ISBN 978-979-19256-0-0

visit indonesia 2008

PROCEEDING

THE 3RD INTERNATIONAL CONFERENCE ON MATHEMATICS AND STATISTICS

BOGOR, 5 – 6 AUGUST 2008

Mathematics and Statistics: bridge for academia, business, and government in the entrepreneurial era

PROCEEDING

THE 3RD INTERNATIONAL CONFERENCE ON MATHEMATICS AND STATISTICS

BOGOR, 5 – 6 AUGUST 2008

Mathematics and Statistics: bridge for academia, business, and government in the entrepreneurial era

organized by

MSMSSEA (Moslems Statisticians and Mathematicians Society in South East Asia)

Department of Statistics
Department of Mathematics
Institut Pertanian Bogor

Department of Mathematics
Universiti Malaysia Terengganu,
Malaysia

PREFACE

Assalaamu'alaikum warahmatullaahi wabarakaatuh

Welcome all participants of ICoMS 2008 to Bogor – Indonesia. This event is organized by MSMSSEA in collaboration with Institut Pertanian Bogor (Indonesia) and Universiti Malaysia Terenganu (Malaysia).

We, the organizing committee, are very glad having this international conference due to many reasons.

1. ICoMS is a good avenue for mathematicians, statisticians, and other scientist to communicate.
2. ICoMS 2008 has a theme related to entrepreneurial era which is very important for mathematicians and statisticians, and scientist in general.
3. The event is important venue for business group, government, and academia to communicate and share knowledge as well.
4. Bogor is beautiful place in Indonesia surrounded by many research centers, IPB, Botanical garden, an other point of interest related to research institution.

We are also happy that the Vice President of Republic of Indonesia, Ministry of National Education, Ministry of Energy and Mineral Resources, and Ministry of Communication and Information Technology are supporting to the ICoMS 2008.

This event held on two days, August 5-6, and consist of several parts. We invite 17 outstanding professors to share and discuss topics in mathematics and statistics, including application. As many as 170 paper and 30 posters presented during this two-day conference. We appreciate to all of contributor from various countries who are motivated to participate in this event.

High appreciation is also awarded to companies and agencies which facilitate so that the even could run well.

We really hope all participants can benefit many things from this international event. May God bless you.

Wa'alaikumsalam warahmatullaahi wabarakaatuh.

The Committee of ICoMS 2008

CONTENTS

SESSION C

POSTER

COMBINING INDIVIDUAL LEARNING AND GROUP DISCUSSION IN CALCULUS COURSE

[1] Endah Asmawati, and [2] Joice Ruth Juliana

[1,2] Department of Mathematics and Natural Sciences
University of Surabaya
Jl. Raya Kalirungkut, Surabaya 60292 – Indonesia

e-mail : [1] e_61113@yahoo.com, [2] joiceruth@yahoo.com

Abstract. *Calculus is one of important course in Engineering Faculty, because it is a foundation of other courses. Moreover, at our University, Calculus is one of drop out requirements for fresh student. Based on this condition, we think that an innovation of learning method should be design to give special treatment for students that do not pass calculus class in the first semester. This second semester, we do an innovation of learning method in Calculus class. The innovation contains Initial Student Worksheet (ISW) before class. In the beginning of the class session, material related with the ISW is explained shortly by the lecturer and continuing with do exercise in small group discussions. The result of the discussion will be presented in classroom as panel discussion. The last, in the end of the class students get individual test.*
As evaluation of this innovation, we found that 64%of the students has score more than 65 and 95% of the students give positive respond to this innovation. For advanced research, we would like give some improvement in this method to increase the passing percentage of the course.

Keywords*: ISW, group discussions, panel discussion, individual test*

1. Introduction

Calculus is one of important courses in Engineering Faculty because Calculus is foundation for others courses. Moreover, at our university, Calculus is one of drop out requirments for fresh student. The content of calculus is similar with mathematics subject at senior high school, i.e. real number, functions, limits, derivatives, integral. It means the students have known the material. We have two full sessions a week for Calculus. The sessions is dominated by explaination and examples. Because of that, it also given one review sessions a week by assitant for doing exercises, we call it as tutorial class. In even semester, when calculus class was followed by students who ever fail only, there are 66.7 % students no attend actively in tutorial class.

