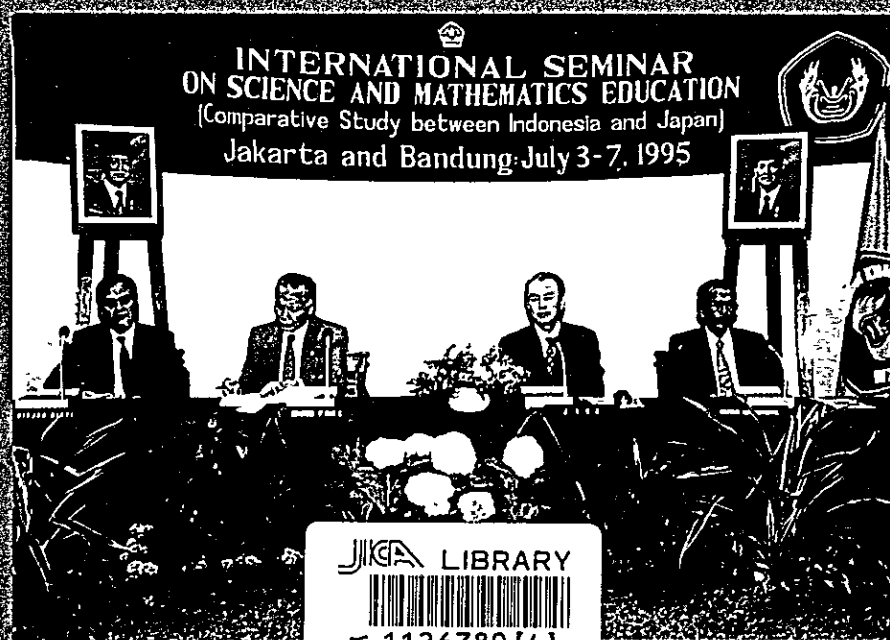


**INTERNATIONAL SEMINAR
ON SCIENCE AND MATHEMATICS EDUCATION
(Comparative Study between Indonesia and Japan)
Jakarta and Bandung: July 3 - 7, 1995**

PROCEEDING



Sponsored by:

**Directorate General of Higher Education
Department of Education and Culture**

**Japan International Cooperation Agency (JICA), Indonesia Office
Bandung Institute of Teaching and Educational Sciences (IKIP Bandung)**

Preface

This proceeding contains some information on activities of the International Seminar on Mathematics and Science Education held in Bandung on July 3 - 7, 1995. This seminar was jointly sponsored by Directorate General of Higher Education of the Republic of Indonesia, Japan International Cooperation Agency (JICA), and Bandung Institute of Teaching and Educational Sciences (IKIP Bandung).

As you pursue the pages of the Proceeding you will discover a vast array of the seminar information concerning the background, schedule, conclusions and recommendation, collection of seminar activities pictures, opening and closing remarks, clipping of news papers, and collections of seminar papers.

The Committee

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INTERNATIONAL SEMINAR ON SCIENCE AND MATHEMATICS EDUCATION

(Comparative Study between Indonesia and Japan)

Bandung, July 3 - 7, 1995

1. Background

As indicated in the Broad Guidelines of State Policy (GBHN) of the Republic of Indonesia, in the second phase of the long term development plan, the emphasis will be put on human resource development. It means that the role of education, particularly in primary and junior high schools will be of great importance. Furthermore, in supporting industrialization plan, the mastery of basic sciences and mathematics among future Indonesian citizens should be developed and improved. Therefore, the efforts to improve science and mathematics teaching need to be conducted more intensively.

However, the results of many assessments indicate low achievement in science and mathematics in both primary and secondary education. This low achievement in the subjects has been related to, among others, the inappropriate formal qualification of the existing teachers. Therefore, one way to improve science and mathematics education in primary as well as in secondary schools is by improving and strengthening science and mathematics education programs in 10 Institutes of Teaching and Educational Sciences (IKIPs) and 20 Schools of Education (FKIPs) all over the country. For this purpose, in 1988, the Directorate General of Higher Education (DGHE) established the Basic Science Team consisting of senior staffs of IKIP Bandung and ITB to assist IKIPs and FKIPs in improving science and mathematics education programs.

Since the condition of IKIPs and FKIPs varies, it is impossible for the Team to complete the task within the given time of assignment. To follow up the efforts of the Basic Science Team, FPMIPAs (School of Science and Mathematics Education) of five IKIPs, one of which is IKIP Bandung, have been determined as Growth Centers in science and

mathematics teacher education in Indonesia. As a Growth Center, FPMIPA IKIP Bandung has to (a) develop itself to be an appropriate model of science and mathematics teacher education institution, (b) improve capability of developing itself continuously and independently, and in the future (c) facilitate the development of other IKIPs and FKIPs. Therefore, FPMIPA IKIP Bandung designed the Indonesia-Japan Seminar to accomplish all these objectives.

2. The Objectives of the Seminar

1. To have a comprehensive understanding on the real feature of Science and Mathematics Education in primary as well as in secondary schools both in Indonesia and in Japan.
2. To establish cooperation particularly in research on science and mathematics education at schools.

3. Date and Venue of the Seminar

The seminar was held in Indonesia commencing July 3 and ending July 7, 1995. The seminar was opened by the Minister of Education and Culture on July 3, 1995 in Jakarta. Other sessions of the seminar were held on the campus of IKIP Bandung, jalan Dr.Setiabudhi 229, Bandung, Indonesia.

4. The Seminar Organization

The Seminar was jointly sponsored by Directorate General of Higher Education (Teacher Development Project), Japan International Cooperation Agency (JICA), and IKIP Bandung. IKIP Bandung had been decided as the host of the seminar.

In the seminar, six Japanese and six Indonesian speakers presented their papers of various topics on science and mathematics education in Japan and in Indonesia. Minister of Education and Culture of the Republic of Indonesia delivered his commencement speech at the opening ceremony at the Department building in Jakarta, Indonesia. Dr.Achmad A. Hinduan and Prof.John T. Shimozawa were Indonesian and Japanese keynote speakers, respectively.

One hundred twenty participants attended the seminar. They are Japanese professors, primary and secondary school teachers, IKIP faculty staffs, Deans of Growth Centers, in-service teacher trainers, and

the ministry education and culture officials. A speaker presented his paper for 30 minutes and spent another 30 minutes for a discussion with audiences. Generally, each speaker discussed his finding, proposed and suggested his ideas to improve the quality of science and mathematics education particularly in Indonesia.

In addition to the seminar, there were several activities as a seminar complement. Japanese participants visited ITB, PPPG, and Boscha observatory to observe the scientific activities in those institutions. The dinner rector was the excited Japanese participants. They enjoyed Indonesian foods and sundanese performances.

Closing remarks by Japanese and Indonesian speakers ended the International Seminar on Science and Mathematics Education on July 7, 1995. Prof. John T. Shimosawa, a Jica expert, summarized the seminar. He also proposed the frame work of future cooperation between Japan and Indonesia. Finally, Prof. Harsono Taroepratjeka, Director of Academic Financial affair of the Directorate General of Higher Education of the Ministry of Education and Culture of the Republic of Indonesia closed the seminar activities. The farewell party of the seminar was sponsored by JICA at Daishogun Restorant in Bandung, Indonesia. The commettees of the seminar are as follows:

Advisory Committee

Prof. Dr. Ir. Harsono Taroepratjeka
Prof. Drs. H.M. Abdul Kodir, M.Sc.
Prof. Dr. H. Moh Fakry Gaffar, M.Ed.
Prof. Dr. H. Endang Sumantri, M.Ed.
Drs. H. Karna Yudibrata
Drs. H. Ilyas Purakusumah
Dr. Utari Sumarmo
Prof. Dr. John T. Shimosawa
Ir. Oetomo Djajanegara
Prof. Ir. S. Pramoejadi
Dr. R. K. Sembiring
Prof. Dr. Ratna Willis Dahar, M.Sc.
Mr. Niida Satoshi
Ir. Dadang Sudiarto
Drs. Sutrisno
Drs. Enoch Moh. Syah

Steering Committee

Dr. Achmad A. Hinduan, M.Sc.
Drs. Harry Firman, M.Pd.
Prof. H. E. T. Ruseffendi, S.Pd, M.Sc. Ph D
Dr. Dadi Setia Adi, M.Sc.
Dr. A. Munandar
Drs. Wahyana
Dr. Sumar Hendayana, MSc.

Organizing Committee

Dr. Achmad A. Hinduan, M.Sc.
Drs. Harry Firman, M.Pd.
Dr. Eddy M. Hidayat, MA.
Drs. Momo Rosbiono, MPd.
Dr. Sumar Hendayana, M.Sc.
Dr. Sjaeful Anwar
Dra. Dewi Rachmatin
Dra. Roswati Mujiarto
Drs. H. Lyon Kertawidjaya, M.Pd.

Committee Members

Dr. Nuryani Rustaman
Drs. H. Yaya Sukjaya Kusuma, M.Sc.
Drs. Jozua sabandar, M.A.
Drs. Yusuf Hilmi Adisenjaya, M.Sc.
Drs. I. Made Padri, M.Pd.
H. Wawa Kartiwa, SH.
Drs. Kosim Rukmana, M.Si.
Drs. Didi Teguh Chandra, M.Si.
Drs. Adi Rachmat, M.Si.
Drs. Jajang Saefullah
Haryati
Drs. Asep Kadrohman, M.Si.
Drs. O.C. Supratman
Dra. Laksmi Prihantoro, M.Pd.
Dra. Zackiyah
Dra. Windartun, M.Si.
Drs. Omang Wirasasmita
Drs. Rahmat Seliadi, M.Sc.
Drs. Dinn Wahyudin, M.A.
Drs. Didi Supriadie
dr. Kemal Adyana Kurnadi

5. Schedule

Date	Time	Topic	Speaker	Chairman	Secretary	Place
Monday July 3, 1995	Morning 08.00 -	Indonesian Participant depart from Bandung to Jakarta by Bus				
	Afternoon 14.30 - 16.00	Opening Ceremony	- Rector of IKIP Bandung - Japanese Ambassador to Indonesia - Minister of Education and culture, Republic of Indonesia			Department of Education and Culture, Jl. Jend. Sudirman, Senayan Jakarta.
	Evening 19.30-20.30	Japanese and Indonesian Participants depart from Jakarta to Bandung via Puncak Stop over at Puncak Pass Restaurant for dinner and informal talks				
Tuesday July 4, 1995	Morning 09.45-10.00 10.00 - 11.00	Coffee morning Indonesian Keynote Speaker	Dr. Achmad A. Hinduan (IKIP Bandung)	Dr. Eddy M. Hidayat	Yozua Sabandar, MA.	Aula IKIP Bandung
	11.00 - 12.00	Japanese Keynote Speaker	Prof. John T. Shimozawa (JICA Expert)	Prof. Hisoyoshi Igo	Yozua Sabandar, MA.	Aula IKIP Bandung
	Afternoon 12.00 - 13.00 13.00 - 17.00	Lunch Visit ITB and PPPG-IPA Japanese participants)				
Wednesday July 5, 1995	Morning 09.00 - 10.00	Mathematics Education in Indonesia	Dr. Suryanto (IKIP Yogyakarta)	Prof. E.T. Ruseffendi	Yaya Sukjaya K., M.Sc.	Aula IKIP Bandung
	10.00 - 10.30 10.30 - 11.30	Coffee break Mathematics Education in Japan	Prof. Nobuhiko Nouda (The Univ. Tsukuba)	Prof. Yasuo Hara	Yaya Sukjaya K., M.Sc.	Aula IKIP Bandung
	Afternoon 11.30 - 13.00 13.00 - 14.00	Lunch Physics Education in Japan	Prof. Yasuo Hara (The Univ of Tsukuba)	Prof. Nobuhiko Nouda	Drs. Wahyana	Aula IKIP Bandung
	14.00 - 14.30 14.30 - 15.30	Coffee break Physics Education in Indonesia	Dr. Sutrisno (ITB Bandung)	Drs. Omang Wirasasmita	Drs. Wahyana	Aula IKIP Bandung

Date	Time	Topic	Speaker	Chairman	Secretary	Place
Thursday July 6, 1995	Morning	09.00-10.00 Biology Education in Indonesia Coffee break 10.00 - 10.30 10.30 - 11.30 Biology Education In Japan	Dr. Sutiman Bambang Sumitro (Brawijaya University) Prof. Shozo Ishizaka (Toyama University)	Dr. Nuryani Rustaman Yusuf Hilmi, M.Sc.	Yusuf Hilmi A., M.Sc. Prof. Satoshi NIDA	Aula IKIP Bandung Aula IKIP Bandung
	Afternoon	11.30 - 13.00 Lunch 13.00 - 17.00 Tours (Japanese participants)				Boscha observatory Tangkuban perahu, Moispring Water Resort Clater
	Evening	19.00 - 20.00 Integrated Science Course in Japanese Schools 20.30 - 21.30 Integrated Science Course In Indonesian Schools	Prof. Hisayoshi Igo (The Univ. of Tsukuba) Mr. Hadari (PPPG-IPA)	Prof. John T. Shimozawa Dr. Nuryani Rustaman	Dr. Eddy M. Hidayat Dr. Eddy M. Hidayat	Aula IKIP Bandung Aula IKIP Bandung
	Morning	08.00 - 08.30 Coffee morning 08.30 - 09.30 Overview of Science Education in Japanese Schools 09.30 - 10.30 Overview of Science Education in Indonesian Schools 10.30 - 11.00 Closing remarks 11.00 - 11.30 Closing remarks	Mr. Satoshi Nilda (High School Teacher in Tokyo) Mr. Tatang Suryana (High School Teacher in Bandung) Prof. John T. Shimozawa UICA Expert Prof. Dr. Harsono Tanoepriatjeka (DAA DGHE)	Prof. Shozo Ishizaka Dr. Sumar Hendayana	Yaya Sukjaya K., M.Sc. Yaya Sukjaya K., M.Sc.	Aula IKIP Bandung Aula IKIP Bandung Aula IKIP Bandung Aula IKIP Bandung Aula IKIP Bandung
Friday July 7, 1995	Afternoon	13.30 - 14.00 Lunch				Aula IKIP Bandung
	06.15	Japanese Participants go to a. Yogyakarta by Buroq b. Surabaya c. Denpasar Visit :				
Saturday July 8, 1995	06.15	Return to Jakarta from : a. Yogyakarta b. Malang c. Singaraja Bali				
Monday July 10, 1995		Report to the Embassy of Japan and JICA in Jakarta. Depart from Jakarta to Tokyo				

Note

6. Conclusions and Recommendations of The Seminar

- (1) The seminar in general has achieved its main targets i.e. introducing the Japanese experts on the development and problems of the education in mathematics and basic sciences in the Indonesian Schools. Through the presentations of The Japanese experts, the Indonesian participants also gain knowledge the same development and problems in Japan.

