PROCEEDINGS

Teaching and Learning in Higher Education for Developing Countries

MARANATHA
TEACHING & LEARNING
INTERNATIONAL
CONFERENCE
2007

Teaching and Learning Center
Maranatha Christian University

TEACHING & LEARNING
CENTER

Organized by

Teaching and Learning Center, Maranatha Christian University
Jl. Prof. drg. Suria Sumantri No. 65 Bandung 40164, Indonesia
Email: tlc@maranatha.edu
Website: http://www.maranatha.edu/tlc/ic2007
Tel. +62-22-2012186 ext. 980
Fax. +62-22-2015154

ISBN 978-979-17132-0-7
9 789791 713207

Proceeding of Maranatha Teaching and Learning International Conference was published in November 2007 by:

Teaching and Learning Center (TLC)
Maranatha Christian University
Suria Sumantri No. 65
Bandung 40164, Indonesia

Telp: +62-22-2012186 ext. 980
Fax: +62-22-2015154

http://www.maranatha.edu/tlc/ic2007
tlc@maranatha.edu

Scientific Committee:

STEERING COMMITTEE

Yusak Gunadi Santoso
(Vice Rector for Academic Affairs, Maranatha Christian University)

ORGANIZING COMMITTEE

- M. Jimmy Hasugian
- Noek Sulandari
- T.Elisabeth Cintya Santosa
- Maya Malinda
- Stevanny Merinda
- Joan Nugroho
- Riki Martusa
- Ratna Widiastuti
- Andi Aulia Hamzah
- Christyan Juniady
- Surya Setiawan
- Budi Setiandari
- Boedi Hartadi Kuslina
- Ariesa Pandanwangi
- Swat Lie Liliawati
- Lina Anatan
- Dedeh Supantini
- Hendra Tjahyadi
- July Ivone
- Rusmiati Simbolon
- Merry Ellen
- Meily Margaretha
- Veraliana Bastian
- Herlina Bastian
- Rosa Marissa
- Anita Anggraeni
- M. Sienly Veronica
- Fanny Kristine
- Arief Suryadi
- Mimi Nofia
- Ana Mariana
- Alexandrey
- Teddy Yusnandar
- Hadi Arief
- Imam Tjahjo Wibowo
- Yenni M. Djajalaksana
- Laura

Conference Secretariat:
Teaching and Learning Center
Maranatha Christian University
Jl. Prof. Drg. Suria Sumantri No. 65 Bandung 40164, Indonesia
Email: tlc@maranatha.edu
Website: http://www.maranatha.edu/tlc/ic2007
Telp. +62-22-2012186 ext. 980
Fax. +62-22-2015154

TABLE OF CONTENTS

Presentation
Competency-based Curriculum Development (71)

Teaching and Learning Strategies (74)

Wednesday, 28th November 2007

Time	Schedule
07.30 – 08.55	Registration + Tea Break (4th Floor, GAP Building)
08.55 – 09.00	Opening Prayer (8th Floor, GAP Building)
09.00 – 09.30	Guest-of-Honor Address and Opening **Prof. Dr. Ir. H. Rochim Suratman** Coordinator of Kopertis IV Jawa Barat – Banten
09.30 – 09.50	Welcome Remark **Dr. Bambang S.P. Abednego** Rector of MCU
09.50 – 10.00	Welcome Remark **Jimmy Hasugian** Chairman, MTLIC2007
10.00 – 11.30	Keynote Addresses **Assoc. Prof. Daphne Pan, PhD** Director of Centre for Development of Teaching and Learning – NUS, Singapore **Dr. Illah Sailah** CBC Working Groups – Directorate of Academic, DGHE
11.30 – 13.00	Lunch (GSG Building)
13.00 – 14.30	Plenary Session I (Higher Education Management) (8th Floor, GAP Building) **Dr. Bambang S.P. Abednego** Maranatha Christian University **Ir. Rudy Wawolumaja, M.Sc.(Eng)** Maranatha Christian University
14.30 – 15.00	Tea Break (4th Floor, GAP Building)
15.00 – 17.00	Parallel Session I (4th Floor GAP Building) Announcement + Closing Prayer

