REPORT OF TRAINING
JICA COUNTERPART TRAINING
ON MATHEMATICS AND SCIENCE EDUCATION

Tokyo, Japan, October 13th 2004 – January 7th 2005

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FOREWORD

This report presents the training activities and the results from the JICA Counterpart Training in Japan during the periods of October 13th 2004 to January 8th 2005. This training is supported by JICA under JICA IMSTEP (*Indonesian Mathematics and Science Teaching Enhancement Program*) follow up program 2004 – 2005. This program is a follow up program for JICA IMSTEP program that has been conducted during the periods of 1998 – 2003. The title of this training is "Mathematics and Science Education", focused on Lesson Study and Use of ICT and multimedia for education, including e-learning.

The training has been conducted at JICA HDQ (to attend lectures by Japanese professors), Gunma University (with Prof. Nishitani) and the Akahori Lab at Tokyo Institute of Technology (with Prof. Akahori). In addition, during the training periods there were some visits to schools, including attending lesson study at Hamanogou primary school, visited a Junior High School at Kiryu City Gunma, Male High School at Shibukawa Gunma, Gakuyo Junior High School at Fuji City Shizuoka, and Sairyu Junior High School Nagano. There were also good opportunities to attend an International Symposium on E-Learning at NIME Chiba and to experience an IVR application at NIME and MeSci Museum.

Most of the training activities and the schedules have been planed by JICA. During the training periods, JICA has been providing supports in the forms of living allowance, accommodation, transportation, training coordinators, and training facilitators. The success of this training is a result of cooperation from many parties – JICA staffs, professors, schools' administrators and teachers, Indonesian government, and others.

I wish to acknowledge the supports of JICA Headquarter and Indonesian JICA, Indonesian government (Department of National Education, Director of DGHE, CPIU, Rector of Yogyakarta State University (UNY), and the Dean of FMIPA UNY. In particular, my special acknowledgement goes to Mr. Eisuke SAITO, PhD as a Chief advisor of JICA-IMSTEP and Mr. Isamu KUBOKI as JICA-IMSTEP coordinator for their supports from the preparation in Indonesian and during the training in Japan.

My special gratitude is addressed to Prof. FUJITA, Prof. SATO, Prof. ONO, Prof. ITO, and Prof. INAGAKI, who had provide very informative lectures about the development of Japan educational system and teacher development in Japan. Special thanks are due to Prof. INAGAKI for his kind hospitality during our visit at Shinano Teacher Center, Nagano.

I wish also to express my special thanks and gratitude to Prof. Izumi NISHITANI, PhD and Prof. Dr. Kanji AKAHORI for their supervision and good directions during our training. We are also in dept to them for each of them has provided not only scientific and social experiences about education, but also the Japanese life styles, and the wonderful Japanese scenes. Prof. Nishitani took me to Mt. Haruna and Mt. Akagi to enjoy the very wonderful scene of autumn. Prof. Akahori has provided very informative lectures and opportunities to experiences on E-learning system and the application of ICT and multimedia on education. We also learn how they teach their students, as educators. Our gratitude to Prof. Akahori and his wife for their invitation to us and their very wonderful New Year celebration and to enjoy visit their house.

My special thanks to Prof. Akahori students, Mr. Oura, Ms. Mio, Mr. Misono, Mr. Yamamoto, Ms. Safiza and other members of Akahori's Lab, who helped me to develop the digital content for teaching material as a training subject. My special acknowledgement to Ms. Mio, who had facilitated me in attending the International Symposium on E-Learning at NIME. I would also like to thanks all Prof. Nishitani's students and their friends, especially Hayashi-san, Shinmasu-san, Hagimaru-san, and Inagaki-san. They have accompanied me very kindly to see the University Festival.

Finally, I wish to thank the Director of Human Development Team JICA Tokyo Mr. T. Nakano, our Training Officer, Mr. T. Sugawara, and our Training Coordinators, Ms. Takagi and Ms. M. Kiyoshima for their kind help and supports during our training.

Sahid

TABLE OF CONTENTS

I. INTRODUCTION

The quality of mathematics and science education in Indonesia needs to be improved, particularly to increase students' achievement in mathematics and science. During the five-year periods of 1998 – 2003, JICA (Japan International Cooperation Agency) IMSTEP (Indonesian Mathematics and Science Enhancement Program) project has been conducted in Indonesia to improve mathematics and science education. After the project finished, currently there is a two-year follow up program for FY 2004 – 2005. Three Indonesian universities have been actively involving on this project, which are Indonesia University of Education, Yogyakarta State University and Malang State University.

At each university, the project is managed by the Faculty of Mathematics and Science Education, who has responsibility to prepare mathematics and science teachers. The project has developed and has been conducting various activities to increase the quality of mathematics and science education in school, by increasing the quality of academic facilities and the quality of human resources in its faculty. The activities of IMSTEP include revising syllabi, developing textbooks, developing teaching material, inviting the Japan expert of Science and Mathematic, and training program in Japan for IMSTEP counterparts.

During the five-year program and the two-year follow up program, the project has also been developing a piloting program on teaching and learning processes in pilot schools (Junior and Senior High Schools) to implement new teaching approach and methods.

Since the IMSTEP established on 1998/1999, a number of JICA counterparts and faculty members from the three universities have conducted training in Japan to increase they knowledge and skills on mathematics and science education. In 2004 there are three counterparts from the three universities who follow "Mathematics and Science Education" training in Japan. The topics of training are lesson study in Japanese school, e-learning system, application of ICT and multimedia in educational and development digital teaching materials.

II. COURSE OBJECTIVES

- To study about the Japanese Education System and Teacher Development through Lesson Study in Japan.
- To study the application of ICT and multimedia in education as well as e-learning system.
- To develop teaching materials mathematics, particularly Geometry, for use in Indonesian schools.

Upon successful completion of this training, I expect to deepen my knowledge and skill on the following items:
1. Authoring software: types and their use;
2. Designing mathematics courseware (**using some mathematics package, e.g. Geometer's Sketchpad**) and implementing it using authoring software (e.g. Web authoring);
3. Multimedia integration into mathematics courseware;

4. Distributing mathematics courses using CDROM for standalone computers and using Web for online distribution;
5. The use of teaching aids and teaching media in Japanese schools
6. Information Technology (IT) for mathematics education: using Internet as teaching-learning resources, distributing mathematics courses using web based course management (*e-learning*);
7. Evaluation of computer based teaching/learning media.

Expected Results

In addition to the deeper knowledge and skills in the use IT (multimedia), teaching aids, and teaching media, the expected outcomes of the training in Japan are:

1. Multimedia CD on teaching some topics in schools mathematics, developed during the training period in Japan. These include Java Applet application for geometry teaching developed using **Geometer's Sketchpad** that can be integrated into hypertext (HTML) based teaching material.
2. Video on the use of mathematics/science teaching aids and teaching media in Japanese schools.

III. CONTENTS OF TRAINING CURRICULUM

A. General

The training curriculum for Indonesian JICA's Counterpart on "Mathematics and Science Education" in Japan is divided into three main parts. The first part is conducted during the first two weeks, which includes attending lectures from Japanese Professors held in JICA Headquarter, Shinjuku – Tokyo and visiting school. The second part is conducted for the next two weeks in Gunma University under supervision of Prof. Nishitani. The third part is conducted for the last two months in Tokyo Institute of Technology under supervision of Prof. Akahori.

Based on the activities, the training curriculum consists of the following contents:

1. Attending Lectures on Japanese education systems and other topics related to teacher development
2. Visiting schools (observation of Japanese lesson study, teaching and learning processes, teacher conferences, etc.)
3. Attending teacher and student seminars at universities
4. Attending Classes (Lectures at universities)
5. Giving lecture to university students
6. Giving presentation at scientific meetings in university level
7. Learning how to develop multimedia contents using Macromedia Flash and Geometer's Sketchpad, including learn about IVR (immersive virtual reality)
8. Attending International Symposium on e-Learning
9. Visiting National Museum of Emerging Science and Innovation
10. Additional activities include sight seeing at Mt. Akagi and Mt. Haruna in Gunma and sight seeing around Tokyo, under guide of Professors and by self guide, and visiting Prof. Akahori's house to learn the Japanese life style.

