

Providing Quality Education for All through Teacher Professional Development and Curriculum Development

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Coverage of the Presentation

- Goals on quality education of *Education for All (EFA, 2000 - 2015)*, *Education 2030*, and *UP NISMED*
- Examples of Japan's initiative on quality education for all through teacher professional development and curriculum development
 - Past: The Science and Mathematics Education Manpower Development Project
 - Present: The APEC Lesson Study Project led by University of Tsukuba, Japan and Khon Kaen University, Thailand
- Future international education cooperation: Lesson Study
 - Sustainability
 - Scalability
 - Joint research

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Goal on Quality Education

- Goal 6 of EFA: Improve all aspects of the quality of education
- Overarching goal/theme of Education 2030: Towards inclusive and equitable quality education and lifelong learning for all
- UP NISMED serves as the national center in the Philippines for the improvement and reform of science and mathematics education at the basic and teacher education levels.
 - Main functions: research, curriculum development, and teacher professional development

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The Science and Mathematics Education Manpower Development Project (SMEMDP, 1994-1999)

- A technical cooperation project between JICA and the University of the Philippines Diliman, Department of Education, Culture, and Sports (now DepEd), Department of Science and Technology, and the Commission on Higher Education with UP ISMED (now UP NISMED) as the main implementing agency.
- Project goal: The capabilities of the science and mathematics teachers in the elementary and secondary schools throughout the Philippines would be enhanced and upgraded through the training provided by teacher trainers trained at UP NISMED.

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The Science and Mathematics Education Manpower Development Project (SMEMDP, 1994-1999)

- Project purpose: UP NISMED shall become a highly competent institute to train science and mathematics teacher trainers in the elementary and secondary levels who could play a leading role in the planning and management of teacher training courses that are focused on laboratory experiments and other practical work and in the development of instructional methods and materials.

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Major Activities of SMEMDP

- Dispatch of and technical transfer from Japanese experts to UP NISMED staff
- Technical training in Japan of counterpart UP NISMED staff
- Provision of needed equipment and books
- Development of instructional materials and methods utilizing practical work
- Conduct of national training of teacher trainers to enable UP NISMED teacher educators to apply acquired knowledge and skills and use developed instructional materials
- Follow-through of teacher trainers in the different regions

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Dispatch of Japanese Experts

GROUP	YEAR	NUMBER OF JICA EXPERTS												TOTAL
		L	S	T	L	S	T	L	S	T	L	S	T	
Team Leader	1994	1*												1
Coordinator	1995	1**												2
ES Science	1996	1	1	1	1	1	1	2	1	1				23
ES Mathematics	1997													5
HS Earth Sciences	1998	2	2	1	1	1	1	1	1					14
HS Biology	1999	1	1	1	1	1	1	2	*		*	*		22
HS Chemistry		1	1	1	1	2	*	1	1	*	1	*	*	14
HS Physics			1	1	2	1	1	1	*	1	*	*	*	22
HS Mathematics			1	1	1	3	3	1	*	1	*	*	*	23
Research & Evaluation					1	1				1	1	*		2
TOTAL		4	4	8	3	6	9	4	7	11	4	4	8	61

L - Long-term Expert
S - Short-term Expert

1* Same person 1** Different persons



The long term and short term Japanese experts assigned at UP NISMED

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Counterpart UP NISMED Staff Trained in Japan

Month/ Year	Group	Number of Counterparts								TOTAL
		ESS	ESM	HSES	HSB	HSC	HSP	HSM	R&E	
June 1994- March 1995		1 (1)	1 (1)	1 (1.5)	1 (1)					4
April 1995- March 1996				1 (2)		1 (2)	1 (3)	1 (2)	1 (3)	5
Nov. 1995- Oct. 1996		1 (2)	1 (3)	1 (6)	1 (3)				1 (1.5)	5
April 1997- Sept. 1998		1 (2)				1 (3)	1 (2)	1 (3)		4
TOTAL		3	2	3	2	2	2	2	2	18

(No. in parenthesis is no. of months in Japan.)