Thursday, 29th November 2007

Time	Schedule
07.30 – 09.00	Registration + Tea Break (4th Floor, GAP Building)
09.00 – 10.30	Plenary Session II (Teaching and Learning) (8th Floor, GAP Building) **Samuel Sidjabat, D.Ed.** Tyranus Theological Seminary, Bandung. **Prof. Michaela Muñoz, Ed.D** De La Salle University, Manila, Philippines **Dr. Odo Fadloely, M.A.** Indonesia Education University, Bandung
10.30 – 12.00	Plenary Session III (Technology in Teaching and Learning) **M.H Marta Adidarma** Education Manager PT Microsoft Indonesia **Dr. Daniel Churchill, Assist. Prof.** The University of Hong Kong
12.00 – 13.00	Lunch (GSG Building)
13.00 – 14.30	Parallel Session II (4th Floor, GAP Building)
14.30 – 15.00	Tea Break (4th Floor, GAP Building)
15.00 – 17.00	Plenary Session IV (Classroom Assessment) (8th Floor, GAP Building) **Assoc. Prof. Daphne Pan, PhD** Director of Centre for Development of Teaching and Learning – NUS, Singapore **Prof. Michaela Munoz, Ed.D** De La Salle University, Manila, Philippines Door prize + Announcement Closing

ENHANCING STUDENT ACHIEVEMENT IN A LARGE SIZE CLASS OF MATHEMATICAL MODELING BASED COURSES

Yosephine Suharyanti
Industrial Engineering Department of Atma Jaya Yogyakarta University
Academic Quality Improvement and Development Office of
Atma Jaya Yogyakarta University
Jl. Babarsari 43 Yogyakarta 55281, phone +62-274-487711,
E-mail: yosephine@mail.uajy.ac.id

Abstract

One of the difficulties in teaching a large size class is to involve all the students in the learning processes. It is difficult also to measure how far the student could absorb the material given in the class. To assure a continuous improvement in the learning process, measuring the achievement only in midterm or final examination is not adequate. This paper concern with those two problems, i.e. how to enhance the student achievement and how to measure it continuously, especially in mathematical modeling based courses. This paper present a study on the author experience in managing Operations Research classes in undergraduate program of Industrial Engineering Department of Atma Jaya Yogyakarta University. There are three approaches have been applied and studied related with enhancing and measuring student achievement continuously. The first approach is running quizzes in the class regularly. The problems for these quizzes are come from the lecturer. The second approach is giving topic based take home assignments regularly after the discussion of the topic. The problems for these assignments are real case based problem created by the student according to the topic previously discussed in the class. The third approach is also giving take home assignments regularly, but the assignments are given before the discussion of the topic in the class, and the problems are come from the lecturer or the textbook. The result of the study shows that the most effective approach to enhance the student achievement is the second approach. The first approach is not quite effective because the students are only enforced to find the solution mathematically without trying to understand the characteristic of a certain mathematical model related with the real case. The third approach is effective only for a few students, i.e. the students having high level of academic capability. Learning by themselves first to do the assignments is too hard for the most undergraduate students of Industrial Engineering Department of Atma Jaya Yogyakarta University.

Keywords**:** student achievement, large size class, mathematical modeling based, assignment

Introduction

Running large size classes are still a must for education institutions in Indonesia, especially for the private institutions, because of many reasons. Mention two of these are the limited number of teachers/lecturers available and the limited funding. Under this restriction, however, the teachers/lecturers have to attempt to ensure that the class will run properly.

In Industrial Engineering Department of Atma Jaya Yogyakarta University, the size of the classes conducted is 25 – 72 students/class. The lower limit is based on BEP calculation and the upper limit is the number of the seats in a class. Most of the classes are occupied by more than 60 students.

In the other hand, there are many mathematical modeling based subjects in Industrial Engineering curriculum, in which the students need intensive assistance from the lecturer. Operations Research, System Modeling and Simulation, Network Analysis are some of the examples. The learning objective of those courses is giving the students ability to build a mathematical model for an industrial problem and solve the problem mathematically.