B. Program Outline

1. During the first two weeks (October 13th – Oct 25th 2004):
   a. Briefing Session/Program Orientation
   b. Lecture on Education System in Japan by Prof. Teruyuki FUJITA, PhD from Tsukuba University at JICA HDQ Shinjuku, Tokyo
   c. Lecture on the Effort of In-School Training by Dr. Ito at JICA HDQ Shinjuku, Tokyo
   d. Visiting & attending Lesson Study at Hamanogo Primary School, Chigasaki City, Kanagawa Prefecture
   e. Visiting the University of Tokyo and attending lecture on the Practice for Study of Teaching by Prof. Manabu SATO (Watched a video about Gakuyo Junior High School with Prof. Sato as the presenter) and after that discussion about the Gakuyo Junior High School development.
   f. Lecture on the Effective School Conduct & Improvement of School by Prof. Ono, at JICA HDQ Shinjuku, Tokyo
   g. Lecture on the Practice of Study for Conference Style by Prof. Tadahito INAGAKI at JICA HDQ Shinjuku, Tokyo
2. Periods of October 26th – November 5th 2004:
   a. Moving to Gunma (Maebashi City)
   b. Training at Gunma University with Prof. Izumi NISHITANI from the Department of Mathematics Education, including visiting a Junior High School at Kiryu City and Male Senior High School at Shibukawa City
3. Periods of November 6th 2004 – January 6th 2005:
   a. Moving back to Tokyo (TIC)
   b. Training at Tokyo Institute of Technology, at Akahori Lab with Prof. Kanji AKAHORI, including:
      (i) Attending the International Symposium on e-Learning at NIME, Chiba
      (ii) Attending weekly Research Seminar (in Japanese) every Monday evening
      (iii) Attending weekly English Seminar every Thursday afternoon
      (iv) Learning and developing digital contents using Macromedia Flash, Movie Maker, and Dynamic Geometry Software (Geometer's Sketchpad, CaR, and Grapes) with help of Mr. Oura, Mr. Misono, and Ms. Mio.
      (v) Seminar on Instructional Design (Mr. Yamamoto), Virtual Reality (Ms. Mio)
      (vi) Seminar with Prof. Akahori on "Features and Framework of Information Communication Technology Use in Classes", "Peer Evaluation Using the Web and Comparison of Meta-cognition between Experts and Novices", and "The Features and Roles of Simulation Software in Classroom".
      (vii) Seminar with Dr. Takeshi Matsuda on "LMS/CMS Requirement for Higher Education in Japan", "Instructional designer for Higher Education: Skills and Curriculum", and "Fluctuation of Satisfaction Level of University Students with High Grades".
      (viii) Giving presentation on "The Use of ICT in Indonesian Education" on English Seminar (December 23rd 2004)
      (ix) Giving final presentation on Research Seminar, December 27th 2004.
   c. Visiting Gakuyo Junior High School at Fuji City
   d. Visiting Shinano Education Association and attending the 7th Open Teacher Conference at Nagano City, hosted by Prof. INAGAKI
4. January 7th 2005: Evaluation

5. January 8th 2005: Departure from Japan and going back to Indonesia

C. Explanation about the Curriculum (Activities)

1. Japanese Education System

As mentioned above, during the first two weeks, the training curriculum includes lectures by Japanese professors. The first lecture was given by Prof. Teruyuki FUJITA, PhD from University of Tsukuba. In his lecture, he explained about overview of Japanese education in the era of prewar and postwar. His lecture foucused on the postwar school reform. The following are some main topics described by Prof. FUJITA: (1) School System in Prewar Japan, (2) Postwar School Reform, (3) Aiming High Growth of Economy, and (4) Toward Life-Long Learning Society.

The Japanese education system in the prewar era used a multi-track system. The basic education was the national schools/elementary schools. The next level consists of six different high schools: (1) higher schools, (2) middle schools, (3) girls' high schools, (4) vocational schools, (5) national schools: advanced level, and (6) youth schools. Only students graduated from the middle schools and higher schools can enter university.

There were two courses after elementary schools. The first one led to university education and the other did not. During the prewar era, the opportunity of education for female students was obviously limited.

In the postwar era, the Japanese education system uses one-track/ladder system, which consists of primary schools, junior high schools, senior high schools, junior college and universities. In this era, the students, regardless of gender, or socio-economic status, can enter any schools according to their ability and aptitude.

In this era, there has been school reform in the Japanese education system. The basic framework of the new education system was as follows:

(1). A shift from the prewar, dual school system to single track system, known as 6-3-3-4 system;
(2). The extension of compulsory education to 9 years, including elementary and lower secondary school;
(3). Elitist schools to schools for everyone
(4). The application of three principles: (i) co-education, (ii) comprehensive schools, and (iii) open to all
(5). The establishment of boards of education at prefecture and municipality levels;
(6). Multiple courses: all graduation certificates are valid for higher education
(7). The abolition of normal schools and the establishment of university-based teacher training system.

As the foundation of educational system, the Japanese laws address to issues of the national education, include the following items.

a. The Fundamental Law of Education (March 31, 1947): *"Having established the Constitution of Japan, we have shown our resolution to contribute to the peace of the world and welfare of humanity by building a democratic and cultural state. The*

realization of this ideal shall depend fundamentally on the power of education" (Preamble).

b. Equal opportunity in education (Article III): *"The people shall all be given equal opportunities of receiving education according to the ability, and they shall not be subject to educational discrimination on account of race, creed, sex, social status, economic position, or family origin."*

c. Religious education (Article IX): (i). *"The attitude of religious tolerance and the position of religion in social life shall be valued in education."* (ii). *"The schools established by the state and the local public bodies shall refrain from religious education or their activities for a specified religion."*

Following the Fundamental Law of Education, a number of educational laws determining the structure and management of the education system were passed:

(1). the School Education Law (1947),
(2). the Board of Education Law (1948),
(3). the Social Education Law (1949),
(4). the Private School Law (1949),
(5). the Industrial Education Promotion Law (1951),
(6). the Science Education Promotion Law (1953),
(7). the Law for Promotion of Education in Remote and Isolated Areas (1954),
(8). the School Lunch Law (1954),
(9). the Law concerning the Organization and Management of Local Education Administration (1956),
(10). the School Health Law (1958),
(11). the Law concerning the Free Provision of Textbooks in Compulsory Education Schools (1963), and
(12). the Law concerning Special Measure for Securing Capable Educational Personnel in Compulsory Education Schools for the Maintenance and Enhancement of School Education Standards (1974).

During the period 1974 – 78, the salary of Japanese teachers in compulsory education schools was revised three times, it had risen by 30% and became to higher than the salary of civil servants. After this measure, the traditional image of a low-paid teacher was shaken off, and the number of applicants for teaching profession increased sharply. The examination for teacher appointment became more competitive. Teaching profession became an attractive work option among young people, included capable and outstanding talent young people.

As a result of Japanese education reform, the Japanese students placed the world top rank, both in mathematics and science, on the international comparative studies on educational achievement such as IEA (International Association for the Evaluation of Education Achievement) and TIMSS (The Trends in Mathematics and Science Study). The education has provided the driving force for economic, social and cultural development in Japan. In general, Japanese education has provided qualified human resources (man – powers) for industrial world and Japanese society, who had the basic knowledge and skills for technical change and innovation, who were disciplined, diligent, and constant and who had the collaborative skill needed to work in a group.

Despite of success in the aiming high growth of economy, Japanese education did faced a number of problems and criticisms that included:

(1). Imposition of excessive control over children's behavior as a result of excessive uniformity and rigidity;
(2). The emerging "examination hell" as a result of excessive competition for entry to the best schools or top – class universities;
(3). Loss of children's spirit of inquiry and of creative thinking as a result of a compulsion to rote memorization and educational fore – feeding;
(4). The increased number of children who were unable to keep up with their classes, the so called "ochikobore";
(5). The "desolation of education" phenomenon, where some students reject to attend school (futookoo) by reason of "dislike for school", in – school violence, bulling (ijime) among pupils, apathy on the part of student;
(6). In contrast to high quality level of elementary and secondary education, the mediocre quality of higher education became a major problem issue.

In August 1987, the fundamental perspective on the Japanese educational reform were presented by the NCER (the National Council on Education Reform) in the form of three principles: (1) the emphasize of the individuality of students; (2) the move to a system of life-long learning; and (3) the response to changes such as internationalization and advancement of information technology.

The development of Japanese education in the 1990s included:

(1). The establishment of Central Council of Education under the Ministry of Education, Lifelong Learning Council, and the Lifelong Learning Promotion Law (1990);
(2). Development of an Infrastructure for Lifelong Learning (1990);
(3). Measure to Promote Lifelong Learning in Response to Social Trends (1992);
(4). Measure to Improve Lifelong Learning Opportunities in the Community (1996);
(5). New "Course Study" for elementary and lower secondary schools (1998).

The characteristics of the Current Course of Study:

(1). The educational content is cut by around 30% (e.g. teaching hours for the 6th grade of elementary school was reduced from 1015 to 95, for the 3rd grade of lower secondary school from 1050 to 980, the integrated learning periods was 3 hours a week in elementary school and 2 – 3 hours a week in lower secondary school);
(2). Education is a task to help children develop their own identity and faculties from early childhood to adolescence and it is not just school's responsibility. Schools, families and communities must cooperate and effectively demonstrate their individual educational function. Such well-balanced education is the key to children's sound development. Specifically, children's life style and learning environment need to be changed, and the roles of schools, families and communities need to be reviewed.
(3). School's primary role is to motivate children to learn and to teach them how to learn. School should be a pleasant place for children to feel relaxed. School's role is to satisfy children by providing them opportunities to receive recognition and to realize the self while they interact with one another and with teachers in classes and in other school activities.