The visit to the various institutions like IKIP Bandung, ITB and PPPG gives also an insight on the institutions engaged in the development of education in basic science and mathematics in Indonesia, and their coordinated efforts to overcome the constrains in the development.

- (2) Personell contacts and discussion between the participants of the seminar will also become a base for future relationships both between the participants and the institutions they represent. This phenomena also hapenns between teachers of elementary and secondary school, the faculty members of FPMIPA, and the graduate students of the graduate school of IKIP Bandung who attend the seminar. This relationship is very important in the development of the second target of the seminar namely to establish cooperation particularly in research on science and mathematics education in Indonesia.
- (3) These two achievement mentioned above will also strengthened, when the Japanese experts extends their visits to IKIP Malang, Yogyakarta after the seminar.
- (4) For the future development of the planned JICA assistance to the Growth Center it is hoped that :
 - a. The Japanese participants will be able to explain to JICA-Tokyo on the basic idea and future role and development of the Growth center.
 - b. They will also become a source of future experts (including the Institutions they represent) for the Growth Center, if in the future JICA will need the assistance of experts through the possible technical assistance extended to The Growth Centers.

(As a note, in the closing remarks, Prof. Dr. Harsono Tarupratjeka, Director of Academic Affair, Directorate General of Higher Education, pointed out that since late 1980s the Ministry of Education has been planning to establish Growth centers for improving science and mathematics education in primary and secondary schools, the ultimate goal of which is for improving the quality of human resources. Prof. Harsono has also expressed his grateful to JICA for its important attention and for its providing support for the development of these Growth Centers.

- (5) As a first step, The future visit of Dr. Hinduan can be organized to continue the initial contacts already established during the seminar. It is also hoped that some initial contact will be initiated by IKIP Bandung with the institutions represented in the seminar.

7. Appendix

7.1. PARTICIPANTS

7. Appendix

7.1. Participants

Participants of this seminar consist of science and mathematics teachers, university professors, and staff of the in-service teacher training institution coming from Indonesia as well as from Japan

LIST OF SEMINAR PARTICIPANTS

No.	Name	Position/Institution
1.	Prof. Dr. Wardiman Djojonegoro	Minister of Education and Culture
2.	Prof. Dr. Bambang Suhendro	Director General of Higher Education and Culture
3.	Mr. Koichiro Okazaki	Resident Representative of JICA, Indonesia Office
4.	Prof. Dr. Harsono Taroepratjeka	Director of Binsarak
5.	Prof. Dr. H.M. Abdul Kodir, M.Sc.	Rector of IKIP Bandung
6.	Prof.Dr.H.Moch.Fakry Gafar, M.Ed.	Deputy Rector for Academic affair, IKIP Bandung
7.	Prof. Dr. H. Eri kang Sumantri, M.Ed.	Deputy Rector for Financial affair, IKIP Bandung
8.	Drs. H. Karna Yudibrata	Deputy Rector for Student affair, IKIP Bandung
9.	Drs H. Ilyas Purakusumah	Deputy Rector for Public Relation affair, IKIP Bandung
10.	Dr. Utari Sumarmo	Dean of Mathematics and Science Education, IKIP Bandung
11.	Dr. M. Akil Malla, M.Sc.	Dean of Mathematics and science Education, IKIP U.Pandang
12.	Prof. Dr. Sukarjo	Dean of Mathematics and science Education, IKIP Yogyakarta
13.	Drs. Gatot Muhsetyo, M.Sc.	Dean of Mathematics and science Education, IKIP Malang
14.	Drs. Raffles Kosasi, M.Sc.	Dean of Mathematics and science Education, IKIP Padang
15.	Dr. Achmad A. Hinduan, M.Sc.	Chairman/ IKIP Bandung
16.	Drs. Harry Firman, M.Pd.	Vice Chairman/ IKIP Bandung
17.	Dr. Eddy M. Hidayat, MA.	Secretary/ IKIP Bandung
18.	Prof.Dr. John T. Shimozawa	Advisory Committee/JICA
19.	Ir. Oetomo Djojonegoro	Advisory Committee/JICA
20.	Mr. Niida Satoshi	Advisory Committee/JICA
21.	Ir. Dadang Sudarto	Advisory Committee/Ditjen Dikti
22.	Drs. Sutrisno	Advisory Committee/ IKIP Bandung
23.	Drs. Enoch Moh. Syah	Advisory Committee/ IKIP Bandung
24.	Prof.H.E.T. Ruseffendi, S Pd, M.Sc. Ph D	Advisory Committee/ IKIP Bandung
25.	Dr. Dadi Setia Adi, M.Sc.	Advisory Committee/ IKIP Bandung
26.	Prof. Dr. H. Ratna Wilis Dahar, M.Sc.	Advisory Committee/ IKIP Bandung
27.	Prof. Dr. Esti ti Bambang H.	Basic Science Team

No.	Name	Position/Institution
28	Drs. Pontas Hutagalung	Basic Science Team
29	Dr. Sadiyah Achmad D E.A.	Basic Science Team
30.	Dr. Tan Ik Gie	Basic Science Team
31	Drs. Murjono, M.Sc.	Basic Science Team
32.	Dr. A. Munandar	Committee/ IKIP Bandung
33.	Drs Wahyana	Committee/ IKIP Bandung
34.	Dr. Sumar Hendayana, M.Sc.	Committee/ IKIP Bandung
35.	Drs Momo Rosbiono, M Pd.	Committee/ IKIP Bandung
36.	Dra. Dewi Rachmatin	Committee/ IKIP Bandung
37.	Dra. Roswati Mujarto	Committee/ IKIP Bandung
38.	Drs H. Iyon Kertawidjaya, M.Pd.	Committee/ IKIP Bandung
39.	Drs Yaya Sukjaya Kusumah, M.Sc.	Committee/ IKIP Bandung
40.	Dr. Nuryani Rustaman	Committee/ IKIP Bandung
41	Drs. Jozua Sabandar, MA.	Committee/ IKIP Bandung
42.	Drs. Yusuf Hilmi Adisendjaja, M.Sc.	Committee/ IKIP Bandung
43	Drs. Kosim Rukmana, M.Si.	Committee/ IKIP Bandung
44.	Drs. Didi Teguh Chandra, M.Si	Committee/ IKIP Bandung
45.	Dr. Syaeful Anwar	Committee/ IKIP Bandung
46	Drs. Asep Kadarohman, M.Si.	Committee/ IKIP Bandung
47.	Drs. Firdaus	Committee/ IKIP Bandung
48	Drs. Adi Rahmat, M Si.	Committee/ IKIP Bandung
49.	Dra. H. Laksmi Prihantoro, M Pd	Committee/ IKIP Bandung
50.	Dra. Zackiyah	Committee/ IKIP Bandung
51	Dra. Wiendartun	Committee/ IKIP Bandung
52.	Drs. Rahmat Setiadi, M.Sc.	Committee/ IKIP Bandung
53.	Drs. Omang Wirasasmita	Committee/ IKIP Bandung
54.	dr. Kemal Adyana Kumadi	Committee/ IKIP Bandung
55	Drs. I. Made Podri	Committee/ IKIP Bandung
56	H. Wawa Kartwa, SH	Committee/ IKIP Bandung
57	Drs Jajang Saefullah	Committee/ IKIP Bandung
58	Drs. O.C. Supratman	Committee/ IKIP Bandung
59.	Drs. Endang Supriatna	Committee/ IKIP Bandung
60	Drs Dinn Wahyudin, MA.	Committee/ IKIP Bandung
61.	Drs Didi Supriade	Committee/ IKIP Bandung
62.	Zul Asmar KS	Committee/ IKIP Bandung
63	Yedi Rudiawan	Committee/ IKIP Bandung
64.	Sri Tri Purwanti	Committee/ IKIP Bandung
65.	Agus Prihatna	Committee/ IKIP Bandung
66.	Dr. Suyanto	Speaker/IKIP Yogyakarta

No.	Name	Position/Institution
67.	Prof. Nouda	Speaker/The University of Tsukuba
68	Prof Y Hara	Speaker/The University of Tsukuba
69	Dr. Suinsno	Speaker/ITB
70	Dr. Suhman Bambang Sumitro, M.S.D.Sc	Speaker/Brawidjaya University
71	Prof S Ishizaka	Speaker/Toyama University
72.	Prof. H. Igo	Speaker/The University of Tsukuba
73.	Mr. Hadiat	Speaker/PPPG-IPA
74	Mr. Niida	Speaker/JICA
75.	Mr. Shumon Yoshikara	JICA, Assist resident representative
76.	Mr. Yukio Ota	JICA
77.	Ms Tani	JICA
78	Ms. Shanthi Dewi	JICA
79	Dra. H. Juanah Adang Sobri	Faculty Member of Chemistry Education, IKIP Bandung
80.	Dra Mulyati Arfin, M Pd.	Faculty Member of Chemistry Education, IKIP Bandung
81	Dra Liliasan, M Pd.	Faculty Member of Chemistry Education, IKIP Bandung
82	Dra. Siti Darsati, M.Si.	Faculty Member of Chemistry Education, IKIP Bandung
83.	Dra Sri Redjeki, M.Pd.	Faculty Member of Biology Education, IKIP Bandung
84.	Dra Toeh S. Pujihartono	Faculty Member of Biology Education, IKIP Bandung
85.	Dra Fransisca Tatilow	Faculty Member of Biology Education, IKIP Bandung
86	Dra Any Fitriani	Faculty Member of Biology Education, IKIP Bandung
87	Drs Parindungan Sinaga	Faculty Member of Physics Education, IKIP Bandung
88	Drs Unang Purwana	Faculty Member of Physics Education, IKIP Bandung
89.	Drs Syambasn Munaf, MA.	Faculty Member of Physics Education, IKIP Bandung
90.	Drs. Taufik Ramlan, M.Si	Faculty Member of Physics Education, IKIP Bandung
91	Drs. Tatang Mulyana	Faculty Member of Mathematics Ed , IKIP Bandung
92.	Dra. H. Rini Marwati, M.Si	Faculty Member of Mathematics Ed., IKIP Bandung
93.	Drs. Asep Syarif Hidayat, M Si.	Faculty Member of Mathematics Ed., IKIP Bandung
94.	Drs Julius Hambali	Faculty Member of Mathematics Ed., IKIP Bandung
95	Dra Tah Sumiah	Head of Center for In service Teacher Training
96	Drs H Alja Supriatna Kartakusumah	Senior high school teacher
97.	Drs. Adjun Ntirmihardja	Junior high school teacher
98	Elly Tasli	Elementary school teacher
99	Drs. Zulbahr Bahar, M.Sc.	School supervisor
100.	Drs. Ujang Sukandi	Balibang Dikbud Jakarta
101.	Dindin Sholahuddin	Madrasah Aliah Teacher
102.	Drs Edi Suwahyandi	Madrasah Aliah Teacher
103.	dr. H Bagja Waluya	Kepala PPPG IPA
104.	Dra Siti Kalsum	PPPG IPA
105.	Drs. Imade Alit M.	PPPG IPA
106.	Dra. Susriw, M Pd.	Graduate Student

