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Research-based Teaching at Universities: A Case Study of KMUTT

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ABSTRACT

Traditionally, university teaching is predominantly lecture-based. An alternative approach to teaching is research-based teaching in which teachers change their roles to mentors and students change their roles to researchers. This study compares students' evaluations of the two approaches. The hypothesis of the study is that students taught with a research-based approach were likely to evaluate the teaching higher than those students taught with a lecture-based one. The subject population were students enrolled at King Mongkut's University of Technology Thonburi, which primarily focuses on science and technology. The subject samples were undergraduate students enrolled in two social studies courses, taught for three consecutive semesters. The first group (N= 1419) followed a traditional lecture-based approach and the second group (N=156) followed a research-based one. The results of the study showed that student evaluation towards the research-based approach in semester 1 and 2 of 2007 were statistically significantly higher than their counterparts. In the semester 2 of 2006, the students' evaluation towards the research-based approach was still higher than those of their counterparts, but not significantly. Then, the hypothesis of the study was accepted.

BACKGROUND OF THE STUDY

Thailand is one of many developing countries where the social structures have changed to a high degree. A society needs its population to develop their abilities. For example the population needs to comprehensively think, skilfully act, wisely analyse, properly synthesize, and prudently evaluate information. The country also needs her population to have the characteristics of enthusiasm, diligence, and voluntarism. Ultimately, the society should be concerned about the social situation at both community and world level (Chareongwongsak 1997). These changes by the Thai population will improve society. The National Education Act supports these national needs by rendering guidelines for Thai educational reform. The Act emphasizes learner-centred learning, lifelong learning, and social engagement. Section 24 of the National Education Act states that education administration has to:

'(1) provide substance and arrange activities in line with the learners' interests and aptitudes, bearing in mind individual differences;'

'(3) organize activities for learners to draw from authentic experience; drill in practical work for complete mastery; enable learners to think critically and acquire the reading habit and continuous thirst for knowledge;'

'(6) enable individuals to learn at all times and in all places. Co-operation with parents, guardians, and all parties concerned in the community shall be sought to develop jointly the learners in accord with their potentiality.'

Section 24 also suggests that learners and teachers might learn together through this course of action from any knowledge resource. It suggests instructors should try to create a learning atmosphere, provide instructional media and facilities for learners to learn and to become well-rounded people. Both students and teachers should benefit from research as part of the learning process.

However, education innovation within contemporary Thai society has not supported the Act yet. For example, Thai educational administration still supports lifelong learning through teacher-centered knowledge. Teachers always focus on studying and transferring western knowledge to their students (Sinlarat 2008). This kind of teaching is a one way communication. In this way the students learn only what the teachers want them to know, whereas they should learn how to research and to create their own personal and new interesting issues. Teaching methods of requiring knowledge better supports the principle of lifelong learning as it provides paths for them to study after school. As Brophy et al. (1998) said in their article 'lifelong learning is a deliberate progression throughout the life of an individual, where the initial acquisition of knowledge and skills is reviewed and upgraded continuously, to meet challenges set by an ever changing society.'

The direction of Thai educational reform is to teach students to be able to think, analyse, and criticize; as 'Smart Consumers'. Selecting new teaching approaches that support these characteristics must be as forward-thinking as those of other countries. The students have to create their own knowledge ('Producing Culture') instead of a 'Receiving Culture' (Silarat 2007). The appropriate teaching approach should begin with the goal of searching for new knowledge which is initiated by the teacher. Then the teacher leads the students to create a project through which they initiate a process of developing knowledge. Finally the teacher lets the students work and study together. The outcomes of this process are the students develop abilities to apply and create their knowledge (Silarat 2007).

Additionally, educational management should aim to create learners' social consciousness. For example, learning only a university's rules does not mould students' roles and morality toward society. Teaching that provides students' opportunities to develop cooperation with others, to sacrifice their own benefit for that of their colleagues, and to show responsibility in their tasks will create their social consciousness and morality better than teaching only the university's rules that are not relevant to social facts (Dewey 1909). Silarat (2007) said that the aim of general education should be based on good, practical principles. By encouraging students to learn through practice lets them have direct experiences and learn from the real world.