The Course of Study and the Five-day school week were fully implemented in April 2002.

## 2. Lesson Study and Teacher development in Japan

In his lecture, Prof. INAGAKI Tadahiko presented a video on "Learning Community – Challenge of Hamanogou Primary School". The Hamanogou Primary School is located at Cirasagi City, and was established in 1998, with the principle is Mr. Ohse and under supervision of Prof. SATO from the University of Tokyo.

The video shown the Ms. Masuie's class on 2nd grade with subject of "Art and Craft of Mixing 3 colors by own images".

During the case conference, each teacher give his/her impression or comments on student learning activities in the classroom, and also learn from his/her observation.

On other part of his lecture, Prof. INAGAKI explained about theoretical problems concerning teaching, as summarized as follows.

- The essential characteristics of teaching involves the specificity of student, content, method, etc.), which make complexity relationship/interaction, as described in the following picture.
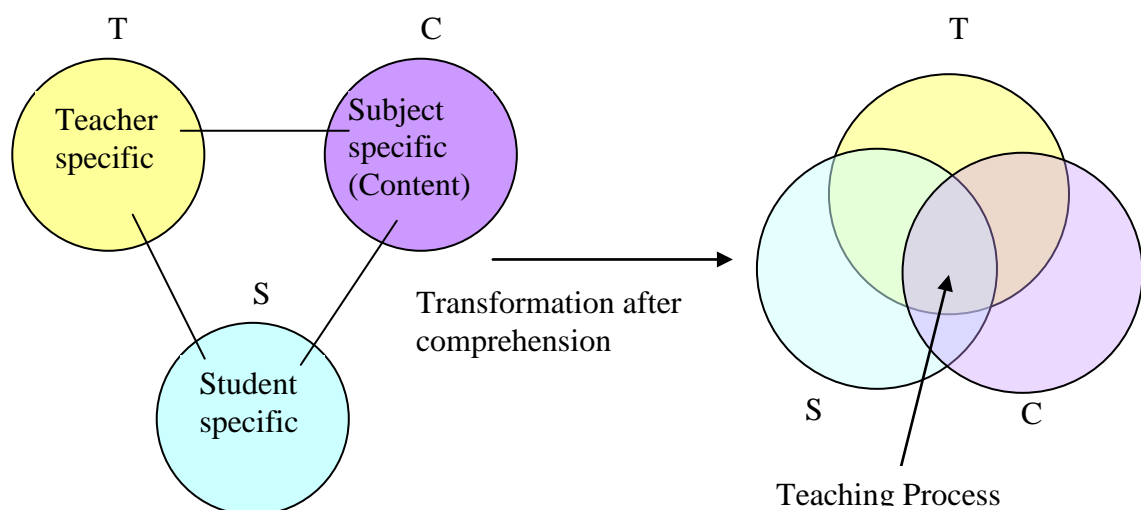
(1). After making judgment, teacher make a teaching **plan** and conduct lesson (**teaching**)

(2). Making **reflection** (collegeous reflection) through **post class conference/ discussion**.

The process of teacher development is a cyclical process (Dr. Shulman's "Model of Pedagogical Reasoning and Action" in Harvard Educational Review, 1987). The model uses the following steps:

(1). **Comprehension** (understanding subject matters, goals of learning, students, etc.) by the teacher.

(2). **Transformation**, which consists of: (i) *critical analysis* of materials, modifications and preparations; (ii) *representations* (choice of analogies, metaphysic examples,

stories, displays, etc.); (iii) *selection* of teaching methods, and (iv) *adaptation and tailoring* to students' prior knowledge, attitudes, etc.

(3). **Instruction** (lecture, discussion, group work, individual work, etc.). This is teaching in action. While teaching is going on, teacher is also understanding, transforming, evaluating, and reflecting his/her development.

(4). **Evaluation and Reflection** (by students, his/her self, and by collegues).

(5). **New Comprehension**. (Through teaching and reflection on teaching, teacher develops new understandings of subject, students, own teaching and self.)

The individual teacher development is a cyclical process of (1-2-3-4-5) → (1-2-3-4-5) → and so on.

- The In-Service Education of Teachers in Japan consists of: (1) a cyclical development of individual teacher, as described above, and (2) collegial development of teachers through learning community, as in lesson study.

The rules of conference (lesson study) in Hamanogou Primary School are follows:

- At least one open lesson per year
- Teacher shows his/her own teaching model
- Teachers do not spend so many time to prepare open lesson.

During lesson study and open lesson, there is sharing the difficulty among teachers and the teaching strategy is also change from telling to listening to students and making connection. The activity system, as described by Prof. SATO, involves teacher (who spend more than 80% times for professional activities, including sharing experiences), students (who devoting their times/energy to lesson), and parents (who actively involve in classroom activities, give supports to school, and attend the classroom).

On the discussion session, Prof. INAGAKI also mention about the Professional Teaching Standards, that are:

(1). Knowledge about students;
(2). Knowledge about subject matter and methods;
(3). Knowledge about student's learning process;
(4). Self development; and
(5). As a community learning member.

As part of lecture on educational system at JICA HDQ Shinjuku, Prof. Yumiko ONO, from Naruto University of Education, who gave lecture on Oct 22nd 2004 explained about "Effective Schools and School Improvement". First part of her lecture, which was also followed by Philippines participants, was a brainstorming on effective schools asking two questions: (1) What are effective schools? and (2) What resources or characteristics are related to "effective schools"? The brainstorming, Prof. ONO explained about School Effectiveness Research (which was mainly referred to Scheerens, 2000) that included the following points:

(1). School effectives research strands (input-output studies: equality of educational opportunity, educational production function, evaluation of compensatory programs, studies of unusually effective schools, and research on teaching)
(2). Characteristics of school effectives research based on focus and variables
(3). Effective instruction research
(4). Effectiveness-enhancing conditions
(5). School effectiveness research in developing countries
(6). Case study on Mandela School , South Africa.

Prof. ONO caution about school effective research (SER) as follows:

- SER is not causal relationship study
- Narrow oriented on basic skills
- Based heavily on studies in developed countries
- Attention on local, cultural contingency
- No single model for all schools or all countries: creativity, commitment, continous efforts of educators to investigate.

3. Training at Gunma University

As part of my JICA's training during the periods of October 13th 2004 to January 8th 2005 is training at Gunma University, given by Prof. Izumi Nishitani of the Department of Mathematics Education, the Faculty of Education. This training is as a result our discussion during Prof. Nishitani's stay in Indonesia a few months ago, as a short term JICA's expert. I stayed at Maebashi city from October 26th to November 6th 2004. During this period, I have followed some activities managed by Prof. Nishitani.

First Impression about Gunma University

For the first time, I arrived at Gunma University accompanied by Mrs. Mariko Takagi from the JICE office. When I entered the university complex, I found the campus is so quiet, not so many students seen around it. Only a few people that I can see then. However, I found that the campus environment is very good with many trees grow inside and around it, so make the air is so fresh.

When Mrs. Takagi asked to someone at the faculty administration office, then Prof. Nishitani come and pick us up to his office. After some talk, Prof. Nishitani introduced me to some lecturers, including Dr. Itoh, whom I already know from his visit to my university about two or three years ago. Then I was shown the room where I can use for my work. It was so impressive for me, because it is a large enough room with some facilities inside it, including air conditioner, fan, telephone, shelter, water sink and tap, sofa, and of course working table and chair. The sun's shine can enter the room during the day because the window faces to sun's direction. However, the room was looked a little bit dirty with dust above the table and on the floor. I thought this room has not been used for a while, so I tried to make to room cleaner and more comfortable to stay. Then I removed the dust above the table with tissue papers I brought, because I didn't find any brush.

Despite this situation, I was happy because Prof. Nishitani said that I could use the telephone for making a local or inter-local call but not international call. In addition, Prof.

Nishitani is very kind to lend me his notebook. I was also very happy because I can access the Internet through the room using the notebook.

During the next days, my activities include attending Prof. Nishitani's classes, attending his students' seminars, giving my speech, and attending lecturer/teacher's seminar. Prof. Nishitani gave me so many respects considering me not as his trainee but his visitor. During his busy times, he always come to my room asking if there is problem with me or when we should go to the class or other place.

Some Lessons from Attending Academic Activities

Attending some Prof. Nishitani's academic activities, I get some lessons and impressions. My first impression is about Math Seminar. I thought it is a big seminar followed by many people as seminar in my university. In fact, it was students seminar followed by two master students, where one of them is a high school mathematics teacher. I was very impressed that the teacher can make so good report and clear and systematic analysis about his research on students understanding in trigonometry.

