

I also had a chance to read about problem-based learning. Johnston (1997) writes that using a problem-based approach to teaching architecture could change the perception of students and that it will give them an education that is relevant to their professional careers: it aims to teach life-long learning skills, and to develop value systems and intellectual as well as

vocational skills. Such an approach does not teach information, but rather process and context. It allows students to understand the interrelationship between competing areas of knowledge and how these are to be applied in practice. It teaches students how to seek information, interpret it, and apply it.

Both cooperative and problem-based learning seemed to me to be similar to the system used when I studied architecture in Paris. But, at that time, I did not know the value of this system; this remained the situation until I had an opportunity to read the books. I had quietly experimented with this approach with the students under my supervision, and the outcomes were very interesting. The majority of students switched on to this new method. For this reason, I was encouraged again to use this topic for my research after realising its relevance to the Faculty of Architecture. With a setting similar to that of a 'round table' – one in which there is no 'head' and there are no 'sides', where no one person is seated in a position of power and all are treated as equals – students openly discussed their ideas with others in the class. These discussions were guided and supported by the teacher, who would promote discussion and provide opportunities for reflection. Cooperative learning was seen as an alternative and improvement to the current teacher-centred approach.

Development of the Thematic Concern

Students of the Studio Project Design course were interviewed in order to gain a deeper understanding of the issues relating to the limited development of their ability. This was seen as problematic for the further development of students in their professional practice. We, as a group of learners, felt it was important in our initial planning to have some input from 'outsiders'. The issue of the thematic concern can be explained by looking at the comments made in the interviews conducted prior to the initial planning phase.

An action group was composed of my students, specialists and me. The

underlying problem or area of concern was based around the students having limited input in determining the teaching process in the class. The main areas of concern voiced by the action group were:

1. The educational process should be teacher-centred; and
2. The course should be based on individual study.

The current setting of the Studio Project Design course also needed to be outlined to give a broader understanding of the educational processes we were looking to change and improve.

Objective of the Study

The objective of this research involved an Interactive Evaluation (Owen & Rogers, 1999), using the qualitative techniques of Action Research (Kemmis, 1985) in order to determine the effectiveness of using a student-centred, cooperative approach – as opposed to the more traditional teacher-centred approach – in the teaching of the Third Year Architecture subject, Studio Design at Sriburapha University. This was to be achieved by changes in place and learning to the current system, as a consequence of the changes implemented within Studio Design.

The objective was to improve the method of instruction from a teacher-centred process to that of a student-centred process. The fundamental principles of cooperative learning were used as a model to develop this process. Action Research was used as an approach to improving the system of education in third-year project design. This was to be achieved by changing the current system and learning from the consequences of the changes that were implemented.

Action Research

Action Research, by definition, is a form of collective self-reflective enquiry. In education, Action Research allows teachers and others to undertake a critical examination of their own educational work. It may be used by

participants as a tool for improving or making better their own educational or social practices. Action Research may also increase the participants' understanding of these practices and the context in which the practices work or operate.

In the educational context, Action Research provides a way of thinking logically about what happens in the faculty or classroom and allows us to put in place action or actions where improvements to the system can be made. It is a continuous process of monitoring and assessing the effects of any changes of the action or actions that have been implemented. It is important to remember that each action implemented is collaborative and based on information observed by the participants.

It was in the educational context of what happens at the classroom level that this research was undertaken. Two main objectives by the teacher were kept in mind regarding this research. These objectives were interrelated and universal to the theme of any Action Research project. The first objective was to improve the current system being evaluated; secondly, it was to be a collaborative effort undertaken by various participants. In this particular situation, it was a collaboration between the students and teacher. This collaboration or collective effort was seen as a crucial aspect of the Action Research process.

Action Research generally stems from the clarification of a group's shared concerns or problems. Participants identify their concerns and evaluate others' opinions and search to find what could be possibly done to improve the situation or the context they are in. A 'thematic concern' is identified and becomes the main area of focus for strategies of improvement. The participants collaboratively plan the action together, act and observe as a group or individually and reflect together. Plans are reformulated based on critically informed decisions, as the group consciously builds its own understanding and description of their situation.

The thematic concern of this Action Research project and the method

used to improve the current system of teaching were highlighted below:

- **Thematic Concern:** Developing student's project conceptualisation and design.
- **Method**: Implement cooperative learning as a new process of teaching.

The identification of the thematic concern enables the participants to engage in the four essential aspects of the Action Research. These four aspects – plan, act, observe and reflect – are dynamically interrelated and linked into a cycle. Ultimately the four aspects of Action Research make up a series of cycles and form self-reflective spirals of planning, acting, observing and reflecting. These four aspects or 'moments' make up the basis upon which participants could make new plans, new actions, observe, reflect and propose further new planning, and so on.

The initial view of what our situation was, in the context of our thematic concern, was the basis for our plan. A new phase of initial reflection was planned as the first step. This was our reconnaissance phase, which preceded our initial plan.

The reconnaissance phase allowed us to have an understanding of some specific issues and how they would fit into the wider human, social and cultural contexts of education and society.

Cooperative Learning

Cooperative learning gives students an opportunity to discuss information, practice skills presented initially by the teacher, and requires students to find or discover information on their own. It is a student-centred approach which allows students to play an active role in the learning process by supplementing the teacher's instruction in the class.

Dominant western cultures, such as those in North America, have tended to highlight independence and individual achievement. These are seen as important educational elements, but students must also learn how to work

cooperatively. To all people, cooperative interaction skills such as interpersonal, group, and organisational skills are considered very important. Skills relating to communication, building and maintaining trust and conflict resolution are seen as especially important.

The main principles of cooperative learning are individual responsibility and accountability in relation to the task at hand and to the group. Individual accountability may be promoted by making each member responsible to the group. Student interdependence may be promoted by encouraging students to help each other as needed. Explaining the content being studied or explaining certain processes as they were learning may be used to do this. During this learning process, the students may make constructive suggestions and help one another. As positive interdependence is developed in a group, so does the cooperative structure of the classroom. This aspect of cooperative learning may be nurtured by making the students responsible for not only what they were learning, but for what everyone else is learning in the group.

The assumptions underpinning the development of cooperative learning groups are fairly self-explanatory; they are summarised below:

- The sharing generated in cooperative situations generates more motivation than do individualistic, competitive environments.
- The members of cooperative groups learn from one another. Each learner has more helping hands than in an individual setting.
- Interacting with one another in a social context creates more intellectual activity that increases learning when compared with individual study.
- Cooperation increases positive feelings toward one another, builds relationships, and reduces the feelings of isolation and loneliness.
- Cooperation increases self-esteem in individuals through increased learning, but also by making them feel respected and cared for by the others in the group.

- Tasks requiring cooperation between students can increase their ability to work productively together, generally benefiting their social skills.

Cooperative learning theorists have different views regarding whether groups in a cooperative setting should compete with one another. Some theorists have generally favoured competition, while others have favoured cooperation. Qin et al. (1995), who favour cooperation, have recently published a complex review of research on this question. They report that cooperative structures generally create improved learning in the important area of problem solving.

There are three common types of cooperative learning groups.

1. **Formal Cooperative Learning Groups** wherein students are grouped in one class period and together for many weeks work on their projects. Students are very comfortable with each other as they work in harmony
2. **Informal Cooperative Groups** are temporary groups that are beneficial for breaking up a lecture into shorter parts combined with group activities which are related to the lesson.
3. **Cooperative Base Groups** are steady groups that could be retained for a year. This group is composed of students with various knowledge and understanding. They support and help one another not only in academic but also in other areas of their lives. They are responsible for their behaviour as they continue to complete their projects. Johnson et al. (1998) assert that, ‘to make academic progress and develop cognitively and socially in healthy ways’, students frequently meet together to show care and support with one another as they continue to finish their work.

Student responses to cooperative learning are generally positive. Some training and changes to how the students interact as individuals and as members of a group may be necessary in order to achieve maximum benefits

from the experience. The extent and need for preparing and planning for cooperative instruction depends on the group's current levels of cooperative learning skills.

Problem-based Learning

Problem-based learning is any learning environment in which the problem drives the learning, that is, before students learn some knowledge, they are given a problem. The problem is posed so that students discover that they need to learn some new knowledge before they can solve that problem: the process used to solve a problem. Since problem-based learning starts with a problem, students working in a problem-based learning environment should be skilled in problem solving and critical thinking as opposed to rote recall (Woods, 1994).

The key features of problem-based learning are as follows:

1. The facilitator of learning is the teacher.
2. Small groups, in which they work together, are formed by students.
3. Learning is encouraged by having challenging problems.

In groups, students are presented with realistic problems that lack complete information. Then students organise themselves to obtain information through inquiry. They could discuss the problem, think what they know, formulate hypotheses, set learning goals, and organize more work. The teacher acts as facilitator and guides students' learning process rather than imparting knowledge (Hmelo-Silver & Barrows, 2006). On the other hand, Sweller & Cooper, 1985, 1987) note that active problem solving early in the learning process is less effective than studying work examples. Learners may have a hard time in obtaining information in a limited time. For beginners, this is a big issue; as learners become more competent, active problem solving is beneficial.

The Current Setting

The main structure of Architectural Education at Sriburapha University comprises a five-year curriculum leading to the degree of Bachelor of Architecture (B.Arch.). This curriculum is divided into two main parts. Once students finish the first three years, they are awarded a Diploma in Architecture. After two years of further studies, a Bachelor of Architecture is conferred.

The curriculum has four major objectives:

1. To promote the responsibility of people in the environment.
2. To learn how to solve problems logically.
3. To use knowledge in order to develop society.
4. To communicate good understanding between the country and the world.

The curriculum for the Bachelor Degree is divided into three main categories:

1. General subjects (30 credits)
2. Departmental subjects (125 credits)
3. Elective subjects (12 credits)

To obtain a Bachelor Degree, students must achieve a total of 167 credits.

Students must complete their degree in five academic years; the course consists of both theoretical and practical elements. The Studio Project Design course is one of the major parts in which all students must enrol. This course requires students to develop their knowledge in both theory and practice for building and environmental design. The course allows them to start with the design of a small-scale building in the first year and end with urban design in the fifth year. The course is finalised in the fifth year with a thesis proposed by the student.

For the third year Studio Design, normally we have around 50 students under the supervision of four teachers. Each teacher is responsible for a group of 12 to 13 students. The course consists of four projects, operating across two semesters, that the students must pass consecutively. The program

is very strict and has remained unchanged for the past 20 years. It is composed of projects in kindergarten, office building, hospital, and commercial complex design. Sometimes the second project may be changed to group housing. Teachers are responsible for organising each program and evaluating their work individually with each student. The course is structured in this way to give the students experience in designing a range of different projects, each with different design components. A separate teacher is responsible for the program of each project; that teacher works independently in the production of the program.

Normally, one project takes six to eight weeks to complete. After the program of the project has been distributed and explained by the teacher/author, the students spend the first week working in groups as they search for information and collect data which they then present to the four teachers. In a long-standing practice, students in the class divide into four to five groups, dependent upon student numbers, and are given different topics. A few responsible students from each group lead the assigned task; the others tend to stand by; some show no interest in the work of other groups.

From the second week to fourth week the students divide into four groups with each group consisting of 12 to 13 students under the supervision of a teacher who develops the project with their students. It starts with site analysis, zoning, functional and circulation diagram; and a comparative area study in order to find out conceptual design that would develop lay-out, plans, elevations, sections, details and a study model. This involves the students developing their ‘own’ version of the design, and recording their results by means of preliminary sketches, working drawings and models. The communication between the teacher and students consists mainly of suggestions by the teacher in relation to what they should be doing in order to successfully complete their assigned task. Often, the advice given to the students is based entirely on the teacher’s own perceptions and ideas.

On the fifth week, all students present their project in front of the four teachers to receive comments; they then return to their supervisor and engage

in making improvements across a period of one or two weeks. Finally, the students personally decide to close their projects after which time they make a formal presentation by means of a written paper and a constructed model: they give an oral explanation of their final work in front of the four teachers again, after which the teachers critique the project and grade the student's work.

The total mark for each of the four project designs is 30, allocated as follows: data collection – 4 marks, preliminary design – 4, process of working – 3, creative thinking – 4, final design – 8, building technology – 2, presentation – 3, and model – 2 marks. These standard marks are used by each teacher.

The various stages of the project are assessed by all four teachers. The total mark for each teacher was combined and then divided by four to give an average result. In the 'Process of Working', however, each teacher makes an assessment only for the students under his or her supervision.

Statement of the Problem

The main problem of this study was to determine the effectiveness of using a student-centred, cooperative approach – as opposed to the more traditional teacher-centred approach – in the teaching of Third Year Architecture subject, Studio Design. Specifically, it was aimed to answer the following research questions:

Major research question:

What has been the impact of using a student-centered approach on 3rd Year Studio Design students at Sriburapha University, Thailand?

Sub-research questions:

1. What is this new method of teaching trying to achieve?
2. How is the new method of teaching going?

3. Is the delivery of the new program working?
4. Is the delivery of Studio Design Program consistent with the original program plan?
5. How could the delivery of the new program be more effective?
6. How could the organisation of Third Year Architectural Design be changed to make it more effective?

Significance of the Study

This study will contribute to the improvement of education in architecture not only in this faculty but also in other universities nationally. I hope that this research will encourage the faculty administration and also the teachers to be drawn to this new method of teaching – a student-centred approach – and to adapt it as an effective teaching strategy that will benefit the students.

The outcomes to be considered consist of the following: the improvement of students' abilities in all components of Studio Design; development of a positive attitude towards design; increase in students' technical and academic competencies to meet design demands; enhancing students' independence, creative thinking; and the level of interaction and cooperation that was engendered between students and teachers.

Scope and Limitation of the Study

This study is limited to the four teachers, including me, and the 46 students enrolled during the academic year 2003- 2004 at the Faculty of Architecture of Sriburapha University.

Definition of Key Terms

Ajarn – a Thai word to call a teacher in the university
architect – a professional who is in charge of building planning
building technology – consists of building structures, building systems like

electricity systems, mechanical systems,

circulation diagram – is the main accessibility related to each group of functions of the building

civil engineer – a professional who is in charge of building structure and safety

comparative area study – to compare the sizing of the main functions all together, according to site location

creative thinking – ability of students to conceptualise their project design based on their personal or collective ideas and views

data collection – the process of gathering data and information needed to support the design of the project, for example, building code, construction materials, building technology like air condition, lighting, water treatment and other energy saving in the building

elevation – the appearance of the building in terms of height and style related to the building plan

energy conservation specialist – an architect or engineer who study and practice for energy saving in the building

final design – the completed product that composed of lay-out, plans, elevations, sections, details, interior and exterior perspectives and models

functional diagram – the main function rooms like administration, working spaces, services, related to each other both horizontal and vertical directions

interior architect – an architect who is in charge of the design of interior space

jury – a committee composed of teachers who judge and critique the quality of the student projects.

landscape architect – an architect who study and practice for landscape planning

lay out – top view of the building related to the boundary of the site location

model – the expression of three- dimension of the final project of the building in miniature scale

perspective – an artist's impression to show the appearance and atmosphere

of the building and its surrounding

plan – a horizontal section of the building of each floor to show the specific space, level, solid and void, materials and building structures used in the project

preliminary design – the conceptual design that express the main objective that designer would like to execute in the project based on data collection and site analysis

presentation – the expression of the designer to explain their ideas of using colour tones and hues, concentration lines, human elements, etc. which could be done in two dimension like plan, elevation, and in three dimensions like perspective and model.

process of working – the step of developing the project from the start to the end

section – a vertical cut- cross of the building to show the specific space, level, solid and void, materials and building structures used in the project

site analysis – a study of location that relate to the environment like sun, wind, and sound direction as well as road accessibility and site topography

site plan – ground floor of the plan related to the boundary of the site location

students – the forty-six students in architecture enrolled to this study at Sriburapha University for academic year 2003-2004

studio – the place in the faculty where students do their workshop under the supervision of the teacher

system engineer – a professional who is in charge of building systems like electrical, mechanical and sanitary system

zoning – major functions of the building related to the site plan and its surrounding

Structure of the Thesis

The thesis consists of five chapters, as follows:

Chapter 1. This chapter includes the introduction, objectives, scope and limitation of this study. It also includes the definition of key terms.

Chapter 2. This chapter is a review of all literatures used in this study-books, journals, articles and information collated from various websites.

Chapter 3. This chapter is composed of research methodology – the quantitative and qualitative methods, Action Research phase 1 and 2 that were applied in this research. It also mentions the respondents and sources of data.

Chapter 4. This chapter explains how this research used Action Research cycles which includes plan, act, observe and reflect. Furthermore, based on the qualitative research approach, it comprises interviews of selected students of the target group as well as the teachers at the Faculty of Architecture at Sriburapha University.

Chapter 5. This chapter answers the research questions of this study as well as significant discussions and recommendations to improve the method of teaching at Sriburapha University.

Conclusion

In view of the fact that for many years, teaching and learning in Thailand has been teacher-centred and that learning has been boring and passive, the concern of this study was specifically aimed at changing the traditional method of teaching to a student-centred approach in Studio Project Design of Sriburapha University. It is also a response to the *National Education Act B.E. 2542 (1999)* (ONEC, 1999) for education reform to develop a 'learner-centred teaching-learning process' in order to make education relevant to the needs of students in the twenty-first century.

CHAPTER 2

Literature Review

Introduction

In the literature, there are numerous concepts related to student-centred learning: the key subject of this research. Specifically, the concepts of cooperative learning – including co-operative learning approaches, cooperative instruction, teaching cooperative learning skills, and responses to cooperative learning – all have, as their main focus, student-centred learning. As well, problem-based learning, constructionism, Action Research, program evaluation, qualitative research, and adult education – particularly professional development, theory of change and lifelong learning – are all vital elements relevant to studying the application of a student-centred approach in the field of architectural education. These concepts serve as the backbone to the whole approach of this research; this literature review examines each of them.

Cooperative Learning

This section defines what cooperative learning, as a component of student-centred approach, is all about. It also shows that it is a very effective teaching method beneficial to both students and teachers. Moreover, it mentions the ‘hows’ and the ‘whys’ of teaching cooperative learning. It also includes the theories of problem-based learning and constructionism as separate strategies to promote cooperative learning.

There are many reasons why cooperative learning works as well as it does. Bonwell & Eison (1991) emphasise that students learn more by doing something actively than by simply watching and listening. This has long been known to both cognitive psychologist and effective teachers. Cooperative learning, they argue, is by its nature an active method. Felder & Brent (1994) point out that cooperation enhances learning in several ways. Weak students working individually are likely to give up when they get stuck; working cooperatively, they keep going. Strong students faced with the task of explaining and clarifying materials to weaker students often find gaps in their own understanding and fill them in. Students working alone may tend to delay completing assignments and skip them altogether; but, when they know that others are counting on them, they are often driven to work in a timely manner. Students working competitively have incentive not to help one another; working cooperatively, they are rewarded for helping. Pitrik & Holzinger (online) assert that there is evidence showing that students, when given freedom to explore areas on their personal interest and help by encouraging understanding teachers, develop socially and grow personally aside from achieving excellent academic outcomes.

Dryden & Vos (1999: 415) emphasise the importance of developing interdependence by working in teams:

> Very simply, that means that instead of working individually with everybody in competition with each other, you develop interdependence within teams.

Positive interdependence in cooperative learning is built among students to achieve their goals; students think that they attain their goals only if other students in the group attain their goals (Deutsch, 1962; Johnson & Johnson, 1989). The success of the group benefits everyone and they feel proud. There is always a celebration of their achievement.

The cooperative learning approach

Slavin (1991) reports that cooperative learning usually supplements the teacher's instructions by giving students an opportunity to discuss

information or practice skills originally presented by the teacher; sometimes cooperative methods require students to find or discover information on their own. Cooperative instruction stresses the key components of cooperative learning: individual responsibility, accountability to the group, positive interdependence, group processing, and group self- evaluation.

Johnson & Johnson (1975), while accepting that the dominant cultures in North America have tended to emphasise independence in individual achievement, stress the essential nature of cooperative learning. Although these are important elements in education, students also need to learn how to work cooperatively, for no skills are more important to human beings than those of cooperative interaction, interpersonal group and organisational skills. According to Lucking (1991), the increasing need for all people to work together during the 1990s and beyond indicates that cooperative learning is an educational practice that contemporary educators must consider for their schools. Particularly important are skills relating to communication, building and maintaining trust, and conflict resolution.

Johnson et al. (1993) enumerate the essential components of cooperative learning, as follows:

1. The first and most important element in structuring cooperative learning is positive interdependence. Positive interdependence is successfully planned when group members recognise that they are linked with each other in a way that one cannot succeed unless everyone succeeds.
2. The second basic element of cooperative learning is promotive interaction, preferably face-to-face. Students need to do real work together, in which they promote each other's success by sharing resources and helping, supporting, encouraging, and applauding each other's efforts to achieve
3. The third basic element of cooperative learning is individual and group accountability. Two levels of accountability must be structured into cooperative lessons. The group must be

accountable for achieving its goals and each member must be accountable for contributing his or her share of the work

4. The fourth basic element of cooperative learning is teaching students the required interpersonal and small-group skills. Cooperative learning is naturally more intricate than viable or personal learning because students have to employ all of these together in task work (learning academic subject matter) and teamwork (functioning effectively as a group).
5. The fifth basic element of cooperative learning is group processing. Group processing exists when group members discuss how well they are achieving their goals and maintaining effective working relationships

Elmore & Zenus (1992) point out that cooperative learning promotes academic achievement and social skills development effectively. The Carnegie Council on Adolescent Development (1989) reports that researchers had supported the implementation of cooperative learning for school development because of its potential to increase student academic achievement and skills development. To researchers, the achievement of cooperative learning in reform settings has been interpreted as an issue of conduct of loyalty, i.e., they define successful accomplishment as agreement with a research-based model (Sapon-Shevin, 1992). Such a model points out the standards of reliability, effectiveness, and longevity typically used by researchers to evaluate effectiveness of education reform, but ignores the adaptations of reform practices appreciated by the teacher (Cuban 1996).

In a recent study, constructivist psychology provides the structure for exploring the implementation of cooperative learning by teachers in real classrooms. Traditional constructivist psychology is rooted in the belief that knowledge is built on prior knowledge, and that the prior knowledge was attained through interactions with the environment (Vygotsky, 1978; Perret-Clermont et al., 1991). The constructivist approach suggests that in the

process of completion, teachers are occupied in the active creation of knowledge about cooperative learning. Newly developed theory will be revealed when cooperative learning is used in the classroom.

When teachers are qualified to use cooperative learning, their understanding should be directed by their existing knowledge of teaching practices and instructional methods and by their previous understanding of current teaching background, including school arrangement, curriculum, and student characteristics. Through the instrument of adaptation, teachers should reorganise the information that they get about cooperative learning to fit their existing plan of teaching. In addition, the teaching plan should include cooperative learning.

Researchers who are concerned in the education improvement movement have used the constructivist approach to check teachers understanding and use of instructional innovations (Alexander et al., 1996), changes in new teachers' idea of effective teaching (Jones & Vasiland, 1996), and effects of subject content on efforts to restructure schools (Grossman & Stodolsky, 1995)

Johnson & Johnson (1989, cited in Lang, 1995) stress that the key principle of cooperative learning is individual responsibility and accountability to the task and the group. In the ideal, these principles combine in a relationship of positive interdependence within which students are able to perform tasks that cannot be completed by a single student. Similarly, Slavin (1987) affirms that cooperative learning can improve students' social skills, increase self-esteem, promote social values and provide positive motivation. By contrast, when instruction stresses only individual achievement, some students may lose self-esteem, as well as the motivation to do their best.

Lang (1995) addresses the issue of positive interdependence inherent in a cooperative classroom. He suggests that a cooperative classroom develops when group members develop positive interdependence. To encourage positive interdependence, students must be responsible for each individual

aspect of group tasks. To learn cooperatively, students must know that they are responsible not only for their own learning but also for that of everyone else in their groups. Promoting interdependence within groups of related ability encourages students to help one another, as the need arises, by explaining content or process to one another as they are learning, making constructive suggestions, helping another analyse, and doing assignments and giving feedback. Good communication, interpersonal and group skills are important elements of this process. At the same time, Lang (1995) suggests that promoting individual accountability makes each group member responsible to the group by completing a particular part of a cooperative learning task. Each student will have to demonstrate mastery of the content studied and of the interpersonal skills that he or she needs in order to share the learning with the group.

Engaging in cooperative instruction

Lang (1995) provides guidelines for teachers who wish to engage in cooperative instruction. Such guidelines place emphasis on offering students the benefits of working together in groups and supporting one another in the mutual process of learning through doing cooperative tasks. He argues that planning for cooperative learning requires standard planning procedures that fit available resources and students' level of cooperative learning skills

Lang (1995) further emphasises that building a climate of trust is the best way to prepare students' cooperative learning skills. Introducing cooperative learning activities and games, gradually, will help students acquire communication and cooperation skills and practise the basics of small group organisation and operation, helping to maintain the necessary climate for cooperative learning.

Teaching cooperative learning skills

From a teacher's perspective, Lang (1995) argues that to teach cooperative learning skills successfully, the teacher must first realise their importance and

then implement them in the classroom. Three steps are proposed:

1. **Teaching cooperative planning skills**

   Introduce cooperative-planning skills gradually, and have students practise them in a variety of situations before they begin a cooperative learning project. An example is to hold whole class or small group discussions to stimulate ideas for carrying out an activity that lends itself to cooperative planning such as creating a display or making a class trip.

2. **Explaining cooperative procedures**

   Explain to each group the procedures required for the job completion, role expectation and assessment criteria. Check each member's understanding of their job before they begin to work.

3. **Observing and monitoring**

   Cooperative learning provides opportunities to observe, reflect and intervene supportively even in a large class. Observation may be either global or systematic.

Lang (1995) further proposes three sets of techniques that teachers would find useful in developing these cooperative learning skills: possible ways of observing; intervening supportively; promoting group self-evaluation.

Cooperative learning strategies

A number of cooperative learning strategies – Jigsaw I, Jigsaw II, Student Team and Achievement Divisions (STAD), and Group Investigator (GI) – are reported in the literature. Each is relevant to this research.

Jigsaw I

The jigsaw method of cooperative learning was developed by Aronson et al. (1978) to encourage peer cooperation and tutoring. Jigsaw is used in subjects in which students learn from texts. Students are assigned to one of five heterogeneous home groups (composed of male and female students with

different levels of ability and different ethnic backgrounds). The team members pay attention to the expert's tutoring since the expert has unique information. When all team members have shared their expert knowledge, students are tested on the entire lesson and graded individually.

Jigsaw II

Jigsaw II, developed by Slavin (1980) promotes an even greater degree of student interdependence than the basic version. It involves the same process as the first version but text scores, based on individual improvement, are totalled to form team scores. High scoring teams are recognised in a number of ways, such as publication of members' names in faculty bulletins.

Student team and achievement divisions (STAD)

The STAD approach, developed by Robert Slavin and his colleagues (Slavin et al., 1985), uses cooperative competition. Teachers translate scores into team scores using achievement divisions. The highest scores form the top division.

Group Investigation (GI)

The GI approach to cooperative learning, developed by Sharan & Lazarowitz (1980) is particularly effective in promoting higher-order thinking skills wherein students gather data then discuss, interpret, and synthesise individual contributions to achieve a group product.

Student responses to cooperative learning

Lang (1995) suggests that students benefit most from cooperative learning when all perform their responsibilities to help others in the group, and each contributes to achieving the group goal. Some positive outcomes noted were: consistently increase learning, and promote achievement to all degree, level of learners; higher self esteem, improved perceptions or greater liking for classmates; more positive attitudes toward faculty, better cooperative skills;

personal and social development that produces more supportive, friendlier, more pro-social behaviour; academic gains including deeper understanding and increased transfer from short to long term memory; greater willingness to cooperate, more concern for others and more productive time on task; and a sense of control of one's faculty experience and stronger desire to do well.

Fogarty (1995) observes that cooperative learning strategies produce vitality and energy in the classroom for both teachers and students.

Rethinking the Pedagogy

Some students are far more comfortable with a teacher-centred, 'chalk and talk' method of teaching, but many teachers are moving away from the teacher-centred approach. Barr & Tagg (1995) advise College Deans not to condemn the teacher who prefers to remain at the centre, but to push them to re-think their pedagogy.

Studies conducted by Aaronsohn (1996) have shown that although many more classes or seminars on methods have been conducted on teaching about the student-centred process, many still adopt a teacher-centred approach. Teachers are overwhelmed by the rigour of the job, and they tend to feel vulnerable, so they retreat to the more familiar form of lecturing. Aaronsohn (1996) suggests that if college teachers came to learn not only the philosophical theory of the student-centred process, but also to learn explicitly how to implement the theory in practice, then the method would become more comfortable, natural, and nearly second-nature.

A paradigm shift: From teacher- to student-centred learning

An important step in learning and teaching is developing an understanding of human individuals as learners. The findings of Provost & Anchors (1987) confirm that a student-centred approach enhances students' learning and that introducing cooperative learning into teaching can improve teaching effectiveness and student learning. Similarly, Cooper & Miller (1991) report

that active learning experiences relate to improved academic performance.

Barr & Tagg (1995) describe a shift in higher education in the US from a teacher-centred approach to a student-centred approach in undergraduate teaching. Before embracing a student-centred approach as their learning paradigm, Barr & Tagg contend that undergraduate faculty and administrators need to be willing to abandon ineffective methods of teaching and instruction, such as lecturing, and adopt styles and strategies that best communicate with students.

Student-centred pedagogy and learning

According to Thompson (1987), 'Everything works, if the right conditions are met'. Although that philosophy is not necessarily correct, different methods do work for different people. While all methods are unique, the most important consideration is the impact on the students. Tudor (1996) points out that creativity is an inherent part of student-centred activity: it adds an element of surprise to each class, and students tend to be bored less often. McCombs & Whistler's (1997) numerous studies on students who were taught using a student-centred approach conclude that not only does student motivation increase, but actual learning and performance do as well. Silberman (1996) reports that students taught in a student-centred classroom retain more material for longer periods of time. In order to learn, the brain cannot simply receive information; it must also process the information so that it can be stored and recalled. The active nature of the student-centred approach helps students actually work with information, and therefore learn it and store it.

In recent theories of cognitive development, Magolda (1995) clearly acknowledges the role played by social context and interpersonal relationships in student learning. Further, the growing presence and assertiveness of a diverse population of adult learners has raised new challenges to traditional teaching styles (Barnes et al., 1994).

According to Sullivan (1996), a student-centred teacher has greater

know-how in creating caring, supportive, and more committed relationships among students, which result in greater productivity, psychological health, social competence, and self-esteem of students. By its very nature, cooperative learning can create philosophic difficulties for the traditional teacher who follows a prescribed curriculum. This is borne out by O'Hara & O'Hara's (1998) comment that despite the proliferation of electronic media and alternative methods of instruction, lecturing is often the instructional tool of choice, forcing students to take notes and to listen carefully. Roper (1999) writes that the message is crystal clear – the dominant method of college teaching must change.

McCombs & Whistler (1997) explain that in student-centred classes, teachers focus their planning, their teaching, and their assessment on the needs and abilities of their students. The main idea behind the practice is that learning is most meaningful when topics are relevant to the students' lives, needs, and interests and when the students themselves are actively engaged in creating, understanding, and connecting to knowledge. Students will have a higher motivation to learn when they feel they have a real stake in their own learning. McCombs & Whistler (1997) also report that in a class where a teacher employs a student-centred approach, learners are treated as co-creators in the learning process, and as individuals with ideas and issues that deserve attention and consideration.

Papalia (1996) observes that the focus on student-centred classroom teaching is on options, rather than on uniformity. By comparison, in a traditional classroom, Hooks (1994) notes that students learn as isolated, independent individuals; in a student-centred classroom, the teacher shares control of the classroom and students are allowed to explore, experiment, and discover on their own. The students are not just memorising information, but they are allowed to work with and use the information alone or with peers. Their diverse thoughts and perspectives are a necessary input to every class. The students are given choices and are included in the decision-making processes of the classroom. Current teaching practices in the classrooms

often revolve around lecturing done by the professors to the students. This practice leads to some significant weaknesses in the higher-education instructional system. Learning is seen as a pure stimulus-response mechanism being based on conditioning. This applies despite the fact that human beings play the role of passive 'knowledge receptacles' (Skinner, 1974).

Bellanca & Fogarty (1991) theorise that in cooperative learning students develop positive social skills thus speed up integration of themselves who saw each other as different. Kain (2003) emphasises that cooperative learning concern changing the classroom environment, student assessment and even the reward and goal structure for the students.

According to Christensen et al. (1991), college teachers who use a teacher-centred approach are afflicted with maladies such as 'narration sickness' and the tendency to enact 'rituals of control' in the classroom. This traditional instruction consists of teachers lecturing and students listening. In this method of teaching, there is little student-to-student interaction, and any teacher-student interaction is often brief and impersonal. In the traditional classroom, students learn as isolated, independent individuals (Hooks, 1994).

A student-centred approach enhances student learning in ways that traditional classroom instruction do not. This means that student-centred activities focus on the learner rather than the teacher. Thus, student-centred teaching encourages a learning environment in which students construct knowledge rather than receive it.

There exist many resources of knowledge, techniques, and theory which constitute raw material for students. It seems that these resources are made available to students, not forced upon them. The teacher in student-centred learning facilitates student learning through activities that engage them in active learning. Effective learning happens because the students take stock of what they already know and then move beyond it. This validates Hendrix's (1999) finding that students in a student-centred classroom learn better through active involvement, small group activities, and cooperative learning.

According to King (1996) students taught in a student-centred classroom retain more material for longer periods of time.

Student-centred versus teacher-centred teaching

Stuart (1997) recognises the importance of student-centred teaching. He believes that it helps teachers design effective instruction 'for every member of the classroom', no matter what are their diverse learning needs. By its nature, student-centred teaching is adaptable to meet the needs of every student. In order to design any lesson, the teacher must first think of the students, rather than the content, and so we are assured that the students' needs are being considered.

Related Approaches to Learning

The literature reveals a number of related approaches to learning that are relevant to this research: problem-based learning, constructionism (as opposed to constructivism), and action learning.

Problem-based learning

According to Woods (1994), problem-based learning is any learning environment in which the problem drives the learning, i.e., before students learn some knowledge they are given a problem. The problem is posed so that students discover that they need to learn some new knowledge before they can solve the problem. Torp & Sage (2002) suggest that, in problem-based learning, students are problem solvers who are looking at the root problem and finding remedies and solutions while teachers act as their colleagues in the process.

Savin-Baden (2003) notes that problem-based learning can help students to inquire and see other ways of looking at things in a way that is separate from their own particular view. Problem-based learning according to Major & Palmer (2001) is an educational approach in which a complex problem

serves as a context and the stimulus for learning. Students work in teams to solve one or more complex and compelling real-world problems. They develop proficiency in problem solving and team participation and acquire more knowledge (Levine, 2001).

Johnston (1997) develops information resources to support problem-based learning to students of architecture in Newcastle, Australia. He suggests that Building Services was one of the most boring subjects in architecture. Students would listen to one lecturer at the same time, the same day every week providing input to them from basic domestic plumbing systems to sophisticated air conditioning systems. In this way, students could not retain the information in their heads and tended to get bored listening, and could not remember what has been said in between the session. Besides, those systems, products, and services that the lecturer dealt with might be considered absolute in the years to come. To change the approach, Johnston gave problem-solving courses to students. In order to solve the problem, students have to know, say for example, about plumbing services during the time when they need the information and when their minds are ready to receive and understand it. This was realised only when the faculty opened the Resource Centre where students could easily get available information from updated catalogues and journals about building products and services anytime they need them in order to solve their problems. In addition, Johnston elaborated that in problem-based learning curriculum, the faculty could invite only a specialist at the time when students are asking for help and information to solve their problems.

Problem-based learning is an educational approach for posing important, contextualised, real world situations, and providing resources, guidance, and instruction to learners as they develop content knowledge and problem-solving skills (Mayo et al., 1993). In problem-based learning, students work together to study the issues of a problem as they try hard to create possible solutions. Unlike traditional instruction, which is often carried out in lecture design, teaching in problem-based learning normally occurs within small

discussion groups of students facilitated by a faculty tutor (Aspy et al., 1993, Bridges & Hallinger, 1991).

Because the amount of direct instruction is reduced in problem-based learning, students accept greater responsibility for their own learning (Bridges & Hallinger, 1991). The instructor's role becomes one of subject matter expert, resource guide, and task group consultant. This arrangement promotes group processing of information rather than an imparting of information by faculty (Vernon & Blake, 1993). The instructor's role is to encourage student participation, provide appropriate information to keep students on track, avoid negative feedback, and assume the role of fellow learner (Aspy et al., 1993).

According to Finchan (1997), problem-based learning does not present a new curriculum but rather the same curriculum through a diverse teaching method. In particular, students should be placed in small groups and provided with means by which they can explore real problems. Finchan (1997) proposes a five-step model of problem-based learning:

1. Problem is presented and read by group member, while another acts as scribe to mark down FACTS as identified by group.
2. Students discuss what is known (the facts).
3. Students discuss what they think and identify the broad problem (brainstorm their ideas and formulate their hypotheses).
4. Students identify their learning needs (what they need to learn in order to prove or disprove their ideas).
5. Students share research findings with their peers, then recycle steps 2-4

There is a specific task which teachers must accept in presenting problem-based learning. Teachers formulate thought-provoking questions to escalate students' comprehension. As students participate in problem-based learning, they tend to become self-directed learners who are able to ask their questions and recognise their needs to continue learning. Learning is driven

by challenging, open-ended problems; students work in small collaborative groups; teachers take on the role of facilitators of learning: these are the characteristics of problem-based learning.

Schmidt (1993) suggests that the achievement and formation of knowledge in problem-based learning can work through the following cognitive effects: initial analysis of the problem and activation of prior knowledge through small-group discussion; elaboration on prior knowledge and active processing of new information; restructuring of knowledge, construction of a semantic network; social knowledge construction; learning in context; stimulation of curiosity related to presentation of a relevant problem.

White (2001) states that, for effective problem-based learning, one must know what students really need to learn and the atmosphere in which they learn. Much of the interest for the problem-based approach to learning comes from mentors who feel invigorated by the creative energy it releases. Wilkerson & Gijselaers (1996) claim that problem-based learning is facilitated by a student-centred approach in which, teachers acts as 'facilitators rather than disseminators' and open-ended problems (in problem-based learning, these are called 'ill-structured' problems) that 'serve as the initial stimulus and framework for learning'.

Gallagher (1997) suggests that mentors

> give voice to metacognitive questions [and] apply them into the classroom dialogue so that students learn to attend to them, appreciate their work, and then adopt their use as they become increasingly independent and self-directed.

Group work is also an essential aspect of problem-based learning for several reasons:

1. Nurture learning communities in which students feel comfortable developing new ideas and asking questions about the topic. Two heads are better than one.
2. Enhances communication skills and students' abilities to manage group dynamics.

3. Motivates students because they become actively involved in the work and are help accountable for their actions by group members (Cohen, 1994).

White (1995) argues that even having students read, summarise, or critique journal articles can be a valuable experience. In order to get students' interest, the mentor may use presentation formats such as op-ends from fictitious newspapers, data from experimental studies, and case reports (Rangachari, 1996). A number of authors (e.g., Seltzer, et al., (1996); Gallagher (1997); Reynolds (1997) argue that learning is student-centred when students are given the chance to study those topics that interest them the most and to agree on how they want to study them. Students should identify their learning needs, help plan classes, lead class discussions, and assess their own work and their classmates' work. Students build up a deeper awareness and ownership of vital concepts in the course by working on activities, a basic precept of the constructive approach to learning.

Gijselaers (1996) suggests that in order to highlight 'learning by doing,' within problem-based learning, students need to be 'metacognitively aware', that is, students must be trained to be mindful of what information they already know about the predicament, what information they need to know to solve the problem and what tactic to use to solve the problem. Being able to express such opinion helps students become more efficient problem-solvers and self-directed learners.

Greenfield (1996) points out that students cannot become competent in this kind of thinking on their own. For this reason, mentors are required as 'cognitive coaches' who are able to replicate or query strategies, guide exploration, and help students simplify and continue their research questions. Gallagher (1997, p. 101) supports this position: mentors play a serious role in helping students become independent learners and must create a classroom setting in which students

> receive logical reasoning in the context of a discipline that will eventually make them more victorious in later investigations.

MacKinnon (1999) believes that problem-based learning endorses students' self-assurance in their problem-solving ability and assists in making them self-directed learners. These skills can put problem-based learning students at an advantage in future courses and in their careers. While such self-confidence does not come right away, it can be cultivated by high-quality teaching: with mentors who are able to create a good learning community in the classroom; with positive teacher-student and student-student interaction; by giving the apprentices a sense of ownership over their learning; by expanding the process to applicable and important problems and learning methods; by empowering students with valuable skills that will give them inspiration to learn and ability to achieve.

Finally, Resnick & Klopfer (1989) and Gallagher (1997) believe that, in general, problem-based learning is an efficient method for improving students' problem-solving skills. Students will make strong connections between concepts when they learn facts and skills by actively working with information rather than by passively receiving information.

Problem-based learning in architecture

In the Western World, architectural education is conducted primarily using a studio classroom methodology which is usually carried out using one of three accepted approaches, namely, 'tutorial-based' teaching, 'apprenticed-based' teaching, or 'mentor-based' teaching. The integrative value of studio approaches was recognised by Donald Schön (Schön, 1983) as a paradigm for professional education. In contrast to its integrative value, however, is the recognition that the majority of the elements of architectural education are individualised with these elements have little relevancy to each other.

In two early case studies, Cowdroy & Graaf (http://www.ijec.dit.ie/-articles/999980/articles.html) reported a research review of the theory and practice of educational innovation associated with the introduction of problem-based learning in architecture. They concluded that despite the disparity of the educational approaches, the philosophy of problem-based

learning was sustainable and was consistent with the sacrosanct principle of architectural education: that all aspects of the architectural curriculum should be integrated within the design process.

Further to these case studies, Cowdroy & Maitland (1994) reported that problem-based learning (PBL) addressed the cognitive part of learning that characterised the traditional design teaching. At the same time, the application of this approach to the entire curriculum within a single theoretical framework achieved the integration on both the theoretical and practical levels. They supported the view of Boud & Feletti (1991) that PBL was 'the most important innovation since the institutionalisation of education for the professionals'.

While this assertion refutes De Zeeuw's proposition (De Zeeuw, 1990) that PBL had its origins in areas unrelated to professional education, PBL's trademarks of change and challenge are innovations in themselves that trigger stimulating behaviour amongst staff and students in professions such as architecture. In 1960s, medical education at the University of McMaster, Canada had been criticised for its curricula filled with bits and pieces of medical knowledge much of which would have become obsolete by the time medical students graduated. PBL was put into use by the university to link education and practice through a holistic approach patterned on such concept as problems from medical practices. This, however, was in sharp contrast to the conventional method of medical specialisation at that time.

PBL is a forerunner of Jerome Bruner's concept of 'learning by discovery' and Carl Roger's concept of 'student-centered learning' (Rogers, 1961) in which students are not only fed with knowledge information by the teachers but they construct their own learning objectives in order to actively go through the acquisition of knowledge and skills. According to Rogers, the scenario of a 'problem in practice' is the starter for the development of a PBL approach. However, there is a difference between practice-based problem and the essence of PBL in that PBL problems are devoid of the reality of practice. Instead, PBL focuses on the more general educational point that

learning about problems, and their solutions, is the outstanding issue in the educational agenda. Whereas professional practitioners are challenged by practice-based problem, students are motivated by PBL-based problems in spite of the abstraction of real practice. PBL therefore can be compared with what has variously been called project work, case studies and studio-teaching approaches.

Post-modernism embraces PBL (Cowdroy, 1994). PBL has become successful especially in professional education, both in medical education within the medical school in Maastricht (Netherlands) and in the Newcastle (Australia) school of architecture – each of which followed the pioneering approach undertaken in the medical school at McMaster. Subsequently, as Cowdrey (1994) reports, PBL has been extended to other branches of education in Law, Economics, Business Administration, and Engineering. This success has led to the development of a taxonomy of problem-based approaches.

The distinguishing format of PBL varies from one user to another. For instance, lectures may or may not take place. Group discussions may be used to enhance the learning process particularly the thinking structure that was relevant to practice (Scmidht,1982). The ideal size for group discussion varies from the original 45 students (McMaster model) to the size of a class. Instructors are merely facilitators (Frijns & Graaff, 1993) and their competency can be from no experience-mentors to broad-experienced mentors.

PBL implementation at Delft

Inspired by the success of the PBL in the medical curriculum at Maastricht, the medical faculty board, under the guidance of the interim faculty director, urged the Delft authority to implement PBL in its institution.

The PBL approach encountered difficulties from day one at Delft, due to the short preparation time available prior to its implementation. Within the six-month preparation, a great deal of adjustment was necessary as the

faculty organisation was traditional and resistant to change. However, the implementation of PBL went ahead with the authority selecting supportive staff members to develop the curriculum. A reinforcement structure, called 'block groups' was established; this involved 23 faculty members from different departments. Each block group was given the task to develop a program for the department that they represented. A committee, consisting of coordinators from each 'block group' was formed. Their responsibilities were the overall basic program and the five specialisation programs. Overseeing these was a committee created by the Faculty Council chaired by the Dean of Education to coordinate the entire implementation process (Graaff & Bouhuijs, 1993).