The mathematical modeling based subject is categorized in science based discipline. According to the criteria mention in accreditation program for higher education of BAN (*Badan Akreditasi Nasional*, National Accreditation Board of Indonesia, 2001), the ideal lecturers to students ratio is 20 for science based discipline and the ideal maximum load for the lecturers is 12 units. If it is assumed that the courses taken by the students in a semester is 18 units on average, it means that ideally, the mathematical based courses is conducted in a small size class consisting no more than 30 students. It is also mentioned by the survey of Herbert and Hannam (2001) in Australia that usually the mathematic or physic or statistic or engineering disciplines are conducted in a small size class. Only 10.9% of those (7 of 64 samples) are conducted in a large size classes. However, the real condition in most of the private education institution in Indonesia is still far from that ideal condition. It is important then to find a strategy in managing a large size class of mathematical based courses. One of the basic points in managing a class is to make sure that the student could understand the material, by giving appropriate treatments and by monitoring the progress.

Unlike in pure sciences, most of the subjects in Industrial Engineering curriculum of Atma Jaya Yogyakarta University are combination of qualitative and quantitative approach. It is important for the students to not only find the solution of a problem by mathematical model, but also to correctly create the mathematical model of a case. Operations Research subjects are some of the example of these kinds of subject in the curriculum. Identifying the achievement of the student in the case of solving the problem quantitatively could easily perform by discussion and examination. However, identifying the modeling ability of the students could only be performed by regular monitoring of every student in each step of the courses.

Problem Statement

The problem now is how to monitor the large size class of mathematical based courses like Operations Research subjects in Industrial Engineering curriculum of Atma Jaya Yogyakarta University. The size of the classes makes it impossible to monitor the students individually, but in the other hand the material and the objective of the courses requires an intensive monitoring of the students.

Objective

Based on the problem mentioned above, the objective of the study presented in this paper is to identify an appropriate method to enhance and measure the student achievement in a large size class of mathematical modeling based courses by evaluating three different assignment approaches have been applied.

Previous Theories and Researches

This part describes the previous theories and researches about student preferences, teaching approaches, and large size class management, which will be the basic for the approach proposed in this paper.

1. Student Preferences

The important aspect that should be considered in managing a class is the preferences of the students. Holmquist et al (2002) observed the student's point of view on a course. A good course according to the students has the following characteristic:

a. the course is well structured
b. teachers know their subject
c. the course content is seen as useful
d. the course is neither too difficult nor too easy

A survey of Bressler and Bressler (2007) showed that the students' preference about the method or tools used in the class has correlation with the result or score they achieved when learning by the methods or tools. For example, a student who prefers using presentation than writing skill will achieve higher presentation score than written assignment score.

2. Teaching Approaches

Hikmat and Masykuroh (2006) found that by implementing collaborative learning approach, students are encouraged to discuss the material with their fiends in a small group, more than if they discuss the material directly with the teacher. This approach also improves the students' self-exertion and capability in learning.

In term of assignment, Haddad (2006) provide some suggestions for making sure that the assignments are meaningful, both for the teacher and the students as follows:

a. Select assignments that are relevant to the learning objectives and outcomes.
b. Design assignments that actually assess whether or not the students are learning what are taught.
c. Design assignments that reveal whether students can apply what they are learning, not just understand.
d. Provide clear directions for all assignments.
e. Give a variety of opportunities for students to show what they are learning.

Many students can solve a problem, but teacher should want them to know why they got a particular answer, not just how. This is the true proof of learning in any subject (Haddad, 2006).

3. Managing Large Size Class

Teaching large classes are mostly a management and organizational problem rather than issues of pedagogy. That is why the teaching methods and forms of classroom organization have a big impact upon the quality of education provided (Smith and Warburton, 2007).

Many researches provided suggestions to teach large size classes. One of them is Haddad (2006) who gave top 20 tips for teaching large classes, i.e.:

a. Plan ahead and prepare thoroughly.
b. Arrange the classroom under students' suggestions and use outside the classroom as learning resources.
c. Do everything possible to get to know the students.
d. Have the students introduce themselves to everyone in an interactive manner.
e. Move around the class when talking to engage students more actively.
f. Be natural and personal in class and outside of it.
g. Tell the students to feel free asking questions they might have even outside the class.
h. Keep track of frequently asked questions or common mistakes.
i. Be aware of the class, involve students and use positive discipline to deal with misbehavior.
j. Give a background questionnaire or a diagnostic test to check the knowledge and skills of the students.
k. Determine various methods such as group work, role-playing, or presentations, to stimulate learning.
l. Develop a formal lesson plan as a way to organize the teaching.
m. Explain to the students exactly the reason of everything conducted in teaching the class.
n. Develop a visual display of the outline of the day's topics and learning objectives.
o. Use "prompts" to develop students' question and answer skills.
p. Give assignments that really assess whether or not the students are learning what are taught.

q. Develop a portfolio system or other ways to keep track of student performance.
r. Develop exams that really make the students have truly learned and not just have remembered.
s. Give prompt feedback on assignments and exams.
t. Reflect on the teaching. Discuss with the colleagues and students how the class can be improved.