Another ideology, learner-centered, espoused by the Act, should be discussed in this paper. The goal of teaching and learning within the learner-centered approach is to develop learners to their optimal level. Then the teachers' roles must be decreased and learners' roles must be increased (Prapaisit 2003). Deller (1990) said that learner-centered activities were a means of countering the difficulties caused by large class size and low-tech materials. It also overcame the dissatisfaction generated by course-books that 'did not meet the real needs and interests of learners' (Tudor 1996). Collins (2004) supports the idea that self-initiated learning is the most lasting and pervasive. Learning should be 'applicable to the learners work or to other responsibilities valued by the learner.' Then, the instructor should understand the learner's needs and design appropriate learning activities in which the learner can be actively involved.

In adopting a learner-based approach, teachers have to be concerned about and be able to analyse: the potential of learners, learners' constant needs, learners' desire for topicality-new issues, learners' previous learning experience, learners' being involved in preparing and using the practice materials, the steps of learners' studying, the element of learners' surprise, learners' peer teaching and correction, and group solidarity (Tudor 1996). A study of Bosch et al (2008) studied "learning-centered" themes. The result of the study found that, to be successful in arranging teaching, the teaching must be composed of student collaboration, effective communication between teachers and students, critical thinking skills, reciprocal respect between teachers and students, passion for learning, high expectations, a variety of teaching and assessment strategies, and student engagement in and responsibility for learning. Learning opportunities outside the classroom in both intellectual and social situations are also necessary.

It is also important to consider the traditional approach, lecture-based teaching. Lectures are more likely to be popular and to be used by most teachers more than other teaching approaches as it costs

less and they are easier to be prepared. The usefulness of the lecture is that when lecturers have a lot of experience they can share profound knowledge and also spark their students' inspiration. Gardner (2004) reported in her study that the lecture was one of the highest ranked teaching approaches that best prepared the new graduate. However, the lecture was not beneficial for all age levels of learners. When it was used with older learners, it would be efficient only under certain conditions, such as: the content of the lecture was relevant to the learners' interests; the content built on their current knowledge; and the lecture was presented in a logical sequence (Knowles 1990; Tough 1979, cited from Callahan 2003). Moreover, learners were likely to lose interest when the lecture lasted more than 30 minutes or when the learners lacked relevant experience to the lecture. (Pascual et al 1998, cited from Callahan 2003).

Research by Boonhong (2002) studied the comparison between the students' satisfaction towards PBL and that towards lecture-based techniques. The report said that there were no significant differences between that towards the lecture-based technique and that towards PBL. However, the scores of satisfaction toward the latter were higher than the former.

In order to find the answer to what approach is more efficient for university students, I studied a comparison between the teaching evaluation to the lecture-based approach and that to the research-based approach. The lecture-based approach was based on the traditional teaching technique that used only the lecture as a source of knowledge for students. The lecture was one way communication. The other was the research-based approach that is based on the principles of learner-centered, lifelong learning, and social engagement which also the principles of PBL.

The aim of this article is to introduce research-based teaching in which the teachers' roles change from lecturers to research advisors and the students' roles change from receivers to researchers. Then I compared students' evaluations toward the lecture-based and the research-based approaches.

OBJECTIVE

The objective of this study is to compare the students' evaluations toward the lecture-based and the research-based approaches of studying in class. The result of the study can be helpful in arranging classes that are more efficient and that also increase students' skills, knowledge, and social morality as desired by the Thai National Education Act.

HYPOTHESIS

I hypothesized that students who were taught with a research-based approach were likely to more highly evaluate the teaching than those students who were taught with the lecture-based approach.

METHODOLOGY

Participants of the Study

The groups taught with the lecture-based technique were students who enrolled in SSC 260 - Introduction to Social Sciences, for the educational semesters starting 2/49, 1/50, and 2/50 at KMUTT. The number of students who gave their evaluation about the teaching was 1419 students enrolled in this subject with 508, 468, and 143 students in the three terms respectively. The evaluation about the teaching was confidential in order that the students would feel free to evaluate their teachers' teaching. Additionally the sexes, ages, and the year of study of the evaluators were not reported. However, the average year-levels of the students were of the first, second, and third year students according to the study plans of the students' departments.

The groups taught with the research-based technique were students who enrolled in SSC 261 - Humans and Society for the educational semesters starting 2/49, 1/50, and 2/50 at KMUTT. The

number of students who evaluated the teaching was 156 students enrolled in this subject with 38, 70, and 48 in the three terms respectively. The evaluation was also confidential. The average year-levels of the students were of the fourth year students according to the study plans of the students' departments.

Teaching Techniques in the Classroom

The lecture-based approach was used in SSC 260 - Introduction to Social Sciences for this compulsory course. This course was arranged in large classes of 200-300 students each: due to the large number of enrolling students. The course description of this subject is as follows:

Study of social phenomena, focusing on three areas of social science, i.e. cultural, political, and economic areas. This study emphasizes social problems in contemporary Thai society.