No.	Name	Position/Institution
107.	Dra. Endang Widi Winarni	Graduate Student
108.	Drs. Syaiful	Graduate Student
109.	Drs. Fazry Yunus	Graduate Student
110.	Drs. Yoseph Paramata	Graduate Student
111.	Drs. Didin Wahidin	Graduate Student
112.	Prof. Koji Masutani	PUDAK Scientific
113.	Dr. Daniel Kumia	PUDAK Scientific
114.	Dr. Zaenal Arief	PUDAK Scientific
115.	Drs. Alwi K. Ismail	Chem. Ed. IKIP Bandung
116.	Drs. Wawan Danasasmita, M.Ed.	IKIP Bandung (as Interpreter)
117.	Drs. Ating Sutisna, M.Ed.	IKIP Bandung (as Interpreter)
118.	Drs. Ahmad Dahidi	IKIP Bandung (as Interpreter)
119.	Drs. Hartono	Senior High School Teacher
120.	Dra. Hermani	Committee Member
121.	Dr. H. Fuad Abdul Hamied, M.A.	IKIP Bandung (as Interpreter)
122.	Dra.H.Nenden Sri L., M.Pd.	IKIP Bandung (as Interpreter)

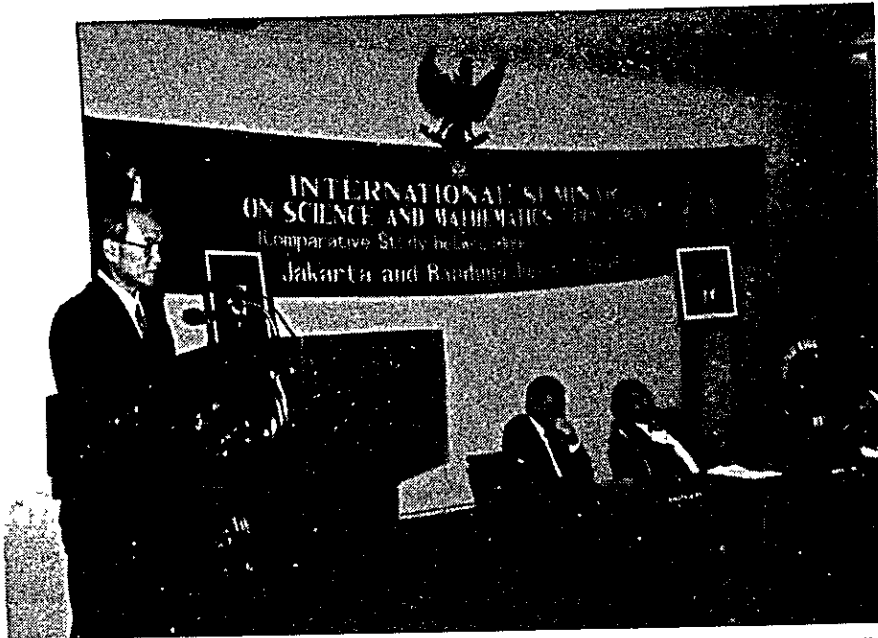
7.2. COLLECTIONS OF PICTURES



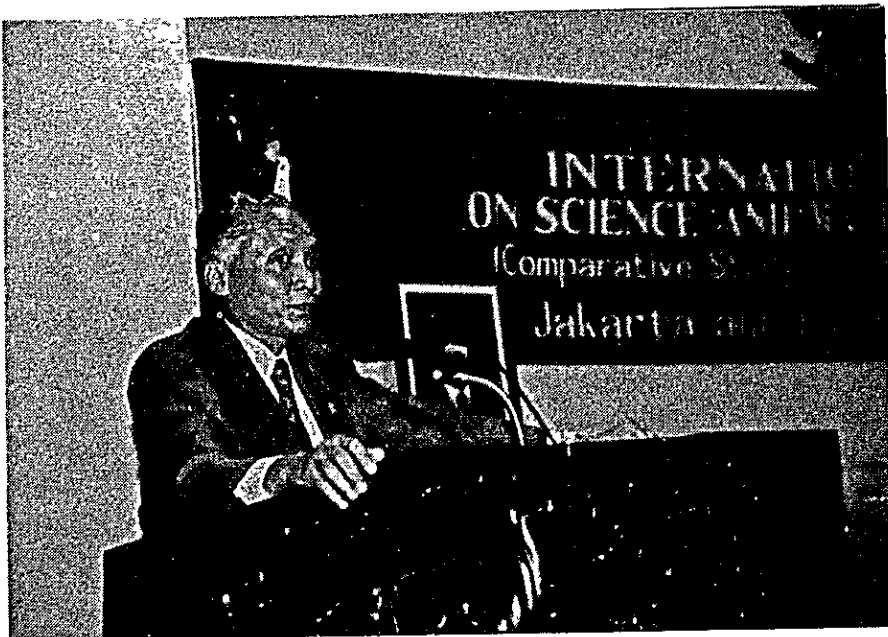
ⁱ
Prof. Abdul Kodir, Rector of IKIP Bandung, is reporting the preparation of the International Seminar on Science and Mathematics Education



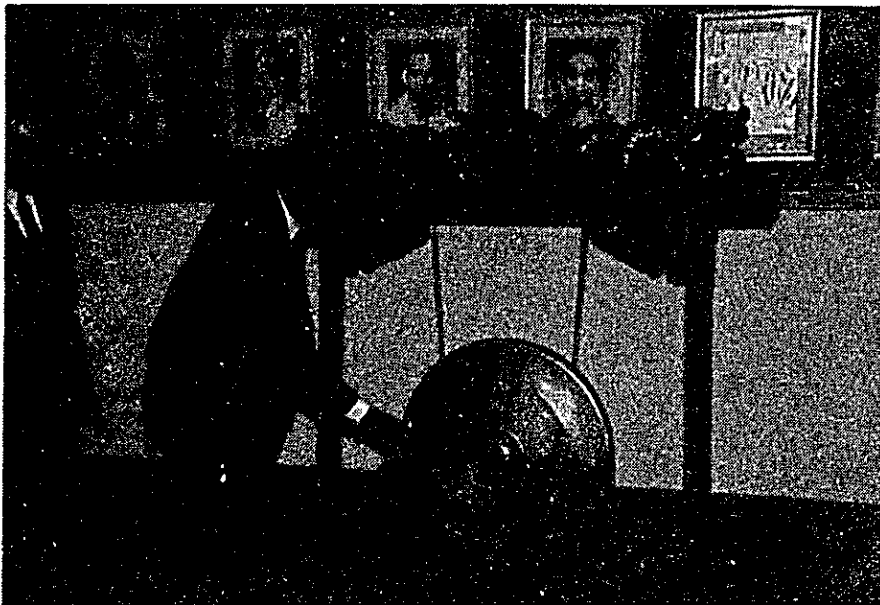
Prof. John T. Shimozawa's address at the opening ceremony. Prof Shimozawa, an JICA expert, is raising two common questions for all seminar participants "Why do we teach science in school?" and "What is the quality of good teachers?"



Mr. Koichiro Okazaki, Resident Representative of JICA Indonesia Office, is addressing his speech on the occasion of the opening ceremony of the International Seminar on Science and Mathematics Education in Indonesia.



Prof. Wardiman Djojonegoro, Minister of Education and Culture of the Republic of Indonesia is delivering his speech and commencing the International Seminar on Science and Mathematics Education



Mr. Minister of Education and Culture of the Republic of Indonesia is commencing the seminar by hitting the "gong". Prof. Bambang Suhendro (behind Mr. Minister) is witnessing the seminar commencement.



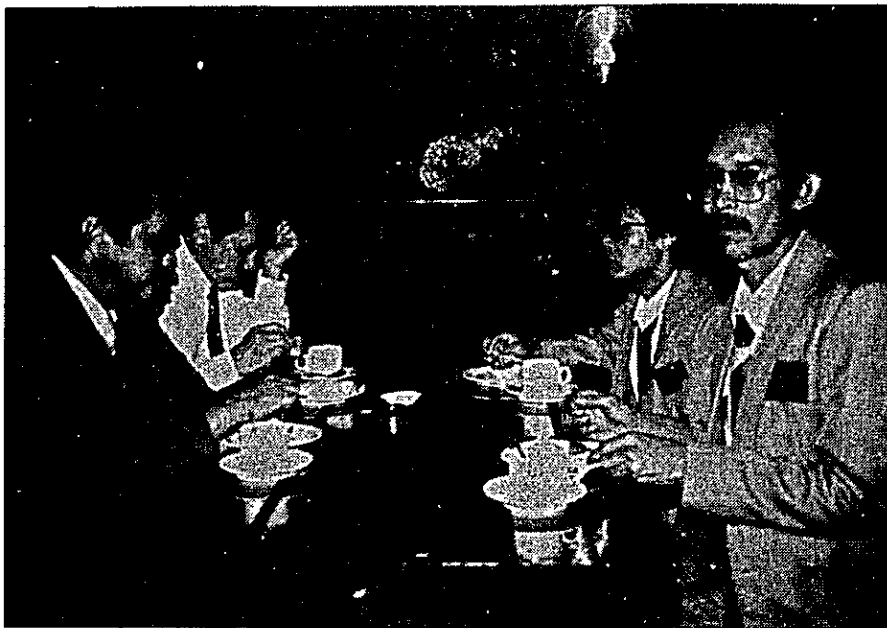
Prof. Abdul Kodir, Rector of IKIP Bandung (right), is expressing his sincere thanks by shaking the hands with Prof. Wardiman Djojonegoro, Minister of Education and Culture (left), after Rector of IKIP Bandung presented a token appreciation to Mr. Minister.



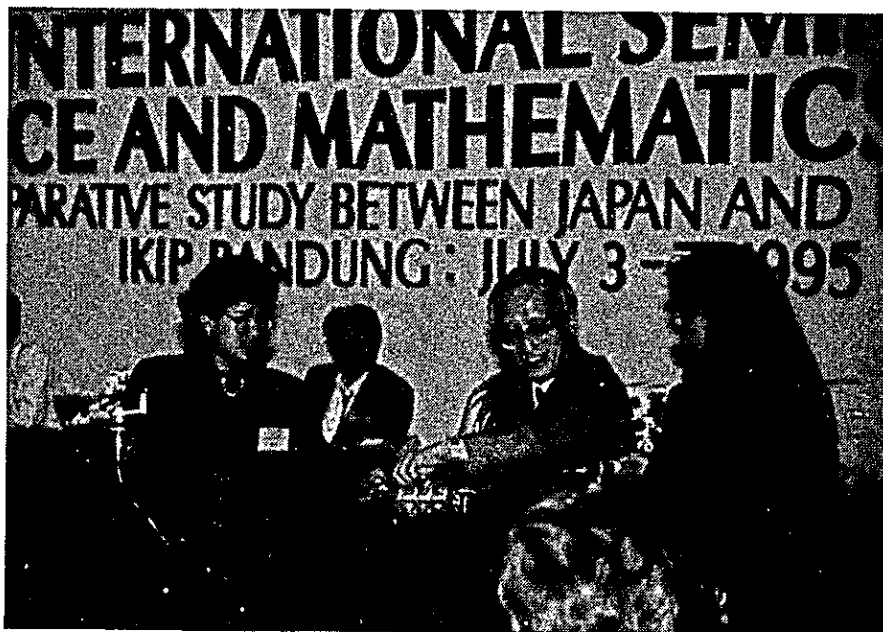
The seminar participants are paying attention to the opening ceremony speeches. They are primary and secondary teachers, IKIP Faculty Staffs, Deans of Growth Centers, in-service teacher trainers, and Indonesian and Japanese Speakers.



An informal talk between minister of education and culture and IKIP Bandung officials after opening ceremony. From left to right: Prof. Wardiman Djojonegoro (minister of Education and Culture), Prof. Moch Fakry Gaffar (Deputy rector for academic affairs), Dr. Utari Sumarmo (Dean of Faculty of Mathematics and Science Education of IKIP Bandung), Prof. E.T. Ruseffendi (Professor of Mathematics Education of IKIP Bandung).



Coffee break at Puncak Pass Restaurant after attending the opening ceremony in Jakarta. From left to right: Mr. Julius Hambali (Mathematics Education Faculty member), Mr. Sutrisno (IKIP Bandung project official), Dr. Sumar Hendayana (vice Chairman of Chemistry Education Department of IKIP Bandung), and Momo Rosbiono, M.Pd. (Chairman of Chemistry Education Department of IKIP Bandung).



Prof. Nouda, Japanese speaker (the third from left) along with Ms. Tani (left most) and Dr. Nuryani (right most) is demonstrating a simple equipment for physics experiment.



Mr. M. Aki Malla (Dean Faculty of Mathematics and Science Education of IKIP Ujung Pandang, left), and Mr. Harry Firman, M.Pd. (Vice Dean for academic affairs of IKIP Bandung) are demonstrating a simple physics equipment.