When the plan for the Faculty of Architecture, patterned on the Maastricht model, was finalised, each program comprised six blocks with themes such as 'the House', 'the City', 'Wet Cell' and the like; each block was set up to last for six weeks. Here, traditional teaching was to be replaced by small group work, and design projects were to be replaced by limited design exercises for the first year. On top of this general format, the architectural staff still had to work on the detailed aspects of the curriculum and its application (Woord & Graaff,1993). It didn't push though smoothly though because most of the faculty did not comprehend the philosophy of PBL sufficiently – not to mention the weak support it earned, and the resistance it encountered.

With the resistance, short preparation time and lack of support, it is not surprising that many things went awry. What is equally surprising, however, is that in spite of all the shortcomings, it worked although not without some difficulties: this was because the creative architectural faculty was smart at improvisation. During the process, a great deal of readjustment was necessary to make the implementation of PBL effective, and this resulted in considerable delay.

A flaw of this the top-down approach to innovation was that a powerful 'upper-group' told a less powerful lower-group what to do. This had an

obvious effect on the level of participation and support given by those who volunteered, and those who were assigned. Despite the support, guidelines and help extended to those involved, some refused the task given to them. A number of reluctant staff that stayed on with the program took some time to understand the concept of PBL.

The major problem arose when the former big project mentors had to act as tutors. In essence these mentors, with their high status and feelings of independence, regarded themselves as the torchbearers of both the new philosophy and their past knowledge and experience of architecture. They were eager to pass on their legacy to the next generation. Caught up in this dual role of both mentor and tutor, they were forced to compromise: half of their mentoring was involved with tutoring based on their knowledge-and experience; half was base on mentoring based on the new philosophy for design teaching. The irony of this system was that it was in fact basically problem-based, differing only in pedagogy (Westrik & Graaff, 1994).

Meanwhile, students were allowed to follow their preference – either intensive teaching, or problem and knowledge based (PKB) learning. Most students found the design assignment challenging. Although the majority opted for the intensive teaching in the design track rather than a venture on the uncertainties of generating their own knowledge, it was found that there was a problem regarding the time required for design, using either approach, and the essential time required for theoretical studies. This limited the integration in terms of knowledge and practice. Nevertheless, the effort exerted by mentors and students to revise the curriculum approach, did not go unnoticed (Visitatie Commissie, 1994). The university continued to apply the concept of PKB learning for six years following its stormy beginning.

The upper management remained helpless as the different departments exerted power by simply doing what they were used to, reducing the new approach to a mere formality (Classens,1995; Classens et al, 1995). It was tough for the students who had to please their teachers – who seemed to be competing with each other. The students were powerless, too: there was no

choice left for them as the teachers were the grade givers.

PBL implementation at Newcastle

The implementation of PBL in the Faculty of Architecture at Newcastle emanated from its sister faculty, the Faculty of Medicine. It was a collective opinion amongst staff that the integration of the curriculum with the studio teaching of design would be a good idea.

It was originally planned to just go ahead with a pilot approach in the first semester; however, before the end of the semester, it was perceived that the PBL approach in Year 1 worked and that therefore it should be pursued. With Integrated Learning (IL) already in use in the curriculum, the Faculty believed that PBL should be linked with IL. Aware of the difficulties of operating with two different educational approaches, i.e., a traditional approach and the new PBL, the Faculty tried to meet both by removing and recasting the traditional method to maintain the knowledge, skills, specialisations very much akin to the traditional method being practiced while, at the same time, providing focus on real problem-handling enhancing the students development of the skills and praxis of architects in a modern context.

The Faculty encountered a number of difficulties in the implementation of PBL. In particular, staff and students were overloaded with tasks. The staff was faced with difficulties in timetabling and coordination, thus, affecting the subject specialists and the traditional regular lectures. The students were also overloaded in terms of the PBL and IL courses. It was not easy for the students to balance the different subject areas; to cope, students took a ‘for information only’ view of knowledge building and assignments. Similarly, the staff streamlined the traditional curriculum to the status of ‘for information only’. This problem particularly affected South-east Asian students who had to make a large cultural adjustment in order to be able to follow up the traditional courses. On top of these seemingly unavoidable dilemmas, there was already a pre-existing problem with the student-centered

approach in the used in the IL course.

The change deeply affected both the staff and the students. The change in role from being a major mentor to just a facilitator affected many career academics. Their once unchallenged authority no longer applied, causing a role conflict in them. Those who were remained adamantly opposed, and those became got stressed, left the faculty, which created both advantages and disadvantages. The departure of these 'adversaries' brought an end to the deep-seated feud between the two opposing groups of staff. The Faculty now consisted of multidisciplinary, experienced, and neutral staff who were able to manage the PBL approach without disregarding the old approach.

With a competent and positive attitude of staff the PBL fared well in Newcastle and the Faculty in particular earned a reputation as a leader in Architectural Education.

Institutional and educational change

To be able to comprehend the implementation processes of Delft and Newcastle of the PBL, one has to explore the literature on educational innovation and organisational change. According to the literature on educational innovation, in order to effect a change, intricate strategies of planning and preparations are significant (Dailin,1978; Fullan, 1982; Romizowski, 1990). In order to bring about successful change, the amount of participation required by organisation members was not to be taken lightly. In other words, participants must regard innovation as an invaluable part of their goal achievement. On the other hand, literature on organisational change supports the principle that change can be effective if force is applied. According to Chin and Benne (1985), there are three strategies applicable to effect change in an organisation:

- Empirical rational strategies;
- Normative educative strategies;
- Power-coercive strategies.

All of these strategies have reference to human nature. Proponents of the empirical-rational strategy treat people as rational beings who follow their own self-interest once this was made clear to them. The normative re-educative strategy gives priority to the social nature of humans, and their being capable of imbibing new behaviour and attitude. While the aforementioned strategies dwell on a positive view of human nature, the power-coercive strategy is based on the application of power which is a negative view. When people are entrenched on their own belief or practice and fail to discern a need for the overall progress of the organisation, the organisation may apply the power-coercive strategy for the common good.

Both the Delft and the Newcastle applied, to different degrees, the three strategies outlined above. At the outset, both institutions gave their own rationalisation of the change that would take place. Delft used an empirical-rational strategy to substantiate overcoming the inertia to change that occurred on its premises by using external threat to bring about a power coercive implementation of the PBL. Newcastle, on the other hand, was out-rightly power-driven in order address threats. Delft tried to change the attitude of the staff towards the changes that they would like to implement in the curriculum in order to retain them using the normative re-educative strategy; but many believed it was a more power-coercive strategy than anything else. At Newcastle, those who actively supported the concept of curriculum change, eventually improved their personal effectiveness to bring about change thereby thwarting the necessity for power-coercive implementation from external sources. They were also able to apply the methods that best suited them. Educational innovators regard the combination of the two strategies (empirical-rational and normative-educative strategies) a good way to persuade people the reasons for change, and/or re-educate them for easier means of prompting them for compliance. However, convincing people, regardless of the approach taken, consumes a lot of time. It is common knowledge that large organisations are more conservative while small organisations are more receptive and less

conventional.

To introduce a large magnitude change in an educational organisation, as was undertaken at Delft, is not easy to accomplish. Delft therefore utilised top-down authority which was deemed necessary to push through the change that was much needed in its faculty. On the other hand, as an agent of change, for instance, the Dean at the Newcastle, was instrumental in breaking a dead-locked situation. The power-coercive strategy used at the two institutions helped both in their urgency for change. The effect of change through this means, however, is likely to be sustainable for only a short period of time; what is more, people who were not part of the change would be less supportive. To be more effective, it is therefore necessary to utilise a long term strategy in situations catering to individual as well as the corporate commitment. The authority designing and implementing such a strategy should be receptive not only to the implications for organisational behaviour but to individual perceptions and aspirations as well. In summary, achieving sustainable change requires strong educational leadership that demands comprehensive management skills.

Constructivism vs. constructionism

The theory of constructivism was designed by Jean Piaget. It focuses on students taking control of their own learning so that knowledge is constructed by the learner. To sum up, students make personal meaning of concepts; so assessing them on the basis of normed standards makes no sense.

The theory of constructionism, on the other hand, was conceptualised by Seymour Papert. According to him, learners are deeply involved in learning if constructing something public and useful. Students encounter complicated issues through construction, thus they exert more effort to solve the problem and learn since they are motivated by the construction. In addition, they learn how to work in the real world, utilizing technology and by experimenting themselves. The teacher helps, observes and gives advice to students and both of them learn together.

In its broadest sense, Guzdial (1997) suggests that constructivism is an educational philosophy where student construct their own unique meaning for everything that is learned. Constructivism, as defined by Walker (2002) is the theory of learners constructing meaning based upon their previous knowledge, beliefs and experiences – and their application in schools. Brooks (1999) suggests that in developing a constructivist approach, teachers rely on open-ended questions and promote dialogue among students. They prepare teaching strategies to encourage students to analyse, interpret, and predict information. According to Woolfolk (2001) constructivism is based on the belief that students learn best when they acquire knowledge through explanation and active learning. Individuals construct knowledge rather than receive it. Airasian & Walsh (1997) write that people learn from the relations between their existing knowledge or beliefs and the new ideas or situations they come across.

Constructionism, on the other hand, is the idea that people learn effectively through making things. According to Papert (1991), it means that students learn best when they are in the active role of the designer and constructor. This idea occurs felicitously when learners are consciously involved in constructing a public entity, for example, a theory of the universe or a sand castle on the beach. The construction of something becomes meaningful when the learners explain, convey, or share the 'public entity' (which could be a website or a computer program) to others – that constructionist learning is, therefore, enormously strengthening (http://edutechwiki.unige.ch/en/constructionism). Papert (1980), in an earlier work, emphasises that teaching is important but learning is more important. It means 'giving students' good things to do so that they can learn by doing much better than they could before.

In a slightly different approach, Gale & Steffe (1995) distinguish radical constructivism and social constructionism. The former is mind-centred while the latter is world-centred which means that a social constructionist is responsible for the behaviour of the group.

Action learning

According to Billet (1996), the processes aiming to change educational practice need to address the further development of individuals' knowledge including values, attitudes and beliefs appropriate to the change. Action learning, as Billet (1996) defines it, is a means by which people learn with and from each other by attempting to identify and then implement solutions to their problems/issues/opportunities; it aims to provide participants with a reflective process by which they will improve their practice.

Billet (1996) explains that learning arrangements, which place the participants in the active role of initiating, planning and managing their learning, are conducive to developing these attributes. He proposes that when learners are pressed into taking responsibility for their learning, they develop and organise knowledge effectively, and learn to manage the use of that knowledge. The main purpose of the faculty is to give high quality learning experiences and chances for the students, and much is done to try to ensure that these experiences and chances are made possible. (Bennet et al., 1997)

The impact of cooperative learning, and its related theories of problem-based learning and constructionism, provides a means by which to develop teaching from being teacher-centred to being student-centred in a Studio Project Design course. By using round table and sharing ideas among themselves, students do not work alone, but have the opportunity to join a group in order to encourage themselves and to build self- esteem, as well as communicating with others so as to enhance creative thinking and to contribute in the overall success of the group.

Active learning

Bruner (1961), following in the tradition of Dewey, was a strong proponent of active learning – a form of learning that directly engages the student in his or her learning process. It may be contrasted with passive learning in which students passively take in information from a lecture. Active learning is much more student-centred because students become actively involved with the

material being learned. In essence, active learning is a more hands-on approach, which involves experiential learning. It has been suggested that students who actively engage with the material are more likely to recall information later and to be able to use that information in different contexts.

Active learning means students do more than listen to a teacher. They process, discover, and apply information. Meyers & Jones (1993) state that active learning is derived from two basic assumptions: (1) that learning is by nature an active endeavour; and (2) that different people learn in different ways. The key elements of active learning are talking and listening, writing, and reflecting. Bonwell & Eison (1991, p. 2) outline what these key elements entail, placing an emphasis on higher-order thinking skills and an exploration of attitudes and values:

> Students are involved in more than listening, less emphasis is placed on transmitting information and more on developing students' skills, students are involved in higher-order thinking (analysis, synthesis, evaluation), students are engaged in activities (e.g., reading discussing, writing), and greater emphasis is placed on students' exploration of their own attitudes and values.

Zuber-Skerritt (2002, p. 1) emphasises the importance of concrete experiences in action learning:

> Action learning, in brief, is learning from concrete experience and critical reflection on that experience – through group discussion, trial and error, discovery, and learning from and each other. It is a process by which groups of people (whether managers, academics, teachers, students, or learners generally) address actual workplace issues or problems, in complex situations and conditions.

Zuber-Skerritt (2002) further points out that solutions made by these groups of people may require change in their organisations, and that these changes are likely to pose challenges to higher management. Despite this, there are great benefits to be derived because the people participating accept that they actually own their own problems and their solutions. He adds that in action learning, learners become specialists on these problems and how to solve them. In the traditional teacher-centred approach the view is that knowledge

is transmitted; thereafter, the learner utilises the knowledge for whatever purpose, as yet undefined at the time of transmission. By contrast, in action learning, learners generate knowledge rather than inactively assimilating the results of studies made by experts.

Zuber-Skerritt (2002, p. 1) cites Pedler's (1997) useful summary relating the philosophical assumptions and definition of action learning:

> Action learning is an approach to the development of people in organisations which takes the task as the vehicle for learning. It is based on the premise that there is no learning without action and no sober and deliberate action without learning. On the whole our education system has not been based upon this principle. The method has been pioneered in work organisations and has three main components – the people, who accept the responsibility for taking action on a particular issue; problems or the tasks that people set themselves; and a set of six or so colleagues who support and challenge each other to make progress on problems. Action on problem changes both the problem and the person acting upon it. It proceeds particularly by questioning taken-for-granted knowledge.

Action learning, according to Pedler, is insignificant unless learners take action on the things they need to learn and problems they need to solve. Learning becomes effective when three components – people, problems, and progress on solving the problems – are present within the organisation.

In sum, Zuber-Skerritt (2002) recommends that facilitators of action learning should ask questions to help people think carefully through the issues that are crucial to their work situations. Facilitators should not impose their own vision but ask participants to contribute to the solving of problems.

Active learning methods

There are many ways to incorporate active learning in the classroom. Classroom teachers can use different strategies to engage students. Questioning by the teacher is one strategy that requires student involvement. Students responding physically to commands by the teacher is also a form of active engagement. With these approaches, students and teachers can also swap roles that allow the students to ask or command both teacher and their

friends. Moreover, the teacher should incorporate activities in which students simulate situations via role-play. After learning new concepts, students can then practise what they have learned in the form of role-playing.

Apart from questioning students' comprehension, there are other ways that students can become more actively involved in a lesson and ultimately in their learning. One technique is Total Physical Response (TPR) which in its basic form requires students to physically carry out commands that a teacher requests. This type of activity involves active learning on the students' part through physical movement. Kinaesthetic intelligence is also used in this technique; it can strengthen the effectiveness of their memory. Role-play is another form of active learning for students. For example, when students have a unit on travel, they can transform their classroom into an imaginary airport, whereby the students act out various roles that this scenario involves. McKinney (2007) lists examples of in-class active learning techniques used in small and large classes, and with all levels of students. These are summarised below:

- **Think-Pair-Share**

  Teacher gives a problem or question to a pair of students and let them think and discuss the idea with one another. They can share their ideas with the whole class.

- **Collaborative Learning Groups**

  Form students into groups comprising three to six people, and then assign them a task to work on together. There must be a leader and a notetaker.

- **Student-session**

  In revising lesson content, each student is to ask at least one question connected to the material that he or she could not understand, and let other student volunteer to answer the question. This helps students to discuss thoroughly the lesson. Teacher can interfere only when there is a problem.

- **Games**

Games can be adapted to the course material and used for review, for assignments, or for exams. They can be employed at the individual level, in small groups, or for the whole class. Some computer programs can also be used to produce games related to the lesson.

- **Analysis or reactions to videos**

This involves a short film presentation, about 5-20 minutes in length; care needs to be taken to ensure that the theme is directly related to the lesson. Before showing the video, students should be provided with reaction or discussion questions, or a list of the ideas presented in the video, in order to help them pay attention during the showing. After the video, students are encouraged to pair up in order to write their reaction, raise questions, or to apply a certain theory they learned from the video.

- **Student debates**

These allow students to take their stand on certain issues and justify their position. They can present facts or logic to support their views

- **Student generated exam questions**

This can be used for review or for the actual examination. This technique helps students actively process material, gives them a better understanding of the difficulties of writing reliable and valid exam questions, helps them to review material, and gives them practice for the exam.

- **Mini-research proposals or projects; a class research symposium**

This could be conducted inside or outside the class. Students work on designing a research study on a topic they have chosen or assigned by the teacher. They can collect data, make observations, or run a survey in the class or in the community. After this, they can present their research in the class, symposium, or professional meetings where faculty and other students are invited.

- **Analyse case studies**

This allows students to read case studies either by pair or in groups

and have them discuss, analyse, and apply concepts and theory in the class.

- **Keeping journals or logs**

Here, students maintain a journal to record and analyse personal events, instances, or issues related to the lesson.

- **Write and produce a newsletter**

Small groups of students are required to produce a newsletter on a specific topic related to the class. Articles may also include relevant research.

- **Concept mapping**

Students can make visual representations of models, ideas, and the relationships between concepts. They draw circles containing concepts and lines, with connecting phrases on the lines, between concepts. These can be done individually or in groups, once or repeated as students acquire new information and perspectives, and can be shared, discussed, and critiqued.

Finally, McKinney notes that some students, who are accustomed to passive learning like lectures, may resist active learning. To apply active learning approach, teachers should explain the goals and advantages of this technique. There may be success and failure but teachers need to get the feedback of students after applying this approach for future improvement.

Benefits of active learning to students

Integrating active learning in the classroom can boost student learning greatly. Active learning can be especially important in order to increase retention among students. Also the more senses involved in learning, including kinaesthetics, the greater the chance is for a learner to internalise learning. Research by Russell (1984) suggests that

> apparently less new content and more time reinforcing the facts and concepts presented (which could include active learning) will lead to greater student learning.

> With active learning students have a greater opportunity to practice previously learned material.

One of the advantages of active learning, according to Seeler et al. (online):

> is to take the student out of a passive role and create an environment where he or she can practice the skills that need to be developed.

Incorporating this approach into different activities in the classroom can improve memory and develop active learning. In addition to memory enhancement, active learning demands more high-order thinking skills than does passive learning. James J. Asher (Asher, 1988), the founder of TPR, stresses the benefit of total physical response: it can greatly affect transfer to other skills.

In a study by Ruhl et al. (1987), it was observed that an instructor stopped lecturing for two minutes on three occasions during each of five lectures: the intervals ranged from 12 to 18 minutes. During the pauses, while students worked in pairs to discuss and rework their notes, no interaction occurred between instructor and students. Students were given three minutes to write down everything they could remember from the lecture (free recall) at the end of the lecture; 12 days after the final lecture, the students were also given a 65 item multiple-choice test to measure long-term retention. A control group received the same lectures (using the same anecdotes and visual aids) and was similarly tested. In two separate courses repeated over two semesters, the results were striking and consistent: Students hearing the lectures while the instructor stopped did significantly better on the free recall and the comprehensive test. In fact, the magnitude of the difference in mean scores between the two groups was large enough to make a difference of two letter grades depending upon cut-off points! According to this research, if teachers talk six minutes less, students learn more.

Undoubtedly these counterintuitive results stem from two things: 1) the short lectures (12-18 minutes) are consistent with the research that suggests

that students' ability to retain information falls off substantially after 10-20 minutes; and 2) by engaging in an activity that reinforces the information presented, student learning should be increased. The research suggests that teachers have an opportunity to include short, active-learning activities into the lectures with no loss to the content learned; therefore, students learn more by this process**.**

Collaborative learning

Several decades of practical research have demonstrated convincingly that collaborative learning is an effective teaching tool in higher education (Meyers, 1997). Despite this evidence and the fact that education scholars have called for an emphasis on this type of teaching for some time there is still, however, an over-dependence on traditional methods that emphasise individual learning (Panitz & Panitz, 1998). Reasons for this gap include the difficulty in translating the principles of collaborative learning into actual practice and the fact that collaborative learning can introduce more difficulties than solutions when done poorly (Bryant, 1978; Giordano & Hammer, 1999).

Meyers (1997) summarises the components of successful collaborative learning tasks in a review of sixty-eight practical articles. He defines three important domains—task structure, student evaluation and group structure – and offers general guidelines for incorporating collaborative learning tasks into courses.

Task structure

Meyers (1997) stresses that the structure of collaborative learning tasks should be open to small-group work and should avoid the trap of social idleness. The research project achieved these goals despite its complex and ongoing nature (Jackson & Williams, 1985). Furthermore, the innumerable components included disjunctive tasks that capitalised on individual strengths and emphasised the benefits of group work and connected tasks that required

joint participation and this emphasised the project interdependent nature. It reduced social idleness by permitting students be in charge of selecting their projects and ensuring that each subtask required unique and original solutions (Harkins & Petty, 1982; Carroll, 1986;).

Student evaluation

Evaluation is a common concern with collaborative learning. It is necessary to develop a system that is acceptable to the individual participants and which does not promote maladaptive behaviours (Darley, 2001). As Meyers (1997) suggests, an assortment of evaluative criteria, measured both at the individual and group level, including written projects, presentations, and participation may be used. Although there is evidence that peer evaluation can be effective (Harkins & Szymanski, 1988), this option is often avoided because of concerns about potential competitiveness among students.

Group structure

Group structures should be created to promote individual participation. First, the wide goals of the project and the steps necessary to achieve those goals should be emphasised (Olmstead, 1974). The second step should borrow techniques from social identity research to create powerful feelings of unity among members of the new groups. It is important to not clearly assign roles to different members of the groups, but rather to assign people with different strengths to different groups, and encourage them to take advantage of each other's unique knowledge and abilities (Bryant, 1978).

Collaborative learning in architecture

Two major issues that education faces nowadays are: how adequate is it to use group dynamics in class to assist students in achieving specific goals; and, is the efficiency of this technique acceptable for all the branches of knowledge? Architecture, because of its most important qualities (professional work in teams, practical skills and creativity) appears to be an

area in which it is likely that the teamwork technique can demonstrate its most important strengths.

According to Bruffee (1995), new procedures in education such as collaborative learning, cooperative and active learning are designed to help students learn by working together. Ventimiglia (1994) defines collaborative learning as the process in which a community formed by students and teachers establishes common goals and participates as partners in the building of knowledge, following specific steps and accepting precise responsibilities. Thus, the team's task is a crucial factor in using each different method of instruction

Working in teams, as is the case in the applied field of architecture, confirms that collaborative learning is a suitable approach to students' learning – particularly in an architectural course in Design. More generally, Foyle (1995) claims that collaborative learning offers a suitable replacement for the traditional teacher-centred approach to teaching in which learning lies entirely in the hands of the teachers.

Advantages of collaborative learning

Three advantages of collaborative learning are that it develops social skills, that it stimulates individual capacities, and that it arouses critical thinking.

Developing social skills

Ventimiglia (1994) indicates that in collaborative learning there is a need for learners to socialise among themselves so that they are able to build mutual respect as they belong in a single learning community. Lyman, cited in Foyle (1995), states that trust, communication, and the ability to manage conflicts are the main qualities that define the collaborative classroom. In this situation, students learn how to interact with one another as they work together in teams.

Stimulating individual capacities

Collaborative learning encourages students to show and contribute their abilities to the success of group work. Individual members are able to play various roles commensurate with their talents that result in a positive result.

Arousing critical thinking

Bruffee (1995) asserts that from the moment teachers abandon their leading position in the classroom, groups are invited to build their knowledge using doubt as a universal tool to determine what is supposed to be known. In this respect, it is necessary to encourage the development of students' judgment; to permit them to achieve the same goal through different ways using means that may challenge pre-established practices. Ventimiglia (1994) has characterised this as the ability of students to engage and transform the world in a creative and innovative way.

To conclude, research affirms that collaborative learning is a viable alternative to traditional education to encourage the development of group discipline, creative thinking and high student involvement in the study of complex subjects. All these are valuable qualities in the learning process of Architecture. The researchers suggest that even though the method is apparently full of obstacles, those should be seen as challenges, which can be overcome, through training and experience. In fact, the effectiveness of collaborative learning in architecture higher education will derive from the appropriate design of the learning process in order to stimulate future professional skills with adequate methods and techniques.

Collaborative approaches around the world

The goal of architectural education is to develop major skills in students so that they can use them in their future professional life. Various universities have been using this approach, and these are discussed below.

At Yale University School of Architecture (on line at http://www.yale.edu/Architec) the program concentrates on three major

objectives: to stimulate sensitivity, to develop creative thinking, and to help students acquire individual capabilities to engage in professional practice.

In the University of Buffalo School of Architecture and Planning (on line at http://www.ap.buffalo.edu/), the program prepares students for two major goals: to place the practice of Architecture in relation to social and cultural frameworks and to develop critical thinking toward current practice. From this specific approach to architecture education it can be said that the 'collaborative learning' approach blends with the skills that an architect should possess. Furthermore, Virginia Polytechnic Institute (on line at http://www.arch.vt.edu/) opens students' minds to a wide universe of study fields defining architecture as an interdisciplinary degree.

According to Dill (1997) architecture is the 'holistic art par excellence' since it is closely related to many specialties such as designing, researching, and planning. Dill notes that architects should specialise in 'creating human environments', and not just concentrate on multi-disciplines such as history, sociology, ecology, and drawing. If this is to be achieved, it is necessary for students to develop social skills so that they can interact with other specialists – engineers, designers, and contractors to achieve professionalism in the task assigned to them; hence, a course in architecture needs to be a preparation for students' future professional practice.

The University of Syracuse (online at http://soa.syr.edu) permits students the discovery of a 'personal expression'; thus, students are able to realise their personalities and provide quality work in the community. Likewise, at the Massachusetts Institute of Technology (on line at http://architecture.mit.edu) it is stressed that architectural education should 'open diverse paths' to a myriad of areas such as designing, teaching, planning, real estate, arts as well as communications.

Dill (1997) opines that students should become experts in different fields and harmonise themselves into the 'real world practice'. Universities, therefore, have to enhance the capacity of students by giving them projects to test them for future professional life. Then it becomes evident how this

matches with ‘collaborative learning’ method.

Finally, the Department of Architecture of Harvard University (on line at http://www.gsd.harvard.edu/depts/archdept.html) describes architectural design as the ability to synthesise a broad body of knowledge to be followed by the ‘skilful manipulation of the form’ in order to solve design challenges. It mainly focuses on the significance of a ‘creative and always renewing approach’ to promote students ability so that they could be able to easily adapt with different clients as they prepare themselves in the so-called global village. With this in mind, a collaborative learning approach in an architectural course arouses critical creativity.

A study of collaborative learning styles and team learning performance

In their article entitled *A Persuasive Example of Collaborative Learning*, Carlsmith & Cooper (2002) write that collaborative learning, the instructional use of small groups or teams where peer interaction plays a key role in learning, has been demonstrated conclusively as an effective teaching device in higher education and while education scholars have for some time called for an emphasis on this type of teaching, an over-reliance on traditional methods such as lecture and text-based learning/instruction still exists which encourages individual learning. Reasons for this include the difficulty of translating the principles of collaborative learning into actual practice and the fact that collaborative learning can introduce more difficulties than solutions when done poorly.

Critical to the success of efforts incorporating collaborative learning techniques and providing direction is the interplay of integrating the project or objective into the core design of the course. What is required is that instructors should develop the course and project as one unit rather than stand-alone modules and for students to conduct research on questions that are inherently of interest to them; the results indicate that this approach is most likely to benefit instructors seeking to improve their student’s

understanding of research methods. By using collaborative learning principles that have been extensively catalogued elsewhere, it is possible to apply these to other courses. One may redesign such courses so that students' focus on particular domains of knowledge such as constructing guides based on learning style, level of analysis and development. This way, the product would dovetail with explicit requirements of a content-based or topic-centred course or objective while reaping the many benefits of collaborative learning.

Yazuci (2005), in her research, concluded that the kind of learning style will certainly influence performance. Her results indicate collaborative learning is influential in developing competitive and participant learning styles. Undergraduate students preferred learning by sharing with their peers and their instructor as this setup provided them with motivation, and allowed participation in class activities, as well as providing structure and control in learning the course material. The combination of learning preferences with collaboration, only, suggests that teaching needs to accommodate diversity of learning preferences. Collaboration enhances critical thinking, communication and implementation skills thus students' learning style preferences is valuable for team building and can affect performance.

The Professional Development of Teachers

This section identifies research which focuses on the reasons why teachers should develop professionalism in their teaching career so that they may adapt themselves easily to any changes occurring in the system of education. Hence, for the concept of competence and its implications, teachers will continue to develop their quality of work through training, intensive workshops, teacher's induction, changing practice, and appraisal as well as in the area of leadership.

Carwood & Gibbon (1981) define staff development as an experiential involvement by a teacher in the process of growing. It is a continuous, never-ending developmental activity. Joyce (1980) suggests that there are three

needs for professional development to fulfil: the social need for an efficient and humane educational system capable of adaptation to evolving social needs; the need to find ways of helping educational staff to improve the potential of people; and the need to develop and encourage the teachers desire to live a satisfying and stimulating personal life

Professional development must become part of teachers' everyday life. Teachers, administrators, and other faculty staff need time to work together in study groups, conduct Action Research, and help one another (Hammond, 1991). The American Federation of Teachers states that the most precious assets in the faculty are teachers, and the most valuable investment the faculty administrators can make is to assure that teachers continue to learn continuous high-quality professional development: it is vitally important to the country's goal of achieving standard of learning for every student. Learning and development, including lifelong learning and continuing professional development for employees, has been viewed as a strategic tool because of the potential increase quality and performance (Journal of Workplace Learning, 2000)

Eraut (1975) makes the point that we need to foster the natural process of teacher development and that development depends upon three things: the knowledge, experience and personality of the teacher; the faculty context; and professional contact and discussion outside the school. McCormick & James (1983) report that effective change depends upon the genuine commitment of those required to implement it. They suggest that commitment can only be achieved if those involved feel they have control of the process. Teachers will readily seek to improve their performance if they regard it as a part of their professional accountability, whereas they will resist change that is forced upon them.

Caldwell & Spinks (1998) argue that teachers need to acquire new knowledge and skill in a learning area in which they are not already qualified to teach. To do this, they need to have a capacity to work in a team and devote much time out of class to preparation and in briefing and debriefing

meetings, in order that they might assess the effectiveness of old approaches and to plan new ones.

Concepts of competence and their Implications

Eraut (1994) believes that a professional person's competence has at least two dimensions: scope and quality. Throughout a professional career, he suggests that professionals will be changing the scope of their competence: through becoming more specialist, through moving into newly developing areas of professional work, or through taking on management or educational roles; and they will also be continuously developing the quality of their work in a number of areas, beyond the level of competence to one of proficiency or expertise.

Eraut (1994) clarifies that learning opportunities for work-based learning are crucially dependent on the way in which work is organised and allocated; and that, in turn, is dependent on prevailing assumptions about the competence of the people involved – which includes students at various stages of training, newly qualified professionals and members of other occupational groups.

Leadership for Change

To be a successful leader, there are some responsibilities where, according to Fullan (1997), the leader's task is designing the learning processes whereby people throughout the organisation can deal productively with the critical issues they face and develop their mastery in learning disciplines. Fullan (1997, p. 101) states that:

> leaders in learning organisation have the ability to conceptualise their strategic insights so that they become public knowledge, open to challenge and further improvement. Leader as teacher is about fostering learning for everyone. Such leaders help people throughout the organisation develop systematic understandings. Accepting this responsibility is the antidote to one of the most common downfalls of otherwise gifted learners—losing their commitment to the truth.

Educational leadership

According to Bottery (2004), educational leadership is taken seriously worldwide because in this age of enormous change, there is a need for every professional educator to understand change in order for students to prepare them in the future. Marshall et al. (2003), cited in Anderson et al. (2003), recognise that, in the last decade, universities around the world are changing, stimulated by forces such as new research methods and teachings, and bigger and more diversified student populations. In relation to this, Dowson & Wallace (2003, p. 116), report the following warning comment by Hallinger & Kantamara regarding a research project into changes in education in Thailand:

> Implementation of the modern educational reforms will fail unless Thai faculty leaders demonstrate a deeper understanding of how traditional cultural norms influence the implementation of change in Thailand's social systems.

To promote leadership for better education, Johnson (1996) states that teachers, administrators, faculty officials, parents and members of the community must understand and believe in the meaningful vision of higher educational leaders.

Teaching repertoire

Joyce & Weil (1986) suggest that teaching requires continuous adaptation where it demands new learning in order to solve the problems of each moment and situation. They believe, therefore, in the importance of teaching skills and strategies being designed to help teachers solve problems and to reach students more effectively – skills which can be accomplished in a training setting, such as workshops.

Joyce & Weil (1986) recognise that many teachers experience a degree of discomfort created by effective training that involves learning to use new skills because this involves greater effort than using old, familiar skills: they feel more awkward and negative for some time during the process. They also

add that the use of an important new skill sometimes involves some risks; because the use of the skill can be confusing and laborious, instruction may go less smoothly until the new skill is mastered,

Mentoring and coaching

Russell (1992) introduces the process of mentoring and coaching to recover some of the valuable elements of learning that have been lost in the classroom environment. Both are explained by Russell to be training strategies that are usually classified as informal learning since they are more often associated with the workplace than the college or training institution. Mentoring, according to Russell, is as much an idea as a clearly defined training strategy while coaching is the more specific process of learning from or about a task while actually performing it.

According to Russell (1992), the successful transformation of an idea into a workplace setting requires considerable thought and skills in the management of change; for mentoring and coaching, particularly, he believes care and sensitivity are required. He explains that mentoring is primarily dependent on personality and attitude variables. He suggests one possible starting point for the establishment of mentoring relationships in the workplace is the identification of potential mentors among senior staff; in particular, their support is likely to be essential to the allocation of resources required for the program.

Intensive workshops

Schaafsma & Spindler (1992) define intensive workshops as working intensively with one issue or theme, ensuring balance between expert input and learner participation. The prime focus for an intensive workshop is enhancement of competence rather than development of knowledge about the issue under study. According to these researchers, workshops provide an efficient and cost-effective means of increasing the skills of the workforce. They realise, however, that intensive workshops need to be seen in a broader

context of pre-planning and post-workshop follow-up to ensure that they produce learning outcomes that contribute to real change.

Teacher induction

Vonk (1994) defines teacher induction as the transition from student-teacher to self-directing professional. The process of becoming a teacher, according to Vonk, is developmental in nature; teacher induction can best be understood as part of the continuum of the process of teacher professional development.

Appraisal of teachers

Given contemporary social, technological and economic pressures, Wilson (1994) is not surprised that most countries want to improve the quality of teaching and learning in their education systems. Appraisal, therefore, is introduced to improve the quality of education by encouraging individual reflection on the effectiveness of job performance in the expectation that this will result in the positive reinforcement of teachers' professional status and image.

Wilson assumes that individual teachers are ultimately the agents of the quality of learning experiences in their own classrooms. Whatever the means to assist them continuously to reflect on and develop their practice, the criteria and principles underlying the process should be clearly understood by appraisers and appraisees alike.

Teacher training

According to Joyce & Showers (1988), there are four conditions that help teachers develop learning skills:

1. Adequate training that develops a high degree of skill with and understanding of an innovation are essential.

2. Opportunities for collegial problem solving which gives time for both pre-service and in-service teachers to observe each other work, analyse their teaching, and plan together the best choices of content and process for specific educational objectives must be structured into the workplace.
3. Building norms that support experimentation with one's own behaviour can lead to increased knowledge, teachers would be more open to exploring alternatives.
4. Organisational structures that support learning in which forceful and active leadership of faculty and district administrators can counter prevailing norms and help establish new ones.

Changing teachers' practice

Schön (1987) introduces a threefold coaching task for teachers as coaches. First, they must deal with the substantive problems of performance, drawing for the purpose on many domains of understanding; then, they need to communicate by a method of analysis-in-action on the implications of the learners' decisions. Second, teachers as coaches must tailor their understandings to the needs and potentials of particular students at a particular stage of their development. Finally, teachers as coaches must do all of these things within the framework of the role they choose to play and the kind of relationship they wish to establish with the student, taking account the ever-present dangers of vulnerability and defensiveness.

Hansen & Stephens (2000) elaborate the moral base of collaborative learning. During the period of its popularity, it has been connected to human growth and development. They cite a theory of Abraham Maslow that says that in practically every human being there is an active will towards health, an impulse towards growth and actualisation of human potentialities. Growth means learning, and learning in a continually transforming environment means 'change'.

Rogers & Freiburg (1994) extend this concept by pointing out that

facilitation of change and learning is the aim of education; in this context, the teacher becomes a facilitator. The role of the 'teacher as facilitator' is very much different from that of the 'teacher as instructor'. As a facilitator, the teacher is very much concerned with the growth of students. It is a moral partnership: teachers and students agree to bring out their best to develop the social and mental potential of the students which implies certain rules – a code of ethics. In addition, Rogers & Freiburg insist that teaching and facilitating is based on moral virtues; more on attitudinal qualities than professional skills. Socket (1993) enumerates these moral virtues as honesty, courage, care, fairness, and accountability.

A major problem in developing a new method of teaching in the Faculty of Architecture is to change the thinking of the teachers: it is not primarily a problem with the students. For this reason, the school's administrators need to be thinking about teacher training, intensive workshops, work-based learning, teacher appraisal, leadership, and mentoring and coaching to develop competence and professionalism among the teachers.

Effective Teaching in Higher Education

To be effective in teaching and ultimately to be instrumental in the success of students' learning, university lecturers need to apply the six key principles of effective teaching in higher education. Based on students' evaluation of teachers, the principles are as follows (Ramsden: 2003):

Principle 1: Interest and explanation

Students are after the quality of explanation by the teacher and arouse their interest on the subject matter. By using authentic material, students find pleasure to learn.

Principle 2: Concern and respect for students and student learning

Concern and respect are about teacher's consideration and consciousness for students. Teacher's lack of compassion affects students and student's learning.

Principle 3: Appropriate assessment and feedback.

Of all the aspects of good teaching, giving feedback and useful comments on student's work was commonly cited.

Principle 4: Clear goals and intellectual challenge.

Explaining to students what must be learned and important concepts they must master. Teachers remember to make the challenge interesting and not boring.

Principle 5: Independence, control, and engagement.

A sense of student control over learning and enthusiasm on the subject matter is crucial considering that students must be engaged with the content of learning activities that they understand. Supplying learning tasks according to their level of understanding can create opportunity for students to learn in their own so as not to avoid over-dependence.

Principle 6: Learning from students.

Effective teaching should not take students for granted. Changing teaching strategies according to teacher's knowledge about students is essential. Good teaching is concern about trying to find out the effects of instruction on the learners.

Professional Learning: The Architectural Studio as a Paradigm for Reflection in Action

Schön (1987) describes a case study regarding a teacher and student discourse in terms of architectural designing. In one semester, students have to develop their own version of the design; recording results in preliminary sketches, models, and working drawings. Then the teacher and the jury critique the designs made by students at the end of the semester.

In the beginning the teacher conducts a design review with every student during the semester. Schön investigated the communication between Quist, a studio master and Petra, his student, who has toiled for many weeks

preparing some drawings and was ‘stuck’ and confused on what she should be doing. Petra was given a program to design an elementary school, and a detailed description of the site where the school is to be constructed. Quist analysed her work by initially placing a sheet of tracing paper over her sketches and starts to draw over her drawing and at the same time giving his comments. His drawing and talking make the process easily understood by Petra. Quist shows what she should be doing.

In this case, Schön stresses that drawing and talking are parallel ways of designing and when combined together is called the language of designing - the language of doing architecture – a metalanguage whereby Quist illustrated the qualities of the process he is showing to Petra as a reflection on the action of designing. The studio master asked his student to begin with a discipline, even if it was arbitrary. The principle is that Petra should work simultaneously from the unit and from the total and then go in cycles.

In the first facet of the review, the student demonstrates her initial sketches and expresses the problems that she met namely: hardship getting past the diagrammatic phase, fitting the shape of the building with the contours of the land but the shape does not fit into the slope, and locating the units in a proper way. The teacher reframes the problems in his personal terms and shows the working out of a design solution. Quist comments that the major problem is not fitting the shape of the building to the slope but that the location is too ‘screwy’. According to the teacher, coherence is a form of geometry – a discipline – that can be placed on it. The new problem of bringing together the constructed geometry with the screwy contour of the slope is now in focus. The geometry can be broken down again by removing the original discipline to test another one. Quist uses metaphor figuratively speaking that geometry is a sort of armour that once created can be broken open in spaces. After this phase, a short interval of reflection follows. Quist tells Petra what to do next that will lead her to look at the representation of the slope in various ways. Next, Quist reframes the problems according to what he sees and shows the design solution followed by a short interval of

reflection on the demonstration. The reframing of the problem created renewed appreciation of the former condition backed up by the new geometry that provides pleasing nooks, views, and soft back areas.

According Schön the characteristics of architectural studios is manifested in here – the student doing something in their own way, not clear on what she is supposed to do, getting stuck, her experience of perplexity and mystery; studio master giving instructions, demonstrating and reflecting.

Schön argues that although Quist as a practitioner and teacher was admired by many students, some of them could not understand what he means by 'thinking architecturally'. Students cannot understand what designing means, and thinking like an architect is to be elusive, obscure, alien, and mysterious. According to Schön (1987, p. 82):

> … the master studio realizes that they do not at first understand the essential things. He sees, further, that he cannot explain these things with any hope of being understood, at the least at the outset, because they can be grasped only through the experience of actual designing. Indeed, many studio masters believe … that there are essential 'covert things' that cannot never be explained; neither the students gets them in the doing, or does not get them at all.'

Furthermore, Schön suggests that the paradox of learning a fresh skill is that in the beginning a student cannot understand what he needs to learn, can learn only by educating himself, and can educate himself only by beginning to do what he does not yet understand.

Action Research

Action Research was the method used in this study. Thus, explaining its definition, elements, and the steps in this section further enhances this research application when cooperative learning is used in the studio. Kemmis & McTaggart (1990, p. 5) define Action Research as:

> a form of collective self-inquiry undertaken by participants in social situations in order to improve the rationality and justice of their social or educational practices, as well as their understanding of these practices and the situations in which these practices are carried out. Groups of participants can be teachers, principals, parents

> and other community members – any group with shared values. In education, Action Research has been used in school-based curriculum development, professional development, faculty improvement programs and systems planning and policy development – policies in classroom rules, faculty policies about their consulting roles, and state policies about the conduct of faculty improvement program.

Caro-Bruce (2000, p. 50) focuses, directly, on the use of Action Research in professional development:

> a powerful form of professional development incorporating reflection and dialogue in small learning communities. It is a process in which participants examine their own educational practice, systematically and carefully, using the techniques of research.

Action Research aims to promote change in specific situations rather than discover 'truth' and derive general laws (Kelly & Kember, 1994). Lewin (1946) describes Action Research as a spiral of steps which is composed of planning, action and the evaluation of the result of the action. This description is expanded by Kemmis & McTaggart (1990) who regard Action Research as 'participatory, collaborative research which normally arises from the classification of some concerns generally shared by a group'. People describe their concerns, explore what others think, and investigate to find what it might be possible to do. They identify a thematic concern or what is called educational issue or educational questions. The thematic concern defines the real area in which the group decides to focus its improvement strategies. Group members plan action together, act and observe individually or collectively, and reflect together.

Owen & Rogers (1999) further enumerate the four elements of Action Research:

1. The **Plan** is constructed action and by definition must be progressive to action it must be forward looking.

2. **Action** in the sense intended here is deliberate and controlled – it is careful and thoughtful variation of practice – and is critically informed. It recognises practice as ideas-in-action.
3. **Observation** has the function of documenting the effects of critically informed action – it looks forward, providing the basis for reflection now, but more so in the immediate future as the present cycle runs its course.
4. **Reflection** recalls action as it has been recorded in observation, but it is also active. Reflection seeks to make sense of processes, problems, issues and constraints made manifest in strategic action is usually aided by discussion among participants.

Kemmis & McTaggart (1990) delineate these steps in more detail:

1. Action Research is an approach to improving education by changing it and learning from the consequences of changes.
2. Action Research is participatory.
3. Action Research develops through the self-reflective spiral.
4. Action Research is collaborative.
5. Action Research establishes self-critical communities of people participating and collaborating in all phases of the research process.
6. Action Research is a systematic learning process
7. Action Research involves people in theorising about their practices.
8. Action Research requires that people put their practices, ideas and assumptions about institutions to the test
9. Action Research is open-minded about what counts as evidence or data
10. Action Research involves keeping a personal journal in which we record our progress and our reflections about two parallel sets of learning.

11. Action Research is a political process because it involves us in making changes that will affect others.
12. Action Research involves people in making critical analysis of the situations (classrooms, schools, systems) in which they work.
13. Action Research starts small, by working through changes which even a single person can try, and works towards extensive changes.
14. Action Research starts with small cycles of planning, acting, observing and reflecting.
15. Action Research starts with small groups of collaborators at the start.
16. Action Research allows us to build records of our improvements.
17. Action Research allows giving a reasoned justification of our educational work to others.

As long as teachers aspire to develop their effectiveness and professionalism, Action Research should always be a part of the teachers' life (Parsons & Brown, 2002).

The cycles of Action Research – to plan, act, observe and reflect – may be used to improve the teaching process as a whole. It is suggested that the Faculty of Architecture might easily remedy deficiencies or weaknesses in its programs and policies by applying continuous cycles of Action Research.

Qualitative Research Design

Qualitative Research Design, specifically as applied to this research, is concerned with gathering the opinions and feedback of students and teachers

who participated in various interviews and focus group discussions. As well, it involves framing the research questions; designing the research; data collection methods; recording, managing and analysing data; managing time and resources; defending the value, logic and the quality of the study.