Other strategies were presented by Colbert (2001). He suggested the following creative strategies to increase student engagement with course material in large classes:

a. Poll students by asking them questions and collecting their responses for review and later use in class.
b. Give group quizzes as breaks from lecture.
c. Note taking pairs, allowing the students to form pairs and compare their notes to identify the key points.
d. Give students the assignment of posting questions that are related to the course material.
e. Involve Web based approach to choose a controversial topic and ask the students to form groups and discuss the topic during class.
f. Require the students to draft a summary of their discussion and to post it on the web, and individual students can then earn additional points by responding to the summaries posted by other groups.

Problem based learning (PBL) and students clustering are also believed as effective approaches for teaching large size classes. Ghosh (1999) found that the students benefit by being exposed to PBL and by being able to relate the topics covered in class to their personal experiences. Dividing students in small groups was done in order to adequately handle PBL. In Wagiman and Suryando (2005), problem based discussion was implemented. Students are clustered in small groups and the discussions are performed three times which are carried out in different level: small group, large group, and then panel discussion. The problem is taken from a real case previously observed. The result of this method shows that students are encouraged to present their opinion (47%), to creatively find the learning resources (55%), and to eagerly ask questions (90%).

In term of students clustering, other research carried out by Hansen and Hansen (2007) concerned on student criteria for choosing teammates during teaming, i.e. importance of pre-team-formation activities, sufficiency of knowledge about prospective teammates to make a choice, and preferred team-formation methods. More than two-third (68.75%) of the students rated the speed teaming exercise as extremely important or important in their choice of potential teammates. None of the students ranked the exercise of no use. Interestingly, less than half of the respondents (43.75%) felt that they knew enough about their classmates at this point in the semester to make a selection of who they thought would be the best teammates. In the method of team selection, there was no mistaking how these

students feel. Almost two-thirds (62.5%) prefer self-selection into teams. Far more students had no preference (29.17%) than for professor-chosen (6.25%) teams.

Jungic et al (2006) presented a using of workshop and help center to assist student in mathematics large classes. The proposed approaches are:

a. giving various types of evaluation tools and various type of media, and
b. preparing workshop and help center for students.

Both approaches are dedicated give students more flexible way to learn the material.

Using high technology approach in managing a large size class was also implemented and observed. Managing a large class by using a classroom response system namely clickers, a tool installed in several location in the class for contacting the lecturer and answering quizzes, was observed by Caldwell (2007). Clickers can be incorporated into a standard lecture course to increase interaction between students and instructor.

The Three Approaches Evaluated

There are three approaches have been applied in Operations Research classes in undergraduate program of Industrial Engineering Department of Atma Jaya Yogyakarta University in order to enhance and measure the student achievement. The three approaches actually are not new approaches. Those are however evaluated and studied in the term of the impact to the student achievement. Part 4.1, 4.2, and 4.3 describe the approaches one by one.

1. Regular Quizzes (RQ)

This approach is performed by giving the students frequent quizzes, at least one quiz for each session. The quiz may be given before and or after the discussion of the material, depends on the situation. The quiz given before the discussion is usually performed in the beginning of the session to enforce the student to focus on the topic. The quiz given after the material discussion is usually performed in the middle-end of the session to measure the student achievement and then followed by the feedback from the lecturer. The problems for these quizzes are short and simple problems given by the lecturer. Figure 1 describes this approach systematically.