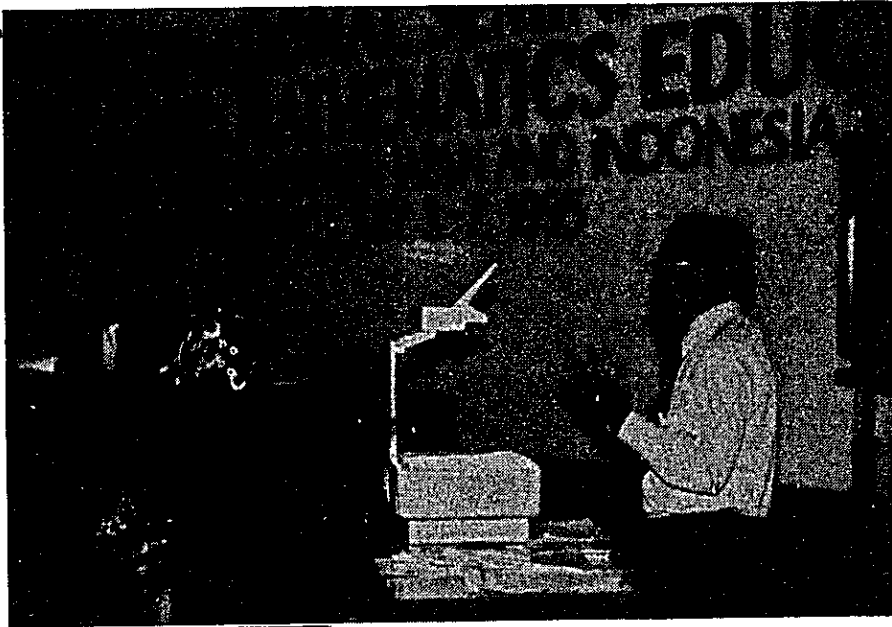
The Seminar situation on the campus of IKIP Bandung.



The discussion between ITB (Bandung Institute of Technology) officials and seminar participants visiting ITB, as one of the programs.



Japanese participants are watching science equipments during their visit to the science teacher training center in Bandung.



A seminar presentation by Mr. Hadiat from science teacher in-service training development center



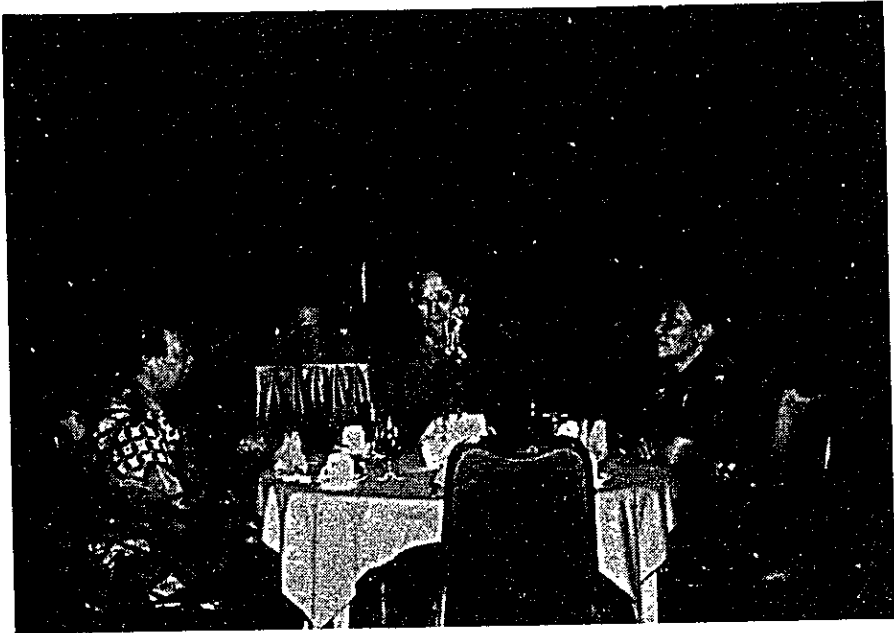
Japanese participants are visiting the star observatory equipment in Lembang.



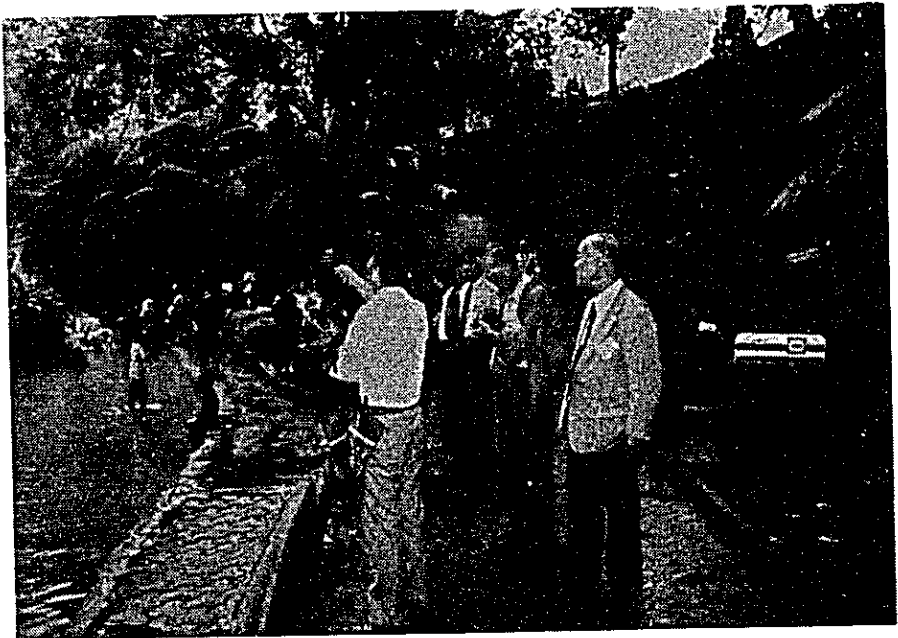
Prof. John. T. Shimozawa (holding a microphone) and Prof. Abdul Kodir, Rector of IKIP Bandung, (left most) are singing a Japanese song with Kabumi Cultural Group at the Dinner of Rector.



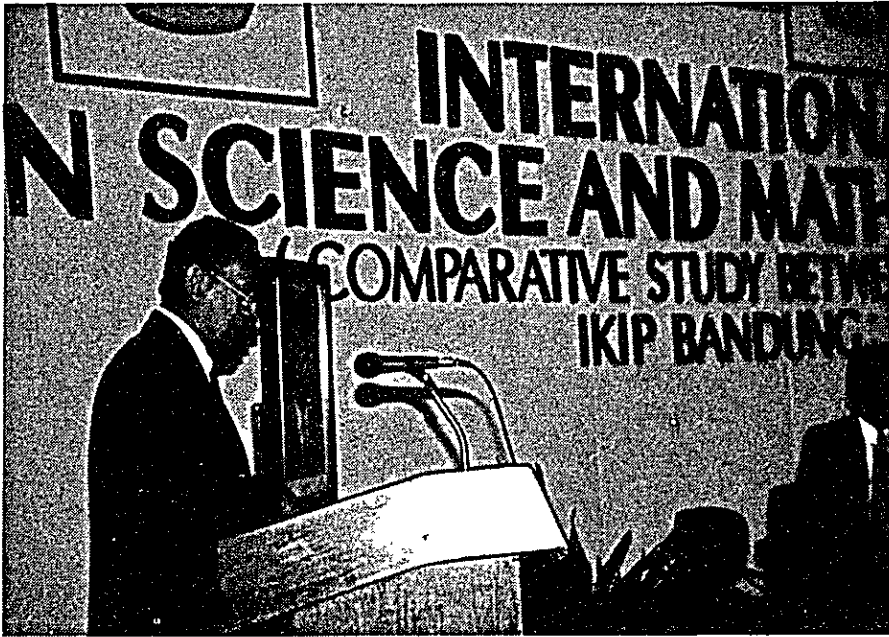
Dinner by the rector at campus of IKIP Bandung. From left to right: Dr. Endang Sumantri (Deputy Rector for Administration and Financial Affairs), Prof Hara (a Japanese speaker), Dr. Utan Sumarmo (Dean of Mathematic and Science Education of IKIP Bandung), and Dr. Sutiman Bambang Sumitro (an Indonesia speaker).



Dinner by Rector at campus of IKIP Bandung. From left to right: Mr. Ilyas Purakusumah (Deputy rector for human relation), Prof. Nouda (a Japanese speaker), and Gatot Muhsetyo, M.Sc. (Dean of Faculty of Mathematics and Science Education, IKIP Malang).



Japanese participants are sight seeing at Ciater hot spring.



Closing remarks by Prof. Harsono Taroepratjeka, Director of Academic Affair (Directorate General of Higher Education)



The farewell party at Daishogun Japanese Restaurant in Bandung.

7.3. OPENING AND CLOSING REMARKS

**ADDRESS BY PROF. DRS. HM. ABDUL KODIR
THE RECTOR OF IKIP BANDUNG
IN THE OPENING CEREMONY OF THE INTERNATIONAL
SEMINAR ON MATHEMATICS AND SCIENCE EDUCATION**

Bismillahirrahmanirrahim,
Assalamu'alaikum warahmatullahi wabarakatuh,

Our Honorable Minister of Education and Culture of The Republic of Indonesia,

Our Distinguished Resident Representative of JICA,
Ladies and gentlemen,

First of all, I would like to welcome the international participants from Japan to the opening ceremony of the International Seminar on Mathematics and Science Education. I do hope you will enjoy your stay in Indonesia and participating in the seminar.

I would like to express our gratitude to our Honorable Minister of Education and Culture for opening and addressing this International Seminar.

Our gratitude also goes to the Honorable Resident Representative of JICA for encouraging us to conduct this seminar. Without your encouragement the seminar is impossible to be held.

Although the opening ceremony is held in Jakarta, the seminar will be conducted on the campus of Bandung Institute of Teaching and Educational Sciences (IKIP) from July 3rd to July 7th, 1995.

Today, attention has been paid to mathematics and science education, since the role of mathematics and science is important in research and application. For this purpose, the goals of this seminar are directed to firstly, to have a comprehensive understanding of the real future of mathematics and science education in primary as well as in secondary school both in Indonesia and in Japan. Secondly, to establish a cooperation between Indonesia and Japan, particularly in research on mathematics and science education in schools.

This seminar will primarily discuss an overview of mathematics and science education system in Indonesia and Japan, particularly in primary and secondary school levels. Beside that, this seminar will also discuss the innovations in mathematics and science education in Japan to improve the quality of mathematics and science education, so that mathematics and science will be more interesting and easier to understand. Finally, the role of educational institutions in preparing mathematics and science teachers for primary and secondary schools will also be discussed by, for example, developing IKIPs as Growth Centers for mathematics and science education in Indonesia.

Eight experts in mathematics and science education from Japan and six experts from Indonesia will share ideas for improving mathematics and science education. Participants of the seminar consist of education personnels, maths and science educators, maths and science teachers from primary and secondary schools, and some university lecturers in mathematics and science.

It is hoped that this seminar will enhance firstly, the improvement of maths and science education in both countries. Secondly, it will enhance the cooperation between Indonesia and Japan in sharing ideas and expertise which will benefit the two countries.

This kind of seminar is expected to be conducted again in the future, not in Indonesia but in Japan. Through this way, collaboration and cooperation between these two countries will continue in the years to come.

Thank you.

ADDRESS AT THE OPENING CEREMONY
BY : PROF. DR. JOHN T. SHIMOZAWA
JICA EXPERT FOR DIRECTORATE GENERAL OF HIGHER EDUCATION

Distinguished guests and Ladies and Gentlemen.

I am an expert of JICA. My roles as an expert are to advice the innovation of Science Education in Indonesia through our experiences in Japan.

Since I came here last August almost 10 months are passed. I met various problems on Science Education by my observations on the Indonesian situation, and I was able to say that there are common problems on Science Education all over the world.

And then, I thought that it is worthwhile to have the Seminar on Science Education by Japanese and Indonesian educators to discuss our common problems & how to resolve these difficulties.

Both the Indonesian and Japanese Governments are very keen to innovate Science Education in Schools, because Science Education is one of the important subjects to be taught in schools towards the 21st century.

Actually, the RI Government has made a proposal to establish the "Growth Center" for Science Education. The roles of the Growth Center are :

1. To improve teacher Training in Basic Science Course (in IKIPs,)
2. To support the in-service Training Course, of Primary & Secondary School Teachers
3. To provide the equipment to be used in the good teachers' cultivation in Science & Mathematics.

We hope the project selection will be selected accelerated through the results of this seminar with mutual understanding through the discussion of the Topics, the motivative force to promote the starting of the project will be well appreciated by both governments.

Now, I would like to raise two common Questions for all participants of the seminar.

First : Why do we teach science in schools ?

Second : What is the quality of good teachers ?

The reasons why questions seems to me the common base in the innovation of teaching of science all over the world.

Although I don't have enough time to explain this background, I hope every speaker thought in mind to include these questions in their talks and to answer the speakers' opinions directly or indirectly.