Qualitative research has become an increasingly important approach in many research fields; it involves some generally accepted common procedures. Marshall & Rossman (1995) view qualitative research as an interactive process – both descriptive and analytical – between researchers and participants that relies on people's words and behaviour to provide the primary data.

Since some qualitative researches display a lack of focus and design description, Marshall & Rossman (1995) believe it is necessary to have clear guidelines for those considering qualitative research, from the process of writing a qualitative research proposal, demonstrating how to write a proposal that reassures reviewers by defining explicit steps to follow, principles to adhere to, and rationales for the strengths of the qualitative approach.

I realised that using qualitative analysis, interviewing students and teachers, and encouraging them to participate in group discussion as well as asking them to answer a questionnaire, would help me to identify their opinions and to provide feedback about the need to improve the teaching and learning approach in the Faculty of Architecture.

Program Evaluation

This section gives the definition, elements, forms, purpose or orientations, typical issues and key approaches of program evaluation. These six elements helped me to evaluate what was needed to improve and change the learning and teaching method in the Faculty of Architecture.

Owen & Rogers (1999, p. 4) describe program evaluation as:

> the processes of negotiating an evaluation plan, collecting and analysing evidence to produce findings and disseminating the findings to identified audiences for use in

> describing or understanding an evaluand and making judgments and/or decisions related to that evaluand.

Royse & Thyer (2001) suggest that whenever new interventions are being tried or it is not known whether they will be successful as previous systems, they need to be subject to program evaluation.

Administrators have to make decisions and it is crucial that programs are 'good programs': this is the moral element of evaluation. Freeman & Rossi (1985), point out that evaluation research is aimed at improving the planning, monitoring, effectiveness, and efficiency of education and other human service programs. According to Owen & Rogers (1999), the forms of evaluation have specific purpose or orientation, focus on a set of common issues, employ major approaches to social science and management, point to a wide range of roles for evaluation and answer the question: 'Why are we doing this evaluation?'

Michael Scriven, cited by Owen & Rogers (1999, p. 3), is a major evaluation theorist, who suggests that practicing evaluators have expanded their range of activities to address questions such as

1. What is needed?
2. What are the components of this program and how do they relate to each other?
3. What is happening in this program?
4. How is the program performing on a continuous basis?
5. How could we improve this program?
6. How could we repeat the success of this program elsewhere?

The findings of an evaluation are of primary importance. They consist of evidence, conclusions, judgements, and recommendations. Owen & Rogers (1999) list the five categories of evaluands or the object of evaluation as follows: programs, policies, organisations, products, and individuals.

Forms of evaluation

Owen & Rogers (1999) enumerate five forms of evaluation; each has a specific purpose or orientation, typical issues and key approaches, as follows:

1. **Proactive Evaluation**
   Purpose: To provide input to decisions about how best to develop a program in advance of the planning stage.

2. **Clarificative Evaluation**
   Purpose: To concentrate on clarifying the internal structure and functioning of the program or policy.

3. **Interactive Evaluation**
   Purpose: To provide information about delivery or implementation of a program or about selected component elements or activities.

4. **Monitoring Evaluation**
   Purpose: To monitor when a program is well-established and ongoing or regularly monitoring the progress of the program.

5. **Impact Evaluation**
   Purpose: To assess the impact of a settled program by, for example, establishing the outcomes of a completed adult education remedial reading program.

Interactive evaluation

Interactive evaluation is concerned with the following: the provision of systematic evaluation findings so that local providers can make decisions about the future direction of their programs; assistance in planning and carrying out self-evaluation; focusing evaluation on program change and improvement, in most cases on a continuous basis; and a perspective that

evaluation can be an end in itself, as a means of empowering providers and participants.

By using Action Research within the Interactive evaluation form, I expected to accumulate general findings and results in order to use them as a tool to make decisions in the improvement of teaching and learning methods for both the teacher and students in the Studio Project Design course.

Theory of Change

Twelve principles of change are enumerated below. These principles strengthen the position of this research: that change must take place to achieve progress in the Faculty of Architecture. Change is inevitable; for educational institutions to progress, change must take place. Schools, students and teachers have to 'change their minds' to reshape their present thinking about faculty and learning. As persons change their practice and thinking they grow (McCombs et al., 1997). Teachers must be inspired to change their beliefs only when they understand the benefits of change. Management guru, Stephen Covey (1989) explains a vision-directed change as, 'starting with the end in mind'. According to him change must be initiated first and foremost within individuals themselves. He suggests that we should have a blue print to define motives clearly. He adds that we should consciously move out of the auto pilot mode of our own entrenched habits and thoughts which could trap us into ineffectiveness, thus, we should engage in rescripting – a conscious process, a habit of deliberate awareness and mental creation backed by clear intentions. Hargreaves et al. (1996) suggest that if schools would like a better future for the world, schools need to change. Change, if it is to mean anything at all, has to have an impact at the classroom level on the hearts and minds of teachers and students (Ainscow et al., 1994). Change might be difficult for both teachers and students following this transition; however, acknowledging the twelve principles of change, as proposed by Hall et al. (1973), future change can be

achieved as follows:

1. **Change is a process not an event.**

Change is not achieved in a short period of time. Change is a process through which individuals and institutions move as they slowly come to understand and learned the new ways of using things.

2. **There are significant differences in what is entailed in development and implementation of an innovation.**

Development includes all efforts, actions, and steps linked to making an innovation while implementation involves all the steps and efforts in learning how to use the innovation.

3. **An organisation does not change until the individuals within it change.**

Even there is a change in the organisation and systems, different people will have different reactions to change. Some people will welcome the innovation quickly, others will need more time to adopt it and still others will avoid making the change for a longer period of time.

4. **Innovations come in different sizes.**

One of the crucial qualities of innovation is size. Some innovations are small, like prescribing a new Edition of the textbook while others are large in scale such as school-and-system wide changes in the roles of academics, take longer years to implement, and involve specialised training and consultation. (Van Den Berg & Vaudenberghe, 1986)

5. **Interventions are the actions and events that are the key to the success of the change process.**

Leaders of change think only on the innovations and do not think about small interventions that will affect the change. One relevant type of intervention is when the dean of a certain faculty has a short discussion to the lecturer about the innovation in the college. This is called one-legged interview. Small intervention should be given emphasis to ensure success of the change process.

6. **Although both top-down and bottom-up can work, a horizontal perspective is the best.**

Top-down means teachers see themselves at the bottom line of the faculty organisation while the principal and other faculty administrators on top level always starts from the top, hence, top down. To attain success in the change process, a vertical model (top to bottom) must be replaced with a horizontal paradigm whereby all people in the organisation view themselves on the same plight or level. Everyone must acknowledge that he or she is a part and parcel of the whole system and learns to trust that all people are doing their job well – that is the way that change can be assured.

7. **Administrative leadership is essential to long-term change success.**

Even there is collaboration among teachers to initiate innovations but without the support of administrators to the innovation then change effort will gradually die down. Administrators need to make new policies to encourage innovations to continue.

8. **Mandates can work.**

Another type of innovation is called strategy aside from small intervention. A mandate is a strategy. Because of its top down orientation, critics say it is ineffective, but with the clear mandate, people expect that innovation will succeed provided that the mandate should be supported with on-going communication, continuous training, on-site coaching and time for implementation.

9. **The faculty is the primary unit for change.**

Individuals play dynamic role in change effort but the main organisational unit for making change is the school. Teachers and administrators can initiate change and can strongly impact the society. However, to make change it needs the support of people inside and outside of its system. Therefore, it can use external resources, and those from the outside should give recognition to faculty staff who

was introducing change.

10. **Facilitating change is a team effort.**

Without team effort, facilitating change is not possible. Both teachers and faculty administrators should learn to work as a team to build a strong unity to facilitate change.

11. **Appropriate interventions reduce the challenges of change.**

Some writers have said that change is painful and asserted that this pain must be endured as a natural part of the change process. To some people, it could be painful if they could not understand very well the benefits they could get from change. If the change process is carried over, change can help to better lives.

12. **The context of the faculty influences the process of change.**

Being a unit of change, the faculty can influence individuals and institutional change efforts because of its physical features (structures, resources and policies that mould the work of teachers) and people factors (values, beliefs, and attitudes to guide teachers' behaviour). Teachers can evaluate their works and identify areas for improvement as well as assess their impact based on student results. Supportive faculty leaders and administrators who work harmoniously with them in their quest for high quality instruction is one attribute that can effect change.

These twelve principles of change were suitable for making recommendations in the final outcome of this research in order to bring about concrete change in the Faculty of Architecture at Sriburapha University.

Dixon (1998) predicts that either we take hold of the future or the future will take hold of us, commenting on the speed of change, and the confusion it creates for organisation. Worall & Cooper (2001) believe that rapid organisational change has totally affected the skill set that people need in order to be effective in the context in which they function.

Many writers suggest that constant innovation is the best way to protect

both individual and the organisational success. Roffe (1999) offers three scenarios:

1. **Incremental change:** here it is the little, unnoticed changes that make the biggest differences;
2. **Discontinuous change:** it is different this time because the response needed is not related to a familiar pattern; and
3. **Radical change:** where 'upside –down' thinking is needed.

Modern firms take a united approach to problem solving by showing a willingness to see problems as a whole, and in their solutions to move outside the received knowledge, to challenge established practices and generally see change as an opportunity rather than a threat. This approach requires the skill to persuade people to invest time and resources in new and possibly risky initiatives; manage problems arising from team working; and understand how change is designed and constructed in an organisational context. On the contrary, firms that used group structures are more likely to see problems in separation and out of perspective. In addition, complacency is also a common reason for performance. Furthermore, problem with organisational change is that it tends to make plan overload and this can trigger resistance from the people most affected. Abrahamson (2000) called this 'permafrost' and it occurs when change-fatigued middle managers undermine initiatives introduced by the twenty-something below them who mastermind change.

Perhaps the key to successful change lies in what Abrahamson (2000) calls 'dynamic stability'. In applying this concept, organisations deliberately combine a major challenge plan with carefully paced periods of incremental, organic change by deploying the following guiding principles: first, borrow and adapt – do not reinvent the wheel; second, capture learning – what we know and what we are learning energetically; third, supervise internally – stability is easier to manage from the inside; finally, encourage a generalist, 'open-minded' approach.

The transition then from random to fixed learning at work is not an easy

one. Several authors have supported a series of progressive steps, as follows:

Step 1: Stop 'fire fighting'. Constant, immediate change or fire fighting destabilises any serious efforts to learn from change. According to Bohn (2000) it occurs if three to six interlinked elements are routinely occurring:

1. Insufficient time to solve all the problems. More problems than teachers can deal with properly.
2. Solutions are incomplete. Many problems are patched, not solved. That is the superficial effects are dealt with, but the underlying causes are not fixed.
3. Problems recur and cascade. Incomplete solutions cause old problems to re-emerge or actually create a new problem, sometimes elsewhere in the organisation.
4. Urgency supersedes importance. Ongoing problem-solving efforts and long-range activities, such as developing new processes, are repeatedly interrupted or deferred.
5. Many problems become crises. Problems smoulder until they flare up, often just before deadline; then, they require major efforts to solve.
6. Performance drops. So many problems are solved inefficiently and opportunities miss that overall performance declines suddenly.

Step 2: Consider what benefits might be derived from embedded, organisational learning. Crossan (1999) argues that renewal of the overall enterprise is the main driver and that organisational learning is principally a means to this end. Crossan (1999) suggests a framework for organisational learning, based on four processes – intuiting (sensing), interpreting, integrating and institutionalising. There are four propositions (*Ps*) underpinning this approach:

1. Organisational learning involves a tension between assimilating new learning (exploration) and using what has been learned (exploitation)
2. Organisational learning is multilevel: individual, group, and organisational.
3. The three levels of organisational learning are linked by social and psychological processes: intuiting, interpreting, integrating and institutionalising (4Is).
4. Cognition affects action (and vice versa)

Step 3: Consider how do we learn from change? The seniors must grab and begin to model themselves a new work culture that encourages and respect openness, collaboration and interdependence. 'Easy to say but difficult to' – do unless the executive team really shapes the work and learning culture and by so doing, actively promotes a desire to learn from change. Fulmer & Keys (1998) suggest that five requirements need to be met before this can happen:

1. Continuous and open access between individuals and groups;
2. Free, reliable communication; where
3. Interdependence is the foundation of cohesiveness;
4. Trust, risk-taking, and helping each other is prevalent; so that
5. Conflict is identified and managed.

The key point here is the potential of individual learners to share their experiences among their own work groups so that organisational benefits can begin to flow from shared insights.

Step 4: Lay the foundations for learning from change. Fulmer & Keys (1998) believe that contemporary organisations should strive to:

1. Work, plan and think more creatively;
2. Build from their knowledge about their products and processes;

3. Engage with their work forces at a deeper level, via concerted and cooperative action with internalised long-range commitment; and
4. embed learning as a way of responding to and understanding the challenges of complexity.

Step 5: Focus on desired outcomes. Learning from change can only benefit the enterprise as a whole if individual take learning seriously and are acknowledged for their efforts. In cultural terms, this is unlikely to happen unless individuals feel:

1. that they can state their view openly;
2. their separate creative contributions can be integrated into a holistic corporate effort;
3. that active learning is valued and practiced senior management; and
4. that the new knowledge and insight that is generated by learning from change will be embedded and used to deliver benefits for all.

The success of all of these steps relies on the ability and strength of the leaders of change, as Kouzes & Posner (1987) point out in their description of the role and influence of leaders on the formation of organisational values.

Popper & Lipshitz (2000) believe that the three main channels of influence are as follows: time devoted by the administrator; administrators' attention; reward and recognition through bonuses, letters of appreciation, and promotion. Commenting on the role of learning in reward and recognition, Popper & Lipshitz (2000) believe that administrators who value and reward learning activities, reward people who contribute to organisational learning, use aspects of learning as part of the process of evaluating employees, make learning activity a criterion for promotion, and reinforce the behaviours required for maintaining organisational learning.

Adult Training

Training is significant not only to young people but also to adults. Thus, this section includes the qualities of adult learners, the major challenges of education of young and adult teachers, characteristics, and the need for lifelong learning. This supports the view that educating and training the teachers, even though they are mature, is important in bringing about change in the educational set-up of the Faculty of Architecture.

Tovey (1997) observes that adult learning can be satisfying, terrifying, overwhelming, threatening or boring. Trainers can help them achieve quality learning or make their learning experience awful. He defines learning as 'change in a person that comes about as a result of practice or experience'. In addition, Tovey characterises some generally accepted principles about adult learning which is also called andragogy. According to Tovey, when a person learns, something changes; in particular, emotion, anxiety, and stress are affected when there is change. Learning greatly affects the psychological and physiological condition of an individual. It is linked with different stages of human development. Adults have already learnt through experience. They develop a preference to continue in the same way, as a result avoiding new things, changes and various ways of thinking. People learn from birth until death. It is a continuous process, it occurs regardless of age. Learning is part of the human life, it is innate and normal. Learning is very personal. It is based on personal commitment to learn. No one can learn for you. Through intuition, we don't know when or how we have learnt things.

Smith (1988) classifies four qualities of adult learners, as follows:

1. **An accumulation of experience.**

   Since adults have many responsibilities and had performed a variety of tasks, they bring a vast treasure of experience and uniqueness to the learning situation in an individual way.

2. **A different approach to education and learning**

   Adult learning is goal-driven. Adult learners should get benefits from it which is mainly focus on practical things or problem solving. They

will come to a course with specific motivation and do not like to waste precious time.

3. **Special development trends**

Adults experience changes in various stages of their lives. Changes may include retirement, money problem, becoming parents, being a divorcee, transferring house, death of a loved one, changing jobs and receiving a promotion. When these things occur, adults require getting some new learning to cope with the situation.

4. **Anxiety**

Learning is connected with change. Change causes fear, pain and anxiety. Trainers should consider the various stages of anxiousness about the change, the training and themselves.

Ten major challenges to the education of teachers are identified by Longworth & Davies (1996):

1. helping establish a cradle-to-grave habit of learning;
2. individuals from all sectors of society regardless of age receiving benefits from developing their personal potentials through learning;
3. providing leadership locally, nationally, globally;
4. teacher training organisation acting as the main focus for learning activities;
5. teacher trainers giving leadership to schools to set joint projects with both educational and non-educational institutions, local and international;
6. universities taking an active role in addressing change to the entire educational service;
7. continuously upgrading and developing skills and knowledge, and doing this for both for students and teachers so that schools can truly adjust themselves to the changing times,
8. being relevant to the demands of present business and industry;

9. developing personal, societal, organisational and national values;
10. recognising that the subject of lifelong learning is vast and it includes not only individuals but also the nation, business and industry and society.

Sir Christopher Ball, speaking at the First Global Conference on Lifelong Learning held in Rome, 1994, (National Board of Employment, Education and Training, 1996) pointed out that the primary point of controlling supplies of education and training in the future must be that significant specific work for learning is encouraged with the assistance of everyone in the community. Not only should learners have planned action but also governments, educational providers, media, professional organisations and business sectors.

Continuous professional development is now very important because all professionals work in a context that is changing rapidly. In education, professional developments have implications for what and how teachers teach. The 1999 Thai Education Act (ONEC, 1999) proposes that the curriculum should teach fewer facts and routine skills, and increase young people's capacity for reasoning, thinking and problem solving on a lifelong learning basis

In order to achieve those changed objectives, teachers should: acquire new content knowledge; use different teaching methods; work in ways accountable to parents and others; act ethically in a context where traditional practices are challenged by new concepts of equity and individual rights.

McNergney & Herbert (2001) point out that in the US many Americans take advantage of higher education because young adults who have completed bachelors degree or higher earn substantially more than those with a high faculty diploma. It also offers opportunities for young and old alike to develop interest and talents and to increase literacy skill.

Lifelong learning

Candy et al. (1994) assert that it is beyond argument that people learn throughout their lives. For almost everyone, continued learning is virtually and inseparable from life itself. It extends from such basics as learning to walk and talk through an astonishing variety of physical, aesthetic, social, linguistic and conceptual achievements, to encompass virtually everything that humans have been able to imagine, to explain and to do.

Longworth & Davies (1997) point out that lifelong learning is the development of human potential; they recognise that each individual has a learning potential and accept few limitations on that potential. Most barriers to progress are not based in biology or physical incapacity but on the limitations and lack of expectations we impose upon ourselves. We take an optimistic viewpoint of human capacity, based on the belief that all of us, irrespective of background, genetic make-up, environmental development, creed, colour or nationality, can make quantum leaps in the achievement of our own human potential-and that we would, if we had the opportunity, and experienced joy in so doing. Hart (1999) suggests that lifelong learning is an outgoing quest for education, knowledge and skills. It is a concept that many would accept without question. Learning implies progress and vitality.

Furthermore, Longworth & Davies (1997) recommend that universities, in particular, should:

1. offer leadership to the whole educational service in addressing change;
2. treat the whole community as comprising past, present or future students;
3. encourage and disseminate research into learning, especially the implications of the new ‘brain sciences’;
4. encourage the professional organisations to promote lifelong learning among their own members;

5. take account of the requirements of lifelong learning when recruiting, and when providing induction to new members of staff;
6. provide programmes which allow the accreditation (assessment) of prior learning;
7. cooperate to harness the new educational technologies in support of the learner.

Motoyo Ogisu-Kamiya, cited in Hatton (1977), recommends that the development of and support for a learning infrastructure is crucial if workplace lifelong learning is to take place. In this vein, competency within the organisation is required in order to facilitate lifelong learning. Strong leadership and an organisational vision, coupled with learning capacity and managerial initiative must be fostered.

The Australian National Board of Employment Education and Training (Ramsden & Martin, 1996) emphasises the importance of a system of recognition and reward for good teaching practice in the higher education sector which is in the process of focusing more attention on the quality of teaching. These efforts and processes must continue to be recognised and promoted by universities in the context of developing lifelong learning.

Candy (1991) sees the relationship between self-directed learning and lifelong education as a reciprocal one. Self-directed learning is one of the most common ways in which adults pursue learning throughout their life span, as well as being a way in which people supplements learning receive informal settings. Lifelong learning equips people with skills and competencies required to continue their own self education beyond the end of formal schooling. Self directed learning viewed simultaneously as a means and an end of lifelong education.

Dawe (1998) suggests that for lifelong learning to work, three main elements have to be involved: employers committed to training and developing their employees; individuals committed to their own development

through training; and providers – from further and higher education – who respond to the needs of employers and individuals.

Individuals who are interested in lifelong learning, formally or informally, should possess: skills and attitudes important for learning, specifically in reading and in number skills; being confident to learn, which adds to a feeling of agreement with the education and training systems; and motivated and willing to learn. Individuals who stick with this system will gain skills and knowledge whenever and whatever area they will learn.

The need for lifelong learning

There are two requirements of lifelong learning: first, that the individual has participated in some initial education and training upon which they may build to reach bigger wider and better economic goals; second, a common set of objectives and goals required to build a society held by a number of people who finds enjoyment in learning. There are unique economic benefits to people who are ready to face a changing economic environment; lifelong learning also has an important social aspect. While economic globalisation and the change of work places by technology is a motive to lifelong learning, there is a growing approval that the success of modern industries relies deeply on a knowledgeable society. Lifelong learning should be involved not only with a skilled, useful workforce but with people who are enabling to recognise their individual ability in public learning emphasising the aware society as well as understanding different important topics in public policy.

The teachers in the Faculty of Architecture need to undergo training even though they consider themselves expert in the field of architecture. In doing so, they have to accept that education is a continuous process.

Assessment and Accreditation in Architecture

Maitland (Boud & Feletti: 2008) comments that in Newcastle the course in architecture focuses on the significance of integrating aspects of architectural

education- discipline areas, particularly design and technical areas, in order for students to see the entire development of a building project.

He notes that assessment in Newcastle can be done as a continuous marking of a task through the year. It includes mid-and end-of-year reviews and a final compilation of assessment with a single grade outcome for the year. Students' projects are reviewed by juries assigned for the year and invited guest critics at the end and even in the middle stage of a problem phase wherein they have a design objective checklist for the project, and are advised, by the group tutor, on the way in which each student undertook the process.

Maitland further notes that every student makes a presentation of their submission to the jury, and answers questions, criticisms and discussions, as well as joining in the debate. It is open during the entire year and other years as well. A closed session by the jury follows, during which a further review of all the projects is undertaken, and grades are given. Finally, the grades are published.

The progress in the study areas is assessed by the relevant consultants in two ways: through the main design submission; and by separate assignments aimed to prepare students with the skills and knowledge needed for solving the problem. The consultant involved, is given the objective for a specific problem phase in which the students are involved, e.g., '…be able to show the proposal by means of a two-point perspective drawing'.

At the end of each semester, the panel chaired by the relevant manager, reviews each student's result for both study areas and design integration in the presence of the student. A remedial program might be given to students who did not achieve at least a pass standard in all areas.

At the end of the year, study area result, weighted according to the speculated time a student is expected to spend on each area are accumulated and added to the design integration result, similarly weighted based on the phase length, to give a single overall graded year result.

The formal assessment process is considered as a supplement of the

learning experience involving debates and discussions where students defend their choices regarding arriving at design solutions. As far as students are concerned, internal evaluation of their responses to the course is not a problem; hence, the Newcastle architecture graduates are the most satisfied in terms of their understanding of the assessment process based on the Graduated Careers Council of Australia's Annual Course Experience Questionnaire.

Another important assessment is the accreditation procedures for external evaluation of architectural course organized by the Royal Australia Institute of Architects, Commonwealth Association of architects and Architects Registration Board for each state.

The accreditation panel is composed of academics, practitioners, state and national representatives and student members. Their task includes visiting schools for three days inspecting portfolios of the lowest, median and the best pass work in the previous two years, evaluating teaching in each discipline areas, inspecting facilities, and meeting staff and students.

A school may be accredited by the joint accreditation panel for professional recognition of its degree for up to five years. Newcastle school was accredited because of its conversion to Problem-Based Learning.

Conclusion

The literature discussed in this chapter reveals that students would be expected to respond positively when cooperative learning and its related concepts, problem-based learning and constructionism are employed.

Meanwhile, to make this plan more successful, the teachers should undergo professional development and adult training. The principles of change should be embraced in their profession in order that change might take place.

CHAPTER 3

Research Methodology

Introduction

This research project undertook an Interactive evaluation of the effectiveness of using student-centred cooperative approach – as opposed to the more traditional teacher-centred approach – in the teaching of a third year architecture subject, Studio design. During the academic year 2003-4, I, as student researcher, taught – in rotation – four classes of the Third Year Studio Design course using a student-centred approach based on cooperative learning.

An Action Research approach, within the framework of an Interactive evaluation research methodology (Owen, 1999), was employed to determine both the effectiveness of this student-centred approach, and ways of improving this method of delivery. My Studio Design students and I, jointly, engaged in this research. I used interactive evaluation because it provides information about delivery and implementation of the research outcome that will bring improvement to students' learning process and teaching methods in the Faculty of Architecture. In this research, I acted as an evaluator to provide findings and facilitate learning.

Based on the typical issues involved in interactive evaluation (Owen & Rogers, 1999), I sought to answer the following specific questions:

1. What is this new method of teaching trying to achieve?
2. How is the new method of teaching going?
3. Is the delivery of the new program working?

4. Is the delivery of the Studio Design consistent with the original program plan?
5. How could the delivery of the new program be more effective?
6. How could changes to the organisation of Third Year Architectural Design be changed to make it more effective?

To answer these questions, an Action Research approach (Kemmis & Taggart, 1988) was applied which means that a form of collective self-reflective inquiry was undertaken by participants in a social situation in order to improve the rationality and justice of their own social or educational practices as well as their understanding of these practices and the situations in which these practices are carried out.

In education, Action Research has been employed in school-based curriculum development, professional development, faculty improvement programs and systems, planning and policy development. A spiral of steps in this research (Lewin, 1946) composed of plan, action, observation, and reflection were followed, accordingly, in this research.

Preliminary comparisons over the past three years, using student grades as the only measure, have suggested that there is a significant improvement in student outcomes using a student-centred approach in Studio Design. Using the qualitative perceptions of student and staff, this research was concerned with determining the reasons why a student-centred approach – which uses cooperative and problem-based learning methods – is more effective in improving student outcomes, and what consequences this might have for future course organisation and improvement. The outcomes that were considered consisted of the following:

- improving students' abilities in all components of Studio Design,
- developing positive attitude towards design,
- increasing students' technical and academic competency to meet design demands,

- enhancing student independence, creative thinking; and the level of interaction and cooperation that is engendered between students and teachers.

In summary, two Action Research phases were undertaken in which the feedback from semi-structured group interviews, in-depth interviews and a student survey were undertaken and, following reflection, the Studio Design course was modified. The details of this process are considered in the next section.

Details of the Research Process

In this section, details of the semi-structured interviewing process, the Action Research phases, and the student questionnaire are provided.

Semi-structured interviews

Information relating to student opinion about the Studio Design course, was collected by semi-structured interviews of all students engaged in the course. I used semi-structured questions (Krueger & Casey, 2000) to give the students the opportunity to provide broad information; hence, questions were open-ended and encouraged elaboration. Advice from an expert in evaluative questionnaire design was sought during the development of questions for the semi-structured interviews, and trials of the instruments were undertaken with previous graduates from course. Sample questions are contained in Figures 3.1 and 3.2. When it had been fully developed, a final copy of the survey was submitted to my supervisor for approval; a copy of the survey is contained in Attachment E. Analysis of the transcripts of these interviews was undertaken using standard data reduction techniques designed to identify a set of key criteria that related to each mode of delivery. These criteria were compared and judgments were made in relation to differences between the two methods of delivery.

FIGURE 3.1 SAMPLE QUESTIONS FOR THE SEMI-STRUCTURED INTERVIEWS WITH STUDENTS

Tell me about a memorable event that occurred in Studio Design; describe it in detail. Compare the style of teaching that you had in Studio Design with the style of teaching that you have previously experienced; give me specific examples. If you had an opportunity to change just one particular approach to the teaching of Studio Design, what would that change involve? Tell me why you would want to make that change.

FIGURE 3.2 SAMPLE QUESTIONS FOR THE SEMI-STRUCTURED INTERVIEWS WITH TEACHERS

Tell me about a memorable event that occurred in Studio Design; describe it in detail. Compare the style of teaching that you had in Studio Design with the style of teaching that you have previously experienced; give me specific examples. If you had an opportunity to change just one particular approach to the teaching of Studio Design, what would that change involve? Tell me why you would want to make that change

Semi-structured interviews and discussions, relating to student-centred and teacher-centred approaches to teaching, were also held with each of the other three teachers of Studio Design at the completion of the semester. Analysis of the transcripts of these discussions was made and data reduction as for the student semi-structured interviews was undertaken.

Action research phases

Action research Phase 1

The following steps were followed in the first Action Research phase of the research:

1. Based on the feedback from these semi-structured interviews and discussions with the teachers, changes to the Studio Design curriculum were made;
2. The information collected from the current method of teaching was used in the planning phase;

3. Group discussions with the action group and other students in the project design class about the new methods that will be adopted; and
4. Deep individual interviews and group discussions with the action group will be undertaken.

The revised mode of learner-centred delivery of Studio Design was put into action and observations of the new action group were made. These observations were recorded in a journal and supplemented by photographs, and video- and audio-tapes. During this phase, observations of students in the other classes were made and recorded in a similar manner.

Action research Phase 2

The following steps were followed in the second phase of the research:

1. Discussions were held with the other teachers for feedback about the new set of actions;
2. Discussions with the action group for feedback about the new actions;

Student questionnaire

Questionnaires were given to all the students in the action group relating to the new method of teaching. The qualitative data was interpreted and analysed for further development of the Studio Design curriculum. Typical items are shown in Figure 3.3. The complete questionnaire is attached as Attachment E.

FIGURE 3.3 TYPICAL 5-POINT, LIKERT SCALE QUESTIONNAIRE ITEMS IN ACTION RESEARCH PHASE 2

I enjoyed the cooperative learning that was possible in Studio Design (+)
I prefer the teacher to tell me what to do in Studio Design (-)
Studio Design was a disaster for me (-)
I switched on to Studio Design (+)
(Responses: SA, A, D, SD, U; a mix of items with a positive and negative polarity)

Ethical Issues

Since there was a power relationship between me, the student-researcher, and my students, the following techniques were applied to negate the effect of power differential:

To avoid any ethical problems associated with my interviewing or surveying students, I sought their written permission before commencing Action Research phases 1 and 2, assuring them that completion of any questionnaire, involvement in any interviews – individual or group, participation in any photographic or audio activity was absolutely voluntary that they had the right of refusal or withdrawal at any time; that refusal was not allowed to influence any subsequent assessment of their work nor should they feel they were being manipulated or pressured in any way; that they had the right to report such action to the Head of School. They were assured that their participation was in no way connected to the requirements of the course and that any data collected was assessed at the end of the semester once the final grades were submitted. The details of this information are contained in Attachments A, B, and D.

Respondents in the Study

The respondents in the study comprised the 46 students enrolled in the Faculty of Architecture at Sriburapha University during academic year 2003-4. Results were obtained from them; twelve were interviewed in-depth representing the volunteer students – three from each project. All students participated in group discussions; all responded to a questionnaire. Likewise, three teachers in the same university were also interviewed.

To gain better perception of the respondents of the study, a profile is drawn in terms of age and sex of respondents and is included as Table 3.2 and Table 3.3, respectively.

TABLE 3.2 AGE AND SEX PROFILE OF STUDENTS

Criterion	Detail
Age	Students of the target group were between 20 and 22 years of age. The ages of three teachers who were interviewed ranged from 35 to-60 years of age
Sex	From Table 3.5 below, it is shown that just over half the samples were males

TABLE 3.3 FREQUENCY DISTRIBUTION OF RESPONDENTS BY SEX

Sex	Number of Respondents
Male	30
Female	16
TOTAL	**46**

Sources of Data

Two sets of data were used for this study, primary data consists of responses from personal interviews and a questionnaire; and secondary data that includes the mark sheets readily available in the Faculty of Architecture. Two sets of questionnaire were used which dealt with student-centred approach of teaching. Firstly, Attachment E contains a copy of the questionnaire entitled, 'Studio Design Course Questionnaire: Students in the Target Group' and, secondly, Attachment E also contains the Likert Scale Questionnaire were used to generate information on the attitude of respondents towards student-centred approach and which served as a basis for this research.

Another source of data was interviews which included personal and group interviews. A one-on-one in-depth interview involved me and the students in approximately a one hour questioning process where a single topic – the student-centred approach – was discussed. The advantages of this approach were as follows:

1. Students are not influenced by their peers in answering the questions.
2. Students are more willing to express themselves, even sensitive matters.
3. Students are the central point during the entire interview and tend to retain interest in the topic.
4. Interviews could be arranged at the convenience of the students.
5. I, as an interviewer can obtain detailed information giving more insight to the thinking process of the students.

One principal format used in group interviews was the focus group where members of the group concentrated on one topic which was the student-centred approach. It was used to explore attitudes and opinions as well as communicate ideas. A focus group is defined as a small gathering of individuals who have a common interest or characteristics, assembled by a moderator, who uses the group and its interactions as a way to gain information about a particular issue (Lewis, 1995; Gibbs, 1997; Marczak & Sewell, 1998).

The purpose of focus group is to promote a comfortable atmosphere of disclosure in which people can share their ideas, experiences, and attitudes about a topic. Participants 'influence and are influenced', while researchers played various roles, including that of moderators, listeners, observers, and eventually inductive analysis. (Kruger & Casey, 2000). As a method, focus groups are based on two fundamental assumptions. The first is that individuals can provide a rich source of information about a topic. The second is that the collective and individual responses encouraged by the focus group setting will generate material that differs from other methods (Glitz, 1998). The advantages of this approach are as follows:

- Students find support from the members and confident to express their ideas and feelings after listening to others express similar attitudes.

- The interviewer can direct and control the discussion as well as input other related areas as new ideas are produced by students.

Conclusion

By undertaking two phases of Action Research, and using semi-structured interviews, individual in-depth interviews, focus group interviews, and surveys, I was able to collect feedback and opinions from students, the action group, and teachers. These were effective methods for obtaining information from the 46 respondents and the three selected teachers at Sriburapha University.

The findings obtained during Action Research Phase 1 were acted upon in Action Research Phase 2: based on the responses to the semi-structured interviews and discussions, a modified mode of learner-centred delivery of Studio Design was implemented and observations of the action group and other studios were made. In addition, under Action Research Phase 2, a Likert scale questionnaire for students was used and focus group discussions were also held for both students and teachers about changes in teaching the Studio Design Course.

CHAPTER 4

The Action Research Cycles: Qualitative Analysis

Introduction

This chapter contains a qualitative analysis of data gathered according to an Interactive Form of Evaluation (Owen & Rogers, 1999) that was concerned with four elements: (1) the provision of systematic evaluation; (2) assistance in planning and carrying out self-evaluation; (3) focusing evaluation on program change and improvement; (4) a perspective that evaluation might be an end in itself. This evaluation used also the four steps of Action Research as determined by Kemmis (1985) namely – to plan, act, observe, and reflect. These steps were used to evaluate four Studio Project Design courses as follows: Kindergarten, Office Building, Hospital, and Commercial Complex.

In addition, it includes the background to Studio Project Design, information about the students and teachers who were the respondents and participants in this research; and my in-depth interview with them regarding their opinions and responses towards a student-centred method of teaching which uses cooperative learning approach.

Basis of this Analysis

This research was based on an Interactive Form of Evaluation (Owen & Rogers, 1999) that was concerned with four elements: the provision of systematic evaluation findings through which local providers might make

decisions about the future directions of their programs; assistance in planning and carrying out self evaluations; focusing evaluation on program change and improvement, in most cases on a continuous basis; and a perspective that evaluation might be an end in itself, as a means of empowering providers and participants.

Program evaluation experts (see Owen & Rogers, 1999, p. 44) suggest that an evaluator might be asked to observe what is happening to help participants make judgments about the success or otherwise of a given strategy or program initiative, with a view to future planning. In addition to collecting and analysing information, the evaluator might assist decision makers in setting directions and, in some cases, actually assisting with change and improvement strategies.

This evaluation used the four steps of Action Research as determined by Kemmis (1985) – namely, to plan, act, observe and reflect – in order to make judgments and recommendations about, in this case, alternative approaches to teaching Studio Design. A fundamental feature of Action Research is that it concentrates on evaluating implementation of a possible solution to a site-level problem.

1. Develop a Plan of Action to improve what is already happening.
2. Act to implement the plan.
3. Observe the effects of action in the context of which it occurs.
4. Reflect on this effect as a basis for further planning, subsequent action, and so on, through a succession of cycles.

Within the context of this chapter, I have analysed the steps of Action Research as detailed above.

Background of the Studio Project Design

Generally, in the third year Studio Project Design, we have four projects. We have kindergarten and office building for the first semester; hospital and commercial complex for the second semester. Normally each project is

allocated seven to eight weeks for completion. Because we work as a team four teachers, including me, we always share to write out each program. For the year under consideration (2003), Ajarn Pensri was responsible for the kindergarten project; I was responsible for the office building project; Ajarn Sanan was responsible for the hospital project; and Ajarn Apirak was responsible for the commercial complex project.

The steps of working from each project must strictly follow the calendar required by the school. For example, we have a framework for sizing each project and in the first week all students must undertake group data collection. The program has always involved students divided into four groups. The standard sequence is as follows:

First Week – data collection (4 marks out of 30) The students are divided into three to four groups numerically to research on site analysis, building code, building diagram, building technology and real project survey. After they finish, the students must present the information in front of the four teachers who critique their work and allocate marks.

Second Week – each group of 11 to 12 students will go to one specific Studio Design teacher and they will propose their conceptual design to the teacher who will supervise them and give comments on the proposal.

Third Week – students must present layout, plan, elevation, and section of the building to the supervisor for comment. Normally, we visit a real project between the second and the third week, depending on the calendar.

Fourth Week – (4 marks) after the students develop the project under supervision of the teacher, they must present the developed product on the schedule mentioned in the program and all groups must present their projects individually in front of four teachers again. All teachers give comments and corrections on each project; they also allocate marks.

Fifth Week – after receiving comments and corrections from the group of teacher, students develop their own projects by consulting their supervisor for the last time.

Sixth Week – students develop their projects and prepare for the final presentation without any further consultation with their teacher.

Seventh Week – (22 marks) students must present the final project, including a model on the due date, and must make a formal presentation of their project to the four teachers who each of whom provides a final comment final mark. The final mark is a summation of the marks allocated by the four teachers.

Background of students entering third year project design

To understand better the background of the target group, I interviewed the head teacher for project design of first and second year. Basically, the teachers in the first year combined a total of eighty students who study architecture and Thai architecture. There were six teachers altogether. Normally, in the first semester of first year, students undertake a very small project that they could finish and have assessed within one or two weeks. In the second semester they engage in a project design similar to that undertaken in the second and third year.

The program starts by letting the student develop their project step-by-step from two dimensions to three dimensions; a three-dimensional model could be presented as part of the final project. Teachers did not assess the plan, only the model. The six teachers worked together and assessed the student's project in two separate steps. In the first step, teachers considered only the ideas of the students. For example, they grouped the students' work into four categories such as very good, good, fair and poor according on how well they expressed their ideas on the project. The total score was 15. In the second step, teachers would see the presentation of the project based on beauty and attractiveness of the same project. Again, the total score was 15. The teacher combined the marks from the first and second steps to give each student a final mark out of 30.

I conducted a second interview with the head teacher responsible for the project design in the second year. In this year, there were four teachers who were responsible for project design. They divided the students into four groups and each teacher was responsible for each group. The teacher who was responsible for his or her group was the only one to assess the work and to award marks. When they had the final result for each project, each teacher would bring only the best and the poorest project of each group for the purpose of comparison. This was done to show the idea of marking but each teacher did not need to interfere with each other in terms of marking the project of each student. They had total freedom in marking their respective students.

In this interview, I learned the detailed background of the target group and the method of teaching in the first and second year. The students had worked individually but in the first year they could learn from the opinions of the group of teachers, while in the second year, the success of their projects solely depended on their teacher.

My discussion with studio project design teachers: Ajarn Pensri, Ajarn Sanan, and Ajarn Apirak

After I had interviewed the teachers from first and second year, I felt that I needed to have a group discussion with the teachers who would handle the students in their third year. My aim was to know their ideas about their teaching method and to promote the concept of cooperative learning to apply in Studio Design for the third year students.

In Thailand, the word Ajarn is given to a person who teaches in a university. The third year project design program was taught by four ajarn of whom I was one. I had the privilege, in 2003, of obtaining the personal background of my colleagues, as follows:

Ajarn Pensri, 59, has been teaching at Sriburapha University for more than 20 years. She graduated in Thailand and holds a master's degree with specialisation in tropical architecture from the USA. She also worked with an architectural firm during her stay in America and set up a studio with her

husband to practice her profession upon her arrival in that country.

Ajarn Sanan, 60, taught for more than 20 years at Sriburapha University. He was an old student of this institution. After graduation, he worked in the American Army for four years and at Thanaburi Municipality for eight years. After a short government service he continued master's degree in architecture from a local university. He returned to Sriburapha University the same year as Ajarn Pensri. He was also former deputy dean and vice rector.

Ajarn Apirak, 39, was also an old student in this university. After he finished his master's degree in the USA, he started a small studio for private practice for some years. Subsequently, he became a visiting teacher and has been teaching at Sriburapha for five years.

For me, Ajarn Ajaphol, at age 52: I had been teaching as a visiting lecturer at Sriburapha University having graduated from Paris under a French scholarship 20 years ago. At the same time, I have, as a professional practitioner, established an architectural firm in charge of many public building projects.

Before this research began, I believed all of my colleagues were satisfied with the method of teaching that they were using, namely, a teacher-centred approach. This method had been used since I started teaching here fifteen years previously – in 1989. It was also the same approach that I had when I was a student in my bachelors' degree course in this country. They reasoned that students need to be guided because they were still young and not responsible enough. Even though the topic of the project was repetitive they had to follow because it was a requirement in the curriculum; only minor changes were needed. For example, the mark allocation must not be fixed and could be different for each project in the frame of thirty marks. Ajarn Apirak proposed that all teachers should give equal importance to the other parts of the project like process of working, façade of the building, or the presentation and not only focus on the function of the project alone.

With regard to students' request to open the studio 24 hours, Ajarn

Pensri stated that it would be useless because many students might just play around and no teacher can control them at night. The faculty could not guarantee the safety of students. In the 2003 academic year, with due respect to Ajarn Pensri who was a permanent teacher and a senior teacher in the faculty, Ajarn Pensri was reappointed as the coordinator for the third year Studio Design program.

My first overall plan for studio project design

In 2003, a total of forty six students were enrolled. They were divided into four groups and each group was composed of 11 to 12 students. The students in the first project – kindergarten, under my supervision – were referred to as Group 1; second project, office building, as Group 2; third project, hospital, as Group 3; and fourth project, commercial complex, as Group 4.

Since the goal of this research was to make an evaluation of the effectiveness of using a student-centred approach, based on the Interactive Form of evaluation (Owen & Rogers, 1999), I applied the four steps of Action Research as determined by Kemmis (1985) namely: to plan, to act, to observe and to reflect on the four Studio Design projects. Four complete cycles were to be applied for each of these four projects.

First Cycle of Action Research: Project Design 1 - Kindergarten

The author of the project this round was Ajarn Pensri. The project ran from 2 June to 21 July 2003. The author explained her overall program to all students in the group, and to the other teachers. Because this was the first project, she proposed a moderate development on around one hectare of land. The sizing of the program, about 5,000 square meters, was to comprise administrative offices, two classrooms for nursery and six classrooms for kindergarten. Each class could accommodate 25 students. There were also teacher rooms and water closets. For special activities,

there were music and computer rooms, a language laboratory, a covered play area including swimming pool, and other facilities. The support functions were to comprise canteen and service areas. The project was very clear, with a strict schedule to be followed.

Plan to teach kindergarten project

Based on my earlier discussions with the first and second year teachers, I knew that the students had previously experienced a teacher-centred approach. Despite the strict time schedule of Studio Project Design 1, I planned to use a new method of teaching with the students under my supervision while, at the same time, observing the other classes and their teachers in order to subjectively gauge which method, if any, was more effective.

Action and observation 1

In view of the above, I initiated round tables with my student as part of cooperative learning where students share and support one another. I believed Dryden & Vos's (1999) view that, instead of working individually with everybody in competition with each other, students develop interdependence within teams. Contemporary educators had claimed that cooperative learning is a better method by which modern day students might be taught. According to Slavin (1991) cooperative learning usually supplements the teachers' instructions by giving students an opportunity to discuss information or practice skills originally presented by the teacher.