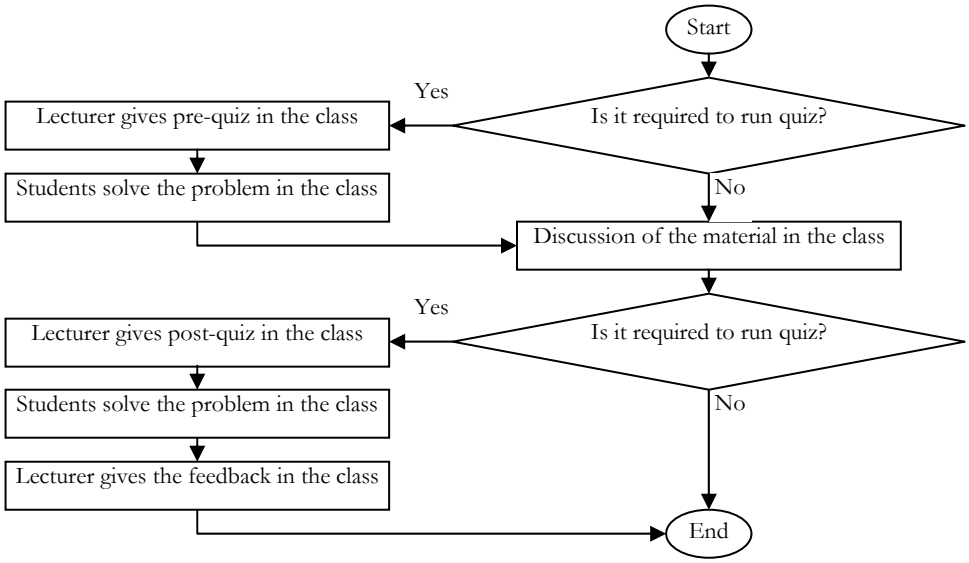

Figure 1. Scheme of the RQ approach

2. Regular Creative Post-discussion Take-home Assignments (RC)

This approach is performed by giving the student a take home assignment, may be in group or individually, depends on the weight of the assignment. This assignment is given after the discussion of the material in the class. The problems for these assignments are created by the students and should be based on a real case. Students have to find an appropriate real problem related with the discussed topic, model the case by the theoretical model has been discussed, and solve the problem by the solution method has been discussed. The assignments must be submitted in the next week session, and at the beginning of the session, the lecturer briefly discusses and comments the result as a review of the last week material. Figure 2 illustrating the mechanism of this approach.

3. Regular Basic Pre-Discussion Take-home Assignments (RB)

Technically, this approach is similar with the second approach. The differences are that the assignments in this approach are given before the discussion of the material in the class and the problem for the assignment is given by the lecturer. Students have to learn and understand the material by themselves first before solving the given problem. The assignments then must be submitted in the next week session. At the beginning of the session the lecturer briefly discusses the solution of the problem while observing the student achievement in order to find the starting level to discuss the material. The systematic description of this approach is presented in Figure 3.

Data, Observation Result, and Discussion

The classes being studied is Operations Research 2 (OR 2) classes conducted in Semester I of AY 2003/2004, Semester I of AY 2004/2005, Semester I of AY 2005/2006 in Industrial Engineering (IE) Department of Atma Jaya Yogyakarta University. The first and the second class were treated by the RQ approach, and the third class was treated by RC and RB approach.