On the following week seminar there were three students, each presented a well-prepared topic. One student discussed about optional mathematics in schools. From her I learn about the role of optional mathematics as: (1) subject study, (2) work, (3) experiment, (4) search, (5) supplement, and (6) expansive study. In my perception, optional mathematics itself is actually contains 'problem solving' in Japanese's school. Another topic discussed is about arithmetic at elementary school. I was surprised that in Japan the name of mathematics lesson at elementary school is 'arithmetic' rather than 'mathematics'. I also learn the role of arithmetic activities in Japanese's school. Another discussion is about comparation between mathematics education in Japan and in Indonesia. I got surprised about the Japanese students' attitude toward mathematics. Despite the well known high achievement on international survey (by TIMMS 1999 Japanese is fifth rank), it is said that about 70 percent of Japanese high students does not understand mathematics and about 50 percent Japanese high school students dislike mathematics. This fact is surprising me.

On other days, I attended Prof. Nishitani's lectures on third and fourth year classes. I was very impressed with the fourth year students. They are able to develop some computer programs for school mathematics using Visual Basic. Some programs are very interesting. Each student has a laptop for developing his/her program. This situation is very advanced compared to my students, where they are not so skilled in programming although they have facilitated with computer labs and given some lectures on computer programming. Here, I found that the students are looked seriously learn and always do assignment though they are seemed relax. This fact is also found when I attend other lectures, "Teaching Methodology", where each student gave his/her ideas orally on each time as assigned by Prof. Nishitani. In the class they looked very relax attending the lecture but they are seemed very seriously preparing and doing their assignments. I was told by Prof. Nishitani, that by giving such assignments he learns much from the students' ideas. I would like to implement this experience to my class when I go back to Indonesia.

I am very lucky that Prof. Nishitani gave me a chance to give my speech on his classes and on the research meeting. Although I did not have good preparation, just talk about Indonesian mathematics education, this was an invaluable chance where I could introduce about Indonesian education system and mathematics education in my department.

Unfortunately, there was no discussion time due to limited time and I could not speak Japanese so Prof. Nishitani always translated what I talked.

I learn much more about academic life from the discussion forum. This (weekly?) meeting is conducted in informal way, all participants attend and participate actively. The presenters also prepared their problem well, in written paper so all members can read and give their comments. This academic atmosphere is, to may opinion, very good and very conducive to develop constructive ideas and scientific communication among all researchers, staff, teachers, and students. I hope this model can be adopted to my institution.

Some Lessons from Visiting Schools

Prof. Nishitani has managed and arranged my schedule to visit schools. Thanks to him for his sincere and kindness to drive me to everywhere, including visited schools and visited very interesting places at Mount/Lake Haruna and Mount Akagi with very nice scenes along the way to get there. During my stay with him, we visited two schools; once visited a Junior High School at Kiryu to attend teachers meeting and twice observed classes at the Kiryu Junior High School and Shibukawa Senior High School.

Among some lessons that I found during school visits are:
1. Japanese teachers always make lesson plans before they teach and they discuss the lesson preparation with their colleagues and a supervisor from university. This is a good practice to have well-prepared lesson and it reflect the teacher's professional as educator.
2. Schools students use uniform during their school time.
3. Some schools, like Shibukawa Senior High School, are only for male students.
4. Some schools, like the Junior High School at Kiryu, separate a class during certain subject, such mathematics, into two groups and they are taught by different teachers. These groups are based on student's ability on the subject taught.
5. The Shibukawa Senior High School has a very modern computer lab where teacher can monitor what students do during the lesson or examination using the teacher's monitor.
6. School atmosphere is very quiet and there is no student play outside class during lesson time.
7. Schools have very appropriate facilities to support discipline; there are lockers for keeping students, teachers, and visitors shoes when they want to enter the school's rooms; there are students' locker for keeping their bags or books.
8. Students do not hesitate to ask questions when they do not understand about what teacher explain or assign to them.

Although this visit is not long, only two weeks or ten effective days, it has provided me with some meaningful academic, educational, and social experiences that are very useful to me as a way to improve my professional. I hope that these experiences can be shared with my colleagues, including teachers in Indonesia. Ultimately, this should be useful to improve Indonesian education, or particularly mathematics education.

Regarding the relationship between teacher/lecturer and student, here I find that students are very respective to their teachers/lecturers. I was very impressed how students always help to bring teaching tools such as computer or projector, without to be asked. I also find that students always say hello when they meet their teacher/lecturer.

Finally, I would like to thank Prof. Nishitani for his kindness accepting me and giving me such invaluable experiences. I would also like to thanks all Prof. Nishitani's students and

their friends, especially Hayashi-san, Shinmasu-san, Hagimaru-san, and Inagaki-san. They have accompanied me very kindly to see the University Festival.

I hope that this relationship will not end here, but will continue in the form of partnership between Gunma University and my university. At least in the form of student exchange to provide our students other experiences to enrich their sight as candidate of educators to make better education on each country.

4. Activities at Akahori Lab Tokyo Institute of Technology

Monday, 08-11-2004
Meet Prof. Akahori at his office accompanied Mrs. Takagi, Mr. Yamanoto, and Mr. Misono. Explanation about rights, obligations, and training schedule. Given building entrance and room keys. Shown how to use the keys looked at Library, Shop. Provided computer laptop and user account. Try to use the computer and to access Internet. Meet Safiza from Malaysia, Ms Mio, and Mr. Oura and others ...

It' seems that my training schedule at Akahori lab has been prepared well with an expectation of good results as I have to write some report and to present my results at the end of my training. I am happy that there are some Prof. Akahori's students who will assist me. Also I happy that there will be visit to schools to see how ICT has been used (hope so). **However, there will be a big challenge for me, because most computer software are Japanese version as most people speak Japanese also**. *I hope that the Japanese version software will not become a handicap for me to be productive. Of course I will be happy if the computer software is available in English version.*

Learn about free software **Grapes** with Mr. Misono and Ms Mio
I find that this software is similar to some other software (tool for graphing some functions) I ever seen, but forget the name. It is interesting, because it's free and in English. Seeing some its use, I am interested to learn more about this software and I have a plan to introduce it so some people when go back to Indonesia.

Accompanied by Ms Safiza go to Mushalla, pray and break fast together. Meet some other Indonesian/muslim students
It seems that some people bring some foods and drinks for break fast together. I think next time I also will bring some foods for it.

Seminar about Statistics (by ...) and some information from Prof. Akahori
This is a very first challenge seminar here, because everything is written and spoken in Japanese. Luckily, Ms. Mio assisted me to understand some words, though I can only get rough ideas from the presentation. That is also with help of my little background knowledge about statistics. I think to borrow some Japanese - English interpreter device from JICA's office to help me, if possible.

Clean & sweep the room
This is my first experiences that students have to clean and sweep together their room at university. Usually, everybody clean or sweep his/her own room, not do it together at the same time under coordination his/her supervisor. Anyway, this I think is a good education! Then I leave the Lab with a worry because I already missed my dinner at TIC and my breakfast package!

Tuesday, 09-11-2004
Independent study: checking some emails, browsing Internet look for some free mathematical/geometry software. Learn to use GRAPES, tray to use it for calculating an area bounded by two curves. It succeeds but need more efforts and manual calculations. I want to try other problems but it take rather long times as a new user to the software.
Don't know whether what I do is appropriate to the software. I am still curious what abilities and facilities GRAPES provides. I am also very curious whether it is possible to use the work from GRAPES to other application, e.g. For Web application in the form Java Applet. I just compare some other maths software like CABRI or Geometer's Sketchpad that can be used to produce Java

Applet application usable for Web application. I also download evaluation version of Sketchpad to try its capability, though evaluation version unable to save the work. Next day I will continue exploring GRAPES   and other maths/geo software. Today I have to go back to TIC earlier in order not to miss my dinner and breakfast package.

Wednesday

10-11-2004

Independent study: Continue learning to use GRAPES, read its manual, tray to use it for making some simulations as on the example, but not succeed yet. Try to make triangle, inscribe polygon. Prof. Akahori offers me a book to read: **Mathematical Problem Solving and New Information Technologies**. I want to read it and make some resume that I can use for next reference in research or writing papers.

I see this software is simple enough and may be powerful enough to make some mathematical simulation/demonstration usable in teaching. However, its use need for script writing that I don't know yet about its commands for scripting. Some examples exists are very interesting but without explanation how to make it. I try to modify some example for other purposes, but failed. Need more learning!