In this semester, we do action research class to give special treatment for students that do not pass Calculus class in first semeseter such that they can pass well when they take the class for the second.

This research based on the importance of calculus as explaination above. In our research, we construct an innovation teaching method, is called Combining Individual Learning and Group Discussions (CILGD). From our observation as explain in the first paragraph, we assume student rarely do exercises for Calculus. CILGD contains Initial Student Worksheet (ISW), shortly conventional teaching, small groups discussions, panel disscusions, and individual test. We give detail about CILGD in the next section. CILGD was done in some topics of Calculus.

2. The construction of CILGD

As we told in the first section, we arrange the innovation design based on observation of the student characteristics. This design is called Combining Individual Learning and Group Discussion (CILGD). The CILGD strategy is

1. The first session, we give a basic test. The content of the test is algebra, trigonometry and arithmetic operation that are commonly used in Calculus course. If the test score is less than 65, the student will get a task with similar content. It is expected that the students who completely do well the basic test and or the task never make mistakes in basic operations.

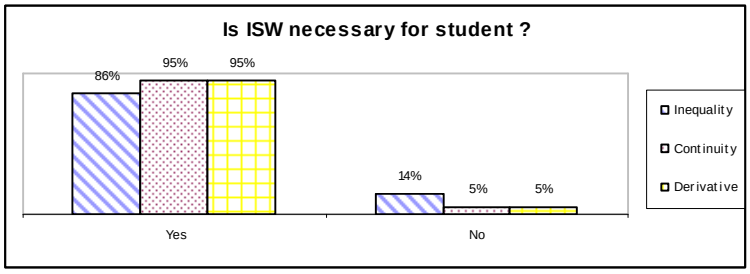
6. Initial Student Worksheet (ISW). ISW is given to student in the end of certain session. ISW contains many problems related with material of next session. For example, we give it to all students in the end of first session. Students individually complete the ISW, and give back to the lecturer before the second session. The purpose of ISW, the lecturer get a picture about the students related with the second session material before the session.
7. Lecturer teachs shortly in the beginning of the second session. It is also explained revision of student's mistakes in ISW.
8. After the shortly teaching, the class activity is continued by small groups discussions. Every gorup must give report of the discussion. Students cannot make a group by themselves. The members of each group are chosen based on the score of basic test and Calculus class before. Every group be composed of student with good, enough and bad scores. We expect that the variance of student capability can improve the group discussions.
9. After the small groups discuss, the result of the discussion bring to class discussion. In this time, every members of the groups should be ready to present the disscusion result of his/her group because lecturer will choose randomly who present the material.
10. 10 minutes before the end of the session, it is done individual test and close book. The material of the test is 'today' material. All of material that student get on the session.
11. Student mark/score for the mid semester and the end semester include:
    - Ø ISW : 10%
    - Ø Average of report of small group discussion, class discussion, and average of individual test of groups members : 15%
    - Ø Quiz : 10%
    - Ø Mid/End examination : 55 %
    - Ø Tutorial : 10%

    In the session without innovasion CILGD, there are still any individual test in the end of session, we called it quiz.

3. Result and analysis

In the implementation, for first mid semester, the Calculus material that we do innovasion are inequality, continuity, derivative. We give quizioner to students and we get some surprise result from students opinion :

- 86 % of the students said that ISW for inequality topics is necessary. And, for continuity topics, 95% of the students said that ISW is important, same as for derivative topics. (See figure 3.1)



Picture 3.1. The necesarry of ISW for student.

- Almost all of the students (equal or more than 90 %) agree that ISW is useful for them in understanding in inequality, continuity, derivative topics. (see figure 3.2).

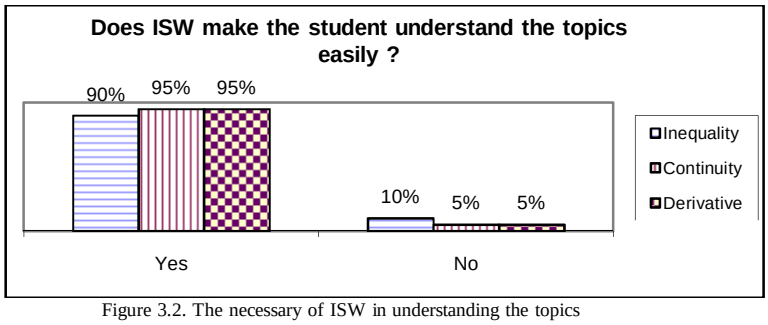


Figure 3.2. The necessary of ISW in understanding the topics

- For inequality topic, 81% of the students said that small group discussion help them to understand the topic. Also 85% of the students have same opinion for continuity and derivative topics. Only 5 % of the students did not give their opinion about it. The rest said that small group discussion did not give them positive effect in understanding the material. (see figure 3.3).