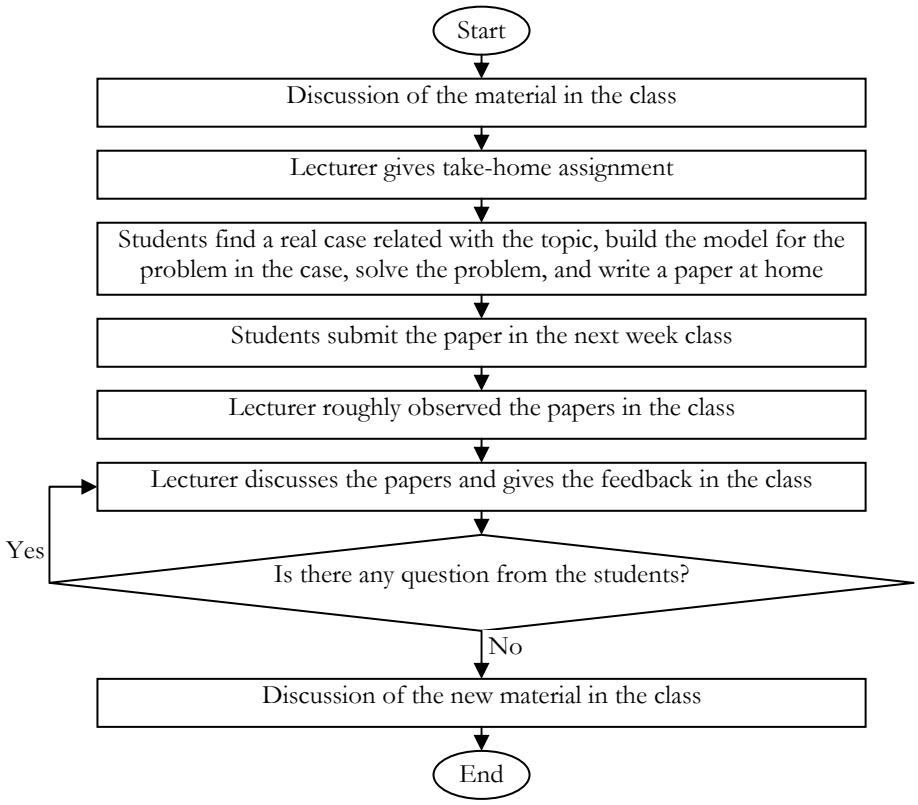

Figure 2. Scheme of the RC approach

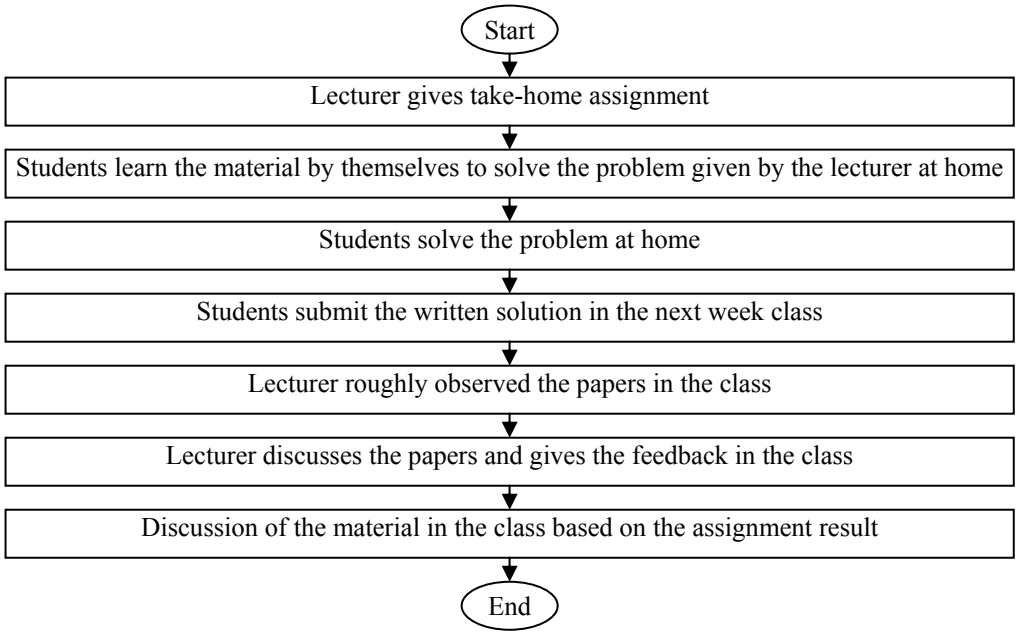

Figure 3. Scheme of the RB approach

Three parameters were measured in this study, i.e. percent of responses, achievement, and outcome. Percent of responses means the percentage of number of students involved in quizzes and assignments toward the total number of students. It represents the student interest to involve in the learning activities. Suppose that the score range is 0 – 100 and the score represents the percent of correct answer of the problem, achievement is defined as the average score achieved by students. It represents the knowledge internalized after the learning activities. Outcome is measured from the examination score as the representation of the comprehension capability of the students.

Table 1 shows the lesson plan of Operations Research 2 class. It can be seen in this table that each model category consists of several unique models. The network model for example, covers the spanning tree, shortest route, maximum flow, minimum cost capacitated flow, and critical path models. Each of these models is dedicated for a specific case or problem. Without an intensive treatment, it is difficult for the undergraduate students to differentiate one model to another.