Thursday, 11-11-2004

Reading the book borrowed from Prof. Akahori, find Bibliographic/Reference Management Tools and download one (**BiblioExpress**) to write some bibliographic citations/references easily

*I found the book is old enough, especially on the topics of computer related to mathematics education. However, for problem solving related topics are still informative and useful for references. I make some citations on the book using **BiblioExpress***

Friday, 12-11-2004

Reading book, searching Internet on Bibliographic Tools (not found the free and better one), having Seminar with Ms Mio about VR, look for some information about VR, download plug-in for viewing VRML and 3D pictures, see interesting geometrical 3D and VR

*I was introduced about VR by Ms Mio. She asked me about my background knowledge about VR. What I know is just from film so I just tried to compare VR with hologram or what I saw on some video games. She explained about the possibility of using VR in education, but I am still wonder because I don't know what VR exactly look like. She also showed to me the software **OmegaSpace** that can be used for making VR application easily. It may be interesting, but all interfaces are in Japanese that make me not possible to learn/use the system by my self. Ms Mio promise to translate or to make the Guide in English to facilitate me to learn it. She informed that the English version will available next year. Today I found an interesting URL: www.geohart.com/virtual-polyhedra*

Monday, 15-11-2004

Make comparison between Indonesian and Japan school maths curriculum (today only extract Indonesian Junior High School Maths Cur.) and tabulated using MS Excel, looking on Internet some geometrical terms, Read a paper from Ms Mio on "Presence and Virtual Environment" (but not so clear for me, need some explanation), attending Research Seminar on Design Experiment and Analysis of Variance

Find some mathematical/geometrical URL and store it on my Favorite menu on IE/myIE2/Maxthon:http://www.geocities.com/thesciencefiles/scimath.html, http://www.algebralab.org/lessons/lesson.aspx, http://regentsprep.org/, http://encyclopedia.thefreedictionary.com/, http://www.mathematicshelpcentral.com/, http://www.walter-fendt.de/, http://www.ex.ac.uk/trol/

Tuesday, 16-11-2004

Independent learning and working to continue making a list of mathematical subjects in Mathematics Curriculum to be compared with Japanese one. Afternoon discuss with Ms Mio about VR. Today I also search on the Internet and information about Geometry (Cinderella, CaR --free) and Virtual Reality

I am interested in comparing Indonesian and Japanese mathematics curriculum, but it needs more times to extract the curriculum. At the afternoon, I have seminar with Mio san to discuss about Virtual Reality (VR). She requested me to respond her questioner about my opinion/background knowledge on VR. I wrote some responses to her questions to my extent. We also made some deals about how to go to NIME for attending the International Symposium on e-Learning. Ms Mio is very kind to register me as a participant in the symposium.

Wednesday, 17-11-2004

Attending International Symposium on e-Learning at NIME (National Institute of Multimedia and Education) in Chiba accompanied by Mr. Misono. At lunch time meet Mr. Tsubokawa from Fukui National College of Technology (Mathematics Education) and have lunch together. On the evening, before leaving Chiba went to Sikayo supermarket to see something interesting to me, but did not find one.

I feel very happy to attend this symposium, because I get a lot of information on e-learning from theoretical to practical aspects. I can see directly the people from different countries, like UK, Canada, USA, Hong Kong, New Zealand, etc. who have been practicing e-learning. Not only seeing and hearing the presentation, I also get the Symposium Proceeding and a booklet contains data on Japanese e-learning practice in Higher Education. All these information are very useful for me that can be my references for writing articles on e-learning.

Thursday, 18-11-2004

Attending 2nd day of the International Symposium on e-Learning at NIME. Today, Ms Mio accompanied me. At the lunch break, Ms Mio brought me a VR studio where I can experience a journey to moon inside a VR cabin. She also introduced me to Prof. Aya Yoshida from NIME, who compiled data about e-learning practice in Japanese Higher education. I ask a permission to use the data as my reference when I need for writing papers. At the evening after symposium, Ms Mio and I meet her friend and they discussed about VR evaluation (?) -- they talked together in Japanese and I didn't understand well what they exactly talk.

During today's symposium, I learn much more about e-learning not only from the presentations but also from the questions from participants during the discussion sessions. It improve my insight about e-learning, theoretically and practically, because almost the presentations are by e-learning developer and practitioners from higher education institutions, like UK Open University, MIT (with MIT Open Courseware), Hong Kong Open University, etc. With help of Ms Mio I can see a VR Studio at NIME. As I imagine, the studio has all high tech audiovisual facilities included some powerful computers and a 3 meter squares VR cabin. I was informed that the use of the studio so far is for research and to explore the possibility of VR use in education, but not used in practical application yet. My observation at NIME and reading NIME booklet find that NIME may be a good institution to have some training or research about multimedia and e-learning. I am questioning if I have a change to visit NIME again. I am interested to learn much more about research and development of multimedia and e-learning conducted at NIME.

Friday, 19-11-2004

Independent learning about geometry software. Afternoon have with Ms. Mio on my daily notes that need more cavitations what I have learned.

Today I continue to learn some geometrical software like free CaR (Compass and Ruler). Afternoon I and Ms Mio discuss about my activities. She asked me to make some more details on my notes. Yes, actually I already learn much about Akahori Lab. Here I find that the term 'seminar' has different meaning from Indonesian 'seminar'. Seminar is not only a formal scientific meeting/presentation/discussion involving many people (usually more than ten) but also which is involving just two persons. Among other things that I find are: (1) the relationship between Prof. Akahori and his students is like a family, (2) during English seminar all students actually learn how make presentation and communicate in English, (3) after Research Seminar Prof. Akahori announces all new and useful information to all members. This forum is similar to a departmental meeting in my Department.

Monday, 22-11-2004

Meeting with Prof. Akahori and all training assistants and trainee to discuss about training schedule and procedure. Learn how to transfer digital video using MS Movie Maker. Attending weekly Research Seminar (two presentations on statistical data analysis). Welcome Party. Room Cleaning. Again we are requested to prepare final presentation that will on Dec 27th and finish final report by Jan 3rd 2005. It seems not too difficult to transfer digital video into computer using MS Movie Maker. Only the Japanese menu that make it difficult to me (at least like a blind). Connection between camera and computer may be very important step. However I only have an analog camera that I want to learn how to transfer my analog video into computer. The weekly Research Seminar as usual is in Japanese that still make me just as a listener without full participate because I only grasp some ideas from the topics, not from the communication. It is a pity for me not to know Japanese

language. Today I learn how Japanese have a party. It looks very funny for me, how people do toast. But I am happy attending the party because all people welcome us and we can eat the foods. (Before the party, Mr. Oura already asked me about foodds that permissible for us to eat as Muslims. Thanks Mr. Oura for your care!). Finally, as usual every Monday evening, before we leave we clean together our room. This situation is like in a family. Everybody has responsibility to clean his/her home!

Wednesday, 24-11-2004
*Independent study, seminar on Instructional Design with Mr. Yamamoto, attending English Seminar. Today there is no many things I done. I just think a list of things to do: **continue making Indonesian - Japanese mathematics curriculum, study the use of Grapes, CaR (mathematical/geometry software), Geometer's Sketchpad and Cinderella (software is being ordered), learn about Virtual Reality**, etc. and start Writing Final Report. But sometime the days are so busy to concentrate. On the afternoon, we have seminar on Instructional design with Mr. Yamamoto. he explain about the book that is being ordered for us. I find the book is very interesting and useful for us as practice guide and also as a reference for conducting research/educational practice. I hope the book will arrive soon. During the English seminar there are four presenters practicing the English presentations. Because it is in English I can fully participate. I find that some research results are interesting enough like **SynChat**. Most are related to e-learning, the topic that I am also interested in. Again, in this seminar I learn how Prof. Akahori teach and give supports and motivation to his students to have good English presentation in the ICCE conference. **But, sometime they talk in Japanese** that in my opinion should be minimize during English seminar to improve our English communication competence.*

Thursday, 25-11-2004
*Independent study (I wanted to work with MS Office – Word/Excel and mathematical software, but sometime the computer has problems and too slow, so I spent much time just surfing Internet to get some useful information/ reading email). Afternoon we have seminar on Flash with Mr. Oura, Mr. Misono, Mr. (), Ms. Mio learn how to install the software and how to make simple animation. I wanted to make some geometrical construction animation with free software **CaR** (Compass and Ruler) that I downloaded from the Internet. It is Java application to produce Java applets. However, the computer seems to run very slow and sometimes become hanging made me frustrated. On the Flash Seminar I learn how make a simple animation. I can make animation of an object moving pass through a circle and changing its color. However, I fail to make animated object change its color continuously, as I expected. Ms Mio showed me URLs that contains some animations/videos for education. I think it is useful to get ideas and to download some files from there.*

Friday, 26-11-2004
Independent study, reply Mr. Saito's email, send email to Prof. Nishitani, Continue to compare Indonesian – Japanese mathematics curriculum, attended English Seminar (16:00 – 19:30). Today there is no new thing I learn. Replying Mr. Saito's email and sending email to Prof. Nishitani. I would like to finish making mathematics' curriculum comparation between Japan and Indonesia, but it seems still need more times. On the afternoon (until evening) I attended the English Seminar (5 presentations). As usual I learn how Prof. Akahori motivates his students to make presentation in English at the ICCE conference. He asked his students to relax and don't worry about English because they are English native speaker. He also mention about research results from his laboratory.

Monday, 29-11-2004
*Independent study, having seminar with Ms Morisa on Staff Development and E-learning in Indonesia
On the discussion with Ms Marissa, we discuss about Staff Development and e-Learning in Indonesia by answering a research questionnaire. We hear that the research is being conducted by Akahori Lab and the questionnaire has been given to six professors from USA, Singapore, Korea, Hong Kong, Malaysia, but no Indonesian. This discussion will contribute to the comparative table. Among issues discussed we find that Indonesian system for faculty development in some aspects are the same as in Japan or USA, but in some other aspects Indonesian is unique. For example, in Indonesia, there is no Faculty Development Center. However, the faculty development is under responsibility of each department/faculty/university and government (national education department). Regarding e-learning, in Indonesia this issue is in the beginning phase and still under*

discussion among some experts. However some universities already establish theirs e-learning either in limited aspect or in an integration form. I am also developing and using e-learning to manage my own online class using free course management software (Manhattan, available at http://manhattan.sourceforge.net).