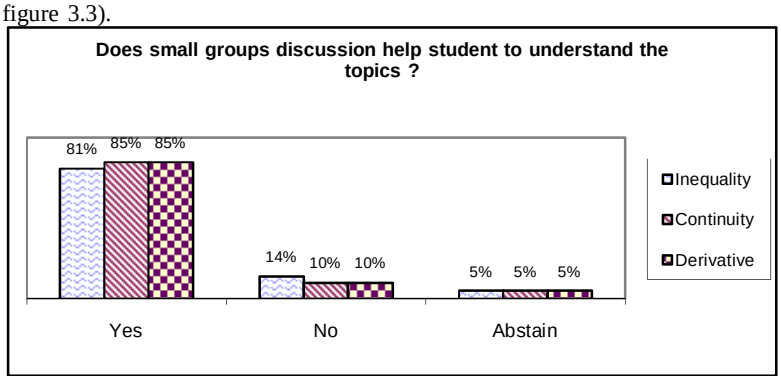


Figure 3.3. The questioner result about small groups discussion

- We get data that 90 % of the students said that teaching method by ISW and group discussion implied that they can complete the inequality and derivative test easier than before. 80% of the students give the same opinion about continuity topic. See figure 3.4.

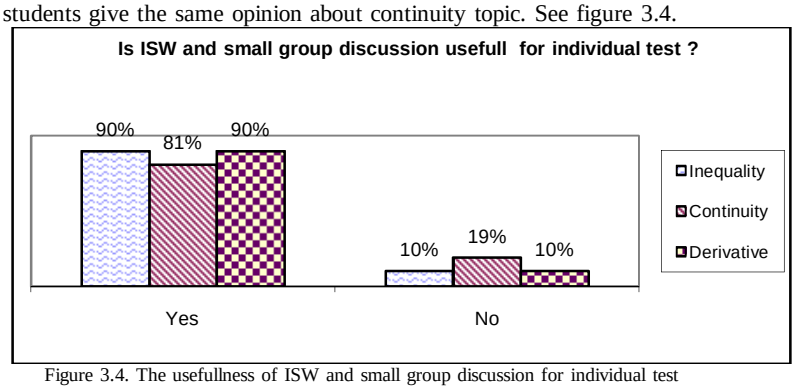
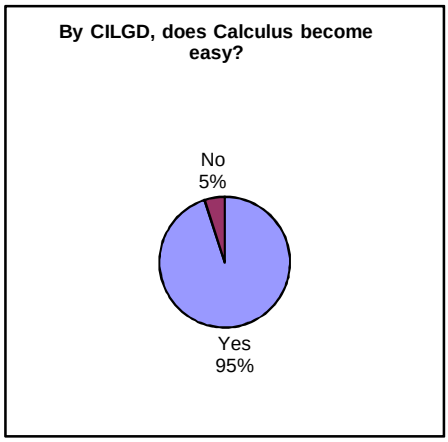
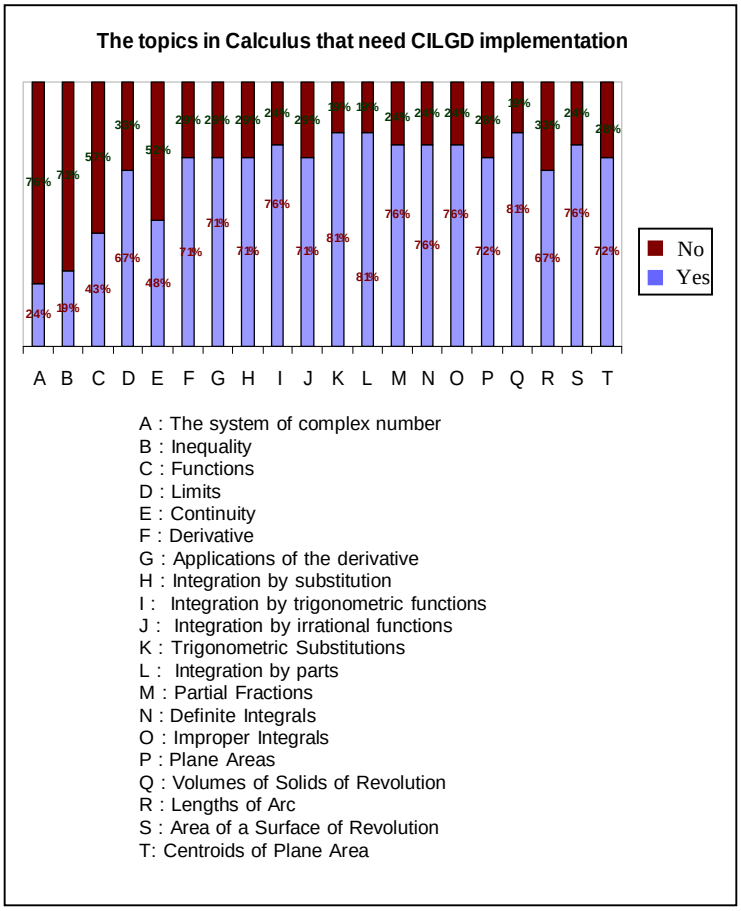