The subject course was designed to last 14 weeks. The detailed description of the course would change according to the current social situation. For example, if at that present time society was concerned with religious conflict, lectures on religion would be applied to the course. The students' final grade would be composed of class attendance (10 %), activities in class, such as report papers and homework (10 %), midterm exam (40 %), and final exam (40 %). Each class lasted for 3 hours. Absenteeism for more than 3 times would make the students fail the course. The teachers were the centre of knowledge by the process of giving lectures as shown in table 1.

Table 1 Step of learning by week of lecture-based approach

Week	Lecture topics
1	Overview lecture on the relationship between humans and society
2	Religions and societies
3	Religions in Thai society
4	Risk society
5	Social theory
6	Concept of society and culture
7	Economic forces in daily life/ part I
8	Economic forces in daily life/ part II
9	Force of capitalization, and sufficiency economy
10	Political analysis approach
11	Basic government regimes
12	Laws and societies
13	Basic concepts of demography
14	Demographic transition and society

The research-based technique was used in SSC 261 - Humans and Society, which was an elective course. The course was arranged in a medium class of 70-80 students per each class. The course was also designed to last 14 weeks. Each week the students studied the subject's content through E-learning by themselves. Additionally, they were assigned a project research according to their interests. They and the teacher had to meet to discuss their study topic every week. By the end of the course, they had to finish their research and present their study to the class. The working steps were designed as in the table below:

Table 2: Steps of learning by week of research-based approach

Week	Activities.
1	Course introduction.
2	Finding topic.

3	Discussion and suggestions on the topic.
4	Present proposal.
5-8	Discussion and suggestions on the students' works.
9-10	Data collecting.
11-12	Analyzing data and making conclusions.
13	Prepare presentation.
14	Present the result of the study in class.

Source of Data

Data used in this study came from the evaluation of courses regularly assessed by students at the end of each semester. The standard teaching evaluation form of KMUTT comprises 18 questions in three sections: 11 for teaching style, 3 for grading and evaluating, and 4 for other related issues. There are five choices for each question: most, very much, moderate, little and least. Details of this form can be found in the appendix. The university's acceptable response rate is 60%.

Study Variable

From these 18 questions, 11 were selected to construct a variable analysis that measured the evaluation of the students towards their courses. The five-multiple choice answers were scored as followed: 5 for most, 4 for very much, 3 for moderate, 2 for little and 1 for least; therefore, the aggregate totals of all 11 answers range from 11 to 55. These scores were further grouped into three segments, representing three distinct levels of satisfaction: 11-39 for the low level, 40-44 for the moderate level and 45-55 for the high level.

Statistical Analysis

Bivariate associations of each teaching approach and evaluation towards the courses were examined using the χ^2 test and test of statistically significance at 0.05. The average scores of evaluation towards the courses are also presented. Only forms with all 11 answers completed were included in the analysis; a total of 1,575 forms were used that consisted of 1,419 for the lecture-based group and 156 for the research-based group.

FINDINGS

Table 3 displays the percentage distribution of students according to their assessment towards teaching-related items and approaches. Overall, a higher proportion of students provided positive answers to all items, ranging from 'moderate' to 'most'. For the 'most' category, a higher proportion was found in the research-based group than for the lecture-based group, especially for items 4, 5, 10, 11. The bivariate associations of teaching approach and the level of evaluation scores towards the different courses can be seen in table 4. It was found that for all three semesters added together, students who were taught with the research based approach had higher proportions reporting high levels of evaluation than their counterparts on the lecture based approach, with a 0.05 statistically significant level. Moreover, semester-specific relationships were also found as there was more frequent reporting of high levels of evaluation among students who were taught with the research-based approach than their counterparts for each semester. These differences between lecture-based and research-based groups were statistically significant at the 0.05 point, except in semester 2 of 2006 (2/49).