Tuesday, 30-11- 2004
Independent study, continue comparing Indonesian – Japanese maths curriculum, reading macromedia flash guide (how to make animation, finding examples from Internet)
Today, there is only little thing that I do/learn. Only continue comparing Indonesian – Japanese math curriculum, reading flash guide and finding some examples from Internet and trying to apply some guide but haven't complete yet.

Wednesday, 1- 12 - 2004
Visiting Gakuyo Junior High School at Fuji-city, Shizuoka. Go to there by shinkansen with Ms. Mary (JICE coordinator).
Today I can see by myself the Gakuyo Junior High School at Fuji-city, Shizuoka, which is previously talked to us by Prof. Sato from Univ. Tokyo. After about one hour trip by Shinkansen from Tokyo accompanied by Ms. Kiyosima from JICE we arrived at the school at 01.00 pm. The vice principle accepted us and took us to some rooms in the school's building. This school was previously well known for the students' juvenile and then under supervision of Prof. Sato and with efforts of its principle and teachers it is changed into a good and a model school. I observe that learning activities at science labs, mathematics class, and some school's facilities like music room, computer room, gymnastic hall. During the observation, I find so many students works and activities photos are displayed on wall inside and outside classes. I saw a board for putting students' works as a portfolio. I see that this school has very complete and well-managed facilities. Each teacher has a laptop. The computers at computer lab are arranged in a good way, surrounding the wall with chairs that can easily be rotated – so students can turn to the teacher's position and to his monitor. I saw how students and teacher clean the science lab after doing experiments and before leaving the school. Students are very respect to theirs teachers by always greeting all adults. From this school, the mount Fuji can be seen clearly. I also attend a Teachers' Conference at 03.00 – 17.00 pm. Unfortunately, I missed the lesson study, which was already held on Nov. 25th. On the teacher conference, after the video watching, some teacher gives comments and exchanges their classes' experiences. We get some information on grouping strategy in the class from the principle, Mr. Fujita, during our conversation before we leave the school at 18:00.

Thursday, 2-12-2004
Independent study, continue to learn Macromedia Flash (learn how to make animation with motion, color, and shape tween), Flash Seminar with Mr. Oura and Mr. Tang.
Today I try to learn how to make tweened animation using Macromedia Flash MX 2004. Following some examples provided by Macromedia Flash 4 that I brought from Indonesia, I learn how to make picture, modify picture, how to change object into symbols, how to make simple animation, tweened animation (motion, color, and shape), and how to use button to control animation. However I still have difficulty (not succeed yet) to use button to control animation.

Friday, 3-12-2004
Independent study, continue to learn Macromedia Flash (learn how to make animation with motion, color, and shape tween),
The same as yesterday, today I try to learn how to make tweened animation using Macromedia Flash MX 2004. Following some examples provided by Macromedia Flash 4 that I brought from Indonesia, I learn how to make picture, modify picture, how to change object into symbols, how to make simple animation, tweened animation (motion, color, and shape), and how to use button to control animation. However I still have difficulty (not succeed yet) to use button to control animation even with help of Mr. Tang.

Monday, 6-12-2004
Independent study; try to make button to control Flash animation but it failed. Attending lecture on "Rural Telecommunication" by Prof. Takada from Center for Research of Educational Technology. The lecture is broadcasted to Thailand (INDES participant); Browsing the Prof. Takada website at registered to his online class (using Moodle). Attending Research Seminar; Filling AEN online questionnaire. Before attending Prof. Takada lecture, Prof. Akahori shown the facilities used for

transmitting the "tele-lecture", including control room, monitor room, server room, and transmitter antenna. In the research seminar, Mr. Misono presented topic of "Printed Material Recommendation System Based on Student's Scores", while Ms. Mio presented activities on ICCE they just participated in Australia. Before the seminar, I tried to enter the Prof. Takada's home page and his e-learning system (using Moodle). On evening, I got interesting information on e-larning on the website of AEN (www.aen.org).

Tuesday, 7-12-2004
 Independent study/work, installed the Geometer's Sketchpad that is just got today from Mr. Misono. Look at some examples from the software and tried to make some geometrical objects for school mathematics (for Junior/Senior High School).

Wednesday, 8-12-2004
Independent work, created geometry teaching materials (circle, triangle) using Geometer's Sketchpad and CaR, converted into Java Applet (HTML).

Thursday, 9-12-2004
Independent work, creating teaching materials on geometry (circle, triangle) using Geometer's Sketchpad and CaR, converted into Java Applet (HTML). There was problem with the Java Sketchpad on calculations involve units. Java Sketchpad do only use the same unit on one document either pixel, radian or degree but no mixed. Meanwhile the free software CaR offer better solution to present units in calculation. There was English Seminar by Prof. Akahori on "Framework of Integration of ICT into Class". There was also request to present on the next week English seminar and I offered myself to present my power point presented at Gunma university. There was also a discussion with Mr. Takashi on e-learning, he showed some conditions of Japanese e-learning, lectures for AEN (Asia E-learning Network) countries and Australia.

Friday, 10-12-2004
Independent work, edited the HTML file & Java Applet on circle teaching (Circle0.html) using MS Front Page, but it was trouble with the Japanese version. I couldn't recognize the Japanese Font Page menus. Looked at Ms. Mio's presentation on Power Point about "Quick Prototyping Methods for Constructing IVR Contents".

Monday, 13-12-2004
Independent work, looking for information on e-learning in Indonesia, following Mr. Misono explanation about Macromedia Dreamweaver. Today I tried to transfer my analog video to digital video with Ms. Mio but it was failed. Attending the weekly seminar (Mr. Oura presented his power point on "Effective Use on Power Point in Teaching".

Thursday, 16-12-2004
In the mooring (10.30 – 12.00) I presented on English Seminar. My presentation was about "ICT in Indonesian Education". On evening we went to MeScie Emerging Science and Innovation Museum at Odaiba, practice how to design IVR at the MeScie IVR research room, guided by Ms. Mio and his friend.

Friday, 17-12-2004
Leaved TIC for Nagano at 07.00 in the morning. Met Ms. Mari Kiyoshima (JICE coordinator) at Shinjuku station, got train to Omiya Sta. and then got Shinkansen to Nagano. Arrived at Nagano about 9 a clock, went directly to the Garden hotel to put luggage. Got on the bus to Shinano Teacher Center, welcomed by Prof. Inagaki and the president and also some teachers having training there. Then we saw the video on history of doll exchange between Japan and USA during the war era (World War I and II), and history of Japanese doll "Miss Nagano", continued to see the "Blue Eye Doll" exhibition and the "Miss Nagano" doll, who has been reapired after 70 years kept at a museum in California and will be returned to USA. After lunch (treated by Prof. Inagaki) we went to Sairyo Junior High School to attend the lesson study on science (Chemistry experiment on mixing and reaction between Feron and sulphure) continued by post conference and discussion until 5 pm.

Saturday, 18-12-2004

Left the Garden hotel at 08.00 and went to Kenkoji shrine, for just a moment, and then walked to the Teacher Center to attend the Teacher Seminar until 12.30. Three teachers, who have been following training at the Institute for one year, presented their teaching research (teaching development) on Integrated Studies. After lunch we attended the 7th Open Conference until 16.40 and got train at Nagano Sta to Shinjuku.

Monday, 20-12-2004
Had seminar/discussion with Prof. Akahori, who presented his research on "Feature and Roles of Simulation Software in Classroom" and "Peer Evaluation Using the Web and Comparison of Meta-cognition between Experts and Novices". I got 80GB external hard disk to store my files. Independent work, learn how to make movie with Movie Maker with Misono san. Attended weekly evening seminar on "Support System for Learning Japanese by Mobile Phone" by Chinese student. After that, we clean and sweep the Akahori lab.

Tuesday, 21-12-2004
Independent work at TIC computer lab, moving files from Flash memory to hard disk, download the resources for presentation, create Java applet applications using CaR and Geometer's Sketchpad.

Wednesday, 22-12-2004
Transfer the video of MeSci Museum & Nagano (Miss Nagano Doll), work on Japanese Cleaning Day (cleaning and weeping the Akahori lab), and dinner party (there was a "magic show" by Prof. Akahori.
Thursday (23-12-2004) to Sunday (26-12-2004)
Preparing final presentation

Monday, 27-12-2004
Lunch Pizza Party. Had presentation on final results.

Tuesday (28-12-2004) to Thursday (6-1-2005)
Writing final report.