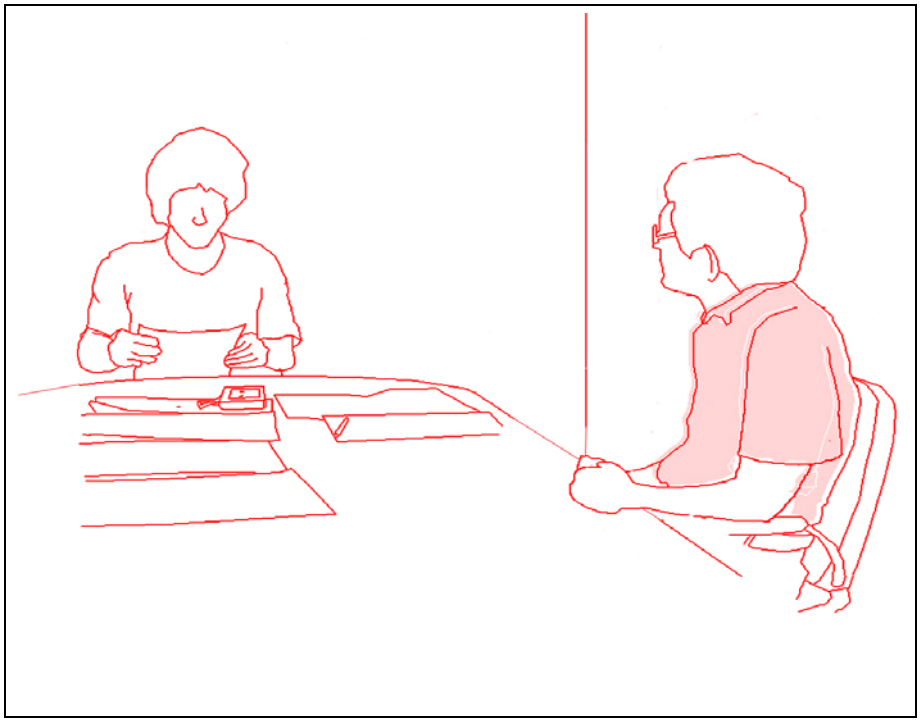
During the first meeting, with the students under my supervision, I created a friendly atmosphere in the studio. I started to question them about the way they would like to learn for this project but I received minimal response. For that reason, I tried to tell them about the new method of teaching. It seemed that the students were interested. And to make their participation easier, I introduced them to the three dimensions model as a tool to develop the project, something which some had experienced during

their first year. Using this method, I hoped that they would share their ideas more easily compared with developing their ideas first in two dimensions and then moving to three dimensions, as they had previously experienced in the program. At the end, I also asked three volunteers to have an in-depth interview with me so that I would know the personal background of each student; at the same time, they would be able to express themselves without hesitation or embarrassment.

In-Depth interview with three volunteer students

I conducted an in-depth interview with three volunteer students regarding the first Studio Project Design, the kindergarten project. This was the period when students in the target group were completely unfamiliar with a student-centred approach to teaching. Figure 4.1 is a line figure drawing of me talking with one of the volunteer students.

FIGURE 4.1 AJARN AJAPHOL INTERVIEWS ONE OF THE VOLUNTEER STUDENTS



The following is a personal profile and summary of the learning experiences of the target students when they were in the first and second years at Sriburapha University.

The Developer's Daughter

She was born in Bangkok. Her family is involved in the construction business. When the student began studying in the first year, she had to attend a campus outside Bangkok where all first year students study. When she was in first year she attributed her poor results in design to the fact that she had to work alone.

In the second year, the student learnt directly from a teacher for each project. The teacher could pass or fail her. Even though the student worked very hard, she was happy because while in Bangkok she enjoyed the comfort and amenities of the city campus, not to mention the senior friends with whom she could consult.

The student was impressed with one teacher because that person looked after her project in detail. The teacher told her to conceive of the project in three dimensions and also in different ways; that was why she had more ideas when she worked.

The Landscape Architect's Daughter

She is the only child in the family. Her father is a landscape architect who teaches in a technical faculty in northern Thailand. The student attended the technical faculty where her father teaches so she had an opportunity to practise drafting – a skill that she found useful when undertaking projects in her studies for the first year.

In her second year, she followed the guidance of her teacher for the first two projects of the first semester. The student was required to work alone and that made her very tired: she had to do everything by herself, including searching for data. In the second semester, she appreciated one teacher because the teacher was always concerned with her work. The teacher

worked closely with her and the other students and she received good marks. The worst teacher, in her opinion, was the teacher whose opinion about the project constantly changed; as a consequence, she became very confused.

She also mentioned that as a student in architecture, she dreamt of the freedom to think. She told me that when she studied in a technical faculty in the north, if someone designed a flat roof, the teacher would not allow it. She thought that that was wrong; after all, it is still a roof. She would like to learn something different and without limitations. The student thought it would be more fun to learn in a different way because it would be more amusing; this was the reason why she enjoyed the sketch design. This was a small project where students must finish within just one day – eight hours – of working. It was a short period of working and students were encouraged to apply their fullest inspiration even though the project might not be realistic. She was unable to work this way in project design because, in her opinion, it was unrealistic and needed a longer period of development.

The Tailor's Son

Born in Bangkok, this eldest son in the family has been influenced by his uncle who is an interior decorator.

The student talked about the individual house project in the second year. Even though he had some experience of this project, the student felt dissatisfied by it because the teacher forced the idea of including style and form in the building. The teacher wanted him to propose more work but, in fact, it was requested only to please the former. The teacher tried to tell him that he would compare the best and the worst project with the other group; the student thought that it was not effective because, ultimately, the teacher would decide the marking all by himself.

In the same year, the student appreciated a teacher for home office project because he had more opportunity to discuss everything about the project with the teacher. The teacher also looked at the project globally.
For the library project, he was not successful because he did not have

enough time and experience to think about this project, and because all steps were dictated by the teacher. It seemed that it was not the student's project at all.

Reflection 1

The in-depth interviews revealed that the students faced many problems in their first academic year when they must study alone in the campus outside Bangkok; it was mandatory that all first year students of the faculty must study there because the faculty compound in the city is small and it could not accommodate all of the students. This arrangement adversely affected the students in the first year in that they had insufficient information, resources, and contact with students from a higher level. The interviews also revealed that the landscape architect's daughter had been advantaged because she had acquired some technical background; the others felt as though they were alone, swimming in the ocean.

In the second year, they realised that, because of the teacher-centred methods employed, their learning was almost entirely dependent on the teacher with just a small amount of input from their previous experience.

Action and observation 2: The way I taught the kindergarten project

First week

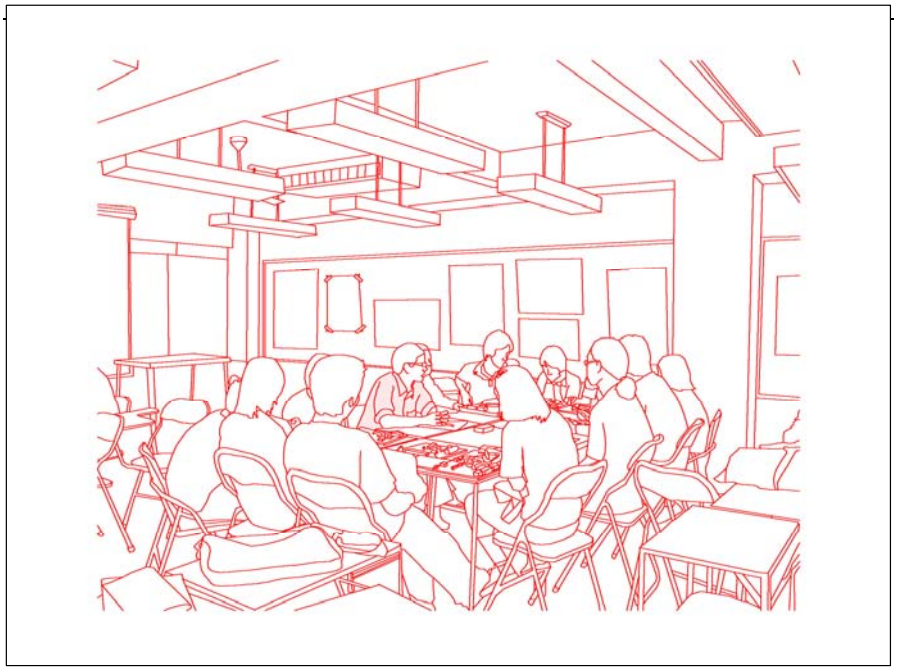
In this year (2003) we had 47 students in our group and, according to the program, they were required to collect data by grouping themselves according to their running numbers. While this appeared, in theory, to be a good arrangement; I observed that only some students worked in each group.

Second week

I had 11 students, numbers 25 to 35 (by rotation with other teachers) and undertook an in-depth interview with three volunteer students. I asked their opinion about the way they studied in the first and second year. After

discussion with the group of students under my supervision, I had learnt a great deal about their learning experiences and also the steps of working they had followed in the previous two years – which, they suggested, had not been entirely satisfactory. In order to provide an alternative approach, I planned to use a cooperative learning method for this group. In a round table, I asked them, as a first step, to develop a three dimensional model as the first step. I conducted a workshop to propose to students that they might build up the conceptual design and share ideas between each other (see Figure 4.2); I then divided them into groups according to the similarity of their ideas and asked them to develop their designs together. I observed that students enjoyed the study because by using three dimensions from the outset, and by not being too strict regarding the area requirements, the students could touch the space and form of the building as though they were playing chess.

FIGURE 4.2 AJARN AJAPHOL IN ROUND TABLE WHERE STUDENTS SHARED IDEAS



During this particular week I also visited and observed the class of Ajarn Pensri, Ajarn Sanan, and Ajarn Apirak. The atmosphere in the class of Ajarn Pensri was quiet. I saw she was seriously occupied with the project of one student, only. In the other corner, a group of four to five students were waiting for their turn to consult her but without showing any interest in what he was doing (see Figure 4.3); it was the same in Ajarn Sanan's class (see Figure 4.4). In Ajarn Apirak's class, I saw that he was teaching and giving comments to the work of a student while other students' observed; they were very passive.

FIGURE 4.3 AJARN PENSRI DISCUSSES A PROJECT WITH ONE STUDENT WHILE OTHERS WAITED FOR THEIR TURN

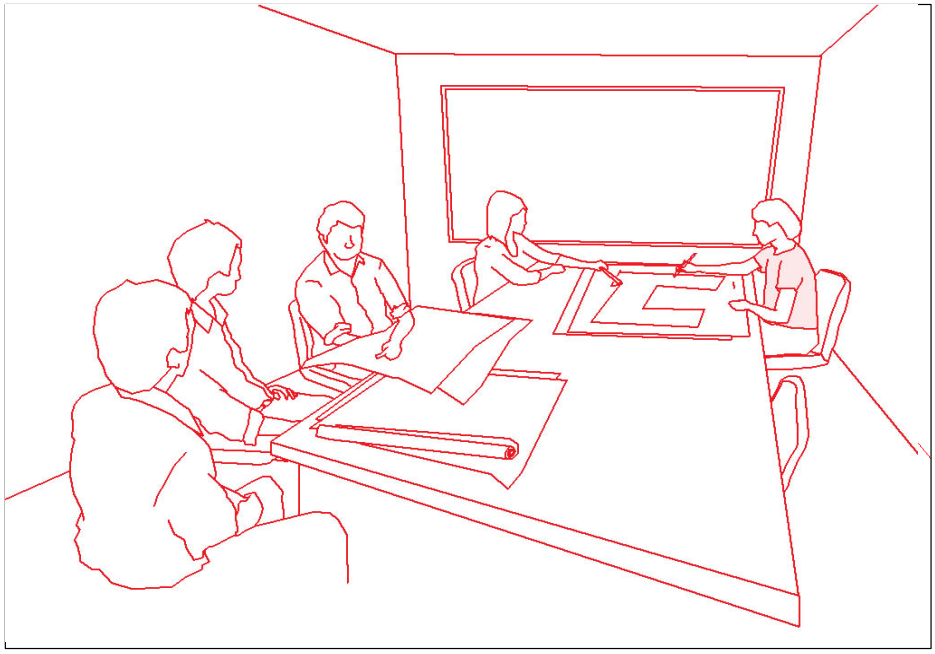
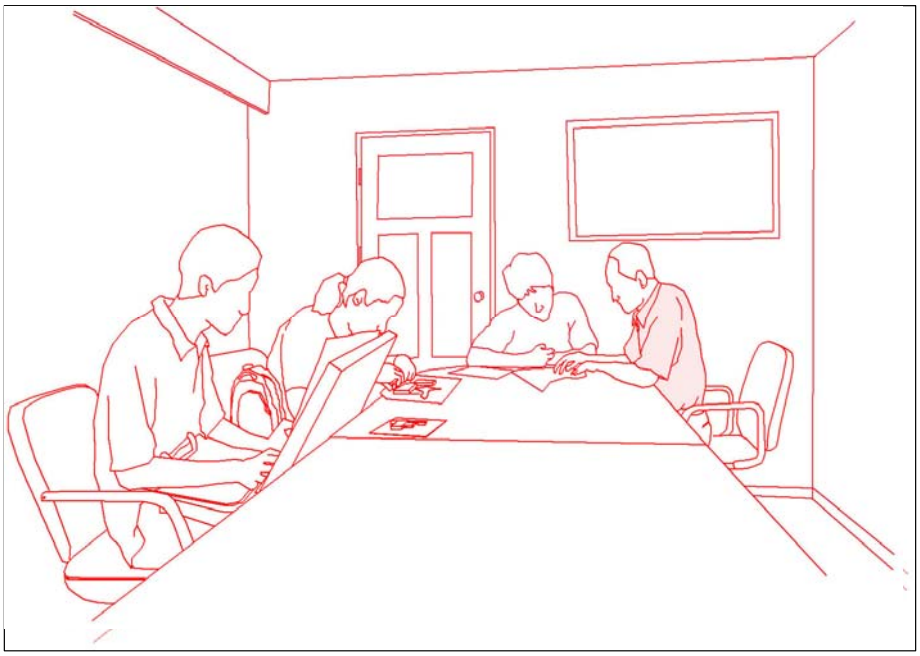


FIGURE 4.4 A STUDENT EXPERIENCES AJARN SANAN'S OLD METHOD OF TEACHING THE KINDERGARTEN PROJECT.



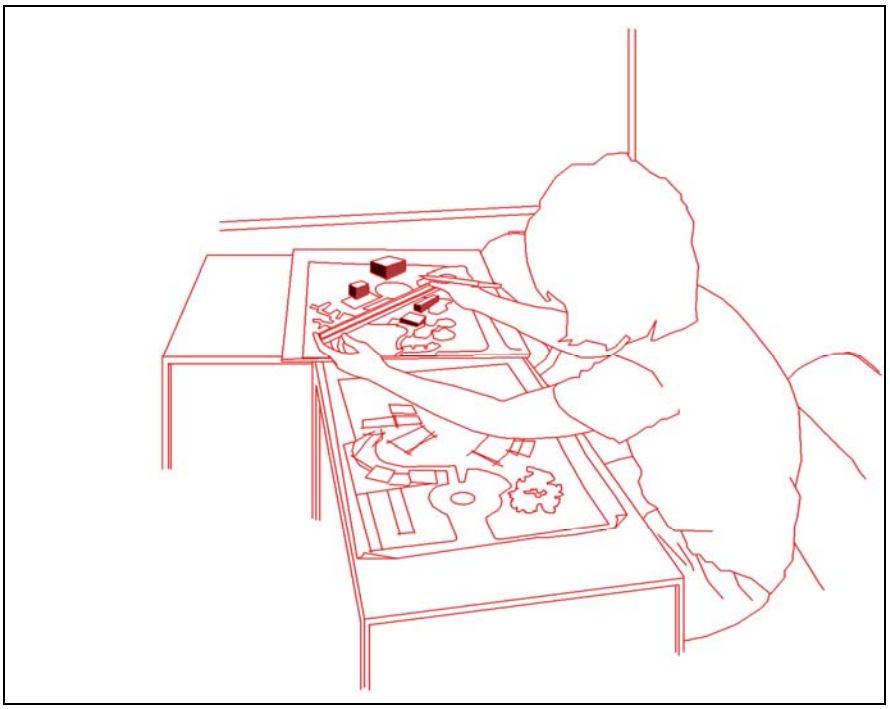
Third week

After developing their ideas in small groups, each student developed their own project in three dimensions and brought it back to the class. In a round table, I and their friends critiqued each project. I observed that this time the students talked more than the first time. They had freedom to express themselves. In the process of critiquing each other, they could provide some useful information to their friends. I noticed, however, that one smart student felt bored; his progress was held up – he could not work ahead because of this kind of grouping.

Fourth week

We transferred their projects from three dimensions back to two dimensions and selected the structure that should be used, including the building system

FIGURE 4.5 STUDENTS TRANSFERRED THEIR PROJECTS FROM THREE TO TWO DIMENSIONS

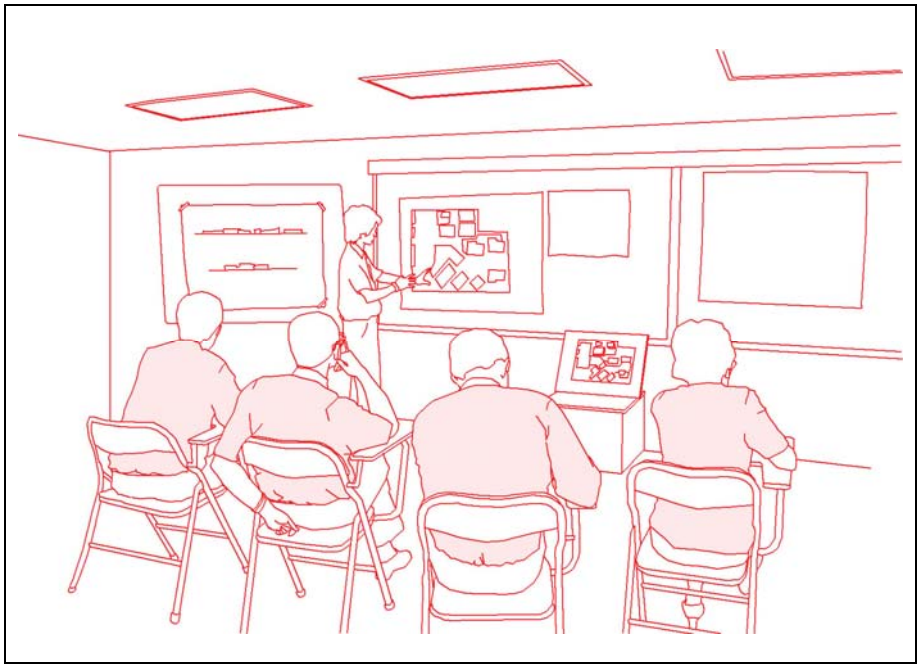


that would best accommodate each project (see Figure 4.5). The students started to think about the facade and details of the building and re-adjusted their plans. I observed that some students still applied their past learning experiences, preferring to develop from two dimensions to three dimensions. I also observed that students lacked information about building systems or how to choose a suitable structure for the project. They needed support and advice.

Fifth week

All students in my class presented their projects in front of the four teachers, including me, as required in the program for the students to get some initial comments from the teachers and also between the teachers themselves (see Figure 4.6).

FIGURE 4.6 FOUR TEACHERS EVALUATE A STUDENTS' PROJECT

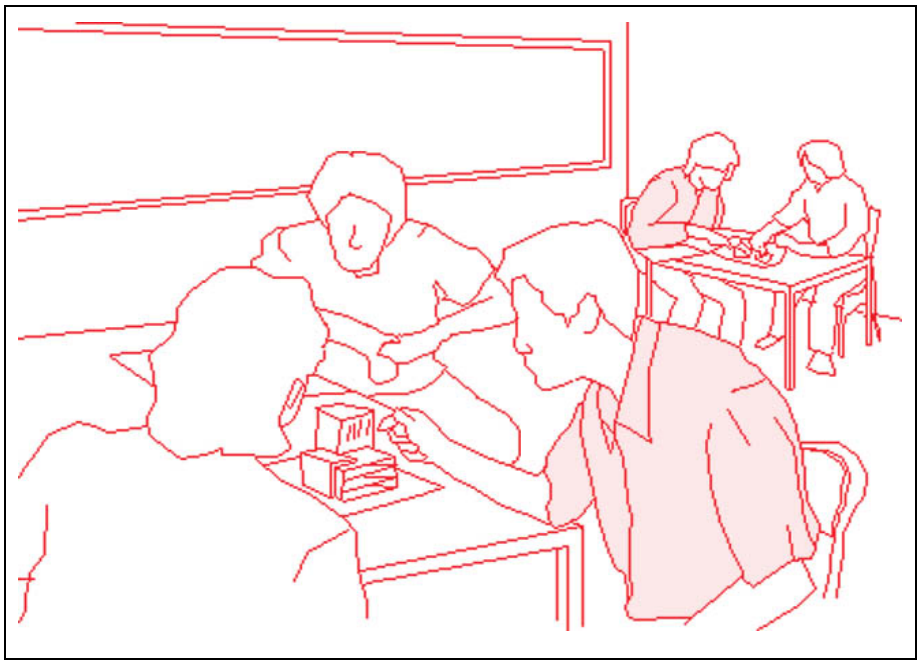


Sixth Week – Based on the feedback and critique of the teachers, I suggested corrections for each student's design. Afterwards, I conducted a workshop wherein I invited a group of specialists – a structural engineer, a systems engineer, and an environmental specialist – to participate in a round table with my students. I observed, as did Boud (1985), that the students were excited to consult these specialists (see Figure 4.7) according to the needs and concerns of their projects.

Seventh Week – By regulation, as outlined in the program plan, students individually developed their projects according to the advice received, in preparation for final presentation.

Eighth Week – For the last time students presented their individual projects to the jury for final marking. I observed that the final project of students in my group was better – except for the smart student who seemed to have lost his way.

FIGURE 4.7 SPECIALIST ADVISED STUDENTS DURING PROBLEM-BASED LEARNING



After the presentation of the students to the jury for the final marking, I had a round table again with the students under my supervision. I asked them their impression on the new method of teaching. Most of the students gave a positive response. Afterwards, I distributed a questionnaire that required them to respond to the strengths and weaknesses of the new method of student-centred approach to teaching which uses cooperative learning. They responded willingly to my request.

Target group responses: Kindergarten project design

A group interview of students was undertaken that sought opinions relating to the new approach taken in the first design project. The questions were aimed at obtaining feedback on the use of a student-centred approach of teaching which uses cooperative learning and problem-based learning. The

input gained, relating to the students' opinions about the course and the teacher, was used to get a broader understanding of the group's opinions about the new approach being undertaken. The responses were summarised and grouped; each is discussed below.

Students' opinion: Strengths of this new method of teaching

By using cooperative learning, students enjoyed working with their project design; they were not as confused as before, because they had a clear overall view and were able to plan to develop their project step by step. They shared, listened, and exchanged ideas with others; ideas were not limited in one direction. They had independence to search out for information and solved the project by themselves, rather than only believing the teachers and being controlled by them. They said that using this system totally changed their line of thinking. It was more systematic than before because they had more freedom. Moreover, they were not afraid to think and imagine. They had been unable to see their weak points when they were forced to work individually.

The teacher was able to open up the capability of students – which, they said, was good for them; previously, they did not have this opportunity to critique one another. Some agreed that this method enabled them to think 'outside the square'. They were happy with their project because they had reason behind it. It was not difficult at all.

The student consensus was that they found cooperative learning to be a better method of learning in the Studio Design course. It was also enjoyable because they had more time to share and develop their ideas with other students in the group. Likewise, they enjoyed the freedom to think about their projects without limitation, as opposed to the past when they had been confined 'inside the square'.

Students' opinion: Weaknesses of the new method of teaching -1

If there were strengths in the student-centred approach, there were also some weaknesses that students discovered and experienced. Students said that they had to talk about many things but lacked the time to develop details of the project. Some students thought that in cooperative learning, students used more time in discussion so the time allotted for the process of working was not enough. Besides, some students said that at the start, they were mixed up because they did not understand clearly the new method that I had explained.

Another student, while supporting the approach, said that even though he loved this new method he could not use it later on because if the next project under another teacher did not follow this new method, it would be useless.

By using a student-centred approach the main focus was not only on the students; in fact, the teachers became more important because they affected the development of this curriculum. They suggested that even though the method of teaching project design could be changed, the remaining curriculum would not change. They thought that they would have to return to the old approach and that further development of the approach would be difficult.

Students' recommendations: Changes in the studio project design course – 1

Students recommended that teachers should use this method in their respective classes. In so doing, they suggested that teachers must allocate enough time so that students might develop their projects appropriately; if students had sufficient time, they could think and concentrate on details of the project. The teachers in the old system must change their ideas and listen more to the students; the teachers must sacrifice and be prepared for the change. In particular, they thought, teachers must really know about this new method and open their minds to it, too; the faculty must start to use it

from now on.

They thought that the teachers must try to develop this system. Even though it was contrary to Thai tradition – where students always listen to the teacher without any reaction – they should experience this new idea of teaching. They said that it was like a real job especially when they had met with external experts and owners of kindergarten schools. Students recommended that more time must be given for the process of actually working on the project.

Reflection 2

Most students responded well to this new method of teaching – a student-centred approach using cooperative learning – even though I, as the teacher, had encountered many difficulties. Importantly, the students became lively and active learners.

An interview with Ajarn Pensri

After I finished my first project design, I interviewed Ajarn Pensri in order to seek her opinion regarding the kindergarten project.

At first, I asked her about a memorable event that had occurred in her Studio Design during this round. She said that she totally agreed with the steps of working that she had planned because the project design of the third year must follow the established framework rather than being like a program for higher education. She reflected that for the data collection it had been thought that if students participated they would understand more; in fact, the students listened only to their group. They did not show interest while others presented. On the other hand, she did not like the use of computer-aided design for students because in the third year they were not yet keen to use computers.

Ajarn Pensri observed that the students were poor in building technology because they were not interested to do the necessary research to solve the problems they met; instead, they copied from each other and sometimes used methods unrelated to their projects. In her opinion, building technology was one of the most important issues in actual professional practice. The experience that she had valued most when she was in the US was that architects cooperated with a group of engineers from the start of the project until its completion. During the past years at Sriburapha University she had also taught basic building technology. The lesson was divided into three parts and she was responsible for one; however, she did not know the details of the other parts that her colleagues were teaching. She concluded that the projects of students must be realistic, and not just a dream. All projects must strictly respect the building code.

Finally, I asked her if she had the opportunity to change just one particular approach to the teaching of Studio Design, what she would change. She stated that the old system that currently we used in this faculty was good. She had heard from the students details of the new system that I used in my studio. She suggested that maybe teacher-centred and student-centred approaches might be combined. She thought that cooperative learning was good in one way but she noticed that sometimes the students did not have enough knowledge to discuss with the teacher, so she agreed to teach them one by one under her personal tutelage. In Ajarn Pensri's opinion, the teacher must also guide and give opportunities for the students to express their opinion. That was why she always shared her experience with them; if the teacher had experience the students would get most profit. The two ways must be combined: if it was only one-way then it would not succeed.

I used some of the responses discussed above to plan for the second project of which I was the author.

Second Cycle of Action Research: Project Design 2 – Office Building

In this cycle, I was required to supervise the second project program – the office building. Thus, I had the immediate opportunity to incorporate into my program some new aspects that I had derived from the kindergarten project. I saw that, in this project, ensuring student acceptance of the new method of teaching would not be too difficult. It was very important that I change the perception of the teachers in the group if I was to succeed in introducing this new system in the school. This realisation related directly to the feedback I had received from the first group of students where they had pointed out that, even though they were interested in this method, they suggested that it could not be recommended if the other teachers would not use it. My first intention, therefore, was to invite Ajarn Sanan to observe my class because in this project he would take care of the students who just learned with me in the first project under the cooperative learning method.

In the past, the project design program had required students to do data collection in small groups. The groups were divided according to roll number and teachers assigned the topic according to their numbers; for example, student numbers one to six would research on-site analysis; numbers seven to fifteen would research the functional diagram and the detail of the program; numbers sixteen to twenty four would research the building code, and so on. As a consequence, students previously had not had the opportunity to work with their close friends, nor did they have the freedom to choose a topic themselves. To circumvent these restrictions, I proposed to the students that they should group themselves and choose the topics of their interest freely; if they had made the same choice they were to toss a coin to resolve the situation.

Action and observation 3

Before starting the second project, the composition of the teachers changed. Ajarn Apirak was replaced by Ajarn Ratchada who had just graduated with a doctoral degree in architecture from the United Kingdom. Ajarn Ratchada was a former student of mine at this school. Five years previously, she had practised the teaching of Studio Design with us for two years before leaving for the UK to further her education.

The program was composed of two parts: the first part was concerned with data collection; the second part was concerned with the implementation of the project design. During the orientation meeting at the commencement of this cycle, I presented the program to the students and teachers; I invited the students to group themselves and chose the topic they liked for the data collection phase; I invited the teachers to voluntarily participate and act as supervisors in allocating the following topics:

1. Site Analysis.
2. Functional Diagram and Details of the Program.
3. Building Code.
4. Parking Lot Analysis.
5. Building Structure and Office Automation System.
6. Building System: electricity, air condition, sanitary, lift, and others.
7. Energy Conservation.
8. Two Examples of Intelligent Building.

The atmosphere seemed lively. After one week, all groups were able to present their projects in front of the four teachers. It seemed that all groups worked out very well except the group of students who were responsible for functional diagram and details of the program. The outcome was not so clear for this latter group because they lacked the information from the other groups in order to complete the topic. This was an oversight on my part: one could only write out the program after first acquiring the

necessary information; previously, this had always been provided by the program coordinator. As a consequence, I invited all the students to meet in an open discussion to brainstorm together in order to develop the program.

I also invited a group of specialists including a structural engineer, a systems engineer, and an energy conservation specialist to participate in this special session. During the meeting, students who were responsible for each topic expressed their opinions while the specialists listened and guided them. Finally, after five hours of deliberation everybody was satisfied with the program that was designed by them. I realised that I had – for the first time – given third year students the opportunity to write out the program by themselves.

Reflection 3

I noticed that students were very enthusiastic in consulting the specialists in order to solve the problems that I presented to them. They learned from the professional advice of the experts: a direct benefit of the problem- based learning approach.

After we finished the Details of the Program each group of students started to work with their supervisors as before. But this time my class, shared with Ajarn Sanan, was composed of two groups: the first consisted of students under my supervision who were the former students of Ajarn Apirak in the first project; the second group consisted of students under Ajarn Sanan's supervision who had been my students in the first project. We shared a room using a round table approach. Once again, I started by introducing the student-centred approach to teaching using cooperative learning. My new group seemed to easily understand what was required: it may have been that these new students had already shared their ideas before we started together; the other group, consisting of my old students from the first project supported my explanation and engaged in discussion in this round table meeting. I saw that Ajarn Sanan remained quiet and observed my approach.

After the first round table together I asked a set of three volunteers from

my new group to undertake an in-depth interview with me. I also sought an opportunity to interview Ajarn Sanan.

In-depth interview: Three volunteers from the second group

To understand the background of the students under my supervision of this second project, I invited three volunteers to give their opinions about the system of learning in the past that include the first project that they learned from Ajarn Apirak.

The Contractor's Daughter

The Contractor's Daughter is the eldest daughter of a family involved in a construction business. During her first and second academic years, she lived in an apartment with her friends in the class because it was more convenient for her to study and work in a group.

For the first project kindergarten, she was under the supervision of Ajarn Apirak. He guided her to simplify the concept. The teacher was coaching her while her friends looked on; she followed the advice of her teacher in order to complete her project.

The Merchant's Son

The Merchant's Son is the youngest son in the family. He wanted to study architecture because he thought that in Thai society people looked up to architects as smart professionals.

He talked about the four projects in the second year that were not successful at all because he did not understand what was required in the work: he completely lacked direction. He told me that the teachers in the second year taught the students one by one and the students were influenced by the ideas of the teacher. He had, however, been impressed by one of them because that teacher helped him to go deeply into the detail of that particular project. This teacher accepted the notion that if he thought it was possible he would push the students to go on.

The Merchant's Son also talked about Ajarn Apirak, his teacher in the kindergarten project. At first, when he proposed his first idea, his friends laughed at him but he did not care because he wanted to work on it; the teacher gave him more details to develop that idea. He had heard about the method of teaching that I had used with his friends in the first project. He thought that maybe cooperative learning was a productive way by which everybody can share ideas.

The Politician's Son

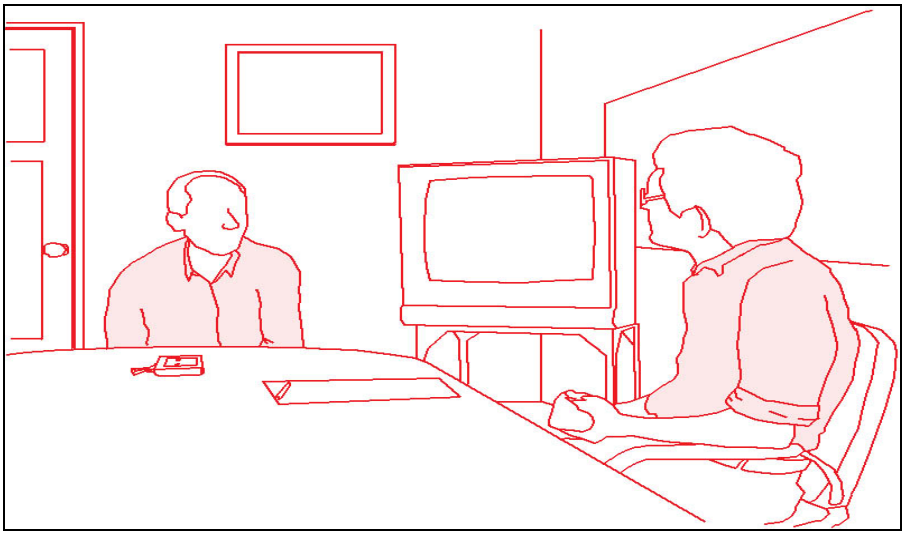
The Politician's Son is the youngest son in the family from Phrae, a small town in northern Thailand. He lived with his uncle in Bangkok but sometimes he used to stay in his rented apartment to join the work with his classmates. He told me that in the second year, a home office project was very successful because he developed the project with one teacher who worked closely with him. The teacher guided him to respect the main idea. Even though sometimes this teacher went into too much detail, the Politician's Son obtained good marks which made him happy. He thought that the teaching methods of Ajarn Apirak worked very well too: Ajarn Apirak had supported him in his project through until the end.

Reflection 4

The in-depth interviews with the three volunteers revealed that they had experienced some successful learning in the second year under a supportive teacher-centred approach.

They had experienced similar success with Ajarn Apirak who had taught them in the third year kindergarten project. Ajarn Apirak guided the students to respect the main idea and worked very hard to support them. I noticed that in his class, some students closely observed the projects of the others, though

FIGURE 4.8 INTERVIEW WITH AJARN SANAN



they did not share or express any personal opinions. It showed that Ajarn Apirak's method of teaching was moving from a traditional teacher-centred approach to one that had elements of being learner-centred.

Interview with Ajarn Sanan

Ajarn Sanan started teaching at this faculty three years ahead of me. He is a very kind and responsible person. He is an alumnus of this faculty and also former deputy dean and rector. Ajarn Sanan narrated his teaching experience (see Figure 4.8):

> When I graduated here, I started to work with the American army for four years but I saw that it was not stable to stay there so I decided to apply in the government sector. Luckily, I passed the examination for Thonburi Municipality. I worked there for eight years then I took up my master's degree in architecture. I returned at Sriburapha University in 1980. Now many things have changed. In the past when I learned project design, we had only one teacher per year level. Each teacher took care of about 30 students. The comment of the teacher to the student's project was very important. If the teacher appreciates your project you receive good marks, but if not, and you don't respect his or her comment, your marks will be badly affected. It does not mean that in the past teachers were bad but because that time we lacked teachers. When I started to work here the system

already changed, we taught as a team. One member of the team was my former teacher when I was in the fifth year in this school. As a young teacher, I had to keep my mouth closed because I could not question her authority because she was my old teacher. Seniority had always influenced in the institution but when you came to join our team I was very glad because I could talk everything with you. It was my first time I had freedom to write out the program of the project and I had the courage to propose more and more.

Now if I have a chance to initiate change, the first thing is the policy. For example, the education in architecture must be related to our country's background. If we follow the developed country while we were still poor it might be wrong so we must have frame of realism for students to become more realistic professional than a dreamer. I respect that students in architecture must have good imagination but we can put it in the program of sketch design that students could finish in one day instead of project design that needs to be developed for a longer period of time. Thinking in the air couldn't be; our students must go out to a real world.

When I asked him about the method of teaching that he used in the class, he said:

When I started to explain the project to my students under my supervision, I guided my students to sketch the main circulation and after that put the function accordingly. It seemed like urban design when we did the master plan for the university. At first, I designed the road so I used the same method when I designed the main building. I would start the main circulation. For the form of the building, I always gave freedom to students so when I taught them I would start from the diagram and all students must propose the main circulation.

I will look after the student project one by one by respecting the step of working that was mentioned in the program. For example, in the first step, the student must present the organisation diagram like functional diagram, circulation diagram, and comparative area study and so on. I would show to the students the importance of the main access of the building like a trunk of a tree that relates to the branches. I would clear to my students all details about it so they could develop the next step according to plan, elevation, and section of the project. They could work out with good comprehension. I gave the opportunity to my students to consult me only on the day that was mentioned in the program because I thought that I must give them time to work and think about their project so if I allowed them to see me

> anytime of the week as you do, students would have no time to develop their projects by themselves,' he added.

It was Ajarn Sanan who had suggested to me that I should consider furthering my studies in education; it was for this reason that I asked him to comment on the methodology of teaching by cooperative learning.

> I heard it from you and I thought that it was interesting. Otherwise, I always thought that my students were like my own children and I taught them the way I taught my son because in fact students were students. If you didn't guide them they would have no direction. So if you gave them more freedom it would be more difficult after.

When I asked him about using a workshop and team approach, he said that he had no time, but if he had, it would be better. And that was why I invited him to teach with me for the first two weeks. He accepted my invitation. We combined the students under his supervision with my students (see Figure 4.9). He observed my class while I was using the method of cooperative learning. Ajarn Sanan also participated in the round table.

FIGURE 4.9 AJARN AJAPHOL GUIDES AJARN SANAN IN THE USE OF COOPERATIVE LEARNING IN THE STUDIO

Reflection 5

By using a student-centred approach the main focus is not only the students; the teacher is also important, because the teacher affects the development of the curriculum. From project design one, a student said that even though the method of teaching for project design could be changed but if the overall curriculum did not change, he thought that he would go back to the old approach. For this reason, I approached Ajarn Sanan to teach together with me because the students under his supervision for this project were my former students in project design one. On the other hand, I noticed that when I finished the first project – Kindergarten – there were signs that showed my approach had made all the teachers in our group worried because they were not sure that the method I used would qualify or affect the method they had been using for a long period of time. For this reason – as my 'secret mission' – I introduced Ajarn Sanan, step by step, to the entirely new approach of cooperative learning, a method of teaching which was entirely new to him. In this way, I could observe and reflect on the impact on him under natural conditions, without him being influenced by any preconceived bias.

My plan for the second project was to incorporate my group with Ajarn Sanan's group for only two weeks, for the third project four weeks, and the fourth project full time. After each of these projects I would evaluate the outcome – by observation and reflection.

Back to our studio for the second time, our two groups of students under our joint supervision: the students shared their ideas by using three dimensions model. I noticed that all students openly proposed their ideas and offered critiques on the projects of their friends. Even Ajarn Sanan himself started to give his opinion. It seemed that it was only I who lacked the opportunity to talk, and that made me happy (see Figure 4.10). At the end of this time, we went back to work with our own groups until the project was finished. At the conclusion of the second project, I sought an opportunity to have a group discussion with the students under my

supervision during which I gathered their opinions about this new method of teaching.

Students' opinion: Strengths of this new method of teaching – 2

My students from the second project stated that with the new method of teaching they had learnt architectural design in a professional way that would be useful in the future. They loved this system because they could decide by themselves; this, in turn, encouraged them to engage, more and more, in design. They could express themselves in their work, and the steps of working that I proposed were just like those of a real project. This method enabled them to gain more experience than was possible under a teacher-centred approach.

At a second level, they could obtain ideas from others to solve problems encountered with their project, instead of having to follow the single direction insisted upon by the teacher, previously. If the students had not been able to participate they would not have seen the projects of their friends. They were able to understand the difference between their own project and those of their friends. They knew what was good and what was bad; they could obtain good information and ideas to assist in the development of their own project. They could accept this method.

Others said that they gained more experience than had been possible in the second year. They learned more details, especially the methods of working as architects; when they were in the second year they did not understand this at all. In using this method, they could search out a new method of work and fully discuss it – something that had not been possible in the old system. They thought it was a very interesting approach and expressed the wish to have more projects with freedom such as this. Unlike the seniors (fourth year students), their projects were always the same each year; now, they were experiencing the freedom of the seniors. One student commented that this was the first time he had begun to understand himself as an architect: what he wanted in architecture and what his style in architecture was compared to that of his friends.

Most of the students pointed out that lack of time was one of the weaknesses. They added that sometimes they felt mixed up and confused by the freedom of thinking of the new approach, especially when it was compared with the control and regulations previously experience in the design program.

Students' Recommendations: Changes in the studio project design course – 2

The second project students recommended that the program must have an expanded time frame. For the lecture hours, the teacher must teach key principles in detail, but reduce the time taken in mere facts to the students. They wanted to have more time for difficult projects. They thought that the faculty must propose to have more projects that involved experiment and that encouraged the use of trial and error. They wished to have cooperation with other students from the faculty of engineering to work together in the same project to integrate knowledge of architecture and structure, as well as engineering systems. They would like to have fewer projects that would enable them to engage in deeper learning.

Project Design 3 – Hospital

The third project – Hospital – had Ajarn Sanan as its author. Before he started to write out his program, he consulted me to help him find both a site, and to discuss the sizing of the project. We agreed to use a plot of land in the east of Bangkok as a site location and considered an eighty-bed capacity complex. I also discussed with him the possibility of slightly changing the working plan. For this project, the data collection as a working group was very important because it involved the principle of functionalism; as a consequence, if the students had insufficient information they could not develop their projects.

Ajarn Sanan agreed to use the same model for grouping students that I had used in the second project, thus giving freedom to students to group themselves and to select their topic of interest. During the presentation of their data to the teachers, I noticed that each group enjoyed and participated more than in the first and second projects; perhaps they were beginning to benefit from their previous experience. In addition, they had not been required to write the program, for two reasons. First, we had made a serious mistake in this regard with the second project. Second, the program of the hospital project was far too difficult because it was composed of many specific functions, e.g., the operating room must be fixed with the sizing of furniture and required operating space. Such features could not easily be changed freely as with the earlier projects. As well, the spaces for the kindergarten and office building projects were more flexible.

Following the data collection, I asked three volunteer students under my supervision to participate in an in-depth interview, as with the previous two projects. Prior to coming to learn with me, this third group had had experience with Ajarn Pensri and Ajarn Ratchada in the first and second projects, respectively.

Action and observation 4

In-depth Interview with three volunteers

Architect's Daughter

The Architect's Daughter lived in Bangkok with her family. Her father is an architect and her uncle is a practising interior architect.

In the first project of third year, kindergarten, she learned with Ajarn Pensri. The teacher gave very detailed directions and the students did not have the chance to make their own decisions. Sometimes the students did the project in a different way; Ajarn Pensri encouraged students to follow her if she noticed that students went in the wrong direction. As a consequence the projects were remarkably similar. Ajarn Pensri made a special focus of concentrating on usability and on the functional area of the

project.

Businessman's Daughter

The Businessman's Daughter lived with her mother and sister in Nonthaburi, north of Bangkok while her father, a former engineer, stayed on weekdays in Lopburi, 100 kilometres from Bangkok. She had some basic background in fine arts before she started to study architecture. In considering Ajarn Pensri's influence, it seemed that students under her supervision had similar ideas. But when they started to work with Ajarn Ratchada the project of each student was different. The Businessman's Daughter suggested that, maybe, Ajarn Ratchada had pushed the idea of individual student work through to the end of the project.

Engineer's Daughter

The Engineer's Daughter lived in Bangkok with her uncle. Her feedback about the teachers of projects one and two, was similar to that of the Architect and Businessman's Daughters.

Reflection 6

These three responses indicate that, within a teacher-centred approach, Ajarn Pensri took care of her students to the best of her ability, using a traditional teacher-centred approach. When learning with Ajarn Ratchada it seemed that students had started to experience a much more student-centred approach.

Action and observation 5

At the commencement of this project, I invited Ajarn Sanan to combine his class with my class; he was in total agreement with this. The students under Ajarn Sanan happened to be the group I had taught in the second project.

On the first day, when we started a round table, not only did the students under our supervision participate, but some students from my first

project also joined in the studio; that explained why our class was crowded. I noticed that Ajarn Sanan participated in group discussion with more enthusiasm than before; as a consequence, I continued to teach with him for a much longer time than the two weeks of the second project.

During the third week, I invited Ajarn Sanan to separate our students into two groups while remaining in the same studio. By doing this, I was able to observe his approach. I immediately noticed that the method of teaching used by Ajarn Sanan had changed. He continued to participate with his group by using round table; I saw many students talking and exchanging ideas with each other. He and his students enjoyed the session (see Figure 4.10).

Reflection 7

All students, as well as Ajarn Sanan, enjoyed the class; I felt happy about Ajarn Sanan using the new method of teaching. Even though it meant that I

FIGURE 4.10 AJARN SANAN TEACHING AFTER EXPERIENCING THE COOPERATIVE LEARNING APPROACH

had to spend more time with him, I realised that I had been successful in my intention to engage him in applying cooperative learning in his class. For him, it was a dramatic change in his teaching career. But the drawback was that I spent less time with my own group of students. I felt that as a consequence they suffered; certainly, their marks were adversely affected. On the positive side, I felt that they were all 'switched on' to this new approach.

Feedback on cooperative learning methods from three volunteers

Architect's Daughter

The Architect's Daughter talked about cooperative learning at the start – she did not understand it and had been a little confused. But after working under this approach, she could compare her work with the ideas of her friends and she could learn from the best of these. Finally, she had realised that it was a good system.

When I asked her about changing entirely to this approach, she suggested that doing two projects each semester was too much. Overall, she switched on to cooperative learning and hoped that one day the faculty would support this approach.

Businessman's Daughter

The Businessman's Daughter thought that cooperative learning was useful when we searched the database together, but after that

> I was mixed up. I didn't know which way I would go, which way was better, because the first two projects were guided by the teacher, but in cooperative learning we must decide for ourselves.