That's all to express my expectations of the seminar I am sure this seminar will lead to good understanding on Science Education in both countries.

Thank you for your kind attention.

**ADDRESS BY MR. KOICHIRO OKAZAKI
RESIDENT REPRESENTATIVE OF JICA INDONESIA OFFICE
ON THE OCCASION OF THE OPENING CEREMONY OF
THE INTERNATIONAL SEMINAR ON SCIENCE AND MATHEMATICS
EDUCATION IN INDONESIA
JULY 3, 1995**

Prof. Dr. Wardiman Djojonegoro, Minister of Education and Culture
Prof. Drs. Haji Abdul Kodir, Rector of IKIP Bandung
Prof. Dr. Shouzo Ishizaka, Toyama University of International Studies
Prof. Dr. Hisayoshi Igo, University of Tsukuba
Prof. Yasuo Hara, University of Tsukuba
Prof. Nobuhiko Nouda, University of Tsukuba
Prof. Dr. Takashi Shimoszawa, JICA Expert for Ministry of Education and Culture
Mr. Satoshi Niida, JICA Expert for IKIP Bandung

Distinguished Guest and Lectures,
Ladies and Gentlemen,

On behalf of the Japan International Cooperation Agency, JICA, it is a great pleasure for me to say a few words on this occasion of the opening ceremony of THE SEMINAR OF SCIENCE AND MATHEMATICS EDUCATION IN INDONESIA which is jointly conducted by Ministry of Education and Culture, IKIP Bandung and JICA.

First of all, I would like to express my greatest appreciation to the officials concerned of the Ministry of Education and Culture, IKIP Bandung and Prof. Shimoszawa, JICA Expert for the Ministry of Education and Culture, for their kind cooperation, consideration and appropriate arrangement in organizing this Seminar.

JICA has been extending its technical cooperation program in various countries through the Technical Cooperation Experts Dispatch Programs, Training Program in Japan, Provisions of Equipments, Development Studies and the like, which among the countries, Indonesia is one of the most important countries to cooperate with. Through JICA's experience, we

believe that human resources development is one of the most important measures for the promotion of national development.

From this point of view, we, JICA, have been extending our cooperation through various projects for higher education, for example, "The High Education Development Support for the Universities in the western part of Indonesia as of 1990 onwards", "Academic Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology-Bogor Agricultural University as of 1988 onwards", "Electric Engineering Polytechnic Institute of Surabaya as of 1987 onwards", and several other projects.

Meanwhile, I am fully aware of the fact that, Primary and Secondary Education in the basis for human resources developments of a country, and is definitely the most indispensable among the basic human needs in the word. Furthermore, the cooperation related to Primary and Secondary Education has been of utmost priority.

Especially in this Seminar, we focus on Basic Science and Mathematics Education. As indicated in the REPELITA VI, in promoting economic growth, industry, manpower, and other development sectors, the role of science and technology is of great importance. Development in science and technology, though, would require considerable support from the development of basic science disciplines consisting of mathematics, physics, chemistry, biology, and space and earth science. I think it is for this reason that basic science education is given more priority in Indonesia, today.

Fortunately, the participants and Lecturers of this Seminar possess various backgrounds in the field of education. I sincerely hope that Seminar provides on opportunity to exchange views and information among the participants from Japan and Indonesia, and be a good stimulus to the development of abilities. Moreover, it is my great pleasure if the Seminar would contribute to further developments in Indonesia.

Distinguished Guests, Dear Participants,
Ladies and Gentlemen,

In conclusion, allow me to express my sincere gratitude once again. I would like to close my address, by wishing all of you, every success, good health, while also wishing fruitful results of this seminar.

Thank you very much for your attention.
Terima kasih.

**OPENING REMARKS BY
PROF. DR. -ING. WARDIMAN DOJONEGORO
MINISTER OF EDUCATION AND CULTURE, REPUBLIC OF INDONESIA
AT THE INTERNATIONAL SEMINAR ON
SCIENCE AND MATHEMATICS EDUCATION
JAKARTA, JULY 3, 1995**

Mr. Okazaki Koichiro, Resident Representative of the Japan International
Cooperation Agency;
Mr. Chairman;
Distinguished Guests,

Ladies and Gentlemen,

It is great pleasure for me to say a few words at the opening of this important international seminar. But first, allow me to welcome our Japanese friends, some of whom have traveled from Japan to attend this seminar and share their knowledge and expertise with us. On behalf of the Government of Indonesia I would like to thank the Government of Japan, who in the form of technical assistance through JICA, has helped to make this seminar possible.

I am also glad to be here because I am personally committed to see to it that in our Indonesian schools we significantly improve our ability to properly deal with such natural or basic sciences as physics, chemistry, and biology, as well as with mathematics. Natural sciences help us understand the world around us, which is fundamental to the objectives of development, and which in turn is the key focus of virtually all the things we do. Mathematics, in this regard, is not some faraway discipline invented to exercise the brain. To the contrary, it is the "language" of science, it is one of the most important tools allowing us to make progress in science. Science and Mathematics together lie at the heart of specific technological developments, and it is through the later that development takes place in the real world, in particular in the development of industry, agriculture or any other area where mankind manipulates resources to produce added value.

Furthermore, I think the focus of this seminar is most appropriate. To advance education of mathematics and basic sciences, we need to start with how we teach important disciplines to our young children in primary and secondary school. It is at this level that the foundation is built for childrens' understanding of the role of mathematics and science in society. In addition, it is here that the foundation is built for their capability to utilize mathematics and science in their own personal development as productive citizens. Failure to properly introduce mathematics and science at this level has in my view far reaching consequences for any society, be it a developed or a developing society.

Ladies and Gentlemen,

I don't think I have to elaborate in this audience on the merits of mathematics and science education. Rather, what I would like to do is to briefly address what I would like to call the fundamental "threesome" in mathematics and science. Here I refer to three related questions or issues, which in my view are germane to your deliberation in this seminar.

Firstly, what are the educational outcomes that we must strive for in teaching mathematics and science at the primary and secondary level? Secondly, how do we teach mathematics and science to assure that such educational outcomes are achieved? Finally, how do we assess on a continuous basis that the educational outcomes are indeed achieved as a result of the teaching process? With respect to the later I would like to note that I use the word assessment as distinctly different from the word examination. Where examinations are held to structure the advancement of children through the overall education system, assessment refers to the activity exclusively design to provide continuous feedback on the effectiveness of both teaching and learning in view of the outcomes to be achieved. It is through assessment activities that we try to probe what children really get out of the education system.

To address the first issue, educational outcomes in math and science education, I purposely use the word outcome to underscore the need for all of us in education to adopt an output orientation. One even may say that it is to a large extent irrelevant to focus on what children should know or when they should know it. Rather, we should put prime emphasis on what children should be able to do on the basis of knowledge

accumulated in the education process. In this regard, we need to continuously ask ourselves why we teach certain subjects in math and science, and more importantly, how certain subjects relate to the tasks that children will need to undertake in the rest of their lives, either in continued education or in the workplace. Those of you who have heard me talk about our LINK and MATCH policy undoubtedly recognize that the basic principle of LINK and MATCH applies also to education in mathematics and basic sciences.

I like to remind you that the question of educational outcomes to be achieved is not a trivial issue to be glossed over. It goes well beyond identification of subjects to be covered in a curriculum. It addresses the fundamental question of the type of competencies and skills that we expect young people to have as a result of going to primary and secondary school. On a previous occasion, I indicated that one can broadly classify these competencies and skills into three categories: (1) Basic Skills including reading, writing, mathematics, listening and speaking (2) Soft Skills including personal qualities such as perseverance, motivation, initiative, responsibility, and the ability to set and meet goals; and (3) Thinking Skills such as creative thinking, critical thinking, reasoning and problem solving. Viewed from this perspective, I hope you agree with me that mathematics and basic science education contribute not only to basic skills formation, but must also allow for the development of critical thinking and problem solving in a broad sense can be targeted as an educational outcome to be achieved by students, with the help of those of us who are mathematics and basic science teachers.

The reason that we must pay much more attention to education outcomes is that the future work place for all our people is rapidly changing. Again this is true for developed as well as for developing countries. We need to educate a future generation, which will find itself in quite different circumstances from those that we found when we grew up. This applies to graduates from all our education subsystems, from basic education to university education. Although I don't want to elaborate on this point, you all have heard about the arrival of the information age, the impact of globalization and so on. The bottom line of all these developments is that future generations need to have the necessary competencies and skills to flourish in a world that only now to become clearer.

This phenomenon of change has been hitting the world hard. In the develop countries, primary and secondary education systems are under pressure to produce more relevant outputs. In Australia, this led to the development of what is commonly called the Mayer Report on key competencies, while in the US the Department of Labor commissioned what is known as the SCANS report, focusing on the issue: "What work requires of schools". Similar efforts are undertaken in many European countries. The common thread in all these efforts is a renewed interest in competencies and skills to be provided through basic education in order to smooth the transition either to continued school-based education or to work, recognizing that past experience provides limited guidance for the world of tomorrow.

Ladies and Gentlemen,

Assuming that we know that outcomes need to be achieved in math and science education, the next issue is how do we teach math and science at the primary and secondary level. Since I am certainly not expert in this area I don't want to address specific methods of teaching. Rather, I would like to make the point that in order to know to teach, we first need to know how children learn. Stated differently, we need to know which conditions are conducive to learning, and which conditions detract children from learning.

Cognitive sciences is the interdisciplinary field which focuses on trying to understand how people perceive, think, learn, remember as well as other functions of the mind. Contemporary research in this field with respect to how children learn challenges some of the basic characteristics that we find our schools and in our teachers, and points to serious flaws. Specifically, I refer to the practices of passive learning, fragmented learning, right-answer/fact-based learning, and non-contextual learning. Undoubtedly, you all recognize some of these flaws in the way most teaching is presently conducted. It is my view that these flaws are particularly harmful in the areas of mathematics and basic science education because these areas are frequently furthest away from the natural interests and inclinations of children. It requires for most a special effort to remain actively engaged.

Allow me to briefly illustrate what I mean. Most schools and teachers treat children as a passive “vessel”, something to be filled with knowledge. Yet, research shows that students need to be actively engaged in learning. They need the experiential feedback that is key to learning. When students learn about scientific phenomena or math concepts which have no sounding board in their own world, it is difficult to expect that much progress can be made. Another well known example is the tendency towards right-answer/fact-based learning. Schools and teachers focus on getting the right answer from the student, at the cost of developing the processes that generate the answers. As a result, students resort frequently to superficial accomplishment. Rote learning falls into this category. This is the more astounding in view of the saying that you learn more from your mistakes. It is seldom that mathematics and science teachers focus on, or use a student’s mistake as a method of learning. Teachers tend to consider student errors as failures, rather than as opportunities to strengthen understanding in mathematics and science. I would like to challenge you to create greater understanding on how students learn, as a prerequisite for improving our teaching methods in mathematics and science, and improving the education of teachers for these subjects.

Ladies and Gentlemen,

The last point I want to make relates to assessment. As I said the beginning I am not talking about examinations. Rather I am talking about the feedback process necessary for improving educational policies, for math and science teachers to improve their own teaching skills, for curriculum designers to improve math and science curricula, for textbook developers to improve math and science textbooks, and so on. This process is fundamental, and yet it is, in my view, one of the most underdeveloped areas in Indonesia education. Let me quickly add that I also realize that conducting such process is a most complex and costly undertaking. However, as an engineer, I am convinced that unless we put more emphasis on measuring skills accumulations in math and science in a systematic fashion, it will always be difficult to analyze how we can improve education in these disciplines. Assessment provides the necessary reality check that allows us to focus on those areas most in need of improvement.

In reading through the brochure of this particular seminar I found the following statement:

"...the results of many assessments indicate low achievement in science and mathematics in both primary and secondary education. This low achievement in the subjects has been related to, among others, the inappropriate formal qualification of existing teachers. Therefore, one way to improve science and mathematics education in primary, as well as in secondary schools, is by improving and strengthening science and mathematics education programs in 10 Institutes of Teaching and Educational Sciences (IKIPs), and 20 Schools of Education (FKIPs) all over the country".

Although I don't disagree with this statement because appropriate qualifiers are included. I would like to point out that the statement is suggestive in the sense that it highlights one cause-effects relationship, namely between student achievement and improved program at IKIPs and FKIPs. For sure, the ability of math and science teachers to influence student achievement is a very important factor. Yet, I think the problem of low student achievement in math and science is in reality much bigger, with many explanatory variables that as of yet have not surfaced. Especially, in view of my earlier comments on how students learn, I am even not sure that the teachers educational background, within limits, is the most important variable explaining low levels of achievement. The point I would like to make is that we simply don't know, because we don't have a comprehensive assessment of achievement in math and science education in Indonesia - that is, an assessment which links achievement to a broad range of explanatory variables.