5. Dynamic Geometry for Teaching and Learning Mathematics

The following items are presented during the final presentation.
- Paper - and - pencil constructions and plots are *static* (as are figures in books, calculator plots, word/graphic processing, etc.) → No geometrical relationship between geometrical objects remain to hold when one of the object is changed
- In *dynamic geometry*, construction can always be dragged, squeezed, stretched, or otherwise changed while keeping all mathematical relationship intact.
- Can be used to explore mathematical properties in a construction (geometrical construction, function plots, etc.

Geometry Software

1) **CABRI** → Commercial, two dimensional geometry, can produce Java Applet application (with CABRI JAVA)
2) **Geometer's Sketchpad** → Commercial, two dimensional geometry, can produce Java Applet application (with JAVA Sketchpad)
3) **Cinderella** → Commercial, capable of constructing 3 dimensional objects, can produce Java Applet application
4) **CaR** (Compass and Ruler) → Free Java Applet, can be run from Web, can produce Java Applet application (with the JVA CaR itself)
5) Enable producing Interactive Geometry Activities for teaching and learning without using the geometry software, which is in some cases are not available to students

Use of Dynamic Geometry

1) To construct geometrical objects/relationship among objects easily
2) To explore & to teach geometrical definitions, properties, and theorems, e.g. geometrical concepts and theorem proofs
3) To make classroom presentation, e.g. show to construct midpoint, square, angle bisection, etc.
4) To construct some interesting geometrical patterns and animation
5) To produce and publish interactive geometry activities accessible from Web

Dynamic Geometry Software can be use as tool for

1) Exploring Euclidean or Transformation Geometry dynamically
2) Developing conceptual understanding
3) Visualizing mathematics
4) Modeling real world problems
5) Making connections to domains outside geometry
6) Encouraing the articulation of mathematical thinking
7) Promoting collaboration in mathematics classrooms

Some Examples (Java applet produced using Geometer's Sketchpad and CaR)

1. Understanding the Concept of Circle
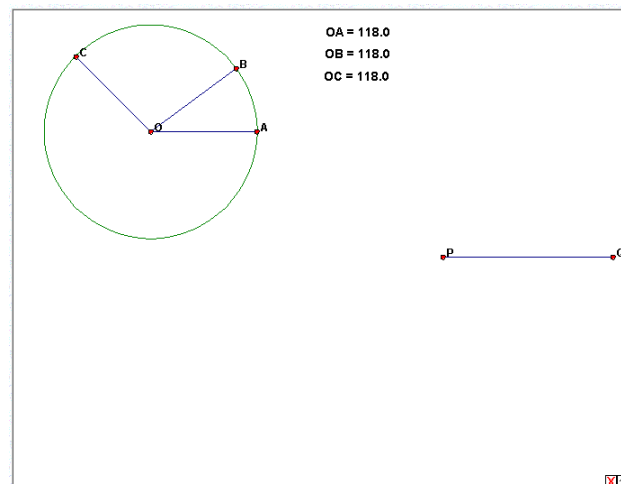
What is Circle? Can you mention the names of things that have circular form? Look at the above picture!

1. Look at the first figure on the left above. On the figure you see three kinds of object: (1) four points (O, A, B, and C), (2) three segments of OA, OB, and OC, and (3) a closed curve passing through the points A, B, and C.
2. Now look at the length of the segments OA, OB, OC shown on the right side of the figure. What can see about these length? You can make exploration with the picture.
3. Using your mouse, drag the point A to any point/direction you want. What can you observe about the figure and the values of OA, OB, and OC? How about the point O?
4. Do the same thing on the point O. What can you observe about the figure and the values of OA, OB, and OC? How about the point A?
5. Now, drag the point B or C. Can you drag it to any point/direction? How about the values of OA, OB, and OC while you are dragging B or C?

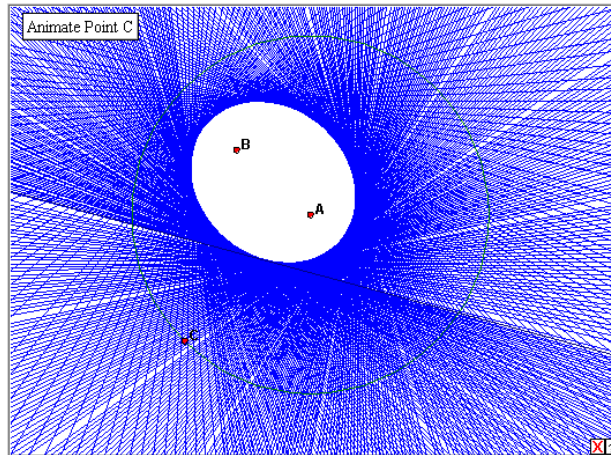6. What can you say about the three objects on the figure?
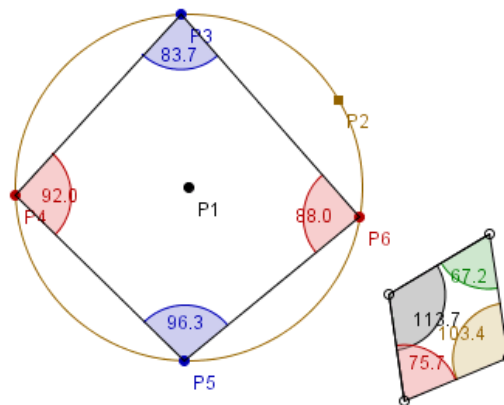
2. Construction of a Circle

Constructing a Circle

m AB = 113.386

Animate Point B

3. Circle Locus


Animate Point B
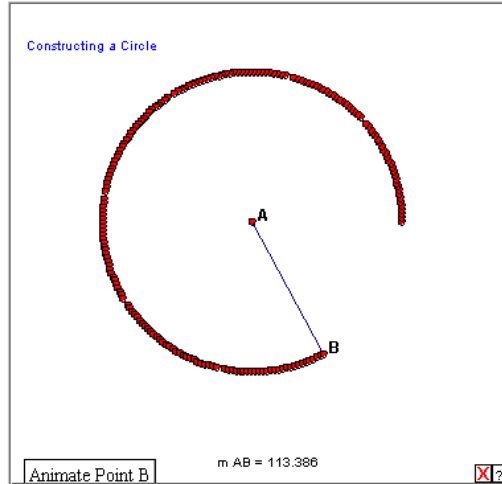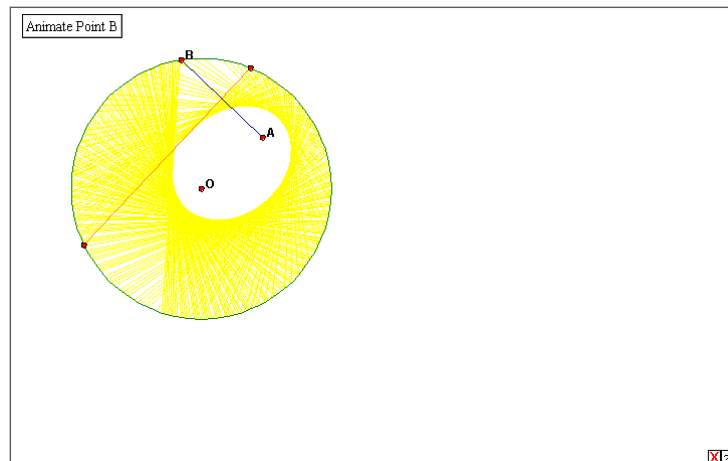
4. Folded Circle

5. Circle and Its Properties

CYCLIC QUADRILATERALS

Look at the quadrilateral with vertices located at a circle. What special properties can you see in this quadrilateral have?

1. Tray to drag any point, which points can be dragged freely, which points can be dragged only throuhh the circle?
2. What changes happen when you drag a point?
3. Which angles change when you drag a point?
4. What properties will not change whenever you drag any point?
5. Are these properties hold for arbritary quadrilateral?
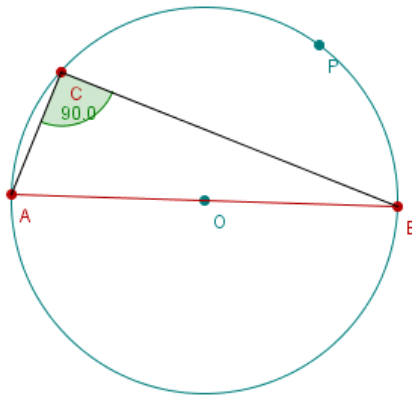
The angle in a semi-circle

A circle is shown along with its diameter **AB**. The point **C** on the circumference is joined to the ends of the diameter (**A** and **B**).
What property does the angle <ACB have?