Table 3: Level of assessment of student towards teaching related items by approaches of teaching (in %s)

Items	Least		Little		Moderate		Very much		Most		Total	
	L	R	L	R	L	R	L	R	L	R	L	R
1.	0.4	0.6	3.6	1.3	32.3	18.6	49.5	55.8	14.2	23.7	100.0	100.0
2.	0.4	0.6	4.0	0.6	33.4	19.2	47.2	48.7	14.9	30.8	100.0	100.0
3.	0.6	1.3	4.0	1.9	34.6	16.7	44.5	53.8	16.2	26.3	100.0	100.0
4.	0.6	0.6	3.6	0.6	32.0	11.5	47.8	42.3	16.0	44.9	100.0	100.0
5.	0.5	0.6	4.4	-	30.4	13.5	48.2	46.2	16.5	39.7	100.0	100.0
6.	0.5	0.6	5.3	0.6	34.5	11.5	44.3	50.6	15.4	36.5	100.0	100.0
7.	0.8	0.6	4.6	3.2	33.1	17.9	46.3	51.2	15.2	26.3	100.0	100.0
8.	0.6	0.6	3.2	0.6	32.6	10.9	47.6	50.6	15.9	37.2	100.0	100.0
9.	0.6	0.6	24	1.9	27.3	12.8	51.7	52.6	18.0	32.1	100.0	100.0
10	0.6	0.6	32	19	29.1	10.3	47.6	46.8	19.5	40.0	100.0	100.0
11.	0.5	0.6	2.3	0.6	25.2	10.3	49.3	48.7	22.8	39.7	100.0	100.0

Notes:
1 = Has a teaching approach that enables students to understand the lesson.
2 = Has a teaching approach that enables students to integrate knowledge.
3 = Explains a relationship of this subject to others.
4 = Has a teaching approach that enables students to think, analyse, and make conclusions by themselves.
5 = Gives students opportunities to ask in class.
6 = Has times for students to ask for advice outside the classroom.
7 = Applies innovation and new knowledge in their teaching.
8 = Students can apply the knowledge from this subject to real life.
9 = Proposes appropriate content for the students.
10 = Integrates morality and professional ethics in the teaching.
11 = Language and personality are appropriate.
L = Lecture-based approach, 1419 cases
R = Research-based approach, 156 cases

Table 4: Percentage of students classified by level of evaluation scores towards teaching, teaching approaches, and semesters

	Level of evaluation						χ^2	p	n
	Low		Moderate		High				
	L	R	L	R	L	R			
Semester 2/49	45.9	28.9	31.3	39.5	22.8	31.6	4.292	0.117	841
	$\bar{x}_L = 40.1$				$\bar{x}_R = 41.9$				
Semester 1/50	30.1	8.6	33.8	21.4	36.1	70.0	30.494	0.000	53
	$\bar{x}_L = 42.8$				$\bar{x}_R = 47.7$				
Semester 2/50	18.9	8.3	45.5	35.4	35.7	56.3	7.036	0.030	191
	$\bar{x}_L = 44.0$				$\bar{x}_R = 45.9$				
All semesters	38.0	13.5	33.5	30.1	28.5	56.4	59.4	0.000	157
	$\bar{x}_L = 41.4$				$\bar{x}_R = 45.7$				

Notes:

$\bar{x}_L$ = Average score of evaluation towards lecture-based approach

$\bar{x}_R$ = Average score of evaluation towards research-based approach

DISCUSSION

My hypothesis that the students who were taught with a research-based approach were likely to more highly evaluate the teaching than students who were taught with a lecture-based approach, is proven. Even though the difference found in the semester 2 of 2006 was not statistically significant at 0.05, the students' evaluation towards the research-based approach was still higher than their counterparts. It could be explained by the fact that it was the first semester that I tried this research-based approach in the classroom. Its working steps had not been well prepared yet. For example, the consistency of the meeting between teacher and students were not set; the students were too free to study by themselves; there was less teacher advice than needed; and there were still classroom lectures every week.

The result of semester 2 of 2006 was in accordance with that of Boonhong (2002), who did not report a significant difference in students' satisfaction between lecture-based teaching and that of the PBL teaching. However, both studies of Boonhong and that of my own reported that the teaching based on student-centered, lifelong learning, such as PBL or the research-based approach was evaluated higher than the lecture-based approach was.

Items 2, 4, and 7 illuminate the application of the lifelong learning process and the learner-centered principles in this research-based approach. Instead of teaching the students the teacher's knowledge, the teacher teaches them tools to study their own interesting issues to pave the way for their own study in the future. Integrating knowledge, thinking and analyzing; and applying innovation in this alternative approach developed the students' potentialities to learn by themselves throughout their lives. As already cited, Brophy et al. (1998) said that lifelong learning must happen throughout the life of a person, where one's knowledge and skills were reviewed and improved incessantly as society never stops changing.