If she had the opportunity to change, the first thing that she proposed was to reduce the number of projects per semester from two to one. In this way, students would have more time to think.

Engineer's Daughter

The Engineer's Daughter thought that cooperative learning was very useful in the first step, when the students could share the ideas for zoning and conceptual design. She suggested that the data collection of the entire group, when finalised, should be posted on the wall so that everybody could learn from it.

Initially, it seemed that it was very slow but, following group discussions, the work went faster; she thought, however, that the period of time for each project was too short.

She also had been impressed when I allowed the class to divide themselves into small groups with similar ideas. When she sat down and listened to the projects of her friend, she could understand them. In this way, the students could support each other and develop their projects in an efficient manner.

Students' opinion: Strengths of the new method of teaching

These opinions showed that this third group agreed with the new method of teaching that I had proposed to them. The system encouraged them to think and they were able to share ideas with each other. One student said that it trained them to think, to design with more freedom and enabled them to practice solving problems. With this solution, they could use the information from each other to support new ideas not only for this project but other projects, too. It was not boring at all; it was as though they were working with groups on a real project.

They thought that everybody in their group understood and could see the principle of the new method. They wanted to propose more and more and thought that it was good. They also proposed that everybody must support, join, and encourage this because it would be useful for students in the future.

Students' opinion: Weaknesses of the new method of teaching

Problems with communication were one of the weaknesses of cooperative learning that the students had encountered. They did not fully understand each other because everybody just talked and talked; some of them became confused and did not know whom to believe. Sometimes their understandings were not in the same direction. One student said that brainstorming could destroy the uniqueness of each person.

Students' Recommendations: Changes in studio design course

Before the jury, they thought the teachers should have a prior discussion with each other before undertaking discussions with the student groups because sometimes their ideas were contrary to each other; as a consequence, students were unsure as to which ideas of the teachers they should follow. They suggested that, for the hospital project, it would be better to start using a teacher-centred approach because students needed more specific information at the beginning of this rather more complex project. Following this introductory phase, they could – over time – develop a student-centred approach. In the end, they thought this would be a more successful approach for this particular project.

Project Design 4 – Department Store

Project Design 4 was led by Ajarn Ratchada and this time students under my supervision were Group 2 who had learned from Ajarn Sanan for the first project, Ajarn Pensri for the second project and Ajarn Ratchada for the third project.

Action and observation 6

The project was divided into two phases, as before. The first phase involved data collection. Ajarn Ratchada encouraged us to follow the approach

employed in the second and third projects – allowing the students to group and select the topics freely, by themselves. To present this information she gave the students the opportunity to use an electronic file. There was an interesting topic called 'Space Syntax' that dealt with the analysis of human traffic at building and city scales; it was an element of new knowledge that she just learned from the UK. In the second phase, we turned back to our studios to work with our students as before. This time, however, I planned to invite Ajarn Sanan to teach full-time with me using a fully student-centred approach.

To gain more background, I carried out an in-depth interview with three members of my action group.

In-depth interview with three volunteer students

Banker's Daughter

The Banker's Daughter was the eldest daughter in her family. Her mother was a teacher. Her teacher for the first project – kindergarten – was Ajarn Sanan. He had looked at the projects one by one but if students were not interested they would gain nothing. Her teacher for the second project – office building was Ajarn Pensri. She looked after the project one by one just like Ajarn Sanan but she would explain more in full detail. With regard to cooperative learning, she thought that round table was one of the best ways to learn.

When I asked her which system she liked, she said that if possible she would like to combine the cooperative learning where students had opportunity to share their own idea with the approach of Ajarn Ratchada who also encouraged students to think.

When I asked the Banker's Daughter what would she like to change in the curriculum, she said that she agreed with the four projects per academic year but if possible we combine project design and project construction together instead of doing it separately to maximise the time.

Trader's Daughter

The Trader's Daughter was the only child in the family. Previously, she had studied archaeology but had finally chosen to study architecture.

When I asked her about cooperative learning method, she remarked that the approach was good and that students could clarify the problems that they could not solve. It was a way by which students could help each other to think and provided them with the opportunity to listen to each other. She felt that it was better than the old system where the teacher taught the student one by one.

If she had opportunity to change the curriculum, the Trader's daughter proposed fewer projects so that they could have more time to concentrate on each.

Public Servant's Son

The Public Servant's Son was the eldest son in his family. His parents worked for a government private corporation in the southern part of Thailand. While studying he rented a house and stayed with his friends. He had wanted to be an architect since childhood.

He talked about Ajarn Pensri who was very strict with the students even though she guided each of them through the important points of the project. He had found Ajarn Ratchada to be eloquent and she put the project on the board and raised questions with the students. In her studio, the atmosphere was like we were talking together.

The Public Servant's son stressed the importance of the study tour that supported the design; he appreciates the opportunity to learn from that type of project in real space.

Reflection 8

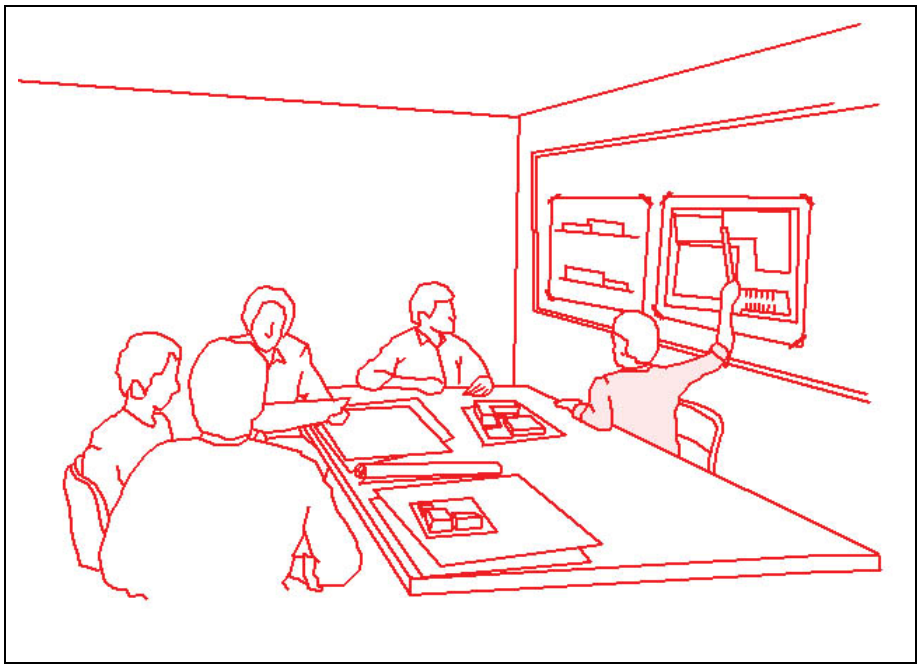
The comments of the Banker's Daughter revealed that, in the first project, Ajarn Sanan had been using a wholly teacher-centred approach. This had caused her to lose motivation – a different feeling when compared to the

teaching of Ajarn Ratchada. In particular, she said, Ajarn Ratchada taught democratically, and it was this comment that encouraged me to observe Ajarn Ratchada's studio and to interview her. The Banker's Daughter felt strongly that the students' opinion would never change Ajarn Pensri's conventional way of teaching.

Action and observation 7

To understand better the way Ajarn Ratchada taught, I went to observe her studio. This time, she was teaching my former students from the first project, all of whom had had experience of the student-centred approach. In the studio, I saw her pose a question to a student while other students looked on without any participation (see Figure 4.11). The atmosphere seemed to be little different from that of the studio under the supervision of Ajarn Apirak

FIGURE 4.11 AJARN RATCHADA DISCUSSED WITH ONE STUDENT WHILE OTHERS DID NOT PARTICIPATE



who had been replaced by Ajarn Ratchada earlier in the year. There was, however, one significant difference: Ajarn Apirak tried to encourage the students to work on their own ideas, and she provided support information to make their projects successful; Ajarn Ratchada used questions to encourage her students to think or to clarify the problem that they were experiencing. To enable me to have a better understanding of this difference, I sought an interview with Ajarn Ratchada.

An interview with Ajarn Ratchada

Educational background

Ajarn Ratchada talked to me about her secondary school background before she started studying at Sriburapha University. She, earlier, had occasion to work in groups; while at Sriburapha University she had to work alone and it seemed she gained less knowledge as a result. I asked about her experience as a former student and the five years that she had studied in this school.

For the first year, she learned the principles of composition of forms, colours and textures, but she did not know their usefulness as it was only experimental. The other project involved the study of interior space: the teacher gave her the space of a room in two dimensions; accordingly, she couldn't imagine the value of that space. She thought that students would understand more if they could have chance to experiment in real space by themselves, and to study how to arrange furniture related to its human function. There was a lack of any workshop activity. After the project was finished, the teacher selected both good and bad projects and presented the reasons for these judgements in front of the class. In that way, it was expected they could learn from these explanations.

In the second year, the teacher taught the class individually. Ajarn Ratchada was impressed by one teacher who taught her how to connect each room to be a house, and from a house to be an apartment, even though she didn't know the mechanism of the program. Initially, she had noticed

that all of the projects of her friends seemed to be similar; for that reason, she started to make her own project different. Even though she didn't know whether her ideas were right or wrong, she completed the project only for the sake of getting marks.

When Ajarn Ratchada was in third year, the communication was better even though she had learned individually with the teacher; nevertheless, students had the opportunity to present their finished projects in front of the class, thus being able to learn from each other. But the program was like mathematics: plenty of formulas to follow. Even though they finished the project step by step, she complained about this in her initial consultation with the teacher; after this the teacher gave her partial guidance. She knew every part and parcel of the project but she couldn't see the overall picture; hence, during the presentation of the project the teacher would say there were mistakes for which they would lose marks. Finally, she said, she gained nothing from the course. She said that while she was a student at Sriburapha she had not been satisfied with the education. She added that the system was no different then from the present arrangement. She remembered that in the third year they had four project designs but she didn't know the objectives. Luckily, she passed without knowing the rationale behind each project. Actually, she learned by asking help from senior students; overall, she learned by herself. She thought that the structure of her architectural education had failed her.

There was, however, one project that she thought was good: a commercial complex project proposed by Ajarn Pataka, who retired from Sriburapha many years ago. Ajarn Pataka gave freedom to the students to participate in building up the program; it was an example of group working. She thought that it was good because during that project students learned how to write the program by themselves.

In the fourth year, she undertook a museum project. While the teacher introduced her to reading books on the topic, the teacher never explained why different buildings had been formed in many different ways. She never learned to know the real building; even though her finished project seemed

beautiful, she could not really answer questions relating to form. The final project in that year was a housing project. The students appreciated it because it was very beautiful but, in fact, the project failed to respond to, or reflect, the ideas of the people who would live in that building.

In the fifth year, she worked in a group that was involved in a site plan. It was an interesting project because she could choose the group by herself – unlike previously, where the teacher selected the group for her: she had failed this earlier project. Her personal project, which all students were required to pass in order to graduate, was a gallery project. On this occasion, Ajarn Ratchada was able to work closely with her adviser and it seemed that everything that she proposed was agreed upon by the committee. Her main concern was to produce a beautiful project; she had not really been concerned about the process, and the relevant information, surrounding this project. She was pleased to obtain good marks for this final project.

After she obtained her bachelor's degree she furthered her studies, obtaining a master's degree in Arizona, USA. While working in the US, she had the opportunity to experiment during her research and was able to test more than a hundred study models for each project, a process by which she obtained a great deal of knowledge.

As a teacher at Sriburapha University

After she graduated with her master's degree Ajarn Ratchada started to teach third year students at Sriburapha University. She first observed her colleagues as perceived by the students: 'The students know that I would like everybody to think more; they must have reasons to support their ideas'. The students were afraid of Ajarn Pensri; they knew that they must try, individually and alone, to push their project as much as they could.

Similarly, Ajarn Ratchada heard that students working under Ajarn Sanan had to work by themselves, alone. They were confused when they consulted with him: they could not decide what was right or wrong. Ajarn Ratchada recognised that part of this was good because the students must

search by themselves; however, only some could achieve by this method. Most did not have enough confidence to do the project alone and that was why many students in Ajarn Sanan's group became confused. Some students had discussed with Ajarn Ratchada how best they might approach their supervisors.

The most striking thing that she had noticed from her teaching up to that time was that students sought the solution to the project expected by the instructed in order that they would obtain better marks. For example, they asked her about the principal block of the project functions related to the site location and main access to the structure. In architectural practice, we call it zoning, knowledge of which would enable them to obtain an A grade. All of the students in the group had then followed this advice without showing any individual thought, input or interest to do experimental work in order to find out an appropriate solution for themselves: the main objective was simply to obtain the highest grade.

Even though a number of students showed that they wanted to further their knowledge, the majority of them neither read books nor consulted references; the percentage of students who used the library was low. They preferred only those books that contained plenty of photos, as opposed to more formal textbooks. Even more surprising was the observation that while the teachers read textbooks, they had never brought them to class to introduce them to the students. The teacher never guided them to read good books.

Finally, she observed that she felt she had to learn again from the three teachers – this time how to teach. In her own opinion, it was too early to judge them but she noticed that their system of teaching had not really changed at all. Even though she would like to change she did not know how to propose a new method. She especially wished to encourage the students whom she supervised to work with their own ideas; she cared sufficiently for them not to have them have to learn in the way that she had experienced in the past.

After two years of teaching at Sriburapha University, Ajarn Ratchada travelled to the UK to study for her doctoral degree. After graduation, she resumed her teaching post in this university and she replaced Ajarn Apirak to teach the second project in Studio Design,.

I asked her opinion about the teaching method that she would like to apply to the project design course in the third year. She was cautious; she said she would like to change the system of teaching but, because Thai culture was still conservative, any change must be gradual.

She related the experience of a friend who had studied with her in UK and who was now a lecturer at Kasikorn University in the north of Bangkok. Her friend would like to totally change the approach of his faculty but she noticed that the system under which her friend now worked was the same as that which they had experienced in England during their doctoral program. From the outset – past to present – almost all the schools of architecture in Thailand seem to have copied the teaching approach of a foreign country. She proposed that if we would like to change, first we must study the system deeply and see whether it was suitable in this country considering the local beliefs, customs and traditions.

She observed that the faculty always followed the needs of the market; she believed that students should have the chance to think 'out of the square' – in other words, to work like a professional architect. She felt that, instead, they tended to copy ideas from Hong Kong and Singapore; as a result, new Thai buildings seemed always to be shaped like a block.

> We did not have our own idea. That is why our country has not progressed as it should. For example, in the market, the professional architects have designed condominiums the same way for the past twenty years until now and we haven't any new concepts and fresh ideas about that type of building in our country.

She proposed that as educators we must develop our students in a professional way: let them think and experiment more and more by themselves to create original designs.

When I asked her what solution she would like to propose, she said that our faculty was too strict in enforcing fixed steps of learning and that it was not sufficiently flexible. She proposed that students must have the freedom to select their own supervisors instead of working in rotation because the teachers had different characteristics. If they wanted to learn based on a particular teacher's style of work, students should be given their preference.

Ajarn Ratchada felt that the students and teachers needed to do more experimental work together. She also mentioned that, if possible, the students should be free to select the special category of each type of project by themselves. She talked about the system of education in England where Years 3, 4 and 5 learned together and always thought that they were in the same class; they only differed in their experience. She thought that the Year 1 and Year 2 Thai students might still be too young to do this, but Years 3 and 4 could be combined. For example, in the third year, students could compare each other's work; outstanding students could encourage others who were weak. With eight projects, in the usual rotation, students would have a minimum of four semesters with greater flexibility and freedom to work on the projects in which they were interested. When I asked her opinion about the design studio where all students from first to fifth year would work together in the same place instead of exclusively separating the students in each year level in their respective studios, she replied that by combining all years together, in the faculty the senior students would influence the ideas of the younger years: she was afraid that they might proffer the wrong advice because they still lacked experience.

What she observed as a teacher

Ajarn Ratchada talked about the teacher at Kasikorn University who proposed to his students that they should undertake only one project per semester, instead of the two undertaken at Sriburapha University. The project was divided into many parts of study. For example, he invited the director of a farm house to state the requirements of the project to the students. They started to work according to the specifications of the client.

Step by step they experimented and developed it, part by part. It seemed that this experiment sounded good in the first step but Ajarn Ratchada saw that, in the end, this process failed because not only students, but also the group of teachers who taught with him, could not see the final direction of the project because they never finished it in a deeper way. And her friend was not able to achieve his expected outcome because only few teachers could understand him. Later on, she said that her friend got lost in the process because students did not know which other areas they had to work in, even though the students were fully involved with their work.

In her opinion, it would be better if students did two projects at the same time. The first project would use the method of her friend: the students experimenting on those parts of the project in which they were interested without having a final destination; the other project could be a small one where the students could use some information and ideas that they got from the first experiment in order to develop the second project in a deeper way.

I had an occasion to visit Ajarn Ratchada while she taught project design four – commercial complex. I noticed that she taught a student by posing questions while the other students looked on. The students that she was teaching in this project were my original group in project design one – kindergarten.

I asked her opinion about the new education program of architecture at Thammasat University. This combined bachelor's and master's degree allowed students to finish the total course within six years instead of the usual five years just for a bachelor's degree. In the new structure, graduating students are able to commence working as an architect after the first four years. If students wanted to continue another two years they could obtain a master's degree. The new scheme, 4+2, enabled the students to gain a Bachelor of Science degree. Following graduation, they needed to continue another two years to earn the credits to be an accredited architect and also receive a master's degree in architecture.

Ajarn Ratchada commented that it was a good program; however, in some circumstances, it was inappropriate because if students graduated four years in a Bachelor of Science degree and did not want to continue further studies in architecture the course in which they had studied could not be transferred to another field or discipline. She also mentioned that on one occasion she was a member of the master's jury at that school. She noted that some of the master's theses were poor due to lack of knowledge. The problem had not really been overcome.

When I asked what she would do if she had the opportunity to change the system of teaching, she said that the first priority was to change the present system – especially, trying new things – because for the past twenty years nothing had changed. Secondly, she suggested, there should be no replacement for the Studio Design project. She was less certain regarding any change to the five-year curriculum; she posed this question, 'What are we doing now and what do we want from education?' In other words, the goals of the program had to be examined closely before any structural change should be made. If this was not done, she said, we might not find a satisfactory resolution and the earlier changes would all have been in vain. Finally, Ajarn Ratchada observed that that the students needed to be given encouragement to experiment and to be original; this would be likely to encourage them to work harder than was evident under the present program.

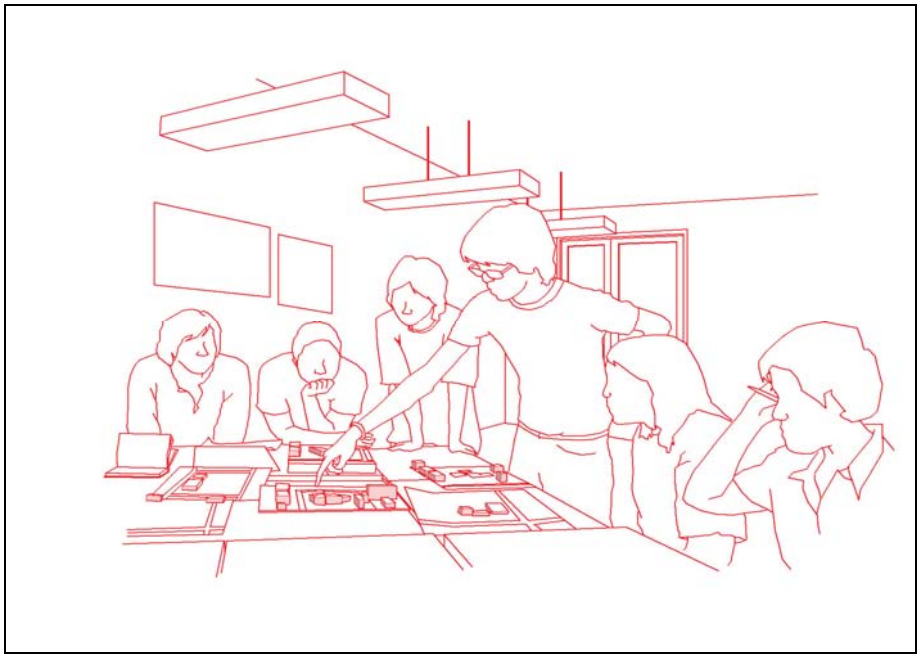
Action and observation 8

I returned to my studio and organised Ajarn Sanan's group to join with mine; however, this time we combined our groups – using round table – for only two weeks. After that we divided our class back into two separate sections to give Ajarn Sanan the opportunity to take up a learner-centred approach. I saw that he continued to use this new method of teaching automatically with his students. I still remember, so well, the change in atmosphere and the change in the approach to learning. Within six to eight months I had been able to change the teaching style of my colleague – a style that he had used all his teaching life – without any overt pressure or

force on him or on his environment.

For my part – following the adverse outcome that I experienced as a consequence of my failure in the third project – I used more time with the students under my supervision and I used the comments of students from the previous projects to plan the experiences to be used in the various steps of the new project. I started by sharing ideas; then I took the opportunity to work with students personally for a period of time. I then provided the students with the opportunity to develop their projects and ensured that they had more time to think creatively based on the information that they got from the first and second round table. After the draft presentation to the jury, we came back to the studio to combine the two groups of students again. Both Ajarn Sanan and I worked as facilitators, using round table to share all the problems of our group based on the comments and opinions of the jury. After that, the students automatically divided into small groups that were

FIGURE 4.12 STUDENTS ORGANISED THE STUDIO DISCUSSION BY THEMSELVES



based on the comments and opinions of the jury. After that, the students automatically divided into small groups that were based on the problems that had emerged, a grouping procedure that had occurred earlier in the development of their project. At the same time, I introduced a group of specialists composed of structural engineers, system engineers, energy conservation specialists, and professional architects all of whom were experienced in the development of commercial complex projects to support the discussions within each group. This occasion provided the appropriate opportunity to meet the needs of the students, helping them to find solutions to their problems. I noticed that other students who were not under our supervision came in droves and joined this session. It was a great moment when I saw the studio packed full with students, with the class being controlled and organised by the students themselves. It seemed that nobody needed to talk to me anymore, and I was very happy (see Figure 4.12).

Before my mission was over, I took the opportunity to discuss and interview Ajarn Sanan again for his opinion. The outcome is described below.

Final interview with Ajarn Sanan

I interviewed Ajarn Sanan for the second time; this time, he totally agreed with the student-centred approach of cooperative learning. He said that at the first stage when I invited him to teach with me in the second project – office building – he had needed to watch and see what I had organised. The time then was too short – only for two weeks – so when he returned to his studio he still used his original methods with his students. When it was time for the third project, in which he was the author of the program, he had the opportunity to talk with me about the framework of that project. In the four weeks during which he taught with me in the same studio by combining our two groups of students, he started to appreciate the value of cooperative learning that I proposed to him. It was the first time that he talked less and listened more to the students.

For the fourth project – commercial complex – with a full period of

seven weeks, advisers were able to work with the students. Initially, he had intended to teach with me from the beginning to the end as he had done in the third project but after the second week he wished to test himself, so he opened his own round table, following my example; this time, however, he was able to use all his experience from his second and third project to organise it effectively. He noticed the favourable feedback he had received from his students. Most importantly, he had had the courage to apply this method in the studio and now believed that this was the best way to teach Studio Design.

He suggested a development for the data collection procedure: he recommended that students be allowed to choose the members of the group as I had done in the second project but that, in addition, they should give consideration to those who might be left out from the group. He stressed the importance of making free-hand sketches for, while students would like to use computers at this stage, it was time-consuming and interfered with the development of their data collecting skills. Finally, he stressed the importance of students respecting the building code, emphasising that architecture had a framework and could not be compared with interior design, fine arts and graphic arts.

Reflection 8

For the final time, I sought the opinions of students, using a questionnaire (see Attachment E). Their responses are summarised below:

Students' opinion: Strengths of the new method of teaching

In the student-centred approach, they could study all steps with good understanding because all students are encouraged to work with the project. Normally, under the teacher-centred approach, they had no opportunity to express themselves; students could receive ideas, information, and knowledge from the teacher to solve the problem – but only to the extent that it satisfied the teacher. Under the student-centred approach, the

students knew how to help each other, worked together by team under supervision of the teacher and brought information from the group to solve problems. They were able to obtain more knowledge, both from friends and from teachers. In this way, they were more knowledgeable than before and could design something special. By this method, the quality of the project was the product of the collaborative thinking of many persons. They were sure it was better than individual effort.

By using problem-based cooperative learning, they shared real experiences by talking with specialists who gave them advice at the time they most needed it. And, importantly, they could think 'outside the square'.

Students' opinion: Weaknesses of the new method of teaching

The student-centred approach was very slow at the start and sometimes they lost a great deal of time because of the discussions. They thought that they could understand the transfer of their ideas from time to time in this class, but often this was not for long because the teacher interfered regularly and challenged their ideas.

Under the teacher-centred approach, the teacher dictated all steps of the work through to the end of the project, so they used less time to think by themselves. Students learned from the experience of the teacher that they could not find somewhere else.

The development of a system of cooperative learning was not yet well-adapted to Thai society because students still did not like to talk or to ask question of persons in authority like a teacher.

Students' Recommendations: changes in studio design course

The teachers must be open to receive ideas. Some teachers believed too much in themselves and were afraid of trial and error. The technique and method of design had totally changed; they must all try to test the new method.

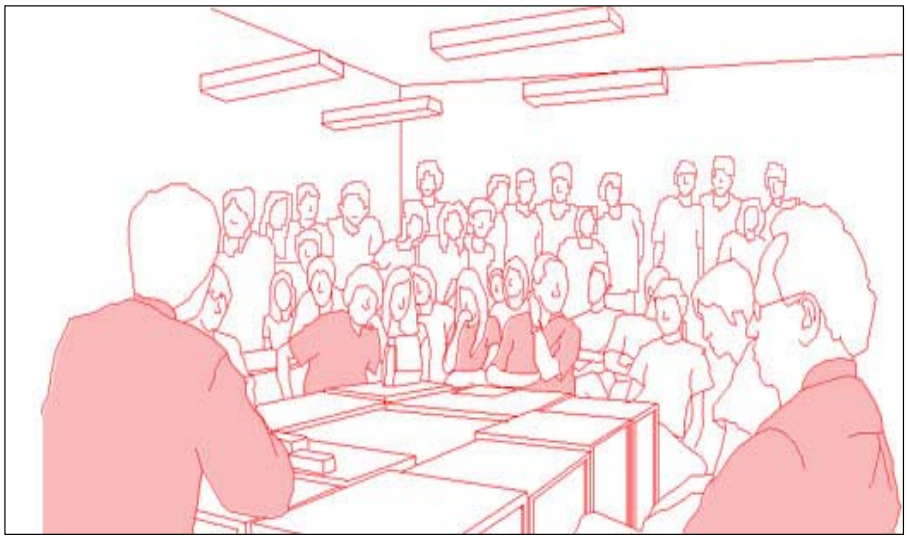
The method in project design must be integrated with other subjects,

instead of treating each subject as a separate entity; there should be few projects, overall. They thought the faculty, initially, should use both teacher-centred and student-centred methods – meeting, half-way, the pressures for each half-way – then gradually placing more emphasis on the student-centred approach until the students would be able to embrace the latter, totally. Ultimately, they would find that it was good using the student-centred approach.

Group discussion with focus group

At the end of the year-long program, I took the opportunity to invite a focus group comprised of teachers and students of all four groups to come and share their opinions regarding the method of teaching architectural project design studio for the third year at Sriburapha University (see Figure 4.13). Generally speaking, a focus group is defined as a small gathering of individuals who have a common interest or characteristic, assembled by a moderator, who uses the group and its interactions as a way of gaining information about a particular issue (Lewis, 1995; Gibbs, 1997; Marczak & Sewell, 1998). The purpose of focus groups, as noted by Krueger & Casey (2000), is to promote a comfortable atmosphere in which people could share their ideas, experiences, and attitudes about a topic.

FIGURE 4.13 GROUP DISCUSSION WITH THE FOCUS GROUP



I acted as the moderator and raised some questions to the students who had just finished all four projects; all of them had experienced cooperative learning with me. When I asked them what they thought about cooperative learning, the Banker's Daughter agreed that, through this approach, they enjoyed learning in teams and supporting one another. The Tailor's Son appreciated that brainstorming within a group was very significant in making their project design successful. There was a warm atmosphere in the class and everybody could share their own ideas. He added that two heads were better than one, and if there were one hundred heads, it would be best. By this method, students could get various solutions from members within the group; hence, they could find remedies to their problems and could come up with multi-faceted project designs. Teachers and students had rapport with one another. There was strength in the group.

The Architect's Daughter liked the approach even though at the first she did not agree with me about using round table because she was afraid that all projects might be similar. The Contractor's Daughter appreciated the cooperative learning method because she had experienced working with some of her friends before; that was why she enjoyed working in groups. She added that visiting real projects would support her imagination and make her work more creative. The Merchant's Son said that the approach was an outlet for sharing and synchronising ideas to develop a good project. A student from my hospital project said that there was teamwork in cooperative learning which helped them share each other's burden and enable them to work hand in hand. He concluded that the work of the best individual simply did not compare with the work of a group – the latter was superior.

One student said that before, when he worked alone, it was tiring; under this method he was able to work on the project better even though his project seemed to be similar to others. This idea was supported by the Developer's Daughter; she stated that by using this method they would have more time to develop each project. She also mentioned that, if possible, the marks of project design and the theory should be separated.

According to her, it was unfair to measure the total capability of the student based on only one aspect. Likewise, she mentioned that sometimes the project design and the theory were not related to each other.

Both the Architect's Daughter and the Businessman's Daughter agreed about the value of the approach of sharing ideas with their friends but they also wanted to spend a period of time to develop their work individually. The Merchant's Son supported the view that, in order to develop the capability of doing project design, the designer should engage in sketching by hand more frequently to make the design better. Being able to share their sketches with others then became very relevant.

A student from the hospital project agreed with the approach; even though the projects were very difficult they had been able to finish their work on time under this method. Initially, he considered that it was boring to listen to others but after the discussion they were able to work faster than before. Concerning the workshop that I proposed to them on the last meeting of the hospital project, he appreciated it very much and wanted to have more workshops for a longer period of time; the Engineer's Daughter also supported this method. She wondered, however, why the teachers were not of one accord in implementing the cooperative learning approach.

A student from the commercial complex project mentioned that sometimes the project design course seemed too strict and overburdened with regulations. Despite the methods used, the program itself could destroy the creativity of the students. The Public Servant's Son agreed with the problem-based learning method, particularly the opportunity for the students to have direct contact with a team of specialists who helped him and his friends to solve their problems 'just in time'. He also mentioned that the project design and project construction had not been related to each other and the students had more work to do.

To further clarify the outcome of the students' reaction towards the new method of teaching, I used a simple Likert Scale Questionnaire to seek the opinions of the three volunteers from each of the four projects. The responses are contained in Table 4.1.

Comment [IML1]:
Comment [IML2R1]:

Based on the responses to the Likert Scale questionnaire, a clear majority of students agreed (in many cases, strongly) with the new method of teaching. This new method created a good atmosphere that made them happy and active in the class; importantly, they were able to share their ideas with others. Most significantly, all students 'switched on' to study as a result of the cooperative learning approach used in Studio Project Design.

TABLE 4.1 SUMMARY OF RESPONDENTS' IMPRESSIONS OF THE STUDIO DESIGN COURSE

Item	Responses				
	SA	A	D	SD	U
I enjoyed the cooperative learning that was possible in Studio Design	6	5	0	0	1
I prefer the teacher to tell me everything what to do in Studio Design instead of group sharing.	0	1	7	3	1
Studio Design was a disaster for me.	1	0	6	5	0
I switched on to Studio Design	9	3	0	0	0

It was remarkable to know that students who were taught under the student-centred approach had enjoyed a new kind of learning experience based on this method. They participated in all classroom activities and, consequently, were no longer the passive learners they had been before. They put life and energy in the classroom which made the learning process dynamic.

CHAPTER 5

Discussion and Recommendations

Introduction

In this study, I attempted to evaluate the effectiveness of using a cooperative, student-centred approach – as opposed to the more traditional teacher-centred approach – in the teaching of a Third Year Architecture subject, Studio Design at Sriburapha University, Bangkok Thailand. I sought to answer the following specific questions:

1. What is this new method of teaching trying to achieve?
2. How is the new method of teaching going?
3. Is the delivery of the new program working?
4. Is the delivery consistent with the program plan?
5. How could the delivery of the new program be more effective?
6. How could changes to the organisation of Third Year Architectural Design be changed to make it more effective?

This research has been based on an Interactive form of evaluation and employs the four steps of Action Research as determined by Kemmis (1985) – namely, to plan, act, observe and reflect – in order to make judgments and recommendations about this alternative approach to teaching Studio Design. The research has been concerned with determining whether or not a student-centred approach – which uses cooperative and problem-based learning methods – results in improved student outcomes. The outcomes that I have considered consist of the following:

1. The improvement of student abilities in all components of the course.
2. Development of a positive attitude towards design, increase in student technical and academic competencies to meet design demands.
3. Enhancing student independence and the level of interaction and cooperation between teachers and students.

The respondents of this study involved 46 students including 12 volunteer participant- interviewees enrolled in Studio Design Course, and three teachers at the Faculty of Architecture, at Sriburapha University, Bangkok, Thailand.

Validation of Answers to the Research Questions

The in-depth interviews and focus group discussion with students provide a source of information to answer the research questions.

What is this new method of teaching trying to achieve?

This study sought to determine the effectiveness of student-centred approach and its impact both in teaching and learning Studio Design course. After using this method, a set of positive outcomes, related to this question, is included in Table 5.1, below.

A student-centred approach supports what many contemporary educators claim: that cooperative student-centred learning is a better method by which to teach modern day students. Dryden & Vos (1999) write that instead of working individually with everybody in competition with each other we develop interdependence within teams. According to Slavin (1991), cooperative student-centred learning usually supplements the teacher's instructions by giving students an opportunity to discuss information or practice skills originally presented by the teacher; furthermore, it usually

supplements the teacher's instructions by first posing a main topic to the students and then giving them the opportunity to discuss and share information. In this method, sometimes students need to search out information for themselves. They should also be responsible for themselves and to the members of their team, and to be able to depend on one another. They should also appraise and check their work as a group. In similar vein, Wilks (1995) states that through a cooperative student-centred learning approach, students develop critical and creative thinking because most of the time they have group discussions and sharing as well as evaluation of group projects and activities.

TABLE 5.1 PROGRAM ACHIEVEMENT OUTCOMES

Element	Sub-element	Action	Outcomes
Cooperative Learning	Discussing and sharing information	Round tables	• development of skills to help each other • contributing ideas, thoughts, feelings, intuitions and reactions • sharing resources and strengthened their respective teams • encouraging students to talk and open up • checking their attitude to build trust
		Peer tutoring	• promoting unity and harmony in studio activities
			• promoting inter-group learning and teaching
	Group interaction	Group investigation	• creation of ideas • gathering different information • making decisions • seeking the cooperation of others • development of interdependent processes: • analysis • interpretation • inter-team coordination and reporting • problem solving • content application • the integration of achievements • cooperation in terms of reporting, problem solving • sharing the success or fulfilment of the group

Element	Sub-element	Action	Outcomes
		Overall	• increased learning competencies • improved self-esteem and build friendship among them • developed better attitude towards the Faculty of Architecture and with the members of the group • enhanced social skills they become more supportive with each other • deeper understanding of the subject matter covered by the course • working productively and volunteering to help others • motivated to do better work and be more self-controlled.
	Problem-based Learning	Interaction with professionals	• workshops with experts such as engineers and energy conservation experts • motivated to commence any project by consulting engineers and other experts • students find professional help in solving immediate problems • students get complete knowledge in all areas of the project

Furthermore, Wilks suggests that if we wish our students to become effective participants in society we need to assist them in developing a range of skills which give them practice in reflective and critical thinking. This will help them in their personal development by becoming aware of, and valuing, the thoughts and feelings of both themselves and others.

In order to establish a cooperative student-centred learning approach amongst my students, I organised round tables for the sharing and evaluation of their group project in order to encourage them to think creatively and critically. This followed Wilks' (1995) advice, that if we would like our students to become effective in society they need to practise reflecting on what they are doing to help develop themselves and to be aware and value their thoughts, feelings and with the other members of the group.

Lucking (1991) states that during the 1990s and beyond, cooperative student-centred learning had been an educational practice that modern educators needed to consider for their schools. I support this objective

because I believe that cooperative student-centred learning is necessary for modern Schools of Architecture, just as Lucking (1991) considers it as a must for all schools.

Cooperative student-centred learning, according to Lang (1995), enables a group to build a climate of trust amongst each individual; it also helps students acquire communication and cooperation skills, and encourages them to practise the basics of small group organisation and cooperation. Johnson & Johnson, (1975) suggest that to keep the climate of trust among them, teachers should:

- ensure that they have the skills to express acceptance, support and the desire to cooperate;
- encourage them to contribute information, ideas, thoughts, feelings, intuitions, support, hunches, and reactions; share material resources and express cooperative intentions, acceptance and support of one another as they work together; discourage rejecting and non supportive behaviour such as silence;
- periodically ask cooperative groups to evaluate their behaviour checking that it is trusting and trustworthy and determining how they might strengthen the cooperation.

In my studio, I observed that students have confidence with one another after having group discussion. Specifically, I observed that they had:

- developed their skills in helping each other;
- contributed ideas, thoughts, feelings, intuitions and reactions;
- shared resources and strengthened their respective teams;
- encouraged students to talk and open up;
- check their attitude from time to time to build trust among them

Lang (1995) suggests that there are two categories of cooperative student-centred learning: *peer tutoring* that provides instruction; and *drill through interaction among peers*, that encourages cooperation and interdependence in pursuing learning tasks. Both elements may be used to explain or acquire information or skills that a teacher has initially presented or investigate

sources that a teacher has identified. Given practice and reinforcement most students become good instructors and benefit greatly from teaching fellow students. What is more, Lang suggests, most students learn better from their peers than from adults.

There were two aspects of cooperative student-centred learning that I used in my Studio Design course. The first was peer tutoring, where I provided many opportunities for students to interact among themselves. This promoted unity and harmony in their studio activities and enabled them to both learn from, and to teach, their fellow students. I particularly noticed that students enjoyed learning with their friends. The second was the undertaking of a group investigation which encouraged students to create ideas, to gather different information, to make decisions and to seek the cooperation of others. These interdependent processes stressed analysis, interpretation, inter-team coordination and reporting, problem solving content application and the integration of achievements. This led to cooperation in terms of reporting, problem solving as a whole and sharing the success or fulfilment of the group in general.

The students in my target group responded positively to the new method in the following manner:

- increased learning competencies;
- improved self-esteem and build friendship among them;
- developed better attitude towards the Faculty of Architecture and with the members of the group;
- enhanced social skills they become more supportive with each other;
- deeper understanding of the subject matter covered by the course;
- working productively and volunteering to help others;
- motivated to do better work and be more self-controlled.

Students benefit most from cooperative student-centred learning when all perform their responsibilities to help each other in the group and each contributes to achieving the group goal. It results in a number of positive

educational outcomes for students. When all students are responsible for supporting one another in the group and contributing to attaining and reaching their objectives, the result is favourable.

This study also suggests that the effectiveness of cooperative student-centred learning is enhanced by problem-based learning. Boud (1985) suggests that, in all problem-based learning approaches, 'the starting point should be a problem, query or a puzzle that the learner wishes to solve'. Problem-based learning is not an ordinary curriculum with problems added: the problems are the curriculum, and in going about solving those problems the learner seeks the knowledge of disciplines, facts and procedures that are needed to solve the problems. The aim is not only to solve those particular problems but in the course of doing so, the learner will acquire knowledge, content-related skills, self management skills, attitudes, know-how: in a word, professional wisdom. Thus, the approach to problem-based learning starts with a problem, question or a puzzle which the student would like to solve. To solve those problems, students should search for knowledge, data and information needed to solve the problem for their designs. In doing so, they gain knowledge, skills and expertise and wisdom from the specialists. To support this idea, when I invited some specialists like engineers, energy conservation experts, to participate in the workshop the students were very interested to ask for solutions to problems associated with their projects.

Normally at Sriburapha University, students learn the theory side-by-side with the project design according to the needs of the project. Students in the past have not shown much interest in the theory that they learn; consequently, when they undertake projects and meet with problems, they don't know how to bring that information to solve the problem in a real situation. For this reason, I invited some specialists from my office to help me in my studio. For example, when a student had a problem with the head of the building for the office project, my specialist was able to propose to him a type of elevator without a machine room on the top.

In this way, the students learnt from experts to solve the immediate

problems found in their projects. This action is an actual scenario that I practise in my real professional life: when starting to design any project, normally an architect must start the conceptual design by consulting engineers and many specialists. At Sriburapha University, the supervisor of the old teaching method uses only one supervisor for the project but this is not enough because one supervisor is not enough to provide knowledge in all areas of the project even though the supervisor had a long teaching experience and expertise. Architects, engineers and other specialists should share their knowledge together to build up a complete project that is realistic.

How is the new method of teaching going?

Based on the responses of the students from each four Studio Project Designs about this new method of teaching, I concluded that the majority of them accepted this new method; however, there were some recommendations that they proposed that they felt would improve the new system of teaching. These recommendations are summarised in Table 5.2.

With the new method of teaching –sharing, listening, and exchanging ideas with others – students enjoyed working in project design. They could keep the information received from other students to develop their own projects and gain specific knowledge from their friends and teachers. They felt encouraged to express themselves. Moreover, they had more freedom to think, unlike in the past where they were always confined ‘inside the square’. They preferred this new method of collaborative thinking among the group to the old system which was individualistic. On the other hand, they encountered communication problems because everybody in the group liked to talk and it was difficult to retain what others had said and to discern what was important. According to the students, brainstorming could destroy the uniqueness of each individual’s work. Culturally speaking, the new system is different from the Thai culture where some students are not accustomed to talking and discussing with teachers.

TABLE 5.2 OUTCOMES FROM THE NEW PROGRAM

Element	Sub-element	Action	Outcomes
Collaborative Learning	Development of interdependence	Working in teams, instead of individually	• Students develop interdependence in teams, instead of working in competition with each other • Students share, listen, and exchange ideas with others • Students have more freedom to think • Get more knowledge from their friends
		Negative consequences	• More time required for discussion and hence insufficient time to complete given tasks • Transferability to other classes likely to cause problems • Communication problems: too much input; cultural problems • Loss of individuality
Curriculum	Curriculum review	Curriculum re-design	• Subjects in architecture and engineering to be integrated, with a lowering in the number of projects to be undertaken • Review of time allocation for subjects • A more holistic approach to courses
Pedagogy	Pedagogical review	Approach to teaching	• Proposal that all teachers should use this new method of teaching • Teachers need to be open to receive new ideas

Students recommended that more time should be allocated to the more difficult projects. They suggested that subjects in architecture and engineering should be integrated and that the total number of projects should be decreased; at the same time they recommend that Project Design should be combined with other subjects instead of separating them into many different subjects, thus creating a holistic curriculum. Finally, they proposed that all teachers should use this new method of teaching and they must be open to receive new ideas.

In conclusion, there is a need for curriculum reform based on the students' recommendation. Hence, under the new teaching method, it will be good if students can have the opportunity to write out their programs under the supervision of the teacher – similar to the fortunate accident that occurred

in my second project, office building. In the past, the curriculum has been fixed and students have had no freedom to choose the project design; even though they have had the opportunity to write out the programs, this has been according to very strict guidelines from the teacher responsible for that project. The curriculum must be more flexible which means that in Project Design, students should be able to choose any project in that area and specify its sizing. For example, the second project, normally, was a medium-sized office building such as a bank. This could be changed to be a police station, post office, or some similar public place of work.

I agree with Ajarn Ratchada that the third and fourth year students be combined – as she had experienced in UK. This would open the door for students to have more flexibility to work on projects that they like. They would be able to compare each other's works; excellent students would likely motivate others who are weak. With eight projects as a usual rotation, students would have a minimum of four semesters with greater flexibility and freedom to work on the project in which they were interested. This method is similar to the system in the Faculty of Architecture in France where I studied more than thirty years ago. At that time, the curriculum was divided into three cycles; each cycle was composed of a minimum of two academic years.

Is the delivery of the new program working?

Based on the discussion of the focus group, students responded favourably with this new method. The key findings from the focus group were as follows:

- They enjoy learning and support one another.
- There is rapport, teamwork, a warm atmosphere and strength among the students and teachers.
- They were able to find solutions to their various problems about their project. Hence, they could develop multi-faceted designs.

- Brainstorming among them helps in making their projects better. They also mentioned that in learning 'two heads are better than one'.
- Problem-based learning gave them the opportunity to have direct contact with a team of specialists which helped them solve problems 'just in time'.
- They believe that the work of the best individual is not comparable with the work of the group.

It is clear from my research that the teachers also accepted this new method; however, they made a number of suggestions, a summary of which is contained in Table 5.3.

With reference to Ajarn Pensri, at the first stage, she used her own method which is teacher-centred; at the end of the semester, she started to understand the method that I used in the studio but she was not really interested in implementing it. At most, she mentioned that if possible, teacher-centred and student-centred might be combined. She thought that cooperative student-centred learning is good in one way but she suggested that students would not have enough knowledge to share ideas with each other. By teaching the students under the control of the teacher, she argued, the teacher can guide and give them opportunities to express their opinions at the same time. Thus, she proposed that if there was to be any change the two ways must combine.