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Counterpart UP NISMED Staff Trained in Japan

• June 1994-March 1995

Duration	Subject Area	Venue/University
1 month	HS* Biology	University of Tsukuba
1.5 months	HS Earth Science	National Institute for Educational Research
1 month	ES** Science	Naruto University
1 month	ES Mathematics	University of Tsukuba

• April 1995-March 1996

Duration	Subject Area	Venue/University
3 months	HS Physics	Kyoto University
2 months	HS Mathematics	University of Tsukuba
2 months	HS Chemistry	Hiroshima University
2 months	HS Earth Science	Shiga University
3 months	Research and Evaluation	Tokyo Institute of Technology

HS* – High School

ES** – Elementary School

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Counterpart UP NISMED Staff Trained in Japan

• November 1995-October 1996

Duration	Subject Area	Venue/University
2 months	ES* Science	Okayama Prefectural Education Center
1.5 months	Research and Evaluation	National Institute for Educational Research
3 months	ES Mathematics	University of Tsukuba
6 months	HS** Earth Science	Kobe University
3 months	HS Biology	Shiga University

ES* – Elementary School

HS** – High School

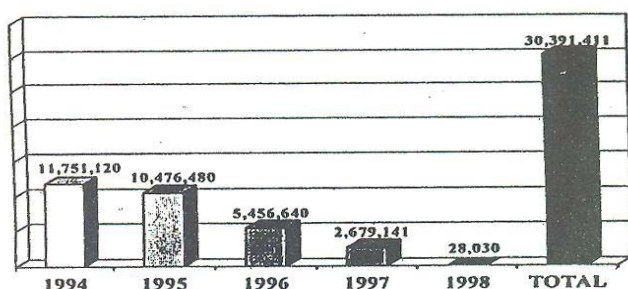
• April 1997-September 1998

Duration	Subject Area	Venue/University
3 months	HS Chemistry	Hiroshima University
2 months	HS Physics	Tokyo Gakugei University
3 months	HS Mathematics	University of Tsukuba
2 months	ES Science	Aichi Prefectural Education Center

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Equipment Donated by Japan

EQUIPMENT (Total Cost in Peso*)



*Conversion rate based on 1 June

1994: 1¥ = P0.2577

1996: 1¥ = P0.2436

1998: 1¥ = P0.2803

1995: 1¥ = P0.3118

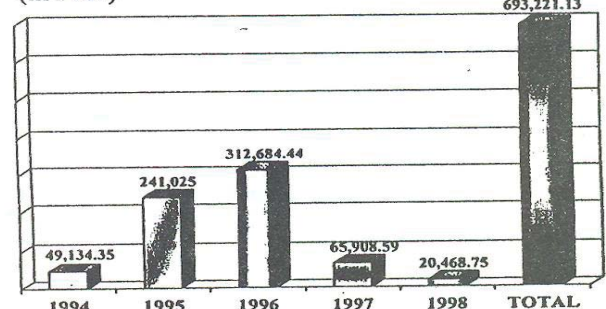
1997: 1¥ = P0.2267

Source: Philippine Daily Inquirer

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Books Donated by Japan

COST OF BOOKS DONATED BY JICA TO ISMED (in Peso)



(493 books)

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Training Scheme

Cascade model (applying the multiplier effect)

National Training Program (NTP)



Regional Training Program (RTP)

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National Training Programs at UP NISMED



Teacher trainer-participants pose during the closing ceremonies of the 1996 NTP.



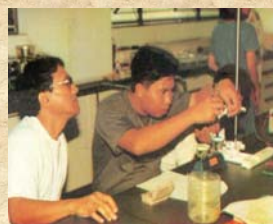
Teacher trainer-participants make and play with parachutes as part of the Elementary School Science activities during the 1999 NTP.