  1. Move the point C
  2. Observe the value of the angle
  3. Move the point A
  4. What change can you see?
  5. Move the point P
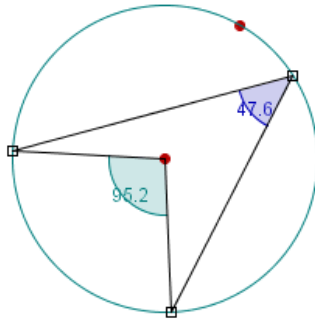 6. What change can you see?
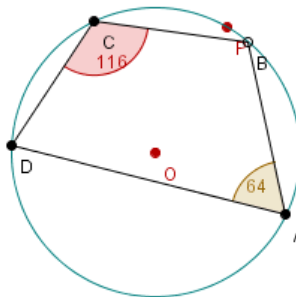
The angles on the circumference

A circle is shown and two points (**A** and **C**) are chosen on the circumference. These are joined to the point **B** on the circumference, and then to the point **D** on the circumference.
What properties do the angles <BAD and <BCD have?
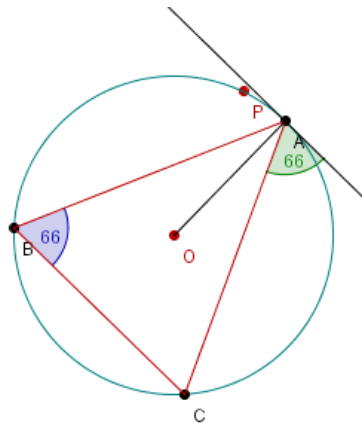What property does the angle <ACB have?

  1. Move one point to anywhere as you can
  2. What change can you observe?

The angle at the centre

A circle is shown and two points are chosen on the circumference. These are joined to the centre and to another point on the circumference.
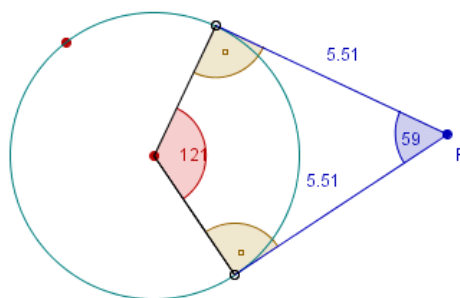What properties do the angles thus formed have?

The angle between a chord and a tangent

A triangle is drawn with its vertices on a circle. A tangent to the circle is drawn at one vertex.
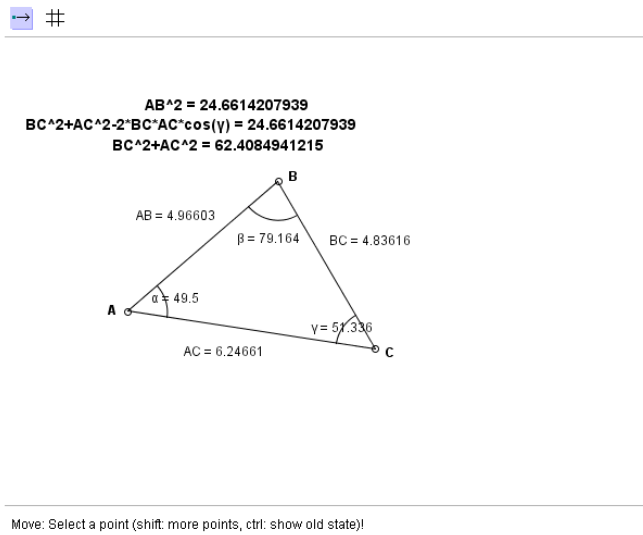What properties do the angles thus formed have?
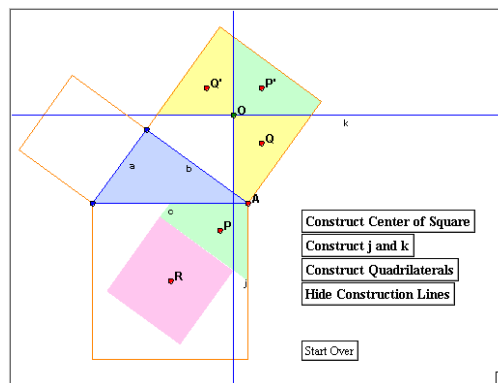

The tangents from a point to a circle

The two tangents from a point P to a circle are constructed.
What properties do the two tangents have?

6. Inscribe Angle (Angle on Circle's Circumference) → See above
7. Law of Cosines in a Triangle

8. Pythagorean Theorem

IV. SUMMARY AND FOLLOW UP PLAN

A. Summary

- This training is supported by JICA under the IMSTEP JICA Follow up Project
- Training period: October 13th, 2004 to January 7th 2005
- Participated by three faculty members from the Indonesian Education University (Bandung), Yogyakarta State University, and State University of Malang

Scoping Activities:

1) Attending Lectures by Japanese professors during the first two weeks
2) Attending Lesson Study at Hamanogo Primary School
3) Training at Gunma University with Prof. Nishitani
4) Training at Tokyo Institute of technology with Prof. Akahori
5) Attending International Symposium on E-learning at National Institute of Multimedia for Education (NIME), Chiba
6) Visiting Gakuyo Junior High School at Fuji City

7) Vising the Center of Teacher Association at Nagano City, attending Lesson Study at Sairyo Junior High School, attending Open Teacher Conference

Some Lessons from this Training:

- Knowledge on Japanese Educational System and Practice within schools and higher education
- Knowledge on Japanese Culture, Transportation System, Recycling System (Flea market), Foods, People, etc.
- Experience on IVR (Immarsive Virtual Reality)
- Knowledge on e-learning practice in USA, Canada, England, Korea, Hongkong, and Japan
- Skill in developing multimedia contents (digital video, flash, dynamic geometry, etc.)
- etc.

B. Follow up Plan

1. Continue develop teaching materials using dynamic geometry software
2. Upload the teaching materials on the Web and distribute it using CD
3. Conduct training on the use of ICT for education to Indonesian teachers
4. Introduce lesson study to Indonesian schools
5. Conduct research on the use of ICT in Indonesian education
6. Continue to make contact with Japanese experts, especially Prof. Nishitani and Prof. Akahori to exchange experience and conduct research collaboration (if possible)

VI. APPENDIX

A. Some facts on Japanes Education

Japanese Student Achievement under International Comparative Studies

Study Year	Rank in Mathematics		Rank in Science	
	Primary School	Junior H. S.	Primary School	Junior H. S.
1964 (TIMSS 1)		2nd in 12		
1970 (TIMSS 1)			1st in 16	1st in 18
1981 (TIMSS 2)		1st in 20		
1983 (TIMSS 2)			1st in 19	2nd in 26
1995 (TIMSS 3)	3rd in 26	3rd in 41	2nd in 26	3rd in 41
1999 (TIMSS-R)		5th in 38		4th in 38

Source: Prof. FUJITA's lecture note

Japanese Student Attitude toward Mathematics and Science
(Junior H. S. level 2, 1995)

Question	Yes in Japan	World Average
Like Math?	53%	68%
Math fun?	46%	65%
Interested in Math related career?	24%	46%
Like Science?	56%	73%
Science fun?	53%	73%
Interested in Science related? career?	20%	47%

Source: Prof. FUJITA's lecture note

The number of Japanese Schools, Students and Teachers (2003)

	Schools	Students			Teachers					Female Ratio (%)	
						Fulltime					
	Total	Total	Male	Female	Total	Total	Male	Female	Part-time	Students	Teachers
Total (including universities)	62.086	20.734.350	10.747.453	9.986.897	1.750.717	1.320.438	695.175	625.263	430.279	48.2	47.4
Kindergarten	14.174	1.760.494	891.753	868.741	121.219	108.822	6.621	102.201	12.397	49.3	93.9
Primary Schools	23.633	7.226.910	3.697.341	3.529.569	430.391	413.890	154.423	259.467	16.501	48.8	62.7
Junior High Schools	11.134	3.748.319	1.915.040	1.833.279	279.393	252.050	148.949	103.101	27.343	48.9	40.9
High Schools	5.450	3.809.827	1.927.522	1.882.305	322.919	258.537	188.575	69.962	64.382	49.4	27.1
Secondary Schools (6 years)	16	4.736	2.716	2.020	580	382	255	127	198	42.7	33.2
Special Education Schools	995	96.473	61.361	35.112	63.228	61.094	25.909	35.185	2.134	36.4	57.6

Source: Prof. FUJITA and Prof. INAGAKI 's lecture notes

Teacher Distribution/Position Status (2001)

Position	Primary Schools		Junior High Schools		High Schools	
	Total	Female (%)	Total	Female (%)	Total	Female (%)
Principles	22.736	17.7	10.114	4.3	5.201	4.7
Vice-principles	23.085	22.0	11.179	7.5	7.785	5.1
Teachers	325.733	65.1	207.092	40.3	222.937	25.1
Lecturers (part-time teachers)	17.406	77.6	12.342	59.3	15.156	42.4

Source: Prof. FUJITA's lecture note

Competitive Teacher Employment Exams (2004)

Prefecture / Level	Ehime Prefecture		Aichi Prefecture	
	# Vacancies	# Applicants	# Vacancies	# Applicants
Primary Schools	560	1837	380	1753
Junior High Schools	230	2129	200	1721
High Schools	170	1772	135	1863

Source: Prof. FUJITA's lecture note

B. Activities on Picture

Please see and print the separated file (Activities_inPicture.doc)