For more than ten years, Ajarn Pensri was teacher-coordinator for the Third Year Studio Design and also responsible for planning the framework of the curriculum in third year. During my discussion with her it seemed that she was unwilling to change. As a senior teacher in the university, she maintained a traditional mode of teaching which was teacher-centred; it would consist of teachers lecturing and students listening. This 'teaching as telling' approach (Christensen et al., 1991) is described as 'teacher-centred' by Bruffee (1993). In this method of teaching, there is little student-to-

TABLE 5.3 OUTCOMES ON THE DELIVERY OF THE NEW PROGRAM

Element	Sub-element	Action	Outcomes
Ajarn Pensri	Understanding the new approach	Reticence to make change	• Suggestion that teacher-centred and student-centred approaches be combined
		Realising the negative aspects of a teacher-centred approach	• Teaching as telling • Little student-teacher interaction • Teacher-student interaction is often brief and impersonal • Acknowledging the validity of a student-centred approach in a university
Ajarn Sanan	Understanding the new approach	Realising the positive aspects of student-centred approach	• Successfully applied student-centred approach • He learnt by doing
Ajarn Ratchada	Wanting to change but no direction	Strong interest to change but already using student-centred approach without her knowledge	• Interested to use student-centred approach • Provided opportunity for students to participate un the discussion

student interaction, and teacher-student interaction is often brief and impersonal. In the traditional classroom, students learn as isolated, independent individuals (Hooks, 1994). Realising this was an old method of teaching, Ajarn Pensri later on agreed that a student-centred approach was, at least, an alternative to the traditional method of teaching. This was quite a concession, compared with her original position.

Meanwhile, Ajarn Sanan, another senior teacher, initially did not understand the way that I had conducted the trial of the new approach to teaching the first project. Later on, when we had opportunity to combine both our studios, it gave him opportunity to observe the way that I taught. From the second to the fourth projects, he had experienced many changes. Finally, he agreed and conducted his studio by using the new method by himself.

Lastly, Ajarn Ratchada, the youngest of the group of teachers, showed a strong intention to change from a teacher-centred to a learner-centred approach. She had no formal background in education; however, she had gained recent alternative learning experiences in a developed country; she

told me that she did not know yet the proper way to adapt to this alternative method of teaching.

During her interview with me, she stated that in the period of time from when she was a student in this university to when she became a teacher, she had noticed that nothing had changed. When I observed her classes, I saw she taught the students by posing questions to them and posed the project on the board in order to provide an opportunity for students to participate in the discussion. I realised that she was genuinely interested in the way that I used the new method, even though it was just in the form of a trial.

Is the delivery consistent with the program plan?

There were five minor changes made in the delivery of the program during the progress of this research, details of which are summarised in Table 5.4.

First, I had intention to be the author of the fourth project because I would have opportunity to gain experience from the other three teachers before I started to plan my program. After I had discussions with the three teachers they asked me to take care of the second project. For this reason, I reorganised my plans and implemented change to the curriculum of the second project.

Second, at the start, there are four original teachers, namely; Ajarn Pensri, Ajarn Sanan, Ajarn Apirak and me. After the first project, Ajarn Ratchada replaced Ajarn Apirak. As a consequence, I had less opportunity to get information from Ajarn Apirak who quit from his teaching position for the first project and his opinion about his teaching method.

Third, in the first stage, I planned to develop a student-centred approach, concentrating only on my students. During the time I was implementing my first project, I saw that if the new method of teaching were to be useful to the faculty, I needed to approach the other teachers and win their confidence. I chose to approach Ajarn Sanan for a variety of reasons. Firstly, as a man I could relate to him easily. Secondly, he lacked motivation in his teaching

Table 5.4 Changes made in the delivery of the program during this research

Element	Sub-element	Action	Outcomes
Management Changes	Changes to the second project	The researcher asked to manage the second project	Reorganisation so that the researcher authored both the second and the fourth program
Personnel Changes	Changing the teachers	Ajarn Apirak replaced by Ajarn Ratchada	Unable to get information from Ajarn Apirak
Changing the Target Group	Changing not only from students but also with teachers	Work-based learning	Change the method of teaching from teacher-centred to student-centred
Changing judgment of marking	Changes to flexibility of mark allocation on each item of the project	Agreement among teachers to change the old marking system	Meeting the new standard of mark allocation of each project based on the aggregate mark of 30
Change in the number of students	Decrease in the number of registered students	One student dropped out	This student under Ajarn Apirak for the first project did not affect the research

because he was about to retire. This point of view was also supported following my interview with Ajarn Ratchada who mentioned that students being taught be Ajarn Sanan had once complained to Ajarn Ratchada how they were required to learn from him. Thirdly, in response to a student in the first project whom I was currently supervising, and who had expressed the wish that the new system might be supported by the other teachers, I saw that Ajarn Sanan would be responsible for this first group of students in the next project, office building; there was the opportunity for some continuity. Fourthly, before the academic year started, Ajarn Pensri, Ajarn Sanan, Ajarn Apirak and I agreed that the mark allocation must not be fixed and could be different on each project in the frame of 30 marks. This was a significant departure from past practice: for many years past, the marks allocated to topic in all projects had been the same. And finally, at the opening of the semester, we had 47 registered students but during the first project one student dropped out. Fortunately, this student was not included in my first group.

How could the delivery of the new program be more effective?

The program would be more effective if teachers were able to enhance a culture of learning in the organisations (Schein, 1985) and the need for regular provision of knowledge for making decisions in the social, political, and economic arena of human discipline (Sowell, 1985).

The outcomes of my research on the third year Studio Project Design subject at Sriburapha University revealed that while we had some problems using a cooperative, student-centred approach, the results from students' responses both from the group discussion and questionnaire were positive. These findings are summarised in Table 5.5. Overall, a key finding was that most of the students switched on to this new method of teaching.

Based on the summary of the Likert Scale questionnaire (see Table 4.1), a majority of students agreed strongly with the new method of teaching because they could share their ideas with others. This new method created a good atmosphere that made them happy and active in the class. All students 'switched on' to study under the cooperative student-centred learning approach in Studio Project Design.

On the other hand, there were varied responses from the teachers. Ajarn Pensri responded partially, because as a senior teacher she had been one of the people responsible for writing the framework of the programs of the third year project design for the previous ten years. She maintained her own standard of teaching and adhered to the old method.

On the other hand, even though Ajarn Ratchada had no formal schooling in education, she expressed a firm intention to change from the old method that she learned before to the new one. For Ajarn Sanan, at first I noticed that he lacked motivation in teaching and that he continued to use the teacher-centred method that he experienced for all of his professional life. After we had worked together using the new cooperative student-centred learning method, however, he demonstrated that he had 'learnt by doing'. The final outcome was very satisfactory.

TABLE 5.5 CHANGES RECOMMENDED TO MAKE THE NEW PROGRAM MORE EFFECTIVE

Element	Sub-element	Action	Outcomes
Ajarn Pensri	Understand both student and teacher-centred approaches	Responded partially	• Accepted partially but still adhere to the old method
Ajarn Sanan	Understand the effectiveness of student-centred approach	Learnt by doing	• Accepted student-centred approach
Ajarn Ratchada	Understand the effectiveness of student-centred approach	Firm intention to change	• Accepted student-centred approach
Andragogy	The need to know	Adults need to learn and the reason for learning	• Aware of the need to know
	The learner's self-concept	Capable of self direction	• Become independent self learners
	The role of the learner's experience	Accumulated more experience in the past that narrow their thoughts	• Less open to new ideas and new ways
	Orientation to learning	Motivated to learn for solving only life's problem	• Learn effectively within real life situation
	Motivation	Respond to external motivators such as salary	• Reward teachers in many ways
Life Long Learning	Workplace-based learning	Learning to happen in the work place	• Mediated by the trainers
	Continuing professional education	Offered by the university or professional organisation	• To update with new teaching strategies
	Self-directed learning	Learn interactive via internet	• Teachers transformed
Training Needs in Professional Architecture	Teacher training	Offer training courses to teachers	• Develop competency

For the new method, if other teachers do not recognise and use it, it would be useless. To deliver the new program successfully, I must approach not only the students but also the teachers. Hence, for the delivery of new program to be more effective, I suggest that andragogy, work-based learning, self-directed learning, and training should be used to develop the capabilities of teachers.

Andragogy

Lindeman (1926) was an early proponent of organising of adult learning activities. This led to the concept of 'andragogy', the art and science of helping adults learn (Informal Education, 1950); andragogy is particularly suited to all teachers who, clearly are adults. Andragogy encourages adults to learn as they experience needs and interests that will be satisfied by learning. A Theory of Adult Learning (Knowles, 1984) describes the andragogical model of adult learning based on several assumptions that vary from those of the pedagogical model. Each of these assumptions, as they apply to Studio Design, is considered below.

The need to know

Even though the three teachers were adults, they needed to know why they need to learn something before undertaking to learn it. There must be a facilitator to help them become aware of the 'need to know'. This was my emerging role.

The learners' self-concept

They must have a self-concept of being responsible for decision making in their own lives. They need to be seen by others and treated by others as being capable of self-direction. If they feel that others are imposing their wills on them, they will often be resentful and withdrawn. As adults, learning experiences must help adults make the change from dependent to self-directing learners.

The role of the learner's experience

When teachers come into an education activity they have both a greater volume and a different quality of experience from their students. By simply having lived longer, they have accumulated more experience that they had as youths. During their adult lives, they also accumulate different types of experiences. This difference in quantity of experience has several

consequences for adult education, such as having different individual differences to those of youths. Experimental teaching-techniques often can be used to tap into the experience of the learner, such as group discussion, simulation exercises, problem-solving activities and others.

The greater experience of teachers can also have some negative effects. As adults accumulate experience, they may have a tendency to develop mental habits and biases that tend to narrow their train of thought. This causes them to be less open to new ideas and alternative ways of thinking.

Orientation to learning

Teachers in contrast to children or youths are task-centred or problem-centred in their orientation to learning. Children or youths, especially in the faculty environment have a subject-centred orientation to learning. Adults are more motivated to learn something if they feel that it will help them perform tasks or deal with problems that they confront in their life situations. New knowledge, understandings, skills, values, and attitudes are most effectively learnt when they are presented in the context of application to real-life situations.

Motivation

Most teachers are responsive to some external motivators such as better jobs, promotions, higher salaries and others. Another very important factor that has to be taken into consideration is the desire for increased job satisfaction, self-esteem and quality of life.

In practice this means that as educators, we now have the responsibility to check out which assumptions are realistic in a given situation. In regard to a particular goal, if a pedagogical assumption is realistic for a particular learner, then a pedagogical strategy may be appropriate (at least as starting point). For example, when learners are entering into a completely new content area without having any previous experience, they do need to accumulate a given body of subject matter in order to accomplish a required

performance. When they feel no internal need to learn that content, then they need to be taught by the pedagogical model.

Life-long learning

Policies on skill formation will need to be more focused on the mature teachers, such as re-skilling them. Continuous learning is required to meet this need. They include workplace-based learning, continuing professional education, further formal study and self-directed learning.

- **Workplace-based learning** essentially refers to learning that happens in the workplace. Workplace-based learning varies greatly with some of it mediated by trainers, some of it self-planned, and some of it unintentional or accidental.
- **Continuing professional education** may be offered by a professional association, a university or a government agency. Educators in architecture are often expected to attend activities to keep up to date with new developments in teaching strategies.
- **Self-directed learning** provides teachers with virtually limitless educational opportunities. With the spread of the Internet, this aspect of life-long learning has increased dramatically and perhaps even transformed.

Training needs in professional architecture

One of the main trends in education and employment is the rapidly increasing pace of structural economic change. Globalisation, driven by advances in information technology, has fast tracked these labour market transformations. This has resulted in the loss of many 'traditional' jobs, which are quickly disappearing. In architecture for example, the processes involved in drawing plans, now require fewer people working for much less time on what was a very labour intensive job. With the help of computers and advances in hardware and software technology, jobs that previously had required twenty people could now be completed by five. As well as a reduction in labour, the

process can also be done approximately ten times faster and to a much greater degree of accuracy.

With the rapidly increasing pace of structural economic change, universities must have in place suitable training courses for professionals in their respective fields.

Based on the summary of the Likert Scale questionnaire (see Table 4.1), a majority of students agreed strongly with the new method of teaching because they could share their ideas with others.

How could the organisation of Third Year Architectural Design be changed to make it more effective?

To implement change successfully and to understand the consequences that arise as a result of change, we must acknowledge the basic principles of change. By acknowledging these principles of change and understanding them, we will be able to predict some main aspects of our change efforts in which we will be engaged in. Roper (1999) writes: 'the message is crystal clear – the dominant method of college teaching must change'. Hall & Hord (2001) have identified twelve principles of change; these principles and the consequence of each arising from this research – and its impact on the Faculty of Architecture at Sriburapha University – are discussed below and are summarised in Table 5.6.

Change Principle 1: Change is a process, not an event

Change is not achieved in a short period of time. Instead change is a process through which people and organisations progress gradually as they come to understand, and become skilled and competent in the new ways of doing things.

Based on my research, I noticed that even though students seemed to be interested in the new method that I was using, some of them felt uncomfortable especially those students who were successful under the old

TABLE 5.6 BASIC PRINCIPLES OF CHANGE

Serial	Change Principle	Comment
1	Change is a process, not an event	• Gradually introduced student-centred both to teachers and students
2	There are significant differences in what is entailed in development and implementation of an innovation	• Teachers interested in student-centred are effective to develop and implement if given resources
3	An organisation does not change until the individuals within it change	• Self initiative to change and the whole faculty will be changed
4	Innovations come in different sizes	• Small investment is required to small faculty and student population
5	Interventions are the actions and events that are keys to the success of the change process	• Work shop and round table were held to understand student-centred approach
6	Although both top-down and bottom-up change can work, a horizontal perspective is best	• Consider teachers and students as equal- learning together
7	Administrator leadership is essential to long-term change success	• Advocator to support administration to initiate change then pass to other teachers
8	Mandates can work	• Mandate can be used to implement change
9	The Faculty of Architecture is the primary unit for change	• School acts as agent of change
10	Facilitating change is a team effort	• Everybody works together to bring about change
11	Appropriate Interventions Reduce the Challenges of Change	• Learn to endure change process
12	The Context of the faculty influences the process of change	• Both physical and man power resources must be tapped to bring about change

method because this group of students learned under the close guidance of the teacher and had competition with each other instead of sharing the knowledge with their friends while the majority of the group which composed of middle and low students had nothing to lose. That is why, when I started to propose the new method, they were interested to participate because deep inside they wanted change. But they could not do anything.

At the same time, the teachers still embraced the teacher-centred approach because they were successful under this method. So if I gradually approach all of the teachers like I did with Ajarn Sanan, I hope that they would understand and accept it.

Change Principle 2: There are significant differences in what is entailed in development and implementation of an innovation

Development includes all of the activities related to creating an innovation. Implementation on the other hand addresses establishing the use of the innovation. Previously more time and effort have been devoted to the development of a process. This past practice resulted in an imbalance, with greater efforts being devoted to development. In reality, implementation requires an equal investment of time and money.

In the trial period of my research, when I first applied cooperative student-centred learning methods in my Studio Design, nobody in the Faculty of Architecture was aware of the changes I was making. The outcomes for the students, with only minor variations were very good. When I published the results of this trial in the faculty journal, prior to this research, I experienced opposition to the innovation from the teachers who were very experienced in the teacher-centred approach; this placed me in a troubled situation. Following patient explanation, sharing of ideas and showing them aspects of the experiment, some of them started to have interest in and seemed to understand the student-centred method that I was proposing. I believe that it would be even more effective if the administration of the faculty were to support this new method by investing time and money for the development of teachers to implement this innovation.

Change Principle 3: An organisation does not change until the individuals within it change

Successful change begins and finishes at the individual level. An entire organisation does not change until every member has changed.

When I started to use a cooperative learning method in my studio I was impressed by the outcome, even though it was not completely successful. It was more interesting when I approached Ajarn Sanan regarding this method because he accepted it, and the result was tremendous. After passing this new

idea of teaching on to him, we realised that we could train more teachers if we were given enough time. Hence, from within us more teachers would be affected by this positive change.

Change Principle 4: Innovations come in different sizes

When people think or talk about change, they tend to concentrate on what will be changed rather than being aware that there is an innovation. Innovations can vary in the amount of time, resources, and effort required for implementation.

The student response to my research indicates that they were motivated to follow the new method of teaching in a most positive way because they were still young and eager to know everything new. In other words, 'they had nothing to lose'.

By way of comparison, the three teachers at the start watched to see the way I taught in my studio without trust in the quality of the outcome; however, by the end of the project, they understood more and they started to accept it. Ajarn Sanan who had opportunity to teach together with me using the same method from the second to the fourth project, showed more progress. The opinion of Ajarn Ratchada, with whom I had less chance to work than with Ajarn Sanan, was that she wanted to escape from the old method even though she did not know which direction she should go. I believe that if she had the opportunity to learn and to practise how to use this new method she would be very interested. At the other extreme, Ajarn Pensri, who at the start entirely denied this new method, showed that at the conclusion of the cycle she was willing to compromise and could accept it. Clearly, to make such a radical change in the method of teaching takes time: initially, the other teachers were afraid to take the initial step; ultimately, they were aware that it had the prospect of being a great innovation.

Considering that there were only a handful of teachers and hundreds of students in the Faculty of Architecture, the administration need only to invest

a small amount of time, resources, and effort for this innovation to truly bring solid change in the system of teaching.

Change Principle 5: Interventions are the actions and events that are keys to the success of the change process

As people plan and lead change processes, they tend to be preoccupied with the innovation and its implementation. The various actions and events that they and others take to influence the process are known as interventions. These interventions can often be neglected. A common example of a type of intervention is a training workshop.

To make my students understand the new approach of teaching, I used round table conferencing and the architectural model as a tool to do the workshop with them: thus, they could share ideas and understand how to build up quality projects. On the other hand, to make the teachers understand more and accept the new method, I must also open a session of workshop like the one I presented to Ajarn Sanan. By this means, they would be able to understand, to gain confidence, and to have the motivation to apply the new method.

Change Principle 6: Although both top-down and bottom-up change can work, a horizontal perspective is best

Most changes are initiated from the top. This approach is commonly known as a 'top-down' approach. Examples of this include mandates that are passed down by federal, state, and local policy-makers. This approach in many cases has been far from successful.

Because I am a professional architect, normally students are interested to participate in my studio because they want to know how I work in my professional life. At the same time, they tend to think that, as an outsider I am not a real teacher. These different perspectives provided me with a good

opportunity to work closely with my students like a brother so I can work with them horizontally.

With regard to my fellow teachers, the fact that we have taught together for more than twenty years means that we are like friends – even Ajarn Ratchada, the youngest, and one of my former students. It was clear that each of us understood the way of thinking of the other. This ability to work together horizontally helped to ensure a sound outcome to this change project.

Change Principle 7: Administrator leadership is essential to long-term change success

A central theme of bottom-up change by its advocates is that those nearest the action have the best ideas of how to accomplish the change. In many instances implementers believe that they do not need any involvement from or with those above them.

Since I am the initiator and advocate of this change I can support the administration in the implementation of this new method of teaching. From the outset, I was able to affirm my commitment to the faculty. This new method can be passed from the present teachers up to the next generation of teachers. For example, if Ajarn Ratchada had an opportunity to change to the new method and when she becomes an administrator in the future, she can lead this new method to other teachers, thus ensuring a long-term success in the change.

Change Principle 8: Mandates can work

A mandate is one kind of strategy that is used widely to implement change. Although mandates are continually criticised for their ineffectiveness because of their top-down orientation, they can work quite well. Mandates can set a clear priority and there is an expectation that the innovation will be implemented.

In Thai culture, seniority is always right even though this belief seems to be not so democratic; but, in fact, in Thai society only a few people lead others. For this reason, if I can encourage the administrators to understand and be interested in changing to the new method then the mandate can be used to make the implementation successful in a short period of time.

Change Principle 9: The faculty is the primary unit for change

Although we must emphasise the importance of understanding the dynamics of individuals in change, the key organisational unit for making change successful is the school.

The world is rapidly changing and the faculty should act as an agent of change to keep abreast with the changes in the society. In education, there must be change to bring about quality learning. It is, therefore, crucial that a new pedagogy such as a student-centred approach to teaching should be a means to bring change especially in the Faculty of Architecture at Sriburapha which had been using the traditional method for many years past.

Brennan & Hoadley (1984) suggest that evaluation could be used in order to encourage the faculty to improve policy to meet the needs of changing times, to support the teachers who may want to introduce a change that could be imposed in other areas of the school, and to bring about a change of policy that will encourage a new image at the school's practices and priorities.

Change Principle 10: Facilitating change is a team effort

Teachers play a critical leadership role in the change process, whether or not change is successful. Everybody working together to help to facilitate the change will make the process smoother.

When I had the opportunity to work closely with Ajarn Sanan it showed that even though we were not totally successful in all areas in applying the new method, a good team effort could facilitate change. I hope that if I had more

opportunity to work like this with other teachers with all of us working cooperatively, change will be easy.

Change Principle 11: Appropriate Interventions reduce the challenges of change

Several writers have stated in one way or another that pain is a part of the change process. They maintain that this must be endured as a natural part of the process.

In Thai society, students always respect the teacher; however, in 2001, when I first used cooperative learning discreetly in my studio, some smart students opposed this new kind of approach. They did not like to share their ideas with the others because they are used to working alone and were very competitive – they wanted to be on top all the time, so this approach was painful to them.

Despite some students' resistance, this came out with a positive outcome. The success of my first experiment was published in the journal of the faculty. Because of this, there was an opposition from a group of senior teachers who claimed that the old method they were using in teaching architectural Studio Project Design was already good. They could 'prove' that the old method had produced many good quality architects in this country. Hence, when I decided to continue to conduct in-depth research for my dissertation some of them held debates and deliberation in open session to reject the new system that I was proposing. Within myself I felt that there were plenty of obstructions. Change is painful at the start but, in order to be successful, teachers should have patience and endurance in the change process.

Change Principle 12: The context of the faculty Influences the process of change

The faculty as the unit of change has two important dimensions that affect individuals' and the organisations' change efforts. The two dimensions are:

physical features – such as the size, and resources, and people factors. The people factors include the attitudes, beliefs, and values of the individuals involved. They also include the relationships and norms that guide the individuals' behaviour.

There are two things that had to be considered at Sriburapha University. First, the Faculty of Architecture should adapt itself to the change process. The Faculty of Architecture operates on two campuses. Thus, first year students stay alone and lack communication with the senior groups and with facilities such as library and other Faculty of Architecture resources. Second, the people factor, which includes teachers and students, must be motivated to accommodate change.

Cuttance (1994) initiated quality reviews in which organisations were responsible for program delivery within broad policy directives. This suggests a need to develop a culture of evaluation so that it becomes a pattern of thinking which fills all the levels of everyday action.

Wadsworth (1991) suggests a number of opportunities for developing a comprehensive program of in-built evaluation which includes daily informal reflection, weekly reviews, special effort evaluation, monthly collective problem-pooling sessions, annual 'what-has-to-be-achieved?' and 'where-are-we-heading next year?' workshops.

Concluding Comments

This study involved an interactive evaluation of a program that evaluated the impact of using a student-centred approach as opposed to the more traditional teacher-centred approach to the teaching of a Third Year Architecture subject; Studio Design at Sriburapha University in Bangkok, Thailand.

This research was based on an Interactive Form of Evaluation (Owen & Rogers, 1999) and used the four steps of Action Research as determined by Kemmis (1985): to plan, act, observe, and reflect to make judgments and

recommendations about this alternative approach to teaching Studio Design.

In this new method, the students – after having experienced round table discussions and sharing information among themselves under the supervision of some of their teachers – had increased learning competencies, enhanced social skills and fostered better relationship in the group. They were motivated to work productively, and had self-control. Moreover, they were able to interact with the professionals with confidence. Hence, they were able to get ideas and information in connection with their projects.

Through a student-centred approach, students had more freedom to think and were encouraged to express themselves. They were able to exchange ideas with each other and were able to work as a team. In the opposite way, some were afraid that they would loss individuality and spend more time for discussion. About the curriculum, students mentioned that the number of projects be reduced by integrating architecture and engineering subjects, and also teachers need to be open to receive this new method.

Based on the discussion of the focus group, students responded favourably with this new method. They enjoyed learning and supported one another under warm atmosphere between students and teachers. They believed that the work of each individual is incomparable with the work of the group. The opinions of the teachers appeared to differ: Ajarn Pensri suggested that teacher-centred and student-centred approaches be combined because she believed that students were still too immature to manage themselves. Ajarn Sanan, with whom I delivered this new program from the second to the last project, successfully applied a student-centred approach. Finally, Ajarn Ratchada who was once an old student of this Faculty of Architecture showed strong interest to change. If she had an opportunity like Ajarn Sanan or attend a special training course, it would be more useful and beneficial for her.

During the process of this research, there were some changes. A problem that interrupted my plan was that I was replaced to be the author of the second project instead of the fourth so I had to reorganise my plan to achieve

my initial goal. And after the first project was completed, I saw that if the new method of teaching were to be useful for the Faculty of Architecture I needed to approach some teachers immediately in order to win their confidence.

To make this new program more effective, teachers needed to apply the following major shifts in their approach to teaching: applying principles of andragogy, which is the way adults learn; applying principles of life-long learning for continuing professional education combined with workplace-based learning and self-directed learning, as well as undertaking special training courses needed in professional architecture; applying the principles of change (Hall & Hord, 2001) so that the faculty was able to adapt itself to the change process; and, finally, the people involved – both the teachers and the students – needed to have the motivation to change.

Even though I encountered various obstacles and difficulties during the process of doing this research work, the faculty administration started to solicit my support in training new teachers. It is significant to note that some of them were members of the population in this undertaking. This means that the institution absolutely welcomed and accepted my concrete move to change the teaching methodology of teachers that will pave the way to a better approach in teaching.

The new method of teaching at Sriburapha University was acknowledged by both students and some teachers. I am satisfied with the result because as the only visiting lecturer who could not impose a power-coercive strategy, as Chin & Benne (1985) have mentioned, I was able to effect change. The experience of Delft University and University of New Castle regarding PBL was similar to what happened in my university. Although there was resistance, effective change was achieved.

In the early years of my working as an architect, I had never had any interest in studying education; I asked myself why people needed to study in this discipline, and found no answer. I thought that teaching was an easy job, as simple as having chalk-and-talk and a group of students. I have been a

part-time lecturer in this faculty for the past 23 years and am still teaching at present. As a professional architect, my experience and expertise had been major tools for me to impart knowledge for the benefits of my students in order for them to be a successful architect someday.

As an old student in Paris, my quest for knowledge led me to further my study in education – but only as a hobby, and mainly as a means to improve my English language. Later, much later, I took the time to go back to school despite my age. During the course of my study for this professional doctorate, I read books, wrote papers for my coursework, and finally, worked on this dissertation. These pursuits have enlightened my consciousness that the field of education is far more than merely constructing great architecture. I accept that educating people is more interesting and more valuable.

In teaching I built up human beings not stones. Human beings like our students are individuals who have diverse backgrounds and learning styles and preferences that teachers need to know. They have sense and sensibility that teachers need to understand. They have learning difficulties that need to be addressed. They have talents and abilities to be honed. And above all, they have a future to build.

This piece of research work, aimed for teachers of architecture like me, is an embodiment of how teachers could play a pivotal role in shaping the minds of students and helping them grow with others in a learning environment where support, teamwork, and interdependence were encouraged. Moreover, teachers should act as catalysts – agents of change – who are able to transform stagnation to dynamism without being bounded by traditions that hamper the intellectual growth of learners. As for me, even if this research can affect only a small change within the academic community; I personally experienced a new birth as a teacher. I have changed my attitude towards my students and my approach to teaching. Finally, I may say that architects were born to build edifices but teachers were born to build the hopes and dreams of human beings – our students.

REFERENCES

Aarohnsohn, Elisabeth (1996) *Going Against the Grain: Supporting the Student-Centred Teacher*. Thousand Oaks: Corwin Press.

Abrahamson, E (2000) Change Without Pain, *Harvard Business Review*, July/August, Vol. 78 No. 4, pp 75-9.

Aimscow, M., Hopkins, D. and West M (1994) *School Improvement in an Era of Change*. Redwood Books Trowbridge, Wiltshire.

Airasian, P. and Walsh, M. (1997) Constructivist Cautions. *Phi Delta Kappan*, 78 (6).

Alexander, P.A., Murphy, P.K. & Woods, B.S. (1996) Of Squalls and Fathoms: Navigating the Seas of Educational Innovation. *Educational Researcher*, 25, 31-36.

American Federation of Teachers. 555 New Jersey Avenue, NW Washington DC, accessed at http://www.aft.org/topics-teacher quality/prodev.htm.

Anderson, L., Kydd, L. & Newton W. (2003) *People Leading and Teams in Education*. London: Paul Chapman Publishing.

Aronson, E., Blaney, N. Stephan, C., Sikes J. & Snapp, M. (1978) *The Jigsaw Classroom*. Beverly Hills, CA: Sage.

Asher, James J. (1988) *Brainswitching: A skill for the 21st Century*. Los Gatos CA: Sky Oaks Productions, Inc.

Aspy, D.N., Aspy, C.B. & Quimby, P.M. (1993) What doctors can teach teachers about problem based learning. *Educational Leadership*, 50(7), 22-24.

Australian National Board of Employment Training and Education. (1996) *Department of the Parliamentary Library 1996* Commonwealth of Australia.

Barnes, L.B., Christensen, C. R.. & Hansen, A.J. (1994) *Teaching and the Case Method: Text, Cases and Readings* (3rd Edition). Boston: Harvard Business School Press.

Barr, R.B. & Tagg, J (1995) From Teaching to Learning: A New Paradigm in Undergraduate Education, *Change*, Volume 27.

Baxter, Magolda, M.B. (1995) Knowing and Reasoning in College: Gender-related Patterns in Students Intellectual Development. San Francisco: Jossey-Bass.

Bellanca J, & Fogarty, R. (1991) *Blueprints for Thinking in the Cooperative Classroom* (2nd Edition). Arlington Heights, Illinois :IRI Skylight Training and Publishing Inc.

Bennett, N., Harns, A., & Preedy, M. (1997) *Organisational Effectiveness and Improvement in Education*. Milton Keynes: The Open University.

Billet, S. (1996) Transforming Teacher's Practice Through Action Learning in P. Oliver (Ed.) The Management of Educational Change. Arena: Aldershot, Ch. 4.

Bohn, R (2000) Stop Fighting the Fires, *Harvard Business Review*, July/-August, Vol. 78 No.4, pp 83-92.

Bonwell, C. C. & J. A. Elson (1991). Active Learning: Creating Excitement in the Classroom, *ASHE_ERIC Higher Education Report No.1*, George Washington University.

Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom, *ASHE-ERIC Higher Education Report No. 1*. Washington, DC: The George Washington University, School of Education and Human Development.

Bottery, M. (2004) The Challenges of Educational Leadership. London: Sage.

Boud, D. (1985). *Problem-Based Learning in Education for the Professions*. Higher Education and Development Society of Australasia.

Boud, D. & Feletti, G. (1991) *The Challenge of Problem-Based Learning*. Kogan Page. London,

Brennan, M. & Hoadley, R. (1984). *School Self Evaluation.* Education Department of Victoria, Melbourne, Australia.

Brent, Rebecca & R.M. Felder (1994) *Cooperative Learning in Technical Courses: Procedures, Pitfalls and Payoffs. National Science Foundation*, Division of Undergraduate Education Grant DUE-9354379, October 1994.

Bridges, E.M., Hallinger, P. (1991,September) *Problem-based learning in medical and managerial education*. Paper presented for the cognition and School Leadership Conference of the National Center for Educational Leadership and the Ontario Institute for Studies in Education, Nashville, TN.

Brooks, Jacqueline & Martin (1999*) In Search of Understanding: The Case for Constructivist Classrooms.* 1703 Beauregard St., Alexandria, VA 22311. USA.

Brown, K. & Parsons, R (2002*) Teacher as Reflective Practitioner and Action Researcher.* Wadsworth/ Thomson Learning. 10 Davis Drive, Belmont California 94002-3098 USA.

Bruffee, K. (1995). Sharing our Toys: Cooperative Learning versus Collaborative Learning. *Change*, v 27 n1, 12-19.

Bruffee, K.A. (1993) Collaborative Learning: Higher Education, Interdependence and the Authority of Knowledge. Baltimore, John Hopkins University Press.

Bruner, J. S. (1961). The Act of Discovery. *Harvard Educational Review*, 31 (1): 21-32.

Bryant, B. K., (1978) *Cooperative Goal Structure and Collaborative Learning.* Teaching of Psychology, 5, 182-185.

Caldwell, B & Spinks, J. M (1998) *The New Professionalism: Beyond the Self-Managing School*, Falmer: London, Ch.6.

Candy, P.C. (1991) *Self Direction for Lifelong Learning*. San Francisco: Jossey-Bass.

Candy, Phillip C., Crebert, Gay, & Leary O'Jane (1994) Developing Lifelong Learners Through Undergraduate Education National Board of Employment, Education and Training; Australian Government Publishing Service.

Carlsmith, K.M. & Cooper, J. (2002) *Abstract Teaching of Psychology. Vol 29.* No. 2, 132-35. 10 Industrial Avenue, Mahwah, NJ 07430-2262. Lawrence Erlbaum Associates, Inc.

Carnegie Council on Adolescent Development. (1989) *Turning Points: Preparing American Youth for the 21st Century.* Washington D.C. Carnegie Corporation of America.

Caro-Bruce, Cathy. (2000) Action Research Facilitator's Handbook. National Staff Development Council. David McCoy Design, Wichita Falls Texas, 50.

Carroll, D. W. (1986) Use of the Jigsaw Technique in Laboratory and Discussion Classes. Teaching of Psychology, 13, 208-210.

Carwood J. & Gibbon J. (1981) *Educational Leadership; Staff Development*. Cape Town: Nasou Ltd.

Chin, R. & Benne, K.D., General Strategies for Effecting Changes in Human Systems. In W.G. Bennis, K.D. Benne & R. Chin (Eds.) *The Planning of Change* (Fourth Edition). Holt, Rinehart & Winston, New York (1985).

Christensen, C.R., Garvin, D. A., & Sweet, A. (1991). *Education for Judgment: the Artistry of Discussion Leadership*. Boston: Harvard Business School Press.

Classens, M. Programmaevaluatie bij Innovatie van een Ingenieiersopleiding [Program evaluation in the Context of an Engineering Course] Dissertation. Delfse Universataire, Delft (1995).

Classens, M., de Graaff, E., Jochems, W., and Cowdroy, R., Student Evaluation of a Problem-Based Course. In: Architecture in Research and Development in Problem-Based Learning, Volume 3, APBLN, UNSW, Sydney (1995).

Cohen, E.G. (1994). *Designing Group Work: Strategies for Heterogeneous Classroom.* New York: Teacher College Press College Classroom, no. 30. San Francisco: Jossey-Bass.

Cooper, S.E & Miller, J.A. (1991) MBTI Learning Style: Teaching Style Discongruencies .*Educational and Psychological Measurement*, Volume 51.

Cowdroy, R. (1994) Concepts, Constructs & Insights: The Essence of Problem-Based Learning. In Chen, Cowdroy, Kingsland, and Ostwald (Editors), *Reflections on Problem-Based Learning*. APBLN, Problarc, University of Western Sydney, Sydney.

Cowdroy, R. & Maitland, B. (1994) Integration, Assessment and Problem-Based Learning. In: Chen, Cowdroy, Kingsland and Ostwald (Editors) *Reflections on Problem-Based Learning*. APBLN, Problarc, University of Western Sydney, Sydney (1994).

Crossan, M.M. (1999) *An Organisational Learning Framework: From Intuition to Institution*, Academy of Management Review, July, Vol. 24 No. 3, pp 522-37.

Cuban, L. (1996) Myths About Changing Schools and the Case of Special Education, Remedial and Special Education, 17, 75-82.

Cuttance, P. (1994) *Quality Systems for the Performance Cycle of Schools*. Paper presented at the International Conference on School Effectiveness and Improvement (ICSE), Melbourne 1994.

Dalin, P. (1978) *Limits to Educational Change*. McMillan, London.

Darley, J.M. (2001) The Dynamics of Authority Influence in Organisations and the Unintended Action Consequences, in J.M. Darley, D.M. Mesick & T. R. Tyler(Eds.) *Social Influences on Ethical Behavior in Organisations* (37-53) Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Dawe, Roger (1998 Dec. 2-8) *Campus Review*. Victoria University of Technology.

Deutsch, M (1962) Cooperation and Trust: Some Theoretical Notes in M.R. Jones (Ed) Nebraska Symposium on Motivation, 275 – 319. Lincoln NE University of Nebraska Press.

De Zeeuw, G. (1990) Problemen van Verbeteren en Innoveren[Problems of Improvement & Innovation]. In *Postdoctorale Opleiding Innovatie Manager*. Academie voor Informatica, Universiteit van Amsterdam, Amsterdam.

Dill, W. (1997). A New Future for Architecture Education and Practice. *Change*, v29 n2, 48-54.

Dixon, P. (1998) *Futurewise: Six Faces of Global Change*, Harper Collins, London.

Dowson, L & Wallace, M. (2003) *Educational Leadership and Management*. Sage Publication Ltd., 6 Bonhill Street London, EC2A 4PU.

Dryden, Gordon & Vos, Jeannette (1993) *The Learning Revolution. Profile Books.* College Hill, Ponsonby, Auckland, New Zealand.

Elmore, R.F. & Zenus, V. (1992) Enhancing Social-Emotional Development of Middle School Gifted Students, *Roeper Review*, 24, 5-11.

Eraut, M. (1975) *Strategies for Promoting Teacher Development*, A Paper Presented to the 3rd Standing Conference on Curriculum Studies, Norwich.

Eraut, M. (1994) *Concepts of Competence and Their Implications in Developing Professional Knowledge and Competence*, Falmer: London, Ch. 8.

Finchan A.G., Baehner, R., Chai Y, Crowe D.L. Fincham, C. Isklander, M. (1997) *Problem-based learning at the University of Southern California, School of Dentistry.* J. Dent Educ 1997: 61, (5), 417-25.

Fogarty, Robin (1995*) Best Practices for the Learner-centred Classroom. IRI* Skylight Training and Publishing Inc., Arlington Heights, Illinois 60005.

Foyle, H. (1995). *Interactive learning in the higher education classroom*. Washington, D.C: National Education Association of the United States.

Freeman, H. E. & Rossi, P.H. (1985) *Evaluation: A Systematic Approach* (3rd Edition). Sage Publications Inc., 275 South Beverly Drive, Beverly Hills, California USA 90212.

Frijns, P. (1993) en de Graaff, Doceren of Faciliteren? *Velon*, 14, 2, 3436.

Fullan, M. (1992) *The Meaning of Educational Change*. Teachers College, Colombia University, London/New York.

Fullan, M. (1997) *Leadership for Change. The Challenge of School Change*, Hawker Brownlow Education, Australia.

Fulmer, R.M. & Keys, J.B. (1998) *A Conversation with Peter Senge: New Development in Organisational Learning*, Organisational Dynamics, Autumn, Vol. 27 No.2, 33-42.

Gale, J. & Steffe, L., (1995) *Constructivism in Education*. Lawrence Erlbaum Associates, Inc., Publishers 365 Broadway Hillsdale, New Jersey 07642.

Gallagher, S. A. (1997). Problem-based learning: Where did it come from, what does it do, and where is it going? *Journal for the Education of the Gifted*, 20 (4), 332362.

Gibbs, A. (1997) *Focus Groups. Social Research Updates. [online]* Issue Nineteen, University of Surrey. Available: http://www.soc.surrey-.ac.uk/sru/SRU19.html.

Giordano, P.J. & Hammer, E.Y. (1999). In Class Collaborative Learning: Practical Suggestions from the Teaching Trenches, *Teaching of Psychology*, 26, 42-44.

Glitz, B (1998) *Focus Groups for Libraries and Librarians*. Forbes Custom Publishing.

Graaff, E. de and Bouhuijs, P.A.J. (1993) Management of Educational Change: A Discussion of the Implementation Process at the Faculty of Building Sciences. In: Erik de Graaff and Petr A.J. Bouhuijs (Eds). *Implementation of problem-Based Learning in Higher Education*. Thesis Publishers, Amsterdam.

Greenfield, Arambula, T. (1996) 'Implementing Problem-based Learning in a College Science Class: Testing Problem-Solving Methodology as a Viable Alternative & Traditional Science Teaching Techniques'.

Grossman, P.L. & Stodolsky, S.S (1995) Content as Context: The Role of Subjects in Secondary School Teaching, *Educational Researcher*, 24, 5-11.

Guzdial, Mark (June 1997) *http:www.Cc.gatech.edu/edutech/LBD/Construct-ivism html.*

Hall, G. E. & Hord, S.M. (1987). *Change in Schools: Facilitating to Process.* Albany, NY: State University of New York Press.

Hammond, Linda-Darling. Restructuring to Promote Learning in American Schools Video Conference #8 the Meaning of Professional Development in the 21st Century. North Central Regional Educational Laboratory 1991.

Hansen E.J. & Stephens J.A. (2000) The Ethics of Learner-centred Education, *Change*, (September-October).

Hargreaves, A., Earl, L. & Ryan, J. (1996*) Schooling for Change: Reinventing Education for Early Adolescents.* The Palmer Press. London, Washington DC.

Harkins, S.G. & Petty R.E (1982*) Effects of Task Difficulty and Task Uniqueness on Social Loafing*. Journal of Personality and Social Psychology, 43, 1214-1229.

Harkins, S.G. & Szymanski (1988*). Social Loafing and Self-Evaluation with an Objective Standard.* Journal of Experimental Social Psychology, 24, 354-365.

Hart, Gail (1999) Bhert News Australia Issue 6 October 1999 *Lifelong Learning in the New Millennium.*

Hatton, M.J. (1997) *Lifelong Learning Humber College*, Toronto: APEC Publication.

Hendrix, James C (1999) *Connecting Cooperative Learning & Social Studies*. The Clearing House.

Hooks, B. (1994) *Teaching to Transgress: Education as the Practice of Freedom*. New York: Routledge Press.

http://architecture.mit.edu

http://ctl.stanford.edu/problem_based_learning

http://en.wikipedia.org/wiki/Problem-based_learning

http://meds.queensu.ca/medicine/pbl/pblhome.htm

http://soa.syr.edu

http://www.active-learning-site.com/sum1.htm

http://www.ap.buffalo.edu

http://www.arch.vt.edu

http://www.chemeng.mcmaster.ca/pbl/pbl.htm

http://edutechwiki.unige.ch/en/constructionism

http://www.gsd.harvard.edu/depts/archdept.html

http://www.ijee.dit.ie/articles/999980/articles.html

http://www.mcli.dist.maricopa.edu/pbl/index.html

http://www.mcli.dist.maricopa.edu/pbl/info.html

http://www.pbli.org/

http://www.studygs.net/pbl.htm

http://www.udel.edu/pbl/

http://www.vt.arch.edu/caus/info [1998, August 8]

http://www.yale.edu/Architec [1998, August 8]

Jackson, J.M. & Williams, K.D. (1985) Social Loafing on Difficult Tasks: Working Collectively Can Improve Performance. *Journal of Personality and Social Psychology*, 49, 937-942.

Johnson R. & Johnson D. (1989) *Cooperative Learning: Warm-up, Grouping Strategies and Group Activities*. Edina, VA: Interaction Book Company.

Johnson, D. & Johnson F (1975*) Joining Together: Group Theory and Group* Skills Englewood Cliffs, NJ: Prentice-Hall.

Johnson, D. W., Johnson, R. T. & Holubec, E. J. (1993). *Cooperation in the Classroom* (6th Ed.). Edina, MN: Interaction Book Company.

Johnson, D.W. & Johnson, R.T. (1989) *Cooperation and Competition: Theory and Research*. Edina, MD: Interaction Book Company.

Johnson, S. (1996*) Leading to Change: The Challenge of a New Superintendency*. Jossey-Bass Inc. Publishers, 350 Sansome Street, San Francisco California 94104.

Johnston, Lindsay (1997*)* ExpEdition of Discovery. Architect Education at Newcastle in Ballantyne, R.. Bain, J. & Parker, J. (Eds) *Reflecting on University Teaching: Academic Stories*. Commonwealth of Australia, Canberra, Department of Employment, Education, Training and Youth Affairs, p. 437-444.

Jones, M.G. & Vesiland, E.M. (1996) Putting Practice into Theory: Changes in the Organisation of Pre-service Teachers Pedagogical Knowledge, *American Educational Research Journal*, 33, 91-117.

Journal of Workplace Learning: *Employee Counseling Today. Volume 12* Number 2 2000, 57-65 MCB University Press ISSN 1366-5626.

Joyce, B. & Showers, B. (1988). *Student Achievement Through Staff Development: Fundamentals of School Renewal* (2nd Ed). White Plains, New York. Longman.

Joyce, B & Weil M (1986) *How to Learn a Teaching Repertoire. Models of Teaching* Prentice Hall: New York, Ch.6.

Joyce, B. (1980) *The Ecology of Professional Development in E. Hoyle & J. Megarry (*Eds) Professional Development of Teachers ; Kogan Page.

Kain, D. (2003) *Problem-based Learning for Teachers*. Pearson Education Inc., USA.

Kelly, Mavis & Kember, David (1994) *Improving Teaching Through Action Research.* Higher Education Research and Development Society for Australia, Inc. NSW, Australia.

Kemmis, S (1985). *The Action Research Planner*. Geelong: Deakin University Press.

Kemmis, S & McTaggart, R. (1990) *The Action Research Planner* (3rd Edition). Deakin University Press, Victoria Australia.

King, P (1996) Student Cognition and Learning in S.R. Komives & D.B. Woodwards (Eds) *Student Services, A handbook for the Profession*. San Francisco: Jossey-Bass.04.