Items 3, 8, and 10 illuminate the application of the social engagement principle in this research-based approach. The approach encouraged the students to learn social facts related to other subjects and issues. Learning the university's rules, such as wearing appropriate clothes or attending class were not enough to create students' social consciousness in behaviour and morality towards society. Group work in the research-based approach gave the students opportunities to express their desires for cooperation, self-sacrifice, and responsibility. Moreover, the approach encouraged the students to learn through field study, which was direct experience in the real world. Therefore, they would be able to engage society as they had developed their relationship to it. This result supports the study of Bosch et al (2008) who reported that successful teaching composed of various elements such as - collaboration among teachers and students, communication, critical thinking skills, reciprocal respect and students' responsibility for learning, including studying outside classroom.

Items 1, 5, 6, and 9 illuminate the application of the learner-centered principle in the research-based approach. Understanding the lessons, having opportunities to ask for advice, getting appropriate content were all shown in the students' assessment toward this approach. Accordingly, Prapaisit (2003) said that the goal of teaching and learning within the learner-centered approach was to develop learners to their optimal level. The contact between the teacher and the students generated the teaching, which met the real needs and interests of learners (Tudor 1996). Assigning the students to study their own social issues of interest supports Collins (2004) on saying that self-initiated learning was the most lasting and pervasive and should be valued by the learners. It should be mentioned that when teachers give their students each more time, they would more understand the students' needs. Then the teacher can design appropriating learning activities for their students.

Item 11 illuminates the students' opinions toward the teacher. Group study made both the teachers and the students share their experiences, whilst the lecture-based approach was inclined to stop this point (Callahan 2003). They had more time to get in touch and felt free to contact the teacher. Two-way communication happened in the process of this research-based approach. Consequently, the attitude

towards the teacher was increased, which made it easier for the teacher to teach the students better morality.

Items 4, 5, 10, and 11 each have higher scores. They also illuminate that the students were more likely to accept the research-based approach, which also positively affected the relation between the teacher and the students. Overall, the students thought that the research-based approach enabled them to produce knowledge; to think, to analyse, and to comprehend by themselves. The outcome of this approach in the long run is that the students would become 'Smart Consumers' (Sinlarat 2008) or 'Smart Citizens'.

The result of this study proved that teaching based solely on a teacher's experience that emphasized only the teacher's knowledge was no longer appropriate for contemporary Thai society. One based on innovative techniques which encourage students to explore and experience real social circumstances has more value.

SUMMARY AND SUGGESTIONS

The hypothesis of the study is proven- that students who were taught with a research-based approach were more likely to highly evaluate the teaching than were students who were taught with a lecture-based approach. A mention should be made here that this study utilized the available data of students' class evaluations with a belief that students who are satisfied with their class can learn their subject better compared to ones who are not. The results however may indicate the need to use new approaches in teaching since they are more highly evaluated than the traditional approaches are. More standardized evaluation research of teaching methods is also very necessary.

My suggestions for using innovative approaches in class are that teachers have to concern themselves about the availability of information and knowledge outside the classroom - web sites, libraries, and the mass media. They should understand that learning must not be limited only to the classroom. Learning is possible outside the classroom if appropriate planning is provided. However teachers have to contribute more time to their students in giving advice and meeting constantly with them. Students are not supposed to study alone without guidance. Moreover teachers must not only give advice but also learn alongside their students.

A flexible class arrangement should be applied to this alternative approach. However, both the teachers and the students have to be concerned about being sufficiently disciplined and motivated. Lacking a plan will result in a failure to learn.

Provision of E-learning or textbooks for self-study are necessary, as Nakavachara (2001) reported in his study that new technology significantly improved both teaching and learning. Self-study through on-line lessons with suggestions from the teachers with this research-based approach supports discussion between teacher and students. Emphasis on both documentary and field research prevents the classroom becoming boring. Moreover, weekly progress reports focuses their attention and makes them have more chance to present their own personalities to other students.

However, the university has to support new alternative approaches through both policy and budget. In addition, the small amount of students per class of the research-based approach must be of concern to the university, since it is impossible to do so with a large class of 200 students and more. The cost of a small class arrangement is worthwhile compared to the benefits of developing students' potentialities as promoted by the National Education Act. However, its cost is lower than the cost of building and providing maintenance and audio-visual apparatus for a large class. In the long-term, this approach would be worthwhile both in saving and developing the human resources of Thai society. Nevertheless, if a large class could not be avoided, active-learning (Hall et al 2002) with various techniques such as: muddiest-point-in-the-lecture cards, electronic response systems, concept tests,

peer coaching, course web pages, and web-based course evaluation must be adopted for lecture-based teaching, including some tips for giving efficient lectures to teachers. (Redish 2002)

REFERENCES

Boonhong, J. (2002) Comparison of the Effectiveness of Lecture and Problem Based Learning Program. Chula Med Journal, 46(9), pp. 763-768.