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National Training Programs at UP NISMED



Teacher trainer-participants detect metals in leaves during the 1996 NTP in High School Chemistry while a JICA expert looks on.



Teacher trainer-participants perform an experiment on magnetic fields and forces during the 1996 NTP in High School Physics.

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National Training Programs at UP NISMED

Year Group	Number of Teacher Trainers Trained					TOTAL
	1995	1996	1997	1998	1999	
ESS	60		55		34	149
ESM	60		55			115
HSES	60		54			114
HSB	57		54			111
HSC		59		58		117
HSP		55		62		117
HSM 1 and 2		57		63		120
HSM 3 and 4		58		62		120
TOTAL	237	229	218	245	34	963

Total: 17 NTP, 33 batches, 963 teacher trainers trained

17 national training curricula

2 NTP per subject area (except for ESS), 2 batches per NTP

National Training Programs at UP NISMED



The NTPs were conducted at the Science Teacher Training Center (STTC). The teacher trainer-participants were accommodated at the Hostel. The STTC and Hostel were donated to UP NISMED by Japan.

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National Training Programs at UP NISMED



The NTP teacher-trainer participants came from all the 14 regions of the Philippines.

Instructional Materials Developed

- 8 final editions of sourcebooks for teacher trainers, volume 1 (ESM, ESS, HSM 1 and 2, HSM 3 and 4, HSES, HSB, HSC, HSP)
- 8 final editions of sourcebooks for teacher trainers, volume 2 (ESM, ESS, HSM 1 and 2, HSM 3 and 4, HSES, HSB, HSC, HSP)
- 68 improvised equipment/devices
- 22 video lessons
- 20 posters
- 7 charts
- 5 software programs
- 2 sets of slides



Instructional Materials Developed



JICA expert explains the SMEMDP to the Japan's Imperial Highnesses during their visit to UP NISMED on 18 June 1998.



Prince and Princess Akishino of Japan look at the improvised model of the circulatory system.

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Follow Through in the Different Regions

Regional Training Programs



Teacher trainers, teacher-participants, UP NISMED teacher educators, and JICA experts pose during the 1996 RTP in Elementary School Mathematics in Region VI.



Teacher-participants in High School Earth Science perform an activity on water filtration during the 1996 RTP in Region X.

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Follow Through in the Different Regions



Teacher-participants in Elementary School Science perform an activity on sounds using musical bottles during the 1996 RTP in Region X.



Teacher-participants in High School Physics perform the "telescope" activity in optics during the 1997 RTP in Region V.

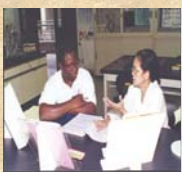
Teacher-participants in High School Biology measure water turbidity and depth during the 1996 RTP in Region



A total of 2,919 teacher-participants were observed during the Regional Training Programs.

After SMEMDP: Using the Gains and Outputs

JICA Counterpart Training Programs at UP NISMED



Mr. Agyare (Ghananian Fellow in High School Biology, 1999)



Ms. Lynette Kisaka (Kenyan Fellow in High School Biology, 2002)



Mr. Daniel Matiri (Kenyan Fellow in High School Chemistry, 2003)

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After SMEMDP: Using the Gains and Outputs

Overseas Fellowship Program of the ADB-Assisted Middle School Project of Pakistan

Year	Subject Areas	Number of Participants
2001	Achievement Testing	3
	Training of Trainers	6
	Study Visit	31
	Curriculum Development	18
	Textbook Writing	7
	TOTAL	65

Participants try out an improvised lung model.



Participants interact with community leaders and members.