Figure 3.4. The usefullness of ISW and small group discussion for individual test

- In general, 95 % of the students agree that they understand the calculus topics better by CILGD than by conventional teaching. In the last, we also ask to the students in detail about what topics of Calculus that they want for CILGD implementation. The result is shown in figure 3.5 b.



(a) The usefullness of CILGD for understanding Calculus



(b) Precentage of student will related the CILGD implementation in Calculus topics.

Figure 3.5. Student opinion about CILGD for Calculus course

Besides the students opinion, we also get report from abserver in CILGD implementation. There are 30 students in Calculus course. However, just 93% of the students actively attend in Calculus class and follow the Calculus examination. The result of examination show that 25% of the students get score below 40, 11% of the students get score between 40 and 65, and 64% get score above 65.

When we investigate presence of the students with score below 40, we find that all of them rarely or never attend Calculus class. We check that their presence percentage no more than 50%. Thus, it means that they did not follow all of the learning-teaching process. As it is said above, some of the students get score between 40 and 65. Although their score is not good, the class lecturer know that the students have have progress in their Calculus concepts. They actively ask some questions and the content of the questions was shown their progress. In general, all of the students have progress. In the first time of group discussion, the discussion was not going smoothly. However, by the time, the discussion is going well. The student actively ask and answer each other in the groups. By ISW, the student must learn firstly before the class, and the lecturer know the students knowledge about the material.

In this time, class discussion can not be implemented because the small group discussion was going very slowly. Group discussion took time more than the time setting. It was needed much time to make all of the group members understand the material. Thus, there is no more time for class discussion.

4. Conclusion

As evaluation of this innovation, we conclude that CILGD implementation was going well in Calculus course. It was shown by students score (64% of the students has score more than 65) and the result of questioner (95% students give positive respond to this innovation). For advanced research, we

would like give some improvement in this method to increase the passing percentage of the course. We expect that the lecturer more than one in the class for helping small group discussion. Because by it, we hope small group discussion will be go smoothly in the setting time. We also still think to improvement the mechanism of ISW, we found that some students did not do ISW by him/herself.

5. References

Hagelgans, N.L., Reynolds, B.E, Schwingendorf, K.E., Vidakovic, D., Dubinsky, E., Shahin, M., Wimbish, G.J., 1995, A Pratical Guide to Cooperative Learning in Collegiate Mathematics, MAA.

Juliana, J.R., 2005, Metode Belajar Semi Mandiri bagi Pembelajaran Kelas, prosiding seminar nasional Fakultas MIPA UGM, yogyakarta.

Juliana, J.R., Herlambang, A., 2005, Tinjauan Faktor Pola Belajar dan Harapan Mahasiswa Baru Bagi Kesuksesan Pembelajaran Kelas, jurnal Sains dan Teknologi Universitas Surabaya, Surabaya.

Pedoman Mahasiswa Universitas Surabaya

ISBN 979-19256-0-0