At this point I would like to remind you of the work done by the International Association for the Evaluation of Educational Achievement (IEA). For years this organization has worked on assessing achievement in math and science in primary and secondary education, and making international comparisons. Unfortunately, the results of this work have sometimes been used as an Olympics in Math and Science, playing one country off against the other, largely for political purposes. This is indeed unfortunate. IEA has produced the First, Second, and Third International Mathematics and Science Study (FIMS, SIMS, and TIMSS). Indonesia through the Ministry's Center for Research and Development (Balitbang

Dikbud), is a participant in the last study. This far, the work undertaken in the context of these studies has not been stirringly linked to our own efforts to improve math and science education in this country. Personally, I would like to see that this situation is corrected, and that we learn from IEA's work in order to better structure assessment for our own purposes.

As I said earlier, the task of conducting comprehensive, yet meaningful, assessments is methodologically complex and frequently costly. Most importantly, our focus should be on careful deliberation of the study goals to be adopted, and then deciding on scope and coverage of the survey instruments to be developed. In doing so we must decide to either conduct cross-sectional surveys (measuring progress over time), or a combination of both. Many issues need to be decided in order to assure that meaningful and credible are produced.

I would like to challenge the participants of this seminar to think through, and discuss, how we can strengthen the capability in this country to conduct such assessment, in particular in the area of math and science education. Perhaps, we should start on a limited geographic basis, until we have mastered the logistic and analysis for doing such assessments on a broader scale. However we need to do it. Perhaps, we could also count on the help of our Japanese friends in building such capability. This is not a one-time project. Instead, it is a long term effort, performed by many (in IKIPs, FKIPs, Balitbang Universities, etc.), in order to develop a rational basis for improving math and science education in this country.

Ladies and Gentlemen,

Through my remarks today, I have tried to articulate a basically simple message. In improving math and basic science education, at the primary and secondary level, we should be output oriented, in the sense that we need to provide children with the skills needed to successfully continue education or to smoothly transit into the world of work. In general, our efforts to provide such outputs should be oriented towards making it easier for children to learn, by removing artificial roadblocks to be able to target specific interventions of high priority, we should develop the analytical basis for deciding on priorities through the mechanism of assessments.

Stated like this the objective of this seminar may sound easy to accomplish. I am well aware that this not the case. Nevertheless, I hope that in your deliberations over the next few days you will keep focused on this simple message, so that at the end we all can conclude that we have made progress.

Finally, I would like to express my appreciation to all those who have worked hard to organize this international seminar. Specifically, I would like to recognize the Rector and Staff of IKIP Bandung and the Directorate General for Higher Education. Also, I would like to once more express my thanks to the Japan International Cooperation Agency and the Government of Japan for helping the Ministry of Education and Culture in this most important area. Although it may not be universally recognize, math and basic science education is one of the most important building blocks in any education system.

I wish you all a most productive seminar in the true spirit of cooperation. It is now my pleasure to declare the International Seminar on Science and Mathematics Education officially opened.

Thank you very much.

Jakarta, July 3, 1995

Prof. Dr.-Ing. Wardiman Djojonegoro
Minister of Education and Culture
Republic of Indonesia.

CLOSING REMARKS
BY PROF. DR. HARSONO TAROEPRATJEKA
DIRECTOR OF ACADEMIC AFFAIR
DIRECTORATE GENERAL OF HIGHER EDUCATION

Rector of IKIP Bandung,

Prof. John T. Shimozawa, the JICA Expert to the Directorate General of Higher Education,

Our Distinguished Professors and experts of teacher education from University and School of Japan,

Participants of the International Seminar,

Ladies and Gentlemen.

Good morning.

It is indeed a great pleasure to stay here to be with you in this occasion the closing part of the interesting Seminar. I wish with you in the opening seminar too, and I truly wish I could be with you during all part of the Seminar. I am sure I can learn a lot of by participating even listening to the seminar. From the papers put in the collections of seminar papers I noted lot of suggestion and experience that we can share, learn, or develop to be implemented in our situation.

Prof. Shimozawa, just show us after world war II Japan has nothing to do, nothing left. The only thing to do is to develop the country, is the construction the nation through technology. You in Japan, have nothing left, nothing to do physically but I think you still have the spirit, the experience, the disciplines that is needed to develop and to grow. Right now Indonesia is Celebrating the 50th years anniversary of Independent. Again that within less than 50 years we have started from nothing we have not much to do. We have not much to start. Of course we have big efforts in maintaining our existence as a nation politically as well as physically such that may be only 25 years ago that we can more seriously thinking about education and thinking about human resource development. We can be said as starting from stretch since we do not

have the experience in working and developing in the technological aspect in the industrialization. We have been experiencing a lot of time with agriculture and blessed by very versatile land. We may forget, we may have forgotten to learn better than just wait for the plant grows and enjoy life. However, we understand that we now have to work better possible harder. I am sure we have to work harder but also we know by working harder we can achieve much better result for the output, for the outcome that we have been belonging for a long time. And one of the most important if not the most important thing is to develop human resource capability.

Education is the responsibility of the government, of the community, and of the family. Part of the responsibility of the government to develop the human resource is through developing the agents that can change the human resources into the better capable nation. This important agents are not less than the teachers. So teachers are the most important agents in the development of the nation and the development of the human resources. Yet as Prof. Shimoszawa pointed out that in Japan you have already capable of providing salaries of teachers higher level than ordinary workers. Well, usually in Indonesia we consider that the teacher are less pay workers. Of course, it is not of matter of whether the government agree to pay more of the teacher or not, certainly the government agree with that. The only thing that the capability of the government that may not make it. However, many efforts have been done, for instance. If we cannot change of the salaries we try to change the basic scale of the salaries not through changing the scale it self, but try through changing of the basic level of the teachers' education because we understand the scale of the salaries is based on the basic education. For instance, by increasing the requirement of the teachers as being S1 graduate not only having the teacher with the better background to teach but also better salary. Of course, there are many efforts have to be done. The cooperation with the regional government that actually mostly get benefit from the teachers are still being tried to be improved. We need time. We understand that during that time we may not loss our spirit because more important than that is our future. Not future as individual but our future as the continuing human race in Indonesia.

Our distinguished guests !

What I just said is not written in my papers that I plan to read to you but it is certainly motivated by what I just learned few minutes of the last session and from listening to the closing remarks of Prof Shimozawa.

We now the importance of science and education are the basis of the nation's development, as the basis of technology but not only that. Not less than Prof. Pirus and well-known work painter and Professor of fine art and former dean Faculty of fine art and design ITB who started that fine art student who have strong comprehension in science and mathematics will have better chances to graduate successfully, they can easier grasp the concept delivered in the courses and the studios, they can initialize summaritional approaches to the artistic concepts. Science and mathematics teach understanding physical and the logical phenomena through modeling them. Through science and mathematics, students and learner gain the ability to understand the words and more than that. The art also train to utilize the modeling skills to explore further. Teaching science and mathematics in primary and secondary school children need special efforts as it much develop the basic skills formation as well as creative thinking skills to students, who have passed potential but still limited mental tools. Most suitable approaches to do the teaching must be developed from time to time as the environmental input to the children are kept changing.

We are in ministry of education and culture have been and still are putting strong efforts to improve the quality of teacher education including science and mathematics teacher education. Since 1974, the ministry has been providing special funding to the teacher education project as no other field have enjoyed. It will continue its efforts for improvement of the quality of teacher through pre- and in-service training. Since late 1980, special activities has been conducted for mathematics and science teaching staffs in the teacher training institutions. To enable further improvement of the teacher training efficiently some growth centers are planned to be developed. It is very fortunate and we are in the ministry are very grateful to the JICA for its important attention and for its providing support for the development of these growth centers. The seminar informing you the distinguished expert of Science and Mathematics Education in Japan having discussion with our teaching staffs and sharing your wisdom and experiences in developing successful teaching capability

to your youngest teacher in Japan are very important events in our big efforts of improvement. You have provided new information and knowledge in your effort and approaches to show similar challenges. But it is still a part of the beginning. We need to discuss and conduct further action and continuous improvement in our efforts. If we may we certainly may that you, our distinguished guest, would be willing to participate further in those activities to support the government of Indonesia and JICA efforts for developing the science and mathematics education of growth center. We will appreciate very much for your attention on these. The seminar is possible through the effort, through the special efforts of Prof. John T. Shimozawa, our JICA expert .

On behalf of government. I would like to extend our appreciation and sincerely thanks for the programs, the efforts, the coordination, the organizations that you have made. The initiative and the efforts of Prof. John T. Shimozawa for the participation of the such group of the distinguished experts and teachers education from Japan are very important to the seminar and to our effort in improving this education through the sharing of the experiences.

To Prof. Nouda, Prof. Hara, Prof. Ishizaka, and Mr. Niida, the minister asked to convey his appreciation, and sincerely thanks. We hope that beside of sharing of your wisdom and experience you have chances to know better our people in science and mathematics education as well as our problem. More than that we hope that you can enjoy the beauty of our country side in Indonesia too.

To the speakers and participants, we hope that you all gain the benefits of the seminar and capable to develop better approach and activities to improve our science and engineering education. I understand that lot of ideas have been presented in this seminar and we can develop, we can adjust, we can learn from that to make our activities better.

To the rector and civitas academica of IKIP, I convey the government message and government appreciation to IKIP to host and provide venues for this important seminar.

Now it is an honor to me to declare the International Seminar on Science and Mathematics Education officially Closed.

May god bless our efforts in this very important aspect in the human resource development and international cooperation. Thank you.

7.4. CLIPPING OF NEWS PAPERS

Prof. Shimozawa: Perlu Perubahan Cara Mengajar

MIPA Dimusuhi Banyak Siswa

BANDUNG, (PR)-

Pendidikan Matematika dan Ilmu Pengetahuan Alam (MIPA) bukan hanya "dimusuhi" oleh siswa di Indonesia, tetapi juga siswa di Jepang. Bahkan di negara maju lainnya, pelajaran MIPA masih dianggap sebagai pelajaran yang digolongkan pada 3D yaitu *Dangerous, Dirty and Difficult* (membahayakan, kotor dan sulit).

"Di Jepang, istilah 3D diekspresikan dengan 3K yaitu *Kiken, Kitanaui dan Kitsui*," kata Prof. Dr. John T. Shimozawa, staf ahli dari *Japan International Cooperation Agency (JICA)* dalam seminar di IKIP Bandung, Jumat (7/7).

Menurut Prof. Shimozawa, anggapan seperti itu muncul, karena guru-guru MIPA ketika mengajar tidak memberikan contoh konkret. Ia mendeskripsikan hal itu dengan membandingkan kursus mengemudi mobil dengan sekolah umum (reguler).

Pada sekolah mengemudi, guru hanya mengajarkan cara menjalankan mobil secara teknis. Namun mereka tidak menjelaskan alasan mengapa hal itu harus dikerjakan. "Ini memang bagian dari pendidikan, tetapi tidak cukup. Sebab guru hanya mengajarkan secara teknis, tanpa memberikan alasan. Jika ada masalah pada mobil, siswa sebagai pengemudi tidak akan mampu mencari permasalahannya," katanya.

Kondisi serupa terjadi di Indonesia. Namun di Indonesia situasinya diperparah dengan rendahnya kemampuan mengajar guru MIPA, sebagai akibat rendahnya gaji mereka. Padahal di Jepang, gaji seorang guru lebih tinggi dibanding gaji asisten di perguruan tinggi. Tingkat penghargaan kepada guru MIPA juga cukup tinggi.

Salah satu cara untuk mengubah anggapan MIPA sebagai "musuh"

Menurutnya, guru MIPA jangan hanya bertugas mentransfer informasi, tetapi juga menjelaskannya melalui berbagai percobaan untuk menjawab permasalahan. "Keberanian ilmiah harus diberikan oleh sejumlah orang dari berbagai penelaahan fenomena alam, dengan melakukan pengujian dari berbagai materi," ujarnya.

Jepang akan bantu

Anak-anak muda juga harus sering membaca buku ilmiah, untuk membantu menerapkan pemikiran baru dalam ilmu pengetahuan. Hal itu juga perlu dilakukan di masa-masa sebelum sekolah.

Keinginan masyarakat untuk mulai berpikir kritis merupakan awal dari transfer teknologi. Yang harus dipikirkan adalah, bagaimana mempertemukan antara kebutuhan sekolah dengan perkembangan ilmu pengetahuan. Itulah masalah yang dihadapi pendidikan.

Dalam kaitan dengan pengembangan pendidikan MIPA di Indonesia Prof. John T. Shimozawa berharap, bisa merealisasikan bantuan berupa *grant* kepada Indonesia, khususnya di IKIP dan di sekolah-sekolah. Tahap awal yang telah dirintis JICA adalah dengan mendirikan *Growth Center* di lima kota.

Melalui *grant*, beberapa langkah bisa dilakukan, antara lain pengembangan kurikulum MIPA, pembangunan pusat pelatihan untuk pendidikan MIPA, pengembangan riset bidang MIPA, pertukaran ahli serta pemberian bantuan sarana laboratorium.