After SMEMDP: Using the Gains and Outputs

JICA Third Country Individual Training Programs for Secondary Mathematics and Science Education for Kenyan INSET (In-service Training) Trainers

Year	Subject Areas (5 or 10 participants/subject area)	Total Number of Participants
2004	HS Biology, HS Chemistry, HS Physics, HS Mathematics	20
2005	HS Biology, HS Chemistry, HS Physics, HS Mathematics	20
2006	HS Biology, HS Chemistry, HS Physics, HS Mathematics	40
2007	HS Biology, HS Chemistry, HS Physics, HS Mathematics	40
2008	HS Biology, HS Chemistry, HS Physics, HS Mathematics	40



After SMEMDP: Using the Gains and Outputs

Developing a Core of Master Trainers for Improving the Quality of Science Education in Nepal

2, 4, 9, 11, and 13 June 2008
22 participants



Participants perform various practical work activities in science.

After SMEMDP: Using the Gains and Outputs

Local Teacher Training Programs



Paranaque school principals perform activities using the circulatory system model during the 1999 Elementary School Science Course: Revisiting Science and Mathematics.



Training participants measure distance using the trundle wheel during an outdoor activity called Mathematics Trail (EQuALLS, 2008).

After SMEMDP: Using the Gains and Outputs

Local Teacher Training Programs



2015 Teacher Training Caravan participants from Region VIII show their copies of the High School Mathematics Sourcebook on Practical Work for Classroom Use.

Lesson Study: Curriculum Development and Teacher Professional Development

The Asia-Pacific Economic Cooperation (APEC) Lesson Study Project

- It aims to develop human resources through lesson study.
- Using lesson study, it introduces innovative mathematics teaching and learning practices in classrooms.
- It is led by the University of Tsukuba in Japan and Khon Kaen University in Thailand and includes APEC economies such as the Philippines which is represented by UP NISMED.

Lesson Study: Curriculum Development and Teacher Professional Development

CRICED University of Tsukuba

APEC-Tsukuba International Conference IX:
Innovation of Mathematics Teaching and Learning through Lesson Study

Date: February 10-16, 2015
Venue: Tokyo, Japan

Theme | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Collaborative | Profile | Summary | Volume | Photo Gallery

筑波大学 アジア太平洋経済協力 (APEC) 国際会議 APEC-TSUKUBA International Conference
Innovation of Mathematics Teaching and Learning through Lesson Study (IX)
Organized by: Ministry of Education, Culture, Sports, Science and Technology, University of Tsukuba
Co-organized by: Ministry of Education, Culture, Sports, Science and Technology, Khon Kaen University, University of the Philippines - NISMED, Asian Science and Technology Association, Association of Mathematics Educators in Japan

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Lesson Study: Curriculum Development and Teacher Professional Development

UP NISMED's Collaborative Lesson Research and Development (CLRD) Project

- It familiarizes schools and teacher education institutions with lesson study.
- It uses lesson study to promote teaching and learning
 - mathematics through problem solving and
 - science through inquiry

Lesson Study: Curriculum Development and Teacher Professional Development

The Context

School: Sta. Lucia High School (SLHS), Pasig City

Goal of the Lesson Study Teams in SLHS:

- Long-term goal: To develop students' mathematical thinking through problem solving
- Sub-goals: To enable students to:
 - represent real-life and mathematical situations
 - give meaning to these representations
 - solve problems in different ways

Lesson Study Team:

- 3 fourth year High School Mathematics teachers and Mathematics coordinator
- 1 UP NISMED High School Mathematics staff
- 1 UP NISMED High School Earth and Environmental Science staff



Lesson Study: Curriculum Development and Teacher Professional Development

Example of a Research Lesson based on the APEC Lesson Study Project
Theme: Innovation of Mathematics Education through Lesson Study - Challenges to Emergency Preparedness for Mathematics: Earthquake and Tsunami