Table 1. The Lesson Plan for OR 2 Course of IE Department of Atma Jaya Yogyakarta University

Week	Lesson material
1	Introduction to mathematical modeling; network model (minimum spanning tree model)
2	Network model (shortest route model)
3	Network model (maximum flow model; minimum cost capacitated flow model)
4	Network model (critical path method)
5	Dynamic programming
6	Inventory model (basic deterministic EOQ model; lead time consideration in EOQ model)
7	Inventory model (quantity discount EOQ model)
8	Midterm examination
9	Inventory model (buffer stock in EOQ model to anticipate demand fluctuation)
10	Inventory model (probabilistic EOQ model)
11	Inventory model (probabilistic EOQ model)
12	Inventory model (single period EOQ model)
13	Markov model (Markov chain)
14	Markov model (Markov decision model)
15	Markov model (Markov decision model)
16	Final examination

Table 2 presents the calculation of the three parameters for the first, second, and third class treated by RQ, RC, and/or RB approach. The average values of the three parameters then are presented in Table 3. Based on the first parameter, percent of responses, the best approach is the RC approach, the second best is the RQ approach, and the worst is the RB approach. Based on the second parameter, achievement, the sequence of the approaches from the best to the worst is also the RC, the RQ, and the RB approach. The third parameter, outcome, could not be used to compare the RC and the RB approach because these approaches were run on the same class, so there is only one examination result for both approaches. However, compare to the first approach, both approaches give better outcome.

Although the data are not yet statistically tested, comparison of the three proposed approach based on the three parameters shows a preliminary conclusion that the RC approach gives the best overall performance. In other word, that the RC approach is the best approach in enhancing student achievement for the Operations Research 2 class of IE Department of Atma Jaya Yogyakarta University.

Table 2. The Percent of Responses and Achievement of the Activities

Class	Total number of student	Approach	Activity	Percent of responses	Achievement	Outcome
Semester I 2003/2004 Class A	72	RQ	Quiz 1	78	84.34	
			Quiz 2	93	98.66	
			Quiz 3	90	82.46	
			Examination			25.68
Semester I 2003/2004 Class C	29	RQ	Quiz 1	79	86.09	
			Quiz 2	93	92.59	
			Quiz 3	90	81.73	
			Examination			32.72
Semester I 2004/2005 Class A	47	RQ	Quiz 1	91	76.36	
			Quiz 2	72	83.38	
			Examination			46.35
Semester I 2004/2005 Class C	42	RQ	Quiz 1	90	75.32	
			Quiz 2	93	80.38	
			Examination			48.73
Semester I 2005/2006	48	RC	Assignment 1	85	81.71	
			Assignment 2	83	95.88	
			Assignment 3	94	88.22	
			Assignment 4	90	100.00	
			Assignment 5	90	82.33	
			Assignment 6	90	91.63	
			Assignment 7	98	84.89	
			Assignment 8	85	61.71	
			Assignment 9	92	80.91	
			Assignment 10	88	84.05	
			Assignment 11	75	82.50	
			Assignment 12	90	89.30	
			Assignment 13	83	94.75	
			Assignment 14	79	100.00	
			Assignment 15	85	100.00	
			Examination			44.83
		RB	Assignment 1	96	81.09	
			Assignment 2	71	54.85	
			Assignment 3	79	86.58	
			Examination			44.83

Table 3. Comparison of the Approaches

Approach	Average % of responses	Average achievement	Average outcome
RQ	86.90	84.13	38.37
RC	87.13	87.86	44.83
RB	82.00	74.17	44.83

A short observation on the student's preference by interviewing several students also was taken. Table 4 shows the characteristic, including the weakness and the advantage of each approach based on the interview. The RQ approach tends to reduce student motivation. The RC approach is seemed hard for the student but it gives motivation for the students to interest to the course. The RB approach is too hard for the student to do, and it tends to make them to avoid doing the assignment.

Table 4. The Students' Perception on the Three Approaches

Approach	Advantage	Weakness
Regular quizzes	▪ Not too busy at home ▪ The case usually is simple	▪ Tend to be forgotten faster
Regular creative post-discussion assignments	▪ Understand more at the end ▪ Working in group is fun	▪ Always busy and tired at home ▪ Need more time ▪ Sometimes difficult to find the case
Regular basic pre-discussion assignments	▪ Sometimes can understand more, especially for an easy topic	▪ Often confuse about the material ▪ Sometimes have no idea to do ▪ Hard to learn from many books