Knowles, M. (1984) *The Adult Learner: A Neglected Species (3rd Edition*) Gulf Publishing Company, Houston, Texas.

Kouzes, J.M. & Posner, B.Z. (1987) *The Leadership Challenge*, Jossey-Bass, San Francisco, CA.

Krueger, R & Casey, M (2000) *Focus Groups: A Practical Guide for Applied Research* (3rd Edition) Newbury Park, CA Sage.

Lang, Helmutt (1995) *Teaching Strategies and Methods for Student-centred Instruction*. Harcourt Brace & Company Canada, Ltd.

Levine, Allan. (2001) About Problem-Based Learning (on line) Maricopa Center for Learning and Instruction: http://www.-mcli.dist.maricopa.edu/pbl/info.html (16 May)

Lewin, K. (1946) *Action Research and Minority Problems*. Journal of Social Issues, 2 (4), 41-56.

Lewis, M. (1995) *Focus Group interviews in qualitative research: A review of the literature.* Action Research Electronic Reader[online] Accessed at http://www.scu.edu.au/school/gcm/ar/arr/arow/rlewis.html.

Longworth N. & Davies W.K. (1997) *Lifelong Learning*. Kogan Page Limited, 120 Pentonville Road, London N1 9 JN.

Lucking, R. (1991) The What, Why and How of Cooperative Learning, *Social Studies*, Vol. 82.

MacKinnon, M.M. (1999) *CORE Elements of Student Motivation in Problem-based Learning.* In M. Theall (Ed.) *New Directions for Teaching and Learning. Motivation from Within: approaches for Encouraging Faculty and Students to Excel*. San Francisco: Jossey-Bass.

Maitland, B. (1991) Accreditation and Assessment in Architecture. In: Boud, D & Feletti, G. (Eds) *The Challenge of Problem-Based Learning*. 2nd Edition. Routledge 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN.

Major C.H. & Palmer B. Spring (2001) Assessing the Effectiveness Problem-Based Learning in Higher Education; Lessons from the Literature Academic Exchange Quarterly Vol. 5 Issue 1, accessed at http://www.rapidintellect.com/AEQweb/mop4spr01.htm.

Marczak, M. & Sewell M (1998) *Using Focus Groups for evaluation.* Cybernet Evaluation[online], accessed at http://ag.arisona.edu/fcr/fs/-cyfar/focus.htm.

Marshall, C & Rossman, G. B (1995*) Designing Qualitative Research* (2nd Edition). SAGE Publication, USA.

Mayo, P., Donelly M.B., Nash, P.P. & Schwartz, R.W. (1993) Student Perceptions of Tutor Effectiveness in Problem-based Surgery Clerkship. *Teaching and Learning in Medicine*, 5 (4), 227-233.

McCombs, B & Whistler, J.S. (1997) *The Learner-centred Classroom and School: Strategies for Increasing Student Motivation and Achievement*. San Francisco: Jossey-Bass Publishers.

McCormick, R. & James, M. (1983) *Curriculum Evaluation in Schools*, London: Croom Helm.

McKinney, Kathleen (2007) Center for Teaching, Learning & Technology, Instructional Technology & Development Center, 301 S. Main St., Campus Box 6370, Normal, IL 61790-6370.

McNergney, R & Herbert, J.(2001) *The Foundations of Education: The Challenges of Professional Practice*. A Pearson Education Co., 160 Gould Street Needham Heights MA 02494.

Meyers, C. & Jones T.B. (1993) *Promoting a Active Learning: Strategies on the College Classroom, No.30*.San Francisco; Jossey-Bass.

Meyers, S.A. (1997) Increasing Student Participation and Productivity in Small-Group Activities for Psychology Classes, *Teaching of Psychology*, 24, 105-115.

Motsching-Pitrik R. & Holzinger, A University of Vienna & Graz University Hospital, Austria e-mail renate.motschnig@univie.ac.at.

National Board of Employment Education and Training Australia (1996) *Lifelong Learning Key Issues January 1996.*

O'Hara Margaret T. & O'Hara, John A (1998) Corporation Learning: A Paradigm for Learning in the 21st century, *American Secondary Education*, Volume 27, No.11.

Olmstead, J. A. (1974) *Small- Group Instruction: Theory and Practice*. Washington, D.C. Humro.

Owen, J.M. & Rogers, P.J. (1999) *Program Evaluation: Forms and Approaches*, 2nd Edition, Sage Publications, St. Leonards, NSW: Allen and Unwin Rowley: Newbury House.

Panitz, T & Panitz, P. (1998) Ways to Encourage Collaborative Teaching in Higher Education. In J. Forest (Ed) *University Teaching International Perspectives*. New York: Garland.

Papalia, A (1976) *Language-Centred Language Teaching Methods and Materials*.

Papert, Seymour (1980) Speech Video Conference to Educators in Japan.

Pedler, M.(1997), *Action Learning in Practice*, Gower, Aldershot.

Perret-Clermont, A.N., Perret, J.F., & Bell, N. (1991) The Social Construction of Meaning and Cognitive Activity in Elementary School Children. In L.B. Resnick, J.M. Levine, & S.D. Tesley (Eds) *Perspectives on socially shared cognition*. Washington, D.C. American Psychological Association.

Popper, M. & Lipshitz, R. (2000) Installing Mechanism and Instilling Values: The Role of Leaders in Organisational Learning, *The Learning Organisation*, Vol. 7 No. 3, pp 135-45.

Provost, J.A. & Anchors, S (1987) *Applications of the Myers-Briggs type Indicator in Higher Education*. Palo Alto, California: Consulting Psychologists Press, Inc.

Ramsden, P (2003) *Learning to Teach in Higher Education*. 2nd Edition. Routledge Falmer, Taylor & Francis Group, London & New York.

Ramsden, P. & Martin, E. (1996) *Recognition of good university teaching: Policies from an Australian study*, Volume 21, Issue 3, pages 299-315.

Rangachari, P.K. (1996). Twenty-up: Problem-based learning with a large group. In L. Wilkerson & W.H. Gijselaers (Eds) *Bringing Problem-based Learning to Higher Education*.

Resnick, L.B. & Klopfer, L.E. (1989) Toward the thinking curriculum. In L.B. Resnick & L.E. Klopfer (Eds). Reston, VA: Association for Supervision and Curriculum Development.

Reynolds, F. (1997). Studying Psychology at Degree Level: Would problem-based learning enhance students' experiences? *Studies in Higher Education*, 22 (3), 263-275.

Roffe, I. (1999) Innovation and Creativity in Organisations: A Review of the Implications for Training and Development. *Journal of European Industrial Training*, Vol. 23 Nos 4/5, pp 224-41.

Rogers, C. & Freiberg, H. J. *Freedom to Learn, 3rd Edition*, Upper Saddle River, N.J. Prentice Hall, 1969/1994.

Romizowski, A., *Designing Instructional Systems: Decision Making in Course Planning and Curriculum Design*. Kogan Page, London (1990).

Roper, L. (1999) Teaching and Training. In S.R. Komives & D.B. Woodward (Eds) *Student Service: A Handbook for the Profession*. San Francisco: Jossey-Bass.

Royse, David & Thyer, Bruce A. (2001) *Program Evaluation: An Introduction. (3rd ed.)* Wadsworth/Thomson Learning, 10 Davies Drive, Belmont CA 94002-3098 USA.

Ruhl, K.L., Hughes, C.A. 7 Schloss & P.J. (1987) Using the Pause Procedure to Enhance Lecture Recall. *Teacher Education and Special Education*, 10. 14-18.

Russell, P (1992) Mentoring and Coaching in a Gonczi Ed Developing a Competent. Workforce NOVER: Adelaide, ch.9.

Russell. I.J., Hendricson, W.D. & Herbert, R.J. (November, 1984). *Effects of lecture information density on medical student achievement.* Journal of Medical Education, 59, 881-889.

Sage, S. & Torp, L (2002) *Problems as Possibilities Problem-based Learning for K-16 Education, 2nd Edition*, Alexandria, VA: Association of Supervision and Curriculum Development.

Sapon-Shevin, M (1992) *Cooperative Learning and Middle Schools.* What it would take to really do it right? Theory into Practice, 33(3), 183-190.

Savin-Baden Maggi (2003) Facilitating Problem-based Learning. The Society for Research into Higher Education and Open University Press. SRHE & Open University Press. McGraw Hill House, England SL 6 2 QL.

Schaafsma, H. & Spindler, L (1992) Intensive Workshop, in A Gonczi (Ed.), *Developing a Competent Workforce*. NOVER: Adelaide, Ch.9.

Schein, E.H. (1985) *Organisational Culture and Leadership*. San Francisco, CA: Jossey-Bass.

Schmidt, H.G., Activatie van Voorkenns, Intrinsieke Motivatie en de Verwenking van tekst (Doctoral Dissertation), Apeldoorn, Van Walraven, Apeldoorn (1982).

Schmidt, Henk G. (1993) Foundations of Problem-based Learning: Some Explanatory Notes. *Medical Education*, (27), 422-432.

Schön, D.S. (1983). *The Reflective Practitioner: How Professionals Think in Action.* Basic Books, New York.

Schön, D,S. (1987a) *Educating the Reflective Practitioner*. Jossey-Bass Inc. Publishers, 350 Sansome St. San Francisco, California 94104

Schön, D.S. (1987b) The Dialogue Between Coach and Student. The Process for Planning Learning – Essential Factors Contributing to the Learning Process. Office of the National Education Commission (2000) Learning Reform: A Learner-centred Approach.

Seeler et. al, (1994) *Journal of Veterinary Medical Education* http://scholar.lib.vt.edu/ejournals/JVME/V21-1/Seeler1.htmlKnowledge Web 2000.

Seltzer, S., Hilbert, S., Maceli, J., Robinson, E. & Schwartz, D. (1996. An Active Approach to Calculus. In L. Wilkerson & W. H. Gijselaers (Eds.) *Bringing problem-based learning to higher education: Theory and Practice*, 83-90. San Francisco: Jossey-Bass.

Sharan, S. & Lazarowitz, R. (1980) A Group Investigation Method of Cooperative Learning in the Classroom. In Sharan et al. *Cooperation in Education: Based on the Proceedings of the first International Conference on Cooperation in Education*. Provo, UT: Brigham Young University Press.

Silberman, M (1996) *Active learning*. Boston: Allyn & Bacon.

Skinner, B.F. (1974) *About Behaviorism*. London: Jonathan Cape.

Slavin, R. (1980) Cooperative Learning, *Review of Educational Research*, 50, 315-342.

Slavin, R. (1987) Cooperative Learning and the Cooperative School, *Educational Leadership*, 45(3), 7-13.

Slavin, R (1991) Synthesis of Research on Cooperative Learning, *Educational Leadership*, 48 (5), 71-82.

Smith, R (1983) *Learning How to Learn*. Milton, Keynes: Open University Press.

Socket, H.(1993) *The Moral Base for Teacher Professionalism.* New York; Teachers College Press.

Sowell, T. (1996) *Knowledge and Decisions*. New York: Basic Books.

Stuart, A. (1997) Student-centred Learning, *Harvard Educational Review*, Volume 26.

Sullivan, Joanna (1996) Implementing a Cooperative Learning Research Model: How it Applies to a Social Studies Unit, *The Social Studies*, Volume 87, No.5.

ONEC (1999) *National Education Act of B.E.2542 (1999)*. Bangkok: Office of the National Education Commission, accessed at http://www.-onec.go.th/Act/5/english/act27.pdf.

Thompson, J.G. (1987) *Educational Technology, How Interactive is Educational Technology*. Educational Technology Publications, Englewood, Cliffs, N.J. USA.

Tovey, Michael D. (1997) *Training in Australia (Design, Delivery, Evaluation, Management).* Prentice Hall, Australia.

Tudor, I. (1996) *Learner Centeredness as Language Education*. Cambridge University Press.

Van Den Berg, R.M. & Van den Berge, R. (1986*) Large-Scale Change and School Improvement: Dilemmas and Solutions*. Leuven, Belgium: Acco.

Ventimiglia L. (1994) *Cooperative Learning at the college level. Thought & Action, IVv25-30* Virginia Polytechnic Institute and State University, College of Architecture and Urban Studies. Accessed at HTTP:

Vernon, D.T. & Blake, R.L. (1993) Does Problem-based Learning Work? A meta-analysis of evaluative research, *Academic Medicine*, 68(7), 550-563.

Visitatie Commissie, Onderwijsvisitatie Civiele Techniek, Bouwkunde en Geodesie. Eindrapportage [Final Report], VSNU, Utrecht (1994).

Vonk, J.H.C (1994) *Teacher Induction*: The Great Omission in Education, in M. Galton & B. Moon (Eds.) *Handbook of Teacher Training in Europe: Issues and Trends*. David Fulton: London, Chapter 5.

Vygotsky, L.S. (1978) *Mind in society*. Cambridge, MA: Harvard University Press.

Wadsworth, Y. (1991) *Everyday Evaluation on the Run*. Melbourne : Action Research Issues Association.

Walker D (2002) *The Constructivist Leader*. Teachers College Press 1234 Amsterdam Ave. NY 10027 and the National Staff Development Council P.O. Box 240 Oxford 011.

Westrik, J. & E. de Graaff (1994) Development and Management of the New PBL-Based Curriculum in Architecture. Keynote Lecture presented at the Conference Reflections and Consolidations New Castle, Australia, 36 July 1994, In : S.E. Chen, R.M. Cowdroy, A.J. Kingsland and M.J. Ostwald (Eds.) *Reflections on Problem-Based Learning*. Australian Problem-Based Learning Network, Sydney.

White, H. (1995). *Creating Problems' for problem-based learning*. Accessed on-line at: http://www.udel.edu/pbl/ctc/jan95-cehm.html.

Wilkerson, L. & W.H. Gijselaers (1996) (Eds.), *Bringing problem,-based learning to higher education: Theory and practice*. San Francisco: Jossey-Bass.

Wilks, Susan (1995) *Critical and Creative Thinking*. Eleanor Curtain Publishing, Australia.

Wilson, J.D. (1994) Appraisal of Teachers, in M. Galton and B. Moon (Eds) *Handbook of Teacher Training in Europe: Issues and Trends*. David Fulton: London, Chapter 4.

Woods, D. R. (1994) *Problem-Based Learning : How to Gain the Most from problem-based learning*. Dr. Woods, Waterdown, Ontario, Canada.

Woolfolk L. (2001) *Educational Psychology* (8th Edition*)* Sydney, Allyn and Bacon.

Woord, J. van der & E. de Graaff, Changing Horses Midcourse: The Implementation of a Problem-Based Curriculum at the Department of Building Sciences of the Technical University Delft, Holland. In: P.A.J. Bouwhijs, H.J. Schimdt & H.J.M. van Berkel (Eds.) *Problem-Based Learning as an Educational Strategy*. Network Publications, Maastricht (1993).

Worall, L. & Cooper, C (2001) Management Skills Development: A Perspective on Current Issues and Setting the Future Agenda, *Leadership and Organisation Development Journal*, Vol. 22 No. 1, pp 34-9.

Yazici, Hulya Julie (2005) *Education + Training*, Volume 47, Number 3, 216-229 (14). Emerald Group Publishing Limited.

Zuber-Skerritt, O. (2002) *A model for designing action learning and Action Research programs*. The Learning Organisation, Bradford, 9(3), 143-150.

ATTACHMENT 1

Attachment 1.1

Semester Paper for HER 8504, Semester 2, 2001

Name of Student: Ajaphol Dusitnanond
Subject: HER 8504
Title: Developing the Method of Teaching Project Design

1 Introduction

Creative thinking in architectural education is the most important attribute one must possess in order to be a good architect in their professional life. All schools of architecture must try to advance this attribute by developing methods of teaching that encourage students to achieve this goal of creativity.

The faculty of architecture at Sriburapha University is one of the most famous architectural schools in Thailand and has been established for more than forty years. It is composed of approximately three hundred (300) students who are enrolled at the bachelor degree level. The program of study is separated into a five-year academic term. This involves students undertaking a six to eight week class in Studio Project Design throughout their academic term of study. Traditionally the teaching process in Studio Project Design has been teacher dominated.

The objective was to improve the method of instruction from a teacher-centred process to that of a student-centred process. The fundamental principles cooperative learning were used as a model to develop this process. Action Research was used as an approach to improving the system of education in third-year project design. By changing the current system in place and learning from the consequences of the changes implemented was how this was to be achieved.

1.1 Action Research

Action Research by definition is a form of collective self-reflective enquiry. In education, action research allows teachers and others to undertake a critical examination of their own educational work. It can be used by

participants as a tool for improving or making better their own educational or social practices. Action Research can also increase the participants understanding of these practices and the context in which the practices work or operate.

In the educational context action research can provide a way of thinking logically about what happens in the school or classroom and allows us to put in place action or actions where improvements to the system can be made. It is a continuous process of monitoring and assessing the effects of any changes of the action or actions that have been implemented. It is important to remember that each action implemented is collaborative and based on knowledgeable information observed by the participants.

It is in the educational context of what happens at the classroom level, that this research has been undertaken. Two main objectives by the teacher have been kept in mind regarding this research. These objectives are considered to be interrelated and universal to the theme of any action research project. The first objective was to improve the current system being evaluated. Secondly, it would be a collaborative effort undertaken by various participants. In this particular situation, it was collaboration between the students and teacher. This collaboration or collective effort was seen as a crucial aspect of the action research process.

Action Research generally stems from the clarification of a group's shared concerns of problems. Participants identify their concerns, evaluate others opinions and search to find what can be possibly done to improve the situation or the context they are in. A 'thematic concern' is identified and becomes the main area of focus for strategies of improvement. The participants collaboratively plan the action together, act and observe as a group or individually and reflect together. Plans are reformulated based on critically informed decisions, as the group consciously builds its own understanding and description of their situation.

The thematic concern of this action research project and the method used to improve the current system of teaching are highlighted below:

- **Thematic Concern**: Developing in student's greater creativity in project conceptualization and design.
- **Method**: Implement cooperative learning as a new process of teaching.

The identification of the thematic concern enables the participants to engage in the four essential aspects of the action research. These four aspects are dynamically interrelated and linked into a cycle. Ultimately the four aspects of action research make up a series of cycles and form self- reflective spirals of planning, acting, observing and reflecting. These four aspects or 'moments' make up the basis upon which participants can make new plans, new action, observe and reflect, and propose further planning etc.

The initial view of what our situation is, in the context of our thematic concern, was the basis for our plan. A new phase of initial reflection was planned as a first step. This is our reconnaissance phase, which will precede our initial plan.

The reconnaissance phase will allow us to have an understanding of some specific issues and how they fit into the wider human, social and cultural contexts of education and society.

1.2 Cooperative Learning

Cooperative learning gives students an opportunity to discuss information or practice skills presented initially by the teacher or requires students to find or discover information on their own. It is a student- centred approach which allows the students to play an active role in the learning process by supplementing the teacher's instruction in the class.

Dominant western cultures, such as those in North America, have tended to highlight independence and individual achievement. These are seen as important educational elements, but students must also learn how to work cooperatively. To people, cooperative interaction skills such as interpersonal, group, and organizational skills are considered are considered very important. Skills relating to communication, building and maintaining trust and conflict resolution are seen as especially important.

The main principles of cooperative learning are individual responsibility and accountability, in relation to the task at hand and the group. Individual accountability can be promoted by making each member responsible to the group. Student interdependence can be promoted by encouraging students to help each other as needed. Explaining the content being studied or explaining certain processes as they are learning can be used to do this. During this learning process the students can make constructive suggestions and help one another. As positive interdependence is developed in a group, so does the cooperative structure of the classroom. This aspect of cooperative learning can be nurtured by making the students responsible for not only what they are learning, but for what everyone else is learning in the group.

The assumptions underpinning the development of cooperative learning groups are fairly self explanatory and are summarized below:

- The sharing generated in cooperative situations generates more motivation than do individualistic, competitive environments;
- The members of cooperative groups learn from one another. Each learner has more helping hands than in an individual setting;
- Interacting with one another in a social context creates more intellectual activity that increases learning when compared with individual study;
- Cooperation increases positive feelings toward one another, builds relationships, and reduces the feelings of isolation and loneliness;
- Cooperation increases self-esteem in individuals through increased learning, but also by making them feel respected and cared for by the others in the group; and
- Tasks requiring cooperation between students can increase their ability to work productively together, generally benefiting their social skills.

Cooperative learning theorists have different views regarding whether groups in a cooperative setting should compete with one another. Some theorists have generally favoured competition, while others favouring cooperation. Theorists Qin, Johnson, and Johnson (1995) who favoured cooperation have recently published a complex review of research on this question. They report that the cooperative structures generally create improved learning in the important area of problem solving.

Student responses to cooperative learning are generally positive. Some training and changes to how the students interact as individuals and as members of a group may be necessary in order to achieve maximum benefits from the experience. The extent and need for preparing and planning for cooperative instruction will depend on the group's current levels of cooperative learning skills. Table 1 below outlines the role of the teacher in the cooperative learning process:

TABLE 1 ROLE OF TEACHER IN COOPERATIVE LEARNING

Create Positive Interdependence

- Provide a structure for achieving:
  - A mutual goal;
  - Shared resources; and
  - Shared reward.

Monitor, Facilitate and Evaluate

- Circulate to help group members achieve the task and maintain the group; and
- Reinforce and provide feedback.

Teach Group Skills

- Teach social skills and promote positive self-concept to help group members:
  - Achieve the task; and
  - Maintain positive working relationships.
  -

Source: Lang, Hellmut. (1995). 'Teaching: strategies and methods for student-centred instruction'. Cooperative Learning, Chapter 15, page 351.Harcourt Brace and Company Canada, Ltd.

The various components of cooperative learning will be used as a basis for developing a new method of teaching project design. The underlying assumptions of cooperative learning are considered as playing an equally important and interrelated role in the development of a student's creative thinking.

2 Objective

In architectural education, an important component of a bachelor degree is the study of Studio Project Design. This component of the course plays an integral part in the development of an architect's creativity in the design process. With the continual changes in the various styles of design used in architecture, a student in the field may find it difficult to develop their own ideas. Guided or 'dictated' by their teachers opinions, the student's own

interpretation the different concepts of architectural professional knowledge and practice in design becomes very confusing.

The main objective of this paper is to identify the problem or problems that limit the student's creative thinking. This will be undertaken as collaborative action research project between the teacher, his students and architect graduates who act as assistant advisors. The development of a new method of teaching in project Studio Design was used as a method for addressing the identified issues relating to the problem of student's limited creative thinking. By using action research, the action group, through observation and interview, will plan, measure and evaluate the implemented changes, based on specific evidence accumulated at each particular action step.

3 Action Research: Developing the Method of Teaching Project Design through Cooperative Learning'

3.1 Preamble

This action research project describes changes in the method of teaching project design to third-year architect students at Sriburapha University. Traditionally the teaching process in Studio Design has been teacher dominated. This usually involves the advisor critiquing students work individually allowing little thought or input from students. The process of learning is usually passive and tends to limit the student's own ideas or thoughts. Our objective was to change the method of instruction from a teacher-centred process to that of a student-centred process. The fundamental principles of cooperative learning were used as a model for this change. Cooperative learning is therefore based on a student-centred approach to the teaching and learning process. It gives students an opportunity to discuss their thoughts and ideas with other students in the class, creating a more conducive environment for them to develop greater creativity in project conceptualization and design.

As the teacher, I worked closely with my students in all stages of implementing the new changes. This included the initial reflection stage (reconnaissance) and in the perspective planning stage, which was based on the first action steps we were to carry out. The implementation and evaluation of subsequent steps that followed were also done collectively. The opinions of two architectural graduates, who act as assistant advisors to recent graduates in my private design studio, were also used in the initial planning phase.

3.2 Reconnaissance: Statement of the Issue in the Context of the Thematic Concern

Traditionally, teaching and learning in Thailand has been a teacher-dominated process operating within a rigid structure offering little or no flexibility. The learning process is one that is passive and tends to be boring to both students and teachers.

Recently the National Education Act B.E. 2542 (1999) has served as a master legislation on education reform in Thailand. One of the major objectives of the reform is being the development of a 'learner-centred, teaching-learning process'. The 'teaching-learning process' is aimed at enabling learners to develop themselves at their own pace and to the best of their ability.

The current rote system will therefore be abandoned in favour of this analytical learning structure. This initiative by the government, which will involve many teachers to undergo intensive re-training, is seen as important in the context of our research. It is hoped that it may be used as a starting point for future educational planning objectives currently being promoted by the Thai educational sector for the betterment of students and teachers alike.

The current method of teaching Studio Project Design to third year architect students at Sriburapha University is very much based on a teacher-centred approach. The process of learning by students is best described as being mostly a passive exercise. This allows students very little if any input into the process of teaching and learning. As a visiting lecturer and teacher of this component of the course since 1984, I believe that the current teaching process in project design limits the student's ability to think creatively.

In the studio, students have little opportunity to express and share ideas about their work with the teacher and other students in the class. The relationship and role of student and teacher are clearly defined, with input of ideas and solutions coming mainly from the teacher. If the learning process could be based on a student-centred approach, this would allow greater input and thought from the students. Perhaps students will then have a greater opportunity to think 'outside the square' and be able to develop greater creativity with the help of input from other students and guidance from their teacher.

There was an expressed interest by the students and the teacher to improve the system in a way that would allow students to have a greater input of how the course was conducted and structured. Experience as a student of architecture in Paris, gave me the initial idea of introducing a system in Studio Project Design that would allow greater input and information sharing between students. As a student, my experiences were comparably different to those of my students. With a setting similar to that of a 'round table', students openly discussed their ideas with others in the class. These discussions were guided and supported by the teacher, who would promote discussion and provide opportunities for reflection. Cooperative

learning was seen as an alternative and improvement to the current teacher-centred approach.

3.3 Development of the Thematic Concern

Students of the Studio Project Design course were interviewed in order to gain a deeper understanding of the issues relating to the limited development of their creative thinking. This was seen as problematic for the further development of students in their professional practice. Two graduates from my private studio were also interviewed. We as a group felt it was important to have some input from 'outsiders', for our initial planning. The issue of the thematic concern can be explained by looking at the comments from interviews conducted prior to the initial planning phase.

The concerns of the action group, composed of the author, his students and graduate architects were similar. The underlying problem or area of concern was based around the students having limited input in determining the teaching process in the class that would allow them to be more creative in the design studio. The main areas of concern voiced by the action group were:

1. The educational process is teacher-centred; and
2. The course is based on individual study.

The current setting of the Studio Project Design course will also be outlined to give a broader understanding of the educational processes we are looking to change and improve.

3.4 The Current Setting

The Faculty of Architecture at Sriburapha University has been established for more than forty years. It is composed of approximately three hundred students, who are enrolled at the bachelor degree level. This program is separated into a five-year academic term, with a practical component at each year of study. This involves students undertaking a six to eight week class in project design.

Normally, there are four teachers per class who teach the Studio Project Design class. Each teacher is responsible for a group of twelve to thirteen students. The course is divided into four different design projects including:

1. Kindergarten school;
2. Office (medium size);
3. Hospital; and
4. Commercial complex (i.e. shopping centre).

Teachers are responsible for organizing each program and evaluating their work individually with each student. The projects on line start from a kindergarten project and then to a medium size office, hospital and commercial complex. The course is structured in this way to give the students experience in designing a range of different projects, each with different design components. Sometimes the second project may be changed to group housing.

At the beginning of the course, the teacher gives all of the students a 'program' or a set of design specifications and a graphic description of the site on which the project is to be built. The setting is that of an actual studio in which each of the twelve students arranges their own drawing tables, papers, books, pictures, and models. This is the space in which students spend most of their working lives. They are mostly occupied in private, parallel pursuit of the common design task.

During each project, a student under the supervision of a teacher develops their individual project. This involves the students developing their 'own' version of the design, recording their results in preliminary sketches, working drawings, and models. The communication between the teacher and student consists mainly of suggestions by the teacher in relation to what they should be doing in order to successfully complete their assigned task. Often, the advice given to the students is based on the teacher's own perceptions and ideas.

On completion of their work, a presentation is made in front of a jury of teachers. This presentation involves the students giving an oral explanation of their work, so the teachers can critique the project and give a grade for their work.

In this particular research project, I have drawn on a specific example of third-year students undertaking the design of a kindergarten under my supervision. The actual processes will be explained. This will be done in a series of steps to give the reader an understanding of what is involved in the design of a specific project.

Each student will receive a program from their advisor, which outlines the procedures they must follow in relation to the development of the kindergarten project. Students must start to work individually in order to develop specific concepts relating to each step of the conceptualization and design stages of their project. These processes are summarized below on a weekly basis:

Kindergarten Project Design

- **Week 1**
  - The student must present their analysis of the site zoning diagram and schematic design; and
  - Teachers will usually tell them to change the approach because it is not correct to the law and tell them to clarify zoning of administration and classroom space.
- **Week 2**
  - Students will present a plan, based on the comments of the teacher from the first step; and
  - The teacher will make necessary corrections and discuss these individually with each student.
- **Week 3**
  - Students must develop their projects to more detail with plan, facades, sections and a conceptual model.

➢ **Week 4**
- Students will present their project to a jury comprising of the four teachers for a critical evaluation of the work completed thus far.

➢ **Week 5**
- Students must bring back their revised projects, based on comments made previously by the jury for further review.

➢ **Weeks 6 and 7**
- Students finalize their projects, again based on the further revision to prepare a good presentation.

➢ **Week 8**
- The students present the completed project to the jury for the final result.

Creative thinking is one of the major things that an architect must possess in their professional life. In order to develop this creativity, we must start doing so in Studio Project Design.

3.5 Opinions of Students and Graduate Architects

The opinions of the students in our research group were used as a basis for initial planning. Interviews of my students were conducted to gain an understanding of their opinions relating to the development of creative thinking. The opinions of two architectural graduates were also used in the analysis. The graduates work as assistant advisors in my private studio. It was felt that their opinions were important to have an 'outsiders' point of view to gain a greater understanding of issues relating to the development of creativity and their implications on future professional practice in architecture.

The interviews were conducted as a group, with questions designed to stimulate discussion in relation to our initial concerns relating to creative thinking. The questions asked were as follows:

1. What do you think about the current method of teaching Studio Design?
2. Why do you think the current system limits your creative thinking?
3. What are your opinions on how to improve the method of teaching?

Graduate's Opinions (assistant advisors)

i) What do you think about the current method of teaching Studio Design?
- The method of teaching now is already good even though students have only one adviser to develop their projects, because advisers change for each project; and
- Each teacher has a different area of expertise, so students can have a different perspective from the different teachers. Some ideas of the teachers they may agree with, others possibly not. The students must try to understand people who have different opinions to those of their own.

ii) Why do you think the current system limits your creative thinking?
- Studio project design concentrates only on the function of the building and lacks focus and discussion relating to creativity; and

- The current system limits creative thinking because it is still heavily based on individual study.

iii) What are your opinions on how to improve the method of teaching?

- The teacher must try to understand the student's ideas and try to guide them to develop their creativity. This can be done by using a team of teachers or advisors who specialize in other related branches such as engineering, economics, the arts etc. to help them develop their project;
- Propose an opportunity for students to select their own teacher or even the project to develop;
- The jury judging the projects should be open to more public opinion;
- Teachers must be flexible and guide students by posing questions that lead to further discussions, allowing them to think for themselves;
- Teachers must also be more sensitive and supportive towards students. For example, rejecting a student's proposal without an adequate explanation. Instead of saying 'no, that will not work', the teachers should give an explanation by using a relevant example such as a case study; and
- The administrators of the course should categorize the teachers in different academic years, relating to the atmosphere and knowledge of the students and according to the direction of education.

Student's Opinions

i) What do you think about the current method of teaching Studio Design?

- To follow the advice of the teacher is realistic, to follow personal development is sometimes utopia;
- For Studio Design, we only talk about I.Q., but we tend to forget the social aspects that govern our feelings, creativity etc.; and
- The system is good, but the problem is based on the quality of teacher.
- Why do you think the current system limits your creative thinking?
- Developing creative thinking by only following the opinions of our advisors is similar to following exact needs of a client. It limits our opinion in the design process and can block creative thinking;
- To follow the comments of the teacher doesn't allow students an opportunity to propose their own ideas;
- The final result given by the jury should be based only on the completed project. The current assessment process takes into account the various stages of the project. This makes the program too restrictive and doesn't give the student much flexibility in the design process;
- All teachers must not impose their personal ideas on the student's project design;
- The teacher plays a very important role in the operative thinking of the students;
- Teachers should not be able to give marks without the input of the jury;
- Teachers critique only the function of the building and forget other important issues relating to the concept, facade design and creativity;
- The timing of each project is too short in order for students to develop a good project and should be extended; and
- The teacher is a 'dictator'.
- What are your opinions on how to improve the method of teaching?
- The students should only be under supervision of a teacher, not be dictated to by the teacher. This would allowing them greater choice in the decision making process;
- It will be good if students can propose the topic of the project by themselves under supervision of the teacher;
- The teachers must only guide the students instead of dominating their creative thinking;
- Teachers must listen to students and try to understand them more;

- Teachers must show some interest in the student's project during the final assessment by the jury. They shouldn't walk in and out all the time;
- Students want to choose an advisor for their projects freely;
- Teachers must be friendly and flexible; and
- Teachers must propose several guidelines for students, so they can have more freedom of choice.

3.6 Initial Review

The ideas of the discussion group were evaluated as a basis for further planning. Based on reviewing the current teaching methods in project design at Sriburapha University and interviews of both current students and architectural graduates (assistant advisors), some common concerns were identified.

Students felt that they had little opportunity to express and share their ideas about their project with their teachers. They felt that in most cases their teachers acted as 'dictators', who imposed their own ideas and perceptions on the students, giving them very little opportunity to use their own creativity. If students were given opportunities to share their ideas amongst themselves and the teacher, with some guidance, then perhaps they might be more inclined to think 'outside the square' and develop greater creativity.

Concerns voiced by graduate architects, who acted as assistant advisors, voiced similar concerns to those of the students. Their perceptions about some issues did vary in certain situations. They did feel however the development of creativity did have an impact on the professional practice of architecture. As assistant advisors, they felt that they had some role to play in the student's development of creative thinking.

Both students and assistant advisors saw creativity, as an essential attribute that an architect must possess in order to develop in the professional context.

3.7 Our Action Research Plan

After our initial analysis, there were a number of things relating to the teaching process that we as a group felt had to be changed to address the issue of improving creative thinking in the design studio. The plan was to introduce a student-centred process of teaching and promote group development.

To improve creative thinking of the students, the system must be flexible. The teacher must be friendly and guide the students by posing ideas and questions to promote discussion. They should not dominate their ideas and thoughts so students can have courage to think for themselves. Students must work together in a group so they can exchange their ideas. The teacher must be willing to listen to the opinions of the students and try to understand them more.

Our action was to be achieved by using a cooperative learning method to develop an atmosphere and a system of study that would promote student creative thinking. The changes incorporate the opinions of the action group as well as encompassing the main concepts underlying the processes of

cooperative learning. The actions and observations of our plan have been outlined on a week to week basis.

3.8 Action and Observation

Our plans were put into action with the twelve students in my Studio Project Design class, undertaking the kindergarten project. As the author, I am referred to as the 'advisor' in the following discussions:

➢ **Week 1**

- A group meeting was scheduled to explain the methods of cooperative learning;
- Emphasis was placed on the need for the students to work together as a group and share ideas and help each other;
- The idea of sharing was encouraged not only between the advisor, but between the students themselves; and
- After each step, the students were asked to evaluate as a group.

The teacher promoted discussion between the group about the various aspects of a kindergarten and ideas about the site location. Questions were posed to promote discussion and information sharing. The intention of the teacher was to build a classroom climate of trust. This was done to find cooperative ways for students to acquire and analyse information relating to the course content. Some of the student's responses are summarized below:

What is kindergarten ?

- A second home for children;
- A jail; and
- A place for children.

How is a kindergarten used in relation to its' function?

- Administration;
- Classrooms;
- Teacher's room;
- Service; and
- Play ground.

What are some concepts we must look at in relation to site analysis?

- Location;
- Size;
- Environment; and
- Orientation;

What aspects to we have to consider in relation to approaches?

- Main entrance;
- Sub-entrance; and
- Regulations.

What are the different zones of each activity?

- Active zones; and
- Passive zones.

What are some issues of circulation that we must consider?

- Roadway;
- Walkway;
- Public;
- Private;
- Service; and
- Axis.

What should the size of the different function areas in our comparative study be in relation to area occupied and the percentage of area occupied?

- **Total Function Area___ m^2 100 %:**

Administration Area	_____m^2	___ %
Classroom Area	_____m^2	___ %
Teachers Room	_____m^2	___ %

The group questioned and answered by discussing between themselves, with the guidance of the teacher. The students plan to present the models of their concept by using all the information gathered in the class discussion. Some students proposed to the group that more information is needed from the library, while others propose to search the Internet. The group agrees to make copies of all the information they will collect and distribute it to all members in the group.

➢ **Week 2**

Students share the ideas for conceptual design by using mass model instead of presenting individual plans;

They critique each others work and make suggestions about some of the problems they have encountered. Some of the questions discussed by the group were:

- How should we plan the various approaches?
- What is the expression of form?
- Where is the zoning of each of the activities?
- Why?

By using a mass model for their presentation, the students seem to enjoy developing ideas. This method gives the students more flexibility, as they can change their ideas by cutting and replacing the model. They all participate and help each other with constructive ideas to evaluate each other's work.

It seems that there are three or four similar conceptual ideas among the group. The teacher divides the students into four groups that will work together on similar ideas. Although they will be doing their individual projects, the groups that share similar ideas will work as a team to help and support each other.

➢ **Week 3**

A group of guest teachers and advisors composed of architects, structural and systems engineers, economist and artists participate with the students to share their ideas and guide them according to the concepts developed by the students. The student's models are used to show their function and form inside. Some issues are raised for discussion between the students who share ideas about the following questions posed by the guests:

- What is the type of the structure that will be used?
- How can you increase energy efficiency on your project?
- Why choose these colours?
- How can you express the symbolism of your project?
- How will the building maintenance be done?

The students consult the advisors about their own project, as well as the other students and their advisor. Information is shared between the group and evaluations are made collectively.

➢ **Week 4**

- The teacher's students presented their projects in front of the jury (four teachers). This is the first phase of the evaluation process and includes students from other project design groups;
  - Students and teachers share the ideas of other groups;
  - Their discussions are guided by the different teachers and advisors, giving the students a chance to have opinions of advisors other than their own; and
  - The teacher makes some constructive notes that the students may use. These notes will be presented to the teachers group in the studio.

➢ **Week 5**

- The teacher and students in the action group discuss and reflect the opinions of the other teachers in the jury. By following the notes and opinions of their own teams and those of the group collectively, the new information will also be used by individuals to further improve their projects. This will help them to have a good final presentation.

➢ **Week 6**

- All the students in the advisors action group are ready to present their projects to the jury for the final evaluation phase, after finalizing ideas gathered from the previous weeks discussions.
- Most of the problems that students encountered have been resolved through vigorous discussions between their individual groups and the all of the group together.
- The teacher's students are very satisfied with their final result and believe that they have been fairly successful in achieving their planned objectives.
- After the jury evaluated the teacher's students, they were interviewed as a group to evaluate their opinions of the new approach to the teaching process in project design.
- The opinions of the students were summarized by their teacher and will be evaluated to determine the outcomes of the new process of teaching.

3.9 Reflect

Student's Opinions

The interviews were conducted as a group, with questions aimed to make some evaluations of student's opinions relating to the new changes that have been implemented. Questions relating to the students opinions about their advisor were conducted by our 'outsiders', in order to be objective. The following questions were asked:

i) What do you think about cooperative learning?
   - It allows students can share more ideas amongst themselves by open discussion and can evaluate the project together. This helped with coming up with new ideas and made our work enjoyable;
   - By having the input of other students, our minds were open to more ideas, allowing us to think more creatively; and
   - Working in groups with similar ideas was very helpful and made developing ideas easier with the increased input from not only our groups, but the ideas of the other groups who participated in the discussions.

By using a model as a tool to develop the project, it seems that student's work on three-dimensional space instead of using a two- dimensional plan or diagram. Using a two-dimensional approach can often be boring to the students as they can readily relate to three-dimensional models as in the real world. This seems to stimulate the student's thoughts and makes learning a more enjoyable process.

Having a group of guest teachers and advisors from different disciplines sharing their ideas with the students, allowed them to obtain specialized advise that may not always be available form their teacher.

ii) What do you think about your teacher?
   - The teacher was very gentle in his approach. He acted only as a guide and didn't try to dominate our opinions with his own ideas or thoughts; and
   - At first we felt strange that the teacher was asking us questions and making us think more critically about what we were doing, but as time went on we became more comfortable with talking openly about our ideas.

Being a student-centred method of teaching and learning, students are given more of an opportunity to actively participate in how the course is conducted. By allowing the students to play a role in selecting their teachers, the teachers must adapt themselves to participate

with the students. This will give them an opportunity to interact with the students more closely on a different level than before.

Generally the results from the observations and interviews have shown us that the students enjoy working in the studio more by using the cooperative learning process. They can work as a group and help each other under the supervision of a teacher who is more sensitive to the needs of the students.

Group observations showed that most students were involved in the various aspects of the class activities and tasks in their groups. Student enthusiasm seemed to be greater in a new classroom setting that was more relaxed and open.

A method of monitoring the individual student's displays of feelings, interests interaction, learning etc. could be used to further assess the outcomes of cooperative learning in a more systematic way. This data could be used to record students' individual command of cognitive knowledge and skills such as communication and cooperative social skills, problem solving skills and their success in working independently within the framework of their respective group. A formal observation sheet could be developed to describe and record this data.

The project design program must be more flexible. A greater selection of the types of projects the students can chose from should be increased form four to six projects. The number of projects that the students have to complete should at the same time be reduced so they can have more time to develop their ideas. Increasing the number of choices in projects for the students to select from can also allow them to change projects if they feel that they don't like what they are working on.

To make the process more successful, the teachers in the class must try to understand and try to develop in the same direction of the students. By introducing cooperative learning to other students who are studying project design, a greater number of participants will also have an increased opportunity to share ideas from each other. The faculty, in implementing these changes across the board may encounter difficulties. Issues such as further training for teachers, developing a good system of management that is related to the needs of the students and the quality of education as a whole must be critically examined.

4 Conclusion

To develop the method of teaching project design as a student- centred approach for the third-year students in architecture at Sriburapha University, we must offer an alternative to enlarge the student's creative thinking in their fields. The four steps or action research: plan, act, observe and reflect were used to implement, measure and evaluate this alternative process.

Evaluations of the new method of teaching a small group of third-year architectural students undertaking project design were seen as being educationally positive in nature. By working as a group the students can learn as group and help each other by sharing their information and thoughts. This

allows them to have more ideas to support their creative thinking as well as improving their interpersonal and other social skills.

Based on the results of the first cycle of action research, it appears that to fully evaluate the effectiveness of the implemented changes, they must also be introduced to the students second, third and fourth projects. The final results of the student's projects must be evaluated and analysed against other control groups using the current teacher-centred approach in teaching the project design course. Analysing the results of student's marks in past academic years could also be done to validate the success of the changes relating to the student's creative thinking. Students' project design results from other schools of architecture in Thailand s may even be used in further evaluations. If this work was to continue, a series of action research cycles will have to be implemented.

If consideration is made to further extend the new method of teaching project design in other classes, other wider issues must be considered such as the structure of Sriburapha University as an educational institute and how it fits into the educational, economic and social structure of the country.

5 References

Barbara, B. Meyer., and Carol, P. Etheridge. (19997). 'Improving student interest in the Spanish 1 classroom through democratic teaching'. University of Memphis, USA.

Commissioned Report No. 24 (1994). 'Workplace learning in the professional development of teachers'. National Board of Employment, Education and Training. Canberra: Australian Government Publishing Service.

Day, C. et al. (1999). 'Educational action research'. Oxford: Triangle Journal Ltd.

Joyce, B., and Weil, M. (1996). 'Models of teaching'. A Simon and Schuster Company, Needham Heights, Mass.

Kemmis, S., and McTaggart, R. (1990), 'the action research planner'. 3rd ed. Victoria: Brown Prior Anderson.

Lang, Hellmut. (1995). 'Teaching: strategies and methods for student- centred instruction'. Harcourt Brace and Company Canada, Ltd.

Office of the National Education Commission, 'National Education Act of B.E.2542 (1999)', Thailand, 1999.

Oxford Analytica Briefs, 'Bureaucrats Threaten Long-Overdue Education Reforms', November 1, 2000.

Schön, D. (1983). 'The reflective practitioner'. Basic Books Inc. USA.

Strauss, A., and Corbin, J. (1996). 'Basic of qualitative research'. London: Sage.

Attachment 1.2

Semester Paper for HER 8506, Semester 1, 2002

Name of Student: Ajaphol Dusitnanond
Subject: HER 8506
Title: Evaluating the Method of Teaching Architectural Project Design. A Case Study of 3rd Year Studio Project, Faculty of Architecture Sriburapha University, 2nd Cycle of Action Research

1 Introduction

In architectural education, an important component of a bachelor degree is the study of project design. This component of the course plays an integral part in the development of an architect's creativity in the design process. With the continual changes in the various styles of design used in architecture, a student in the field may find it difficult to develop their own ideas. Guided or 'dictated' by their teacher's opinions, the student's own interpretation of the different concepts of architectural professional knowledge and practice in design becomes very confusing.

The introduction of a student-centred method of teaching using the fundamental principles of cooperative learning to third-year project design students at Sriburapha University in earlier research undertaken by the author, showed many positive qualitative outcomes. To better evaluate the new method of teaching, students' academic results were analysed and compared against their results achieved under the teacher-centred approach. It is hoped that this analysis will show more conclusively that students can develop their creativity and be able to better relate theory to real practice in architecture.