Topic: Interpreting the graphs of functions

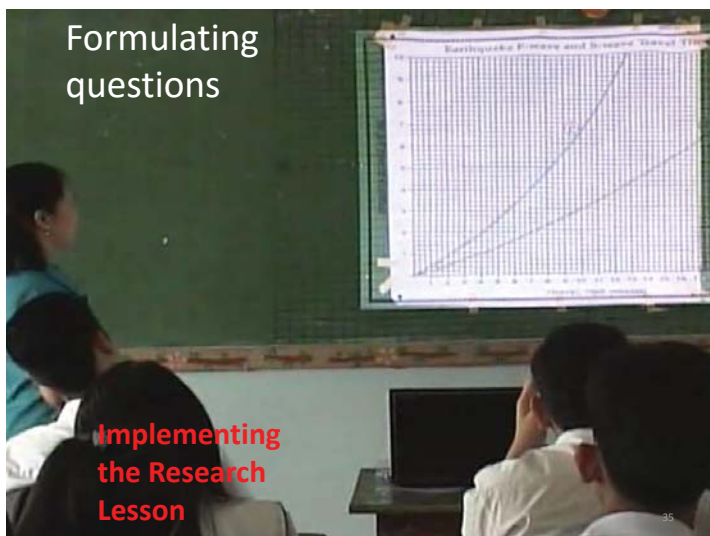
Objective of the lesson: To formulate questions whose answers can be found on the distance-time graph of p-wave and s-wave which are produced when an earthquake occurs



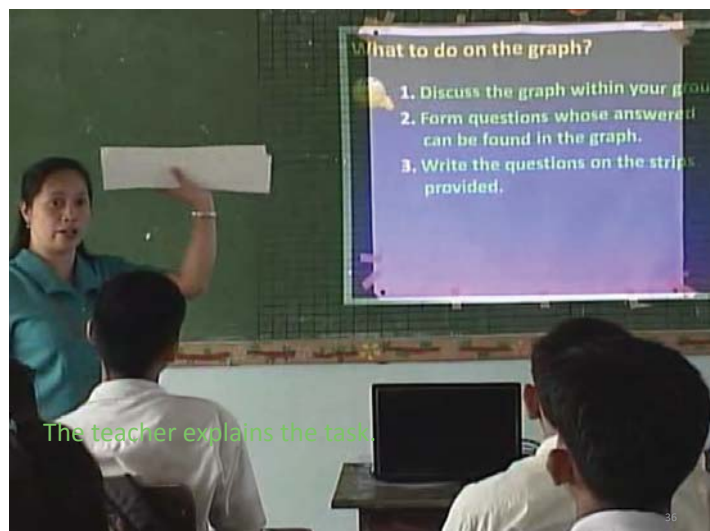
The lesson study team plan the research lesson at the Mathematics Faculty Room of SLHS. A major concern of the teachers was "the students are not used to asking questions."

Planning the Research Lesson

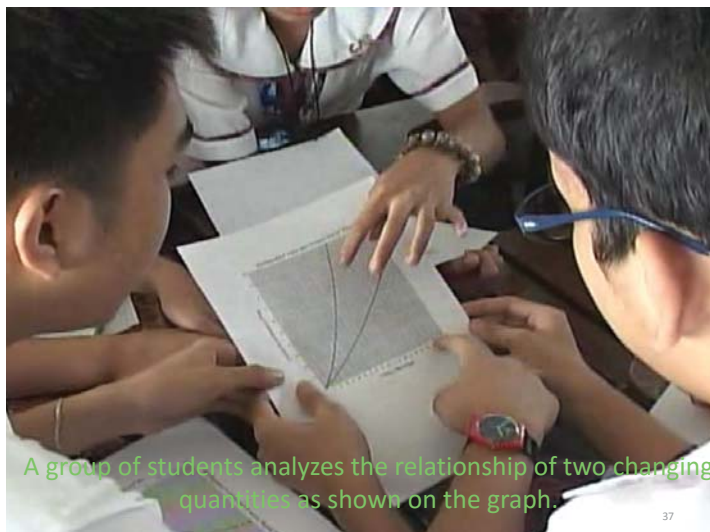
Formulating questions