Concluding Remark

The result of the study shows that the most effective approach to enhance the student achievement in Operations Research 2 class of IE Department of Atma Jaya Yogyakarta University is the RC approach. The RQ approach is not quite effective because the students are only enforced to find the solution mathematically without trying to understand the characteristic of a certain mathematical model related with the real case. Most of the students were good in finding the solution mathematically, but they were failed to model a problem as presented in the result of midterm and final examination. The RB approach is effective only for a few students, i.e. students with high level of academic capability. Most of the student got nothing even in understanding the material, and the unexpected effect then

appeared, i.e. students tend to think that Operations Research is untouchable for them. Learning by themselves first to do the assignments is too hard for the most undergraduate students of IE Department of Atma Jaya Yogyakarta University. The RC approach is the most attractive treatment for the students because they had enough time to do the assignments and they understood the material more. They understood the material more than the other approaches, because in the RC approach the students had to create their own problem, and by doing that one, they had opportunity for creatively thinking about the material.

Finally, actually there is no "best way" to teach large classes. Each teacher must develop the approach that works best for the class based on the teacher's teaching style, the characteristics of the students, and the goals and objectives of the lessons and curriculum (Haddad, 2006).

References

BAN, 2001, *Pedoman Penilaian Borang Akreditasi Jenjang S1* (A Guideline for Assessing Accreditation Data of Undergraduate Degree), Jakarta.

Bressler, M.S. and Bressler, L.A., 2007, Teaching Methodologies in the Classroom: a Study of Student Preferences, *Academy of Educational Leadership Journal, Vol. 11(1), 69-80*.

Caldwell, J.E., 2007, Clickers in the Large Classroom: Current Research and Best-Practice Tips, *CBE – Life Sciences Education, Vol. 6, 9-20*.

Colbert, J., 2001, Teaching and Learning in Large Classes, *Teaching at ISU Bulletin, Vol. 13(3), 1-3*.

Ghosh, R., 1999, The Challenges of Teaching Large Numbers of Students in General Education Laboratory Classes Involving Many Graduate Student Assistants, *Bioscene, Vol. 25(1), 7-11*.

Haddad, C., 2006, *Practical Tips for Teaching Large Classes: a Teacher's Guide*, UNESCO Asia and Pacific Regional Bureau for Education, Bangkok.

Hansen, R.S. and Hansen, K., 2007, The Student Experience in Speed Teaming: a New Approach to Team Formation, *ABR & TLC Conference Proceedings, 1-10*, Hawaii.

Herbert, D. and Hannam, R., 2001, *A Survey of Large Class Teaching Around Australia*, AUTC Project 2001 – TLC of the University of Queensland, Queensland.

Hikmat, M.H. and Masykuroh, Q., 2006, *Peningkatan Kemandirian dan Kemampuan Mahasiswa dalam Mata Kuliah Essay Writing dengan Menggunakan Metode Pembelajaran Kolaboratif* (Enhancing Student Autonomy and Capability in Essay Writing Course by Using Collaborative Learning Method), P3AI-TPSDP Batch III Teaching Research Grant Report of Universitas Muhammadiyah Surakarta, Surakarta.

Holmquist, M., Andersson, S., Jansson, P., and Fäldt, Å., 2002, *Large-Class Teaching/Learning: a C-SELT Project at Chalmers University of Technology*, Göteborg.

Jungic, V., Kent, D., and Menz, P., 2006, Teaching Large Math Classes: Three Instructors, One Experience, *International Electronic Journal of Mathematics Education, Vol. 1(1), 1-15*.

Smith, P. and Warburton, M., 2007, Strategies for Managing Large Classes: a Case Study, *British Journal of In-service Education, Vol. 23(2), 253-265*.

Wagiman and Suryando, A., 2005, *Proses Pembelajaran Mata Kuliah Pengendalian Limbah Industri dengan Model Proporsi Diskusi-Kasus 75 Persen* (Learning Process for Industrial Waste Control Class by Using 75 Percent Proportion of Discussion-Case), Report for Inno-Sinno Grant of DUE-LIKE, Yogyakarta.

MARANATHA
TEACHING & LEARNING
INTERNATIONAL
CONFERENCE

Certificate

TLC-UKM/MTLIC/S01-1107

This is to express our appreciation to:

Yosephine Suharyanti, S.T., M.T.

as

Speaker

in the Maranatha Teaching and Learning International Conference
"Teaching and Learning in Higher Education for Developing Countries"
conducted at Maranatha Christian University, Bandung, Indonesia,
28th & 29th November 2007

Rector of Maranatha Christian University

Dr. Ir. Bambang S.P. Abednego