2 Background

The faculty of architecture at Sriburapha University is one of the most famous architectural schools in Thailand and has been established for more that forty years. It is composed of three hundred and fifty students (2001 academic year) who are enrolled at the bachelor degree level. The program of study is separated into a five-year academic term. This involves students undertaking a six to eight week class in architectural Studio Project Design

throughout their academic term of study. Traditionally the teaching process in project design has been teacher dominated.

Normally, there are four teachers per class who teach the project design class. Each teacher is responsible for a group of eleven to thirteen students. The course is divided into four different design projects including:

1. Kindergarten;
2. Office building (medium size);
3. Hospital; and
4. Commercial complex (i.e. shopping centre).

Teachers are responsible for organizing each program and evaluating the work of their students. The evaluation process consist of the teacher assessing various stages of his or her student's work. This is normally done on an individual basis between the students and teacher. The final grade for each project, however is determined collectively with input from all four teachers.

The projects on line start from a kindergarten project and then to a medium size office, hospital and commercial complex. The course is structured in this way to give the students experience and designing a range of different projects, each with different design components.

The previous objective was to improve the method of instruction from a teacher-centred process to that of a student-process. The fundamental principles cooperative learning were used as a model to develop this process. Action Research was used as an approach to improving the system of education in third –year project design. By changing the current system in place and learning from the consequences of the changes implemented was how this was achieved. Previous research on the development of a new method of teaching project design (HER 8504) identified problems that limit the student's creative thinking. This was undertaken as collaborative action research project between the teacher, his students and architect graduates who acted as assistant teachers.

The research completed consisted of students undertaking a kindergarten project design. This research was the first study by the author into developing the method of teaching in project design. The development of a new method of teaching in project design was used as away of addressing the identified issues relating to the problem of student's limited creative thinking. By using action research, the action group, through observation and interview, planned, measured and evaluated the implemented changes, based on specific evidence accumulated at each particular action step.

Generally the results from the observations and interviews of the first cycle of action research have shown us that the students enjoy working in the studio more by using the cooperative learning process. They can work as a group and help each other under the supervision of a teacher who is more sensitive to the needs of the students.

Group observations showed that most students were involved in the various aspects of the class activities and tasks in their groups. Student enthusiasm seemed to be greater in a new classroom setting that was more

relaxed and open. As the previous research was based on qualitative analysis, the impact of the implemented changes were not evaluated using quantitative methods. The new research will focus on evaluating the impacts of the new method of teaching by using both qualitative analysis to fully evaluate the efficiency and effectiveness of the research.

3 Research Questions and Objectives

Previous action research (the first cycle) identified positive qualitative outcomes of cooperative learning in architectural project design. The main objective of this paper is to build on previous the research done by the author. Qualitative and quantitative analysis will be used to further analyse the new method of teaching, based on cooperative learning.

In undertaking this research, two principal questions were considered:

- Would the introduction of cooperative based learning enable students in hospital project design to think more creatively?
- Would the introduction of problem-based learning allow students to better relate the theoretical part of their course to real practice in the studio?

The second cycle of action research will be based on the results of the first cycle undertaken, as well as new data from student grades in project design. The previous findings will be adopted in the second cycle, with the inclusion of problem-based learning. Problem-based learning will be introduced as a way of integrating the practical and theoretical components needed by the students in project design. The integration of problem-based learning is aimed at stimulating the students' need to know. It is hoped that this will give more meaning to their studies and allow them to work done in the studio to real life situations.

4 Literature Review

Creative thinking in architectural education is the most important attribute on must possess in order to be a good architect in their professional life. All schools of architecture must try to advance this attribute by developing methods of teaching that encourage students to achieve this goal of creativity.

Traditionally, teaching and learning in Thailand has been a teacher dominated process operating within a rigid structure offering little or no flexibility. The learning process of learning is one that is passive and tends to be boring to both students and teachers.

The current method of teaching project design to third year architect students at Sriburapha University is very much based on a teacher-centred approach. The process of learning by students is best described as being mostly a passive exercise. This allows students very little if any input into the process of teaching and learning.

4.1 Cooperative Learning

Cooperative learning gives students an opportunity to discuss information or practice skills presented initially by the teacher or require students to find or discover information on their own. It is a student-centred approach which allows the students to play an active role in the learning process by supplementing the teacher's instruction in the class.

The main principles of cooperative learning are individual responsibility and accountability, in relation to the task at hand and the group. Individual accountability can be promoted by making each member responsible to the group. Student interdependence can be promoted by encouraging students to help each other as needed. Explain the content being studied or explaining certain processes as they are learning can be used to do this. During this learning process the students can make constructive suggestions and help one another. As positive interdependence is developed in a group, so does the cooperative structure of the classroom. This aspect of cooperative learning can be nurtured by making the students responsible for not only what they are learning, but for what everyone else is learning in the group.

4.2 Problem-based Learning

The approach to problem-based learning for the integration of the practical and theoretical knowledge needed by professional architects. This integrated problem-based learning approach stimulates students' need to know, thus allowing information to be presented and received in a context that is useful and motivating for students.

Problem-based learning is very similar to the way things are done in real practice. Students are taught how to do things the way they are done in practice. This gives more meaning to their studies and allows them to relate work done in the classroom to real life situations.

By using problem-based learning approach to teaching Architecture, students are given an education that is relevant to their professional careers. It also aims to teach life-long learning skills, to develop value systems and intellect as well as vocational skills. It teaches students how to seek information, interpret it, and apply it.

It's really important for a student architect to realize that when you're just beginning to get together a conceptual design for your building, you need to talk to various experts such as the structural engineer and the services engineer. At this point the structural engineer or the services engineer will sit down and look at somebody's project and talk about it. The students can then understand how the content fits into the context and how it relates to other things. And that's the way they learn. This way of presenting information is much more motivating for students and they will tend to learn great deal more using this approach.

In problem-based learning, there is a need to provide some basic information in order to facilitate students' 'learning by doing' within the problem-based learning framework. One obstacle that can be encountered with this learning approach is not providing enough theoretical information.

In view of Johnston (1997), a pioneer in the field of architectural problem-based learning, delivering a high amount of theoretical information is inappropriate. He personally thinks most of the information received by students in a didactic lecture situation, isn't retained and they don't understand the context of the information.

When students get to a point where they perceive the need for information, this is when they're ready to receive it and understand it. One of the difficulties in planning a problem-based learning curriculum is trying to see when these situations will be reached. For example, instead of getting a related expert in to deliver a lecture series, they are organized to come in at the same point in the process when students will be seeking their information.

5 Methodology

This paper is an extension of the previous classroom based action research project that will build on previous research done into developing the method of teaching third-year project design at Sriburapha University. The first cycle of our action research will be extended by reflecting on previous outcomes, as well as using students' grades from the four project designs. Research will be undertaken by the author and a new action group. The grades and opinions of this group from their first, second and fourth projects under the teacher-centred method will be used as a comparison against their third project under the student-centred approach. This data will be used as to gauge the expected differences in the students' grades for the four projects undertaken.

The action group selected for the research will comprise of twelve students who have completed the hospital project under the supervision of the author using a student-centred approach based on cooperative learning techniques. This action groups has been selected for the purpose of comparing the two methods of teaching, as well as comparing the results of our action group who have previously completed three other design projects under the teacher-centred method.

Observations and the information from student questionnaires will be used as a qualitative method of evaluating the results of the new changes. The questionnaires are used by the faculty of architecture as method of getting students feedback about their project design teachers from each project. This new research will also compare the grades of another group of students who have undertaken their third design project of a hospital building with the author. The grades of these students for four (4) projects will be evaluated. Each project has been taught by a different teacher. Three out of the four projects were taught using a teacher-centred approach and one by using a student-centred approach (based on the fundamental principles of cooperative learning). The quantitative analysis of the students' grades will be used as a measure of the students' progress in designing their projects.

At the time of the research, forty four (44) students were enrolled in the third-year project design class. The students are divided into four groups with

approximately the same number of students under the supervision of one teacher. In some instances, due to the uncertain enrolment numbers, some classes may not have the same number of students. The author's action group is composed of twelve (12) students. In the future references this action group is referred to as 'Group 1'. The remaining students in the other classes are referred to as Group 2, Group 3 and Group 4.

6 Action Research

At the beginning of the course, the teacher gives all of the students a 'program' or a sent of design specifications and a graphic description of the site on which the project is to be built. The setting is that of an actual studio in which each of the twelve students arranges their own drawing tables, papers, books, pictures and models. This is the space in which students spend most of their working lives. They are mostly occupied in private, parallel pursuit of the common design task.

During each project, a student under the supervision of a teacher develops their individual project. This involves the students developing their 'own' version of the design, recording their results in preliminary sketches, working drawings and models. The communication between the teacher and student consists mainly of suggestions by the teacher in relation to what they should be doing in order to successfully complete their assigned task. Often, the advice given to the students is based on the teacher's own perceptions and ideas.

On completion of their work, a presentation is made in front of a jury of teachers. This presentation involves the students giving an oral explanation of their work, so the teachers can critique the project and give a grade for their work.

In this particular research project, the author has drawn on a specific example of a hospital project undertaken by third-year students, under his supervision. Actual process of the architectural project design course will be explained. The actual processes have been summarized and show only the basic details. This will be done in a series of steps to give the reader an understanding of what is involved in the design of a specific project. (see Appendix 1).

Each student will receive a program from their teacher, which outlines the procedures they must follow in relation to the development of the hospital project. The teacher encourages the students to discuss their various ideas abut their understanding of what a hospital is. Their discussion is non-formal and many different ideas are presented by each student. The teacher acts only as a facilitator, answering specific questions about the concepts relating to each step of the conceptualization and design stages of their project.

6.1 Hospital Project Design

Creative thinking is one of the major things that an architect must possess in their professional life. In order to develop this creativity, we must start doing so in project design.

Our action was to be achieved by using a cooperative learning method to develop an atmosphere and a system of study that would promote student creative thinking. The changes incorporate the opinions of the action group as well as encompassing the main concepts underlying the processes of cooperative learning. The actions and observations of our plan have been outlined on a week to week basis in **Appendix 2.**

6.2 Quantitative Analysis and Reflection

The assessment process in project design consists of students being given a score for various stages of their work. Each project is given a total score of thirty (30) points. The various stages of the project are assessed by all four teachers, except for the 'Process of working.' The total marks for all other criteria are given by all four teachers. The total mark is then divided by four to give an average result. For the process of working, each teacher gives their mark for his or her student only. The results from four projects have been analysed in order to compare the differences in marks attained from students undertaking their studies by teacher-centred and student-centred methods. The marks that are accumulated during the various stages of the design process are outlined below:

1. Data collection (4 points)
2. Preliminary design (4 points)
3. Process of working (3 points)
4. Creative thinking (4 points)
5. Final design (8 points)
6. Building technology(2 points)
7. Presentation (3 points)
8. Model (2 points)

In order to gain a deeper understanding of the students' academic ability, the results of theory examinations were compared. The theory examination is conducted each semester and is related to the theoretical aspects of the design course. Based on the results from semester 1 and semester 2, our action group (Group 1) obtained the lowest average score compared to the other three groups undertaking the third year design course. The results are outlined in Table 1.

After further investigations into the academic abilities of the students in the author's action group (Group 1), grade point averages (GPA's) were obtained. For the first semester of their third year study, Group one had the lowest GPA's as compared with other students. For the average GPA's from the first semester of the first- year, Group 1 was amongst the poorest also. Table 2 gives an outline of the GPA's for the third-year students.

TABLE 1 AVERAGE RESULTS FOR THEORY EXAMS

(Score from 20 points)

Semester 1						Semester 2			
	Group 1	Group 2	Group 3	Group 4		Group 1	Group 2	Group 3	Group 4
	12.22	10.3	11.35	11.15		14	15.25	14.0	15.25
	6.6	11.85	11.8	10.8		12.43	14.75	14.85	14.85
	7.35	14.25	10.3	14.1		7.0	17.9	14.05	18.3
	14.5	7.0	10.2	13.2		12.65	9.98	14.15	15.65
	10.02	11.7	10.15	11.3		13.38	15.94	14.3	17.22
	12.05	9.5	12.25	10.0		15.08	15.0	17.86	14.85
	12.0	10.06	10.02	12.5		17.1	16.2	14.7	13.18
	12.1	11.75	12.85	11.8		14.6	14.6	16.85	16.1
	8.4	9.25	12.0			16.0	17.75	15.75	
	8.1	11.35	9.97			11.23	15.35	14.35	
	11.75	9.85	13.39			17.05	13.5	16.7	
	8.75	11.9	10.25			13.35	15.1	16.1	
Average	**10.32**	**10.78**	**11.27**	**11.86**	**Average**	**13.66**	**15.11**	**15.31**	**15.68**

Source: Sriburapha University Faculty of Architecture, Bangkok, Thailand (2001-2002 Academic Year)

TABLE 2 COMPARISON OF GPAs

Semester 5 (First semester of 3rd year)						Semester 1-5 (First semester of 1st Year to 1st semester of 3rd year)			
	Group 1	Group 2	Group 3	Group 4		Group 1	Group 2	Group 3	Group 4
	2.98	3.05	3.19	2.85		2.67	2.47	2.12	2.69
	3.48	3.13	3.18	3.28		3.23	2.70	2.64	2.89
	2.61	3.78	2.90	3.50		2.07	3.63	2.67	2.84
	2.68	2.145	2.14	2.39		2.14	2.06	2.26	2.33
	2.58	3.25	2.80	3.33		2.62	3.01	2.57	2.85
	3.30	2.93	3.43	2.61		2.96	2.77	3.19	2.54
	3.40	2.64	2.75	2.52		2.98	2.46	2.51	2.54
	2.60	3.35	2.33	3.48		2.50	3.13	2.21	3.11
	3.15	2.65	3.40			2.95	2.44	3.09	
	2.38	3.10	2.75			2.16	2.56	2.69	
	2.58	2.70	3.28			2.79	2.52	2.54	
	2.36	3.05	2.73			2.49	2.53	2.70	
Average	2.84	2.98	2.91	3.00	Average	2.63	2.69	2.60	2.74

Source: Sriburapha University Faculty of Architecture, Bangkok, Thailand (2001-2002 Academic Year)

TABLE 3 ACTION GROUP COMPARISON OF FOUR PROJECTS

(Score from 30 points)

Action Group	**Group 1**	**Group 1**	**Group 1**	**Group 1**
Project	Kindergarten	Office Building	Hospital	Commercial
Method of Teaching	Teacher-centred	Teacher-centred	Student-centred	Teacher-centred
	21.5	22.38	22.63	22.51
	21.66	21.45	22.40	21.29
	18.83	21.33	18.79	17.96
	20.95	19.50	19.53	20.02
	20.77	19.09	20.86	20.39
	24.49	23.46	24.25	24.23
	22.11	20.84	23.10	20.47
	21.32	19.08	20.51	19.63
	22.14	23.08	22.88	22.88
	19.43	19.95	20.19	19.35
	19.88	21.46	24.04	22.53
	20.57	19.77	20.66	19.96
Average	21.14	20.95	**21.65**	20.95

Source: Sriburapha University Faculty of Architecture, Bangkok, Thailand (2001-2002 Academic Year)

The four projects completed by our action group show that under the student-centred method, they achieved the highest average scores for their final project design. The student-centred method of teaching was used during their third design project, hospital. The other projects completed by the action group was taught using the current teacher-centred method. **Table 3** outlines the results of the four projects that were undertaken by the action group.

Table 4 outlines the average scores for the various assessment categories used in the hospital design project. The table shows the scores obtained by all groups, including the action group (Group 1). The different assessment categories have been averaged for the purpose of simplifying the data.

As per **Table 1** and **Table 2**, which shows that the action group has amongst the poorest academic results for their theoretical exams and grade point averages. The average results for assessment categories of Creative Thinking and Building Technology show that the action group has obtained the highest scores as compared with the other groups. Although they are academically the poorest, their average scores in these two areas are the best. Through the use of a student-centred approach based on the fundamental principle of cooperative learning, the students were able to achieve the highest grades for creative thinking.

The Building Technology grades are on average the highest compared with the three groups that studied under the current teacher-centred approach without the introduction of problem-based learning. The action group by the use of problem-based learning were able to achieve very good results, indicating that this approach has helped them to better related theory and practice.

The average scores for the Final Design component although not the highest, are very comparable with the top group. This component of the assessment criteria shows that even students who are not as diligent ass the top students, they have been able to successfully achieve good results for their final design. This criteria also reflects the students' creativity in the design process.

TABLE 4 AVERAGE OF ASSESSMENT CATEGORY-RESULTS FOR HOSPITAL DESIGN PROJECT

Assessment Category	Maximum Score	Group 1	Group 2	Group 3	Group 4
i) Data collection	4 points	3.25	3.44	3.25	3.00
ii)Preliminary Design	4 points	2.70	2.82	2.91	2.73
iii)Process of working	3 points	2.14	2.42	2.27	2.19
iv) Creative thinking	4 points	2.80	2.66	2.66	2.65
v) Final design	8 points	5.66	5.48	5.67	5.55
vi) Building technology	2 points	1.41	1.38	1.33	1.35
vii) Presentation	3 points	2.12	2.19	2.14	2.12
viii) Model	2 points	1.59	1.54	1.62	1.60

Source: Sriburapha University Faculty of Architecture, Bangkok, Thailand (2002-2002 Academic Year)

6.3 Qualitative Analysis and Reflection

The interviews of students from the second cycle of action research were used to valuate their opinions relating to the new changes that were implemented. Interviews were conducted as a group by the author. The results of these interviews were summarized and are listed in **Appendix 3.**

Information relating to the students' opinions about their course and teacher was used to gain a greater understanding of the action group's opinions about the new method of teaching. These questionnaires were used by the faculty of architecture at the end of each academic year. This information will be used by the author and is summarized below.

- I found the new method of teaching very helpful, as I have been able to get more ideas

  about designing my project.
- The teacher has encouraged me a lot with many new ideas that I will be bale to apply in areas outside the project design course.
- By using the method of teaching, I have been able to develop my creativity as well as being able to apply my new skills into real practice, regardless of whether my grades are higher or not.
- I have really enjoyed studying using the new method of teaching. At first I thought that the course would be very hard work but learning has been more fun. I have also been able to get more experience at the same time; and
- Under this system I have been able to further develop my creativity than before.

The questionnaires used by the faculty of architecture reflect that many of the students that have studied with the author have found the project design course to be very interesting. As well as learning is fun and relaxed atmosphere, students have been able to be more creative and become more knowledgeable than by studying under the other teachers who use a teacher-centred approach.

7 Discussion and Recommendation

Based on the analysis of student results, we can see that in the areas of creativity and building technology, the research action groups have developed their skills more under the student- centred method of teaching. Although the average results for the final design of our action group were not the highest, they are amongst the top for the four classes.

On some areas the assessment process for the hospital project, the results were not as encouraging as expected. This may be attributed to the actual process of assessment in project design. A more systematic method of analysis for some areas such as for the process of working should be developed. If the assessment process was developed to be more consistent, the data would be more representative of the students' ability.

Being a student-centred method of teaching and learning, students are given more of an opportunity to actively participate in how the course is conducted. By allowing the students to play a more active role in the learning process, they are able to develop their creativity more so than before. This will also give the teachers a greater opportunity to interact with students more closely on a different level.

Using information from experts that is delivered in a practical form must be balanced with adequate theory. Problem-based learning is an approach to the learning process that allows students to relate theory in the context of real life situations. Delivering large amounts of theory may not always be interesting to the students. Finding the right balance between theory and practice is important in giving students greater meaning to their studies. It is important that the course structure is planned to accommodate the student's perceived need for information rather than having series of lectures delivered by a related expert when the students do not require the information.

To make the process more successful, the teachers in the class must try to understand and try to develop in the same direction of the students. By introducing cooperative learning to other students who are studying project design, a greater number of participants will also have an increased opportunity to share ideas from each other. The faculty, in implementing theses changes across the board may encounter difficulties. Issues such as further training for teachers, developing a good system of management that is related to the needs of the students and the quality of education as a whole must be critically examined.

Any staff development programs that may be adopted must have specified functions. In dealing with educational change across the board, the

teachers and students must work closely with the administration. By working together, education administrators can be made more aware of knowledge problems that can hinder the path to achieving desirable goals.

Total quality management (TQM) in education may be considered as an approach to managing some of these issues. By introducing systematic methods of quality control measures, the faculty of architecture at Sriburapha University can focus on the needs and views of their learners. This is seen as very important to the success of a student-centred approach.

8 Conclusion

To develop the method of teaching project design as a student-centred approach for the third-year students in architecture at Sriburapha University, we must offer an alternative to enlarge the student's creative thinking in their fields. The four steps of action research: plan, act, observe and reflect were used to implement measure and evaluate this alternative process.

Qualitative evaluations of the new method of teaching third-year architectural students undertaking project design were seen as being educationally positive in nature. By working together the students can learn as group and help each other by sharing their information and thoughts. This allows them to have more ideas to support their creative thinking as well as improving their interpersonal and other social skills.

The quantitative analysis of student results has been consistent with the themes of increasing a student's creativity in project design. The introduction of problem-based learning in project design has given our action group a better understanding how to apply the theoretical aspects of their studies to real practice.

Change in any institution affects the various facets of its' organization. Good leadership is considered paramount in achieving the objective of introducing a new method of teaching. The opinions of all teachers must be taken into consideration, as well as those of the students in planning for change. Goals and objectives can be met by working together as a team with all those affected by change.

If consideration is made to further extend the new method of teaching project design in other classes, other wider issues must be considered such as the structure of Sriburapha University as an educational institute and how it fits into the educational, economic and social structure of the country.

9 References

Barbara, B. Meyer., and Carol, P. Ethridge. (1997). 'Improving student interest in the Spanish 1 classroom through democratic teaching'. University of Memphis, USA.

Commissioned Report No. 24 (1994).' Workplace learning in the professional development of teachers'. National Board of Employment, Education and Training. Canberra: Australian Government Publishing Service.

Day, C. et al. (1999). 'Educational action research'. Oxford Triangle Journal Ltd.

Doherty, D. Geoffrey.' Developing Quality Systems in Education'.

Donald, C. Orlich (1989)' Staff development Enhancing Human Potential'. Needhan Heights: Mass Allyn and Bacon.

ExpEdition of discovery: Architectural education at Newcastle—L Johsnton in Ballnatyne, R. Bain, J and Packer J. (1997)

Joyce, B., and Weil, M. 91996). 'Models of teaching'. A Simon and Schuster Company, Needham Heights, Mass.

Kemmis, S. and McTaggart, R. (1990). 'The action research planner'. 3rd ed. Victoria: Brown Prior Anderson.

Koncharlard, Kunawudh. (2002)' Professional development in education'. Sripatum University, Chonburi, Thailand.

Lang, Hellmut. (1995). 'Teaching: strategies and methods for student-centred instruction'. Harcourt Brace and Company Canada, Ltd.

Muongmee, Pratoom. (2002) Course Notes from 850612-850613. Burapha University, Chonburi Thailand.

Office of the National Education Commission, National Education Act of B.E. 2542 (1999)', Thailand 1999.

Owens, Robert and Steinhoff, Carl, ' Administering change in schools.

Oxford Analytica Briefs,' Bureaucrats Threaten Long-Overdue Education Reforms'. November 1, 2000.

Schön, D. (1983). ' The reflective practitioner'. Basic Books Inc. USA.

Strauss, A. and Corbin, J. (1996) 'Basic of qualitative research'. London: Sage

10 Appendices

10.1 Appendix 1. Hospital Project Design Course Outline

Week 1

- Students must present their analysis of the site zoning diagram and schematic design; and
- Teachers will usually guide the students to clarify their ideas about zoning of the many sections of a hospital to be practical, functional and synchronized with the site.

Week 2

- Students will present plan, based on the comments of the teacher from the first step; and
- The teacher will make necessary corrections and discuss these individually with each student.

Week 3

- Students must develop their projects to more detail with plan, facades, sections and a conceptual model

Week 4

- Students will present their project to a jury comprising of the four teachers for a critical evaluation of the work completed thus far.

Week 5

- Students must bring back their revised projects, based on comments made previously by the jury for further review.

Week 6

- Students finalize their projects, again based on the further revision to prepare a good presentation

Week 7

- The students present the completed project to the jury for the final result.

10.2 Appendix 2. Hospital Project Design: Action and Observation

Our plans were put into action with the twelve students in the authors' project design class, undertaking the hospital project. The author, is referred to as the teacher in the following discussions:

Week 1

- A group meeting was scheduled to explain the methods of cooperative learning;
- Emphasis was placed on the need for the students to work together as a group and share ideas and help each other;
- The idea of sharing was encouraged not only between the teacher, but between the students themselves; and
- After each step, the students were asked to evaluate as a group.
- The teacher promoted discussion between the groups about the various aspects of a hospital idea about the site location. Questions were posed to promote discussion and information sharing. The intention of the teacher was to build a classroom climate of trust. This was done to find cooperative ways for students to acquire and analyse information relating to the course content. Some of the students' responses are summarized below:

What is a Hospital?

- A place to cure sick people;
- A hotel for patients;
- A safe place where sick people can recover from their illness; and
- A place of work for doctors and nurses.

How is the hospital used in relation to its' function?

- Out-patient department
- In-patient department;
- Emergency section;
- X-ray laboratory;
- Pharmacy;
- Operating section;
- Intensive care unit;
- CSSU/CSSD;

- Administration;
- Service centre

What are some concepts we must look at in relation to site analysis?

- Location;
- Size;
- Environment; and
- Orientation

What aspects do we have to consider in relation to approaches?

- Main entrance
- Sub-entrance; and
- Regulations.

What are the different zones of each activity?

- Public zones; and
- Private zones

What are some issues of circulation that we must consider?

- Axis;
- Roadway;
- Walkway;
- Public corridor;
- Service corridor;

What should the size of the different function areas in our comparative study be in relation to area occupied and the percentage of area occupied?

- Out-patient department _____m2
- In-patient department _____m2
- Emergency section _____m2
- X-ray laboratory _____m2
- Pharmacy _____m2
- Operating section _____m2
- Intensive care unit _____m2
- CSSU/CSSD _____m2
- Administration _____m2
- Service centre _____m2
- Etc…

The group questioned and answered by discussing between themselves, with the guidance of the teacher. The students plan to present the models of their concept by using all the information gathered in the class discussion. Some students proposed to the group that more information is needed from the library, while others propose to search the internet. The group agrees to make copies of all the information they will collect and distribute it to all members in the group.

Week 2

- Students share the ideas for conceptual design by using mass model instead of presenting individual plans; and
- They critique each others work and make suggestions about some of the problems they have encountered. Some of the questions discussed by the group were:
- How should we plan the various approaches?
- What is the expression of form?
- Where is the zoning of each of the activities?
- Why?

By using a mass model for their presentation, the students seem to enjoy developing ideas. This method gives the students more flexibility, as they can change their ideas by cutting and replacing the model. They all participate and help each other with constructive ideas to evaluate each other's work.

It seems that there are three or four similar conceptual ideas among the group. The teacher divides the students into four groups that will work together on similar ideas. Although they will be doing their individual projects, the groups that share ideas will work as a team to help and support each other.

Week 3

- A group of guest advisors composed of architects, structural ands systems engineers, economist and specialist in hospital design participate with the students to share their ideas and guide them according to the concepts developed by the students;
- The student's models are used to show their function and form inside; and
- Some issues are raised for discussion between the students who share ideas about the following questions posed by the guests.
    - What is the type of the structure that will be used?
    - How can you increase energy efficiency on you project?
    - How can the operating room operate efficiently?
    - How can you design a hospital that can be easy to maintain in terms of hygiene?
    - How can you efficiently and effectively operate public and private elevators?
    - What is the best system for controlling both incoming and outgoing materials. Oxygen for the patients and waste products such as human waste?

The students consult the advisors about their own project, as well as the other students and their teacher. Information is shared between the group and evaluations are made collectively.

It's really important for a student architect to realize that when you're just beginning to get together a conceptual design for your building, you need to talk to various experts such as the structural engineer and the services engineer.

The students can then understand how the content fits into the context and how it relates to other things. And that's the way they learn. This way of presenting information as problem based learning is much more motivating for students and they will tend to learn a great deal more using this approach.

Week 4

- The students presented their projects on front of the jury (four teachers).
- This is the first phase of the evaluation process and includes students from other project design groups;
- Students and teachers share the ideas of other groups;
- Their discussions are guided by the different teachers, giving the students a chance to have opinions of a teacher other than their own;
- The teacher makes some constructive notes that the students may use; and
- These notes will be presented to the teacher's group in the studio.

Week 5

- The teacher and students in the action group discuss and reflect the opinions of the other teachers in the jury. By following the notes and opinions of their own teams and those of the group collectively, the new information will also be used by individuals to further improve their projects. This will help tem to have a good final presentation.

Week 6

- Most of the problems that students encountered have been resolved through vigorous discussions between their individual groups and all of the group together;

- All the students in the teacher's action group are ready to present their projects to the jury for the final evaluation phase, after finalizing ideas gathered from the previous weeks discussions.

Week 7

- The teacher's students are very satisfied with their final result and believe that they have been fairly successful in achieving their planned objectives;
- After the jury evaluated the students; they were interviewed as a group to evaluate their opinions of the new approach to the teaching process in project design; and
- The opinions of the students were summarized by their teacher and will be evaluated to determine the outcomes of the new process of teaching.

10.3 Appendix 3. Summary of Student Interviews and Questionnaires

1) What do you think about cooperative learning?

- It allows students to share more ideas amongst themselves by open discussion and can evaluate the project together. This helped with coming up with new ideas and made our work enjoyable;
- by having the input of other students, our minds were open to more ideas, allowing us to think more creatively; and
- Working in groups with similar ideas was very helpful and made developing ideas easier with the increased input from not only our groups, but the ideas of the other groups who participated in the discussions.

By using a model as a tool to develop the project, it seems that student's work on three-dimensional space instead of using a two-dimensional plan or diagram. Using a two-dimensional approach can often be boring to the students as they can readily relate to three-dimensional models as in the real world. This seems to stimulate the student's thoughts and makes learning a more enjoyable process.

2) What do you think about problem based learning?

- By having information from experts in other disciplines, it allows us to have a better idea of how things are done in real life situations. For example during the conceptual stage of project development, talking to the structural engineer we have a much greater understanding about the types of structures that can be designed for our project;
- With additional information, we are able to have a greater insight into what is and what isn't possible to design for our project; and
- This then can enable us to use this information to further develop the design with our teacher.

Having a group of guest advisors from different disciplines sharing their ideas with the students, allowed students to obtain specialized advice that may not always be available from their teacher. It will also allow them to find additional information that they need for other aspects of their project such as air conditioning, interior design etc.

Understanding how the content fits into the context and how it relates to other things students will tend to learn much more than by just studying theory. Presenting information in this way is much more motivating for students.

By the time the students have completed their project design course, they'll have a very good knowledge of buildings and their construction as well as the various issues relating to property development, profitability, the environment etc. Each of these is a subject area in itself. Over a small period of time, the students have gone from knowing nothing about these subjects to knowing quite a lot. The students will have taken a great step forward intellectually, intellectually, technically and professionally. This type of learning is very practical and has all the real issues to do with being an architect.

3) What do you think about your teacher?

- The teacher was very gentle in his approach. He acted only as a guide and didn't try to dominate our opinions with his own ideas or thoughts; and
- At first we felt strange that the teacher was asking us questions and making us think more critically about what we were doing, but as time went on we became more comfortable with talking openly about our ideas.

ATTACHMENT A

ATTACHMENT A

VICTORIA UNIVERSITY

INFORMATION TO PARTICIPANTS: STUDENTS

I, Ajaphol Dusitnanond, student researcher, would like to invite you to be a part of a study into Developing a Method of Teaching Third Year Architectural Project Design at Silpakorn University. This project involves undertaking an interactive evaluation, using the qualitative techniques of Action Research, in order to determine the effectiveness of using a student-centred, cooperative approach – as opposed to the more traditional teacher-centred approach – in the teaching of a Third Year Architecture subject, 'Studio Design', at Silpakorn University, Bangkok, Thailand.

This research, based on an Interactive Form of evaluation, will employ the four steps of Action Research as determined by Kemmis (1985) – namely, to plan, act, observe and reflect – in order to make judgements and recommendations about this alternative approach to teaching Studio Design.

The four design projects to be undertaken by Third Year Studio Design students at Silpakorn University during the academic year in 2003 – designs for a kindergarten, an office building, a hospital and a commercial project – will be evaluated during the 2003-4 academic year. Four different teachers will teach each particular project. Three teachers will employ a teacher-centred approach in their classes in each project; the researcher, Ajaphol Dusitnanond, acting as a teacher-as-researcher, will employ a student-centred approach in his classes in each project.

Preliminary comparisons over the past three years, using student grades as the only measure, have suggested that there is a significant improvement in student outcomes using a student-centred approach in Studio Design. Using the qualitative perceptions of students and staff, this research will be concerned with determining the reasons why a student-centred approach – which uses cooperative and problem-based learning methods – is more effective in improving student outcomes, and what consequences this might have for future course organisation and improvement. The outcomes to be considered will consist of the following: the improvement of students' abilities in all components of Studio Design; development of a positive attitude towards design, increase in students' technical and academic competency to meet design demands; enhancing student independence, creative thinking; and the level of interaction and cooperation that is engendered between students and teachers

The specific **research questions** are as follows:

- What is this new method of teaching trying to achieve?
- How is the new method of teaching going?
- Is the delivery of the new program working?
- Is the delivery consistent with the program plan?
- How could the delivery of the new program be more effective?
- How could changes to the organisation of Third Year Architectural Design be changed to make it more effective?]

Any queries about this study may be directed to Ajaphol Dusitnanond, student researcher (ph. 02 688 1449, 02 688 1450; email: adusit@csoms.com), his principal supervisor, Dr Ian Ling (ph. +61 3 9857 9837; email: i.ling@bigpond.com) or his co-supervisor, Dr Chalong Tubsree (ph. 038 39 1043; email: chalongtubsree@hotmail.com). If I have any queries or complaints about the way I have been treated or to discuss my rights as a research subject, I can contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne, 8001 (ph. +61 3 9688 4710). Should you require counselling support, please contact Ms Rattanasiri Khemraj, Burapha University (ph. 038 39 3498).

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ATTACHMENT B

ATTACHMENT B

VICTORIA UNIVERSITY

Consent Form for Participants Involved in Research

CERTIFICATION BY PARTICIPANT: STUDENTS

I, _____ of _____

_____

certify that I am at least 18 years old and that I am voluntarily giving my consent to participate in research entitled:

Developing a Method of Teaching Architectural Project Design: A Case Study of Third Year Studio Project, Faculty of Architecture, Silpakorn University, Thailand.

being conducted at Silpakorn University by Ajaphol Dusitnanond.

I certify that the objectives of the research, together with any risks to me associated with the procedures listed hereunder to be carried out in the study, have been fully explained to me by Ajaphol Dusitnanond and that I freely consent to participation involving the use on me of these procedures.

Procedures

The research will consist of two Action Research Phases involving the lecturer, Ajaphol Dusitnanond, as teacher-researcher and the students in the Studio Design class. The phases will include the following:

Action Phase 1

The following steps will be followed in the first action phase of the research:

1. based on the feedback from these semi-structured interviews and discussions with the teachers, changes to the Studio Design curriculum will be made;
2. the information collected from the current method of teaching will also be used in the planning phase;
3. group discussions with the action group and other students in the project design class about the new methods that will be adopted, and
4. deep individual interviews and group discussions with the action group will be undertaken;

The revised mode of learner-centred delivery of Studio Design will be put into action and observations of the new action group will be made. These observations will be recorded in a journal and supplemented by photographs, and video- and audio-tapes. During this phase, observations of students in the other classes will be made and recorded in a similar manner.

Action Phase 2

The following steps will be followed in the second phase of the research:

1. discussions will be held with the other teachers for feedback about the new set of actions;
2. discussions with the action group for feedback about the new actions;
3. questionnaires will be given to all the students in the action group relating to the new method of teaching;
4. photographic and video records of students' work-in-progress and final products will be kept in order to provide a portfolio of each student's work in the author's class. Each portfolio will be annotated, described and its overall measure of creativity evaluated as high, medium or low. Photographic exemplars of work representative of these three categories will be included in the thesis. A CD-ROM of the suite of portfolios will be provided as an attachment to the thesis; and
5. the qualitative data will be interpreted and analysed for further development of the Studio Design curriculum.

Risks and Safeguards

1. Participation is voluntary, that is, it is in no way connected to the requirements of your academic course, and that data analysis will not be undertaken until the end of the semester when the grades for the subject have been submitted. If, at any stage, you feel that you do not want to participate, you can withdraw from the study without any penalty.

2. All of the people to be surveyed and interviewed are adults; nevertheless, there are risks that need to be considered and minimised. The most significant of these is that concerned with the inherent Buddhist attitude of not being willing to criticise elders and social superiors. At all stages in the research, Buddhist sensitivities and conventions will be observed. As a standard risk management technique, confidentiality will be maintained at all times and strict procedures will be developed to ensure this. These include:

    a. Completion of the questionnaire does not require you to provide your name or any other form of identification. While the questions deal with potentially sensitive information, your responses are completely anonymous. This questionnaire will take about 15-20 minutes of the class to complete. Once you have completed the questionnaire, remain in your seat until everyone else has completed the questionnaire. Completion and return of the questionnaire means that you have given consent. If, at any time, you feel uncomfortable with the questions being asked, and you do not wish to continue, simply wait in your seat until all the questionnaires are collected at the end.

    b. All information gathered from interviews and recordings will be de-identified.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed: ..... }

Witness other than the student researcher: } **Date:** .....

..... }

Any queries about this study may be directed to Ajaphol Dusitnarend, student researcher (ph. 02 688 1449, 02 688 1450; email: adusit@ozemail.com), his principal supervisor, Dr Ian Ling (ph. +61 3 9857 9837; email: i.ling@bigpond.com) or his co-supervisor, Dr Chalong Tubtree (ph. 038 39 1043; email: chalongtubtree@hotmail.com). If I have any queries or complaints about the way I have been treated or to discuss my rights as a research subject, I can contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne, 8001 (ph. +61 3 9688 4710). Should you require counselling support, please contact Ms Ramanasiri Khemraj, Burapha University (ph. 038 39 3498).

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ATTACHMENT C

VICTORIA UNIVERSITY

Research Project Involving Human Subjects

Revocation of Consent Form for Subjects Involved in Research

To be used by participants who wish to withdraw from the project

I, ...

research participant, of (address), ...

.....

hereby wish to WITHDRAW my consent to participate in the research proposal described in the Plain Language Statement for the research program called:

Developing a Method of Teaching Architectural Project Design: A Case Study of Third Year Studio Project, Faculty of Architecture, Silpakorn University, Thailand.

and understand that such withdrawal WILL NOT jeopardise any treatment or my relationship with Silpakorn University.

Any data already collected may/may not be included in the research project.

ATTACHMENT D

VICTORIA UNIVERSITY

INFORMATION TO PARTICIPANTS: TEACHERS

I, Ajaphol Dusitnanond, student researcher, would like to invite you to be a part of a study into Developing a Method of Teaching Third Year Architectural Project Design at Silpakorn University. This project involves undertaking an interactive evaluation, using the qualitative techniques of Action Research, in order to determine the effectiveness of using a student-centred, cooperative approach – as opposed to the more traditional teacher-centred approach – in the teaching of a Third Year Architecture subject, 'Studio Design', at Silpakorn University, Bangkok, Thailand.

This research, based on an Interactive Form of evaluation, will employ the four steps of Action Research as determined by Kemmis (1985) – namely, to plan, act, observe and reflect – in order to make judgements and recommendations about this alternative approach to teaching Studio Design.

The four design projects to be undertaken by Third Year Studio Design students at Silpakorn University during the academic year in 2003 – designs for a kindergarten, an office building, a hospital and a commercial project – will be evaluated during the 2003-4 academic year. Four different teachers will teach each particular project. Three teachers will employ a teacher-centred approach in their classes in each project; the researcher, Ajaphol Dusitnanond, acting as a teacher-as-researcher, will employ a student-centred approach in his classes in each project.

Preliminary comparisons over the past three years, using student grades as the only measure, have suggested that there is a significant improvement in student outcomes using a student-centred approach in Studio Design. Using the qualitative perceptions of students and staff, this research will be concerned with determining the reasons why a student-centred approach – which uses cooperative and problem-based learning methods – is more effective in improving student outcomes, and what consequences this might have for future course organisation and improvement. The outcomes to be considered will consist of the following: the improvement of students' abilities in all components of Studio Design; development of a positive attitude towards design, increase in students' technical and academic competency to meet design demands; enhancing student independence, creative thinking, and the level of interaction and cooperation that is engendered between students and teachers.

ATTACHMENT E

ATTACHMENT E

VICTORIA UNIVERSITY

Consent Form for Participants Involved in Research

CERTIFICATION BY PARTICIPANT: TEACHER

I, _____ of _____

_____

certify that I am at least 18 years old and that I am voluntarily giving my consent to participate in research entitled:

Developing a Method of Teaching Architectural Project Design: A Case Study of Third Year Studio Project, Faculty of Architecture, Silpakorn University, Thailand.

being conducted at Silpakorn University by Ajaphol Dusitnanond.

I certify that the objectives of the research, together with any risks to me associated with the procedures listed hereunder to be carried out in the study, have been fully explained to me by Ajaphol Dusitnanond and that I freely consent to participation involving the use on me of these procedures.

Procedures

The research will consist of two Action Research Phases involving the lecturer, Ajaphol Dusitnanond, as teacher-researcher and the other teachers of the Studio Design course. The phases are outlined below. Teachers will be involved only in Action Phase 2, point 1.

Information relating to your opinions about the Studio Design course will be gathered by group discussions. An analysis of the transcripts of these discussions will be used to gain a greater understanding about the new method of teaching.

Action Phase 1

The following steps will be followed in the first action phase of the research:

1. based on the feedback from these semi-structured interviews and discussions with the teachers, changes to the Studio Design curriculum will be made,
2. the information collected from the current method of teaching will also be used in the planning phase;
3. group discussions with the action group and other students in the project design class about the new methods that will be adopted, and
4. deep individual interviews and group discussions with the action group will be undertaken.

The revised mode of learner-centred delivery of Studio Design will be put into action and observations of the new action group will be made. These observations will be recorded in a

journal and supplemented by photographs, and video- and audio-tapes. During this phase, observations of students in the other classes will be made and recorded in a similar manner.

Action Phase 2

The following steps will be followed in the second phase of the research:

1. discussions will be held with the other teachers for feedback about the new set of actions;
2. discussions with the action group for feedback about the new actions;
3. questionnaires will be given to all the students in the action group relating to the new method of teaching;
4. photographic and video records of students' work-in-progress and final products will be kept in order to provide a portfolio of each student's work in the author's class. Each portfolio will be annotated, described and its overall measure of creativity evaluated as high, medium or low. Photographic exemplars of work representative of these three categories will be included in the thesis. A CD-ROM of the suite of portfolios will be provided as an attachment to the thesis; and
5. the qualitative data will be interpreted and analysed for further development of the Studio Design curriculum.

Risks and Safeguards

1. Participation is voluntary, that is, it is in no way connected to the requirements of your employment. If, at any stage, you feel that you do not want to participate, you can withdraw from the study without any penalty.

2. All of the people to be interviewed are adults; nevertheless, there are risks that need to be considered and minimised. The most significant of these is that concerned with the inherent Buddhist attitude of not being willing to criticise elders and social superiors. At all stages in the research, Buddhist sensitivities and conventions will be observed. As a standard risk management technique, confidentiality will be maintained at all times and strict procedures will be developed to ensure this, including the de-identification of all information gathered from the interviews

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way. I have been informed that the information I provide will be kept confidential.

Signed: .....)

Witness other than the student researcher:) Date: .....

.....)

Any queries about this study may be directed to Ajaphol Dusitnanond, student researcher (ph. 02 688 1449, 02 688 1450; email: adusit@cscoms.com), his principal supervisor, Dr Ian Ling (ph. +61 3 9857 9837; email: i.ling@bigpond.com) or his co-supervisor, Dr Chalong Tubsree (ph. 038 39 1043; email: chalongtubsree@hotmail.com). If I have any queries or complaints about the way I have been treated or to discuss my rights as a research subject, I can contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne, 8001 (ph. +61 3 9688 4710). Should you require counselling support, please contact Ms Rattanasiri Kheraraj, Burapha University (ph. 038 393498).

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Studio Design Course Questionnaire : Students

1. Listed below is a series of terms which describes aspects of teaching and learning in your Studio Design Course. On the left-hand side indicate the emphasis that was given during this course. On the right-hand side indicate the impact that this had on your learning in the course.

PLEASE RESPOND TO EVERY QUESTION.

Emphasis in my Studio Design Course (tick one)		Impact this had on my learning (tick one)
Little/None ☐	i) A co-operative approach to learning	☐ Little/None
Small ☐		☐ Small
Moderate ☐		☐ Moderate
High ☐		☐ High

3. Please indicate the overall level of satisfaction that you felt after having concluded the Studio Design Course.

จงโปรดแสดงระดับความพึงพอใจโดยรวมที่ท่านมีต่อการเรียนวิชาออกแบบสตูดิโอสถาปัตยกรรม 261 605 ที่ท่านได้ศึกษามา

☐	Very satisfied พอใจมาก	☐	Moderately satisfied พอใจปานกลาง	☐	Slightly satisfied พอใจเล็กน้อย	☐	Not at all satisfied ไม่พอใจ

Write a note to explain your response if you wish:

จงโปรดแสดงความคิดเห็นเพิ่มเติมตามความประสงค์ของท่าน