Bosch, William C.1, Hester, Jessica L.2, MacEntee, Virginia M.3, MacKenzie, James A.4, Morey, T. Mark5, Nichols, James T.6, Pacitti, Patricia A.7, Shaffer, Barbara A.8, Tomascak, Paul B.9, Weber, Suzanne P.10, and Young, Rosalie R.11. (2008) Beyond Lip-service: An Operational Definition of "Learning-centered College". Innov High Educ 33, pp. 83–88.

Brophy, Peter, Craven, Jenny and Fisher, Shelagh. (1998). The Development of UK Academic Library Services in the Context of Lifelong Learning, Department of Information & Communications, Centre for Research in Library & Information Management (CERLIM), http://www.ukoln.ac.uk/services/elib/papers/tavistock/ukals/ukals.html#Heading1.

Callahan, Judith Scully, Kiker, D. Scott, and Cross, Tom. (2003) Does Method Matter? A Meta-Analysis of the Effects of Training Method on Older Learner Training Performance. Journal of Management 2003; 29; pp. 663, http://jom.sagepub.com/cgi/content/abstract/29/5/663.

Chareongwongsak, Kriengsak. (1997). A Report of Desired Characteristics for Thai Youth According to Their Age Ranges, Office of the Education Council, Ministry of Education, Thailand.

Collins, Jannette MD Med. (2004). Education Techniques for Lifelong Learning, Principles of Adult Learning, Radio Graphics, http://radiographics.rsnajnls.org.

Dewey, John. (1909). The Project Gutenberg EBook of Moral Principles in Education, http://www.pgdp.net.

Hall, Steven R.1, Waitz, Ian2, Brodeur, Doris R.3, Soderholm, Diane H.4, and Nasr, Reem5. (2002) Adoption of Active Learning in a Lecture-based Engineering Class, 32nd ASEE/IEEE Frontiers in Education Conference, November 6, Boston, MA.

Gardner, Sandra M. (2004) Graduate Nurses' Conceptualization of Critical Thinking and Perceptions of Classroom Strategies that Foster Critical Thinking, Thesis (Ed. D.) University of Missouri, Saint Louis CHE PDF Dissertation Full Text, http://ebook.thailis.or.th.

Nakavachara, Chaturapadh. (2001) Facilitating Learning in Engineering Education: A Problem-Based Approach, Thesis (Ph.D.) Vanderbilt University, CHE PDF Dissertation Full Text, http://ebook.thailis.or.th.

Office of the National Education Commission. (1999). The National Education Act B.E. 2542 (1999), Office of the Prime Minister, Kingdom of Thailand, http://www.onec.go.th/publication/law2545/nation_edbook.pdf.

Prapaisit, Lakhana. (2003). Changes in Teaching English after the Educational Reform in Thailand, Thesis (Ph.D.) Michigan State University, CHE PDF Dissertation Full Text, http://ebook.thailis.or.th.

Redish, Edward F. (2002) Teaching Physics with the Physics Suite, Department of Physics, University of Maryland, http://www2.physics.umd.edu/~redish/Book.

Sinlarat, Paithoon. (2008). New Leadership and New Globalization in Thai Higher Education: A Path to Future. Conference Report on "How to develop Thai Gen Ed in the Changing World?", Sripatum University.

APPENDIX

The full questions from the university's evaluation form on instructors' teachings:

Part 1: Teaching Style

1. Presents clearly objectives and plan of study.
2. Provides documents and material.
3. Explains clearly the concept of study.
4. Has a teaching approach that enables students to understand the lesson.
5. Has a teaching approach that enables students to integrate knowledge.
6. Explains the relationship of this subject to others.
7. Has a teaching approach that enables students to think, analyse, and make conclusions by themselves.
8. The teaching covers all the contents planned in the outline.
9. Gives students opportunities to ask in class.
10. Has time for students to ask for advice outside the classroom.
11. Applies innovation and new knowledge in the teaching.

Part 2: Grading and evaluating

12. Explains clearly the assessment criteria.
13. Gives advice, reviews and reveals the question of the assignments.
14. Students can apply knowledge from this subject to real life.

Part 3: Other issues

15. Proposes appropriate content for the students.
16. Integrates morality and professional ethics in their teaching.
17. Is punctual.
18. Language and personality are appropriate.