Seminar internasional yang berlangsung sejak 3 Juli 1995 itu, ditutup secara resmi Jumat siang oleh Direktur Pembinaan Sarana Akademis, Prof. Dr. Ir. Harsono Taroeprajekta, mewakili Mendikbud.

Abdul Kodir, MSc dan Ketua Panitia Dr. Achmad A. Hinduan, MSc.

Kepada wartawan, Prof. Harsono mengatakan, pengajaran MIPA di sekolah lanjutan memerlukan upaya serius dari guru, agar siswa dapat mengembangkan formasi kemampuan dasarnya serta cara berpikir kreatif. Karena itu, upaya peningkatan pendidikan tenaga pengajar MIPA terus dilakukan. Antara lain dengan menyekolahkan 600 orang untuk pendidikan S2 dan beberapa orang untuk S3.

Pada sisi lain, pendidikan MIPA sudah waktunya lebih dikembangkan kemampuannya melalui pengembangan terpusat. "Untuk mempertahankan dan meningkatkan kemampuan pendidikan MIPA, tidak bisa ditangani sekaligus, tapi harus bertahap sehingga dibuat lima pusat pertumbuhan (*growth centre*). Yaitu di IKIP Bandung, Yogyakarta, Padang, Ujungpandang dan Malang," katanya.***

**PROF. SHIMOZAWA : THE TEACHING OF MATH AND SCIENCE
NEEDS TO BE CHANGE
MANY STUDENTS DO NOT LIKE MATH AND SCIENCE .**

Mathematics and Science Education not only enemies by Indonesian Students but also by Japanese students. In the other countries mathematics and science lessons is considered as 3D (dangerous, Dirty and Difficult). In Japanese it is expressed "3K" (Kiken, Kitanai, Kitsui) said Prof. Dr. John T. SHIMOZAWA (JICA Expert) at the International Seminar on Science and Mathematics Education of the IKIP Bandung.

According to Prof. SHIMOZAWA, this expression come, because the teachers do not give the concrete examples. He described the matter by comparing the driving school and Regular Schools.

At the driving school instructors there merely teach the way to start the engine of the car technically. They never explain why you do such actions. This is the share of Education but not enough. Because teachers at drivers schools only teach technique but they never mention to reason. If a car has trouble, pupils as driver can't discover the trouble.

This condition happens in Indonesia and this is supported situation by the low salary. In Japan teacher's salary is higher compared with assistant at the higher Institution. Respect to Mathematics and Science teachers is also high.

According to Prof. SHIMOZAWA, Mathematics and Science teachers don't assign to transfer the information, but they must explain with some experiments to solve the problems. Scientific truth be given by some people from different kinds of research in the world, through examination of different subject matters.

Japan will help and support

The wish of the society for critical thinking is the beginning of the technology transfer. In the connection with the development of Mathematics and Science Education in Indonesia, Prof. John T. SHIMOZAWA hopes the realization of assistance in the form of grant to

Indonesia, especially to IKIP and some schools. The first step has been anticipated by JICA to build growth center at five cities.

Through this grant, some step can be done such as: Curriculum development Center for Mathematics and Science Education, Research Development in Mathematics and Science, exchange experts, and support for laboratory.

Prof. Harsono said to the reporters that increase teachers Mathematics and Science Education efforts must be executed among other send 600 people for (S2) and some people for (S3).

For defended and increase ability Mathematics and Science Education, can't once handled, but must with stage so has make five growth center, that is (IKIP Bandung, Yogyakarta, Padang, Ujung Pandang and Malang).

(Pikiran Rakyat, July 10' 95)

8 Juli 1995

Pengajaran Matematika dan IPA Memerlukan Usaha Sungguh-sungguh

Jakarta, Kompas

Pengajaran Matematika dan Ilmu Pengetahuan Alam (IPA) di sekolah lanjutan menengah tingkat pertama dan atas (SMTP dan SMTA) memerlukan upaya yang sungguh-sungguh dari para guru agar siswa dapat mengembangkan formasi kemampuan dasar dan cara berpikir yang kreatif.

Hal itu dikemukakan Direktur Pembinaan Sarana Akademik Ditjen Dikti Depdikbud, Prof Dr Ir Harsono Taroepratjeka, ketika menutup seminar internasional tentang Pendidikan IPA dan Matematika di IKIP Bandung, Jumat (7/7). Seminar yang berlangsung sejak 3 Juli, atas kerja sama Ditjen Dikti, Lembaga Kerja Sama Internasional Jepang (JICA), dan IKIP Bandung, diikuti 75 orang.

Menurut Prof Harsono, matematika dan IPA mengajarkan kepada kita pemahaman tentang fenomena fisik dan logis melalui *modelling* kedua bidang tersebut. Dengan demikian melalui pengajaran keduanya, siswa akan dibawa kepada pemahaman tentang dunia, dan lebih jauh lagi memanfaatkan keterampilan *modelling* kedua bidang itu. Oleh karenanya maka agar siswa dapat mengembangkan formasi kemampuan dasar (*basic skill formation*) dan cara berpikir kreatif (*creative thinking*), pengajaran Matematika dan IPA memerlukan usaha yang sungguh-sungguh (*special efforts*) dari para guru.

Untuk mengembangkan pengajaran Matematika dan IPA, kata Prof Harsono, pihak Depdikbud sejak tahun 1980-an telah melakukan pembinaan staf, khususnya bagi para dosen Fakultas Matematika dan IPA pada IKIP se Indonesia. Kegiatan itu antara lain melalui pelatihan serta penataran di dalam dan luar negeri. Malahan di sejumlah IKIP telah dibangun *growth centre* (pusat pertumbuhan) khusus di kedua bidang itu. (*/hcb)

TEACHING OF MATHEMATICS AND SCIENCE NEEDS SEPECIAL EFFORTS

Teaching of Mathematics and Science at the lower and upper secondary schools needs special efforts from teachers in order that pupils can develop basic skills, in formation, and creative thinking said Prof. Dr. Ir. Harsono Tarepratjeka, Director of BINSARAK Dirjen DIKTI Minister of Education and Culture when he closed the International Seminar on Mathematics and Science Education at IKIP Bandung, on Friday, July, 7 1995.

According to Prof. Harsono, in mathematics and sciences teaching is understanding about physical and logic; phenomena through modeling of those subjects, pupils will understand about world. Using those approach. Because the pupils can develop basic skills and creative thinking, teaching mathematics and science need special efforts from teachers.

For developing teaching mathematics and science Prof. Harsono said that Minister of Education and Culture since 1980 has been developing teacher training program mathematics and science in the IKIPs. The activity is conducted via in domestic country and foreign countries. In some IKIPs the growth center for science and math education are being constructed.

(Kompas, July 8' 95)

Mendikbud:

Pengajaran Matematika dan IPA Harus Segera Dibenahi

Jakarta, Kompas

Pengajaran matematika dan ilmu pengetahuan alam (MIPA) di tiap jenjang pendidikan selama ini cenderung didominasi teori-teori yang berbentuk verbal. Kondisi demikian bukan saja menyebabkan bidang studi MIPA kurang diminati, tetapi juga berakibat mata pelajaran ini paling ditakuti oleh peserta didik.

Akibat lebih lanjut, kemampuan siswa dalam pemecasaan ilmu-ilmu

Suatu pun relatif rendah. Dalam tahun yang lebih luas, situasi ini berpengaruh pada upaya peningkatan sumber daya manusia Indonesia selangkah demi selangkah menghadapi persaingan dengan bangsa-bangsa lain di dunia. Berangkat dari kenyataan ini, pengajaran MIPA di sekolah-sekolah dituntut perlu segera diubah.

Beberapa antara lain pokok-pokok pikiran Menteri Pendidikan dan Kebudayaan, Wardhana Diponegoro ketika menghadiri Seminar Internasional Pendidikan MIPA di Jakarta, Senin (27/1) kemarin ini dipaparkan. Rektor IKIP Bandung, Al Abdul Kadir, ketika dalam rangka pembicaraan dengan Menteri (7 Juli 1994) diselenggarakan oleh kerjasama Ditjen Dikti, Japin, Intermation of Cooperatim Agency (ICCA) dan IKIP Widyadarmasari.

"Perubahan pertama adalah bagaimana memubuhakan minat anak didik terhadap matematika dan sains," kata Wardhana.

Diungkapkan, untuk itu diperlukan yang diandaikan pesannya antara lain: konsep di segala bidang kehidupan harus diwujudkan di upaya peningkatan mutu sumber daya manusia. Pengkajian teori adalah sebagai acuan dalam upaya ini. Konsep ini membantu mata diandaikan di dalam proses pembelajaran di dunia ini.

Selanjutnya, diandaikan diandaikan adalah pelajaran matematika dan

sains. Tetapi masalahnya mata pelajaran ini justru terkesan yang paling ditakuti oleh anak didik. Dan itu tercermin dalam banyak hal. Lihat saja mata statistik di perguruan tinggi, yang paling sains itu sangat sedikit," ujar Mendikbud.

Tetapi karena itu menurut Wardhana, pengajaran MIPA di sekolah harus dibenahi. Selain penubuhakan pada upaya memubuhakan minat anak pada bidang studi ini, masalah pengajaran kurikulum juga perlu dapat perhatian. Setelah itu baru langkah berikutnya yakni penubuhakan kegiatan belajar mengajar.

Dalam kaitan upaya penubuhakan proses belajar mengajar diandaikan Mendikbud, Jakarta, Kementerian Pendidikan dan Kebudayaan, serta kemampuan guru-guru MIPA secara implisit diandaikan, komite yang ada sekarang belum cukup menelaah dan menelaah terakumulasi sebagai besar tenaga pengajar MIPA bertakuti belakangkan pendidikan D-3.

Penemuan sendiri

Menurut Rektor IKIP Bandung, Prof Al Abdul Kadir MSc, penyebab pengajaran MIPA di sekolah cenderung menjadi monoton adalah akibat terlalu banyaknya teori. Sebaliknya, kegiatan di praktik diandaikan bentuk-bentuk penemuan sendiri yang sederhana justru sedikit. Anak lebih banyak diajak mengungkap teori yang ada, masalahnya sementara diandaikan diandaikan ke dalam kehidupan nyata yang berlangsung di

sekolahnya justru terakumulasi.

"Selain itu, anak lebih banyak belajar di dalam dan lapangan. Anak harus diberi peluang seluas-luasnya menemukan sendiri apa yang sesungguhnya itu adalah. Jadi, pendekatan yang digunakan harus bertitik tolak diandaikan penemuan, sehingga pada satu saat anak mampu membuat penemuan sendiri dalam bentuk yang sederhana," kata Abdul Kadir.

Kondisi ini diperburuk oleh muatan kurikulum yang memang kurang memberi peluang pada anak untuk berkreasi. Metode pemecahan masalah belum diberdayakan secara maksimal, sehingga anak kurang diberi arahan untuk melihat sendiri semua gejala yang terjadi. Padahal, muatan kurikulum yang bertumpu pada teori ternyata juga berimplikasi pada kegiatan belajar mengajar. Guru cenderung kurang memberi peluang pada kegiatan ekstra di luar kelas. "Tetapi persoalan ini sudah-mula-mula bisa terjawab oleh kurikulum 1994," ujar Rektor IKIP Bandung.

Meski dibuka di Jakarta, seminar internasional tentang pendidikan MIPA yang berlangsung hingga Jumat (7/7) ini seluruh kegiatannya akan berlangsung di kampus IKIP Widyadarmasari. Menurut panitia, tujuan seminar adalah untuk ajang saling tukar informasi dan pengalaman dalam penyelenggaraan pendidikan MIPA antara Jepang dan Indonesia. Dalam hubungannya ini, beberapa pembicara dari Jepang yang tampil di antaranya Prof Nouda dan Prof Y Haru (The University of Tsukuba), Prof S. Iizuka (Yayama University). Sedangkan dari Indonesia, antara lain, Dr A Hindarto (IKIP Bandung), Dr Sutrisno (ITB Bandung), Dr Suciyanto (IKIP Yogyakarta), dan T. C. S. Suryana (sebagai koordinator guru BKU di Bandung) (tan)

(Minister of Education and Culture)
TEACHING OF MATHEMATICS AND SCIENCE
HAS TO BE IMPROVED SOON

All this time, teaching of Mathematics and science at every education level has a tendency to be dominated by verbal theories. This condition is not only mathematics and science not interesting but they also make the students are afraid to this subjects.

Far-reaching consequences, the ability of for a basic science students low on an average. This condition will affect the quality of human resources in Indonesia as a main capital to face the competition among countries in the world. From this basic condition, the teaching of Mathematics and science at school has to be improved. Prof. Wardiman said about matters when he opened the International Seminar on Science and Mathematics Education in Jakarta on Monday, July 3, 1995.

According to Prof. Wardiman the first improvement is how to increase the interest of pupils in mathematics and science.

"Globalisasi" demands a competition among countries in the world in every live sectors. Thus has to be answered by efforts to increase the qualification of human resources.

According the rector of IKIP Bandung, Prof. M. Abdul Kodir, M.Sc., the teaching of mathematics and science in high school makes the pupils afraid of these subjects. This is caused by too many theoretical teaching, and too little practice of simple research out door. The students are forced to remember science and math, but the condition of life around them is ignored.

This condition is getting worse because the curriculum is lack of opportunity for pupils to be active and creative. The method of solving problem has not been implemented maximally, so there is a lack of directions for pupils to watch by themselves the nature signs could be happened.

(Kompas, July 4' 95)

Berlangsung di IKIP Bandung

Seminar Internasional Matematik - IPA Studi Banding Indonesia dan Jepang

BANDUNG, Bandung Pos
Institut Keguruan Ilmu Pendidikan (IKIP) Bandung, menyelenggarakan seminar tentang pendidikan matematik dan ilmu pengetahuan alam (IPA), sebagai studi perbandingan antara Indonesia dan Jepang (*International Seminar on Science and Mathematics Education, Comparative Study between Indonesia and Japan*)

Menurut Humas IKIP Bandung, Dinn Wahyudin, kegiatan seminar berlangsung mulai hari ini sampai tanggal 7 Juli mendatang, dengan tujuan antara lain sebagai ajang untuk tukar informasi dan pertukaran dalam penyelenggaraan pendidikan matematik dan IPA. "Untuk bidang IPA meliputi fisika, kimia, dan biologi di kedua negara yaitu Indonesia dan Jepang," katanya.

Ditambahkan, tujuan lain seminar tersebut adalah untuk meningkatkan kerjasama di bidang penelitian, khususnya yang menyangkut gapungan pendidikan matematika dan IPA.

Dinn Wahyudin menjelaskan, seminar ini terselenggara berkat adanya kerjasama Direktorat Pendidikan Tinggi Departemen Pendidikan dan Kebudayaan (Depdikbud), Japan International Cooperation Agency (JICA), dan pihak IKIP Bandung yang bertindak sebagai tuan rumah.

Dibuka Mendikbud

Pembukaan seminar ini diselenggarakan di Kantor Depdikbud Jakarta, dibuka oleh Menteri Pendidikan dan Kebudayaan Prof Dr Wardiman Djuyunggoro, ketampan.

Selanjutnya, penyelenggaraan seminar berlangsung selama empat hari di IKIP Bandung.

Dikatakan Humas IKIP Dinn Wahyudin, pada seminar tersebut tampil beberapa pembicara dari mancanegara, antara lain Prof Niwada dari *The University of Tsukuba* dengan membawakan topik *Mathematics Education in Japan*, Prof Y Hara dari dari universitas yang sama membawakan topik *Physics Education in Japan*, dan Prof S Ishizaka dari *Toyama University* dengan makalah yang berjudul *Biology Education in Japan*.

Sedangkan para pakar dari Indonesia yang tampil adalah Dr A Hinduar, MSc dari IKIP Bandung yang berinkuk sebagai *Indonesia Keynote speaker* (pembicara kunci), D Sutrisno dan Institut Teknologi Bar.

dung (ITB) dengan menampilkan topik *Physics Education in Indonesia*, Dr Suryanto dari IKIP Yogyakarta dengan menyajikan topik *Mathematics Education in Indonesia*, dan seorang lagi dari kalangan guru sekolah menengah umum (SMU) akan tampil Tatang Suryana yang menyajikan makalah dengan topik *Overview of Science Education in School*.

Menurut Dinn Wahyudin, seminar internasional ini, diikuti oleh para peserta dari kalangan guru matematika dan biologi, kimia dan fisika (IPA) se-Indonesia, para dosen perguruan tinggi, antara lain dari IKIP se-Indonesia, yaitu mereka yang menggeluti bidang pendidikan matematika dan IPA, serta para pakar dari JICA dan beberapa pakar dari universitas di Jepang (bs)

INTERNATIONAL SEMINAR ON SCIENCE AND MATHEMATICS EDUCATION AT IKIP BANDUNG COMPARATIVE STUDY BETWEEN INDONESIA AND JAPAN

The purpose of this seminar is to exchange the information and experiences in the implementation of mathematics and science education in school especially science which comprises Physics, Chemistry and Biology between Indonesia and Japan.

In addition to that, another purpose of this seminar is to increase cooperation in research especially which relates to Mathematics and Science Education.

Dinn Wahyudin explained this seminar was conducted by cooperation among Directorate General of Higher Education, Department of Education and Culture, Japan International Cooperation Agency (JICA) and IKIP Bandung.

The speakers in the seminar were Prof. N. NOUDA from The University of Tsukuba with his topic Mathematics Education in Japan, Prof. Y. HARA, from the same University with his topic Physics Education in Japan, and Prof. S. ISHIZAKA from Toyama University with his paper which has title Biology Education in Japan.

Besides that, expert from Indonesia were among the speakers they were Dr. A. Hinduan, M.Sc. from IKIP Bandung as Indonesia Keynote Speaker, Dr. Sutrisno from Bandung Technology Institute with his topic Physics Education in Indonesia, Dr. Suryanto from IKIP Yogyakarta with his topic Mathematics Education in Indonesia, and one teacher from Public Senior High School, Mr. Tatang Suryana who reads his paper on the overview of Science Education in School.

(Bandung Pos)

Mendikbud Akui NEM Mata Pelajaran MIPA Lebih Rendah dari Rata-rata

Jakarta, Pelita

Menteri Pendidikan dan Kebudayaan Wardiman Djajonegoro mengakui, Nilai Eblanas Murni (NEM) untuk mata pelajaran Matematika dan Ilmu Pengetahuan Alam (MIPA) selalu lebih rendah dari nilai rata-rata mata pelajaran lain. Hal itu salah satunya diakibatkan guru kurang pintar, bahkan banyak yang hanya lulusan D III.

"Memang ada siswa yang [sufisior], sebutnya. Tapi mereka tidak tinggi, tapi hanya sebagian kecil. Kebanyakan siswa lebih rendah dari nilai rata-rata pelajaran lain. Banyak di Indonesia sebenarnya pintar, tapi hal itu terjadi karena gurunya yang kurang pintar," kata Wardiman saat membuka Seminar Internasional Pendidikan Sains dan Matematika (MIPA) di Jakarta, Senin (3/7).

Menurut Wardiman, guru yang mengajarkan MIPA saat ini tidak menaruh perhatian terhadap apa yang diajarkannya. Karena itu, mereka perlu "dipinjam" lagi untuk meningkatkan kualitas kemampuan, terutama dalam menerapkan metode belajar-mengajar yang tepat, serta upaya menambah jumlah guru MIPA itu sendiri.

Selama ini, pelajaran MIPA dikatakan Wardiman selalu jadi "mumuk" di kalangan siswa. Apa yang diajarkan guru selalu sangat abstrak, sehingga tidak menentrik pada kemampuan yang dimiliki dalam kehidupan sehari-hari, apalagi tidak dilirik oleh buku-buku yang memadai.

Untuk mengatasi hal itu, Wardiman menyebutkan perlunya dilakukan tiga hal penting. Pertama, harus ditingkatkan minat dan ketertarikan terhadap pelajaran MIPA. Kedua, mencari jalan bagaimana mengisi Kurikulum 1994 yang telah memberikan kesempatan lebih luas. Ketiga, memperbaiki proses belajar mengajar.

Ditambahkan Wardiman, MIPA memang merupakan ilmu dasar yang menjadi penyangga ilmu-ilmu terapan. Selama ini, ada orang yang menganggapkan ilmu-ilmu dasar itu tidak berhubungan langsung dengan hal-hal praktis yang menunjang kemampuan suatu bangsa.

Sebagai bukti lemahnya pendidikan MIPA, Wardiman mengungkapkan banyaknya akuntan asing yang kini bekerja di Indonesia. Itu karena akuntansi juga sangat dekat hubungannya dengan matematika.

Penemuan

"Sementara itu, Ketua Panitia Seminar yang juga Rektor IKIP Handung, Prof H Abdul Kodir MSE menyatakan, guru-guru di Indonesia perlu secepat mungkin melihat gejala-gejala yang ada di dalam ini dan mengekspresikannya dalam

prakira. "Dengan demikian, mereka tidak lagi hanya terpaku dengan pengajaran teori-is sehingga pelajaran MIPA jadi tak menarik," paparnya.

Menurut penilaian Kodir, kecerdasan dan pengajaran teoritis yang terjadi selama ini dibuktikan antara lain peralihan yang kurang. Selama ini, kurikulum lama juga dinilai terlalu padat dan menyita sebagian besar waktu guru sehingga mereka tak bisa mempersiapkan diri dengan baik.

Salatnya, kurikulum, dikatakan Kodir membuat guru MIPA sulit menyisihkan waktu untuk menyiapkan kegiatan intra maupun ekstra kurikulum. Akibatnya, siswa tidak dapat melihat kaitan teori dengan kenyataan, begitu pula pengajarannya untuk pemecahan masalah.

"Membalikkan pelajaran biologi, kan sebaiknya dilakukan di alam terbuka, bukan cuma di dalam kelas. Tapi kalau di kelas, habiskan waktu. Mulailah-mulailah dengan Kurikulum 1994 yang berusaha untuk sedikit menampilkan materi, bisalah guru-guru itu mempunyai peluang untuk membuat persiapan yang lebih matang," lanjutnya.

"Ada orang bilang, lupa matematika tuh orang bisa maju. Padahal, matematika sangat besar pengaruhnya untuk bidang-bidang ilmu lain yang bisa digunakannya. Misalnya perancang rumah komputer yang membutuhkan pemahaman matematika sangat kuat."

Wardiman mengaku telah lama pada para Dekan di Lembaga MIPA agar akan diadakan pelajaran matematika pada mahasiswa, juga menyediakan komputer. Dengan adanya dua komputer itu, ada keterbatasan dan keterpaduan di dalam dunia kerja. Selama ini, sudah banyak lulusan yang bisa bekerja di ahli perancangan rumah.

Proses belajar yang dulu lebih banyak menuliskan informasi kepada siswa, kemudian baru bergerak ke arah ilmu pengetahuan. Sekarang, proses itu dilakukan Kodir akan dicoba dibalik. Sambil menanggapi informasi, mereka bisa melihat sendiri kaitannya dengan kehidupan sehari-hari.

Metode yang paling tepat untuk ini adalah pemecahan masalah (*problem solving*). Pemecahan masalah dengan menggunakan pengetahuan yang ada di dalam kehidupan sehari-hari yang dikaitkan dalam sistem pendidikan di negara maju. Pendekatan *inquiry* (penemuan sendiri) itu dilakukan dengan menemukan problem di lapangan, baru dibahas di dalam kelas," jelasnya.

Seminar Internasional Pendidikan MIPA, dilaksanakan selama lima hari dari 3-7 Juli 1995 di Kampus IKIP Handung. Kegiatan yang merupakan kerjasannya Ditjen Pendidikan Tinggi (Dikti) dengan Badan Kerjasama Internasional Jepang (JICA) itu menghadirkan para pakar MIPA dari Jepang dan Indonesia.

Menurut Ketua Panitia

Seminar yang juga Rektor IKIP Handung, Prof H Abdul Kodir MSE, para pakar kedua negara akan saling bertukar informasi tentang pengajaran MIPA dan merumuskan pola terbaik yang bisa diterapkan di Indonesia, terutama bagi siswa sekolah dasar dan menengah.

Sepuluh topik akan dibahas dalam seminar itu dengan mengundang para guru besar dan doktor MIPA. Dari Jepang tercatat di antaranya Prof Njuda, Prof Y Ichi dan Prof H Itoh (Universitas Tsukuba), serta Prof S Ichizka (Universitas Toyonui). (sax)

PELITA IAL. 5 Kolom 1.0 s/d 4
 Tanggal. 4 Juli 1995

MINISTER OF EDUCATION AND CULTURE ADMITS THE RESULT OF MATHEMATICS AND SCIENCE IN FINAL EXAMINATION AT HIGH SCHOOLS IS LOWER THAN THE AVERAGE

It has been a long time that students do not like Mathematics and Science. To solve this problem Prof. Wardiman explains that there are 3 ways. First, is to increase the interest and pay attention to Mathematics and Science Education. Second, is to find a way how to implement 1994's curriculum which gives more chances to poor people. The third is to improve the teaching learning process.

Up to now, some people describe that the basic Science don't have a direct relation with practical things and application which support the progress of the country.

The chairman of Seminar committee and also the rector of IKIP Bandung, Prof. H. Abdul Kodir, M.Sc. He said, that there was a tendency of theoretical teaching all this time in high schools which is resulted from lack of equipments. Besides the old curriculum which was crowded and teachers did not have much times to prepare the lesson.

The crowded curriculum makes teachers of Mathematics and science feel difficult to spare time for preparing both intracurricular and extra curricular activities. Therefore, pupils can't watch the relation between Mathematics and Science theory and daily activities in a real life, also they can't use them for solving problems.

The right method for this problem is problem solving. The approach for this is doing experiments. An inquiry approach will be done by finding a problems outdoor and then they discuss them in the class, Abdul Kodir added.

(Pelita, July 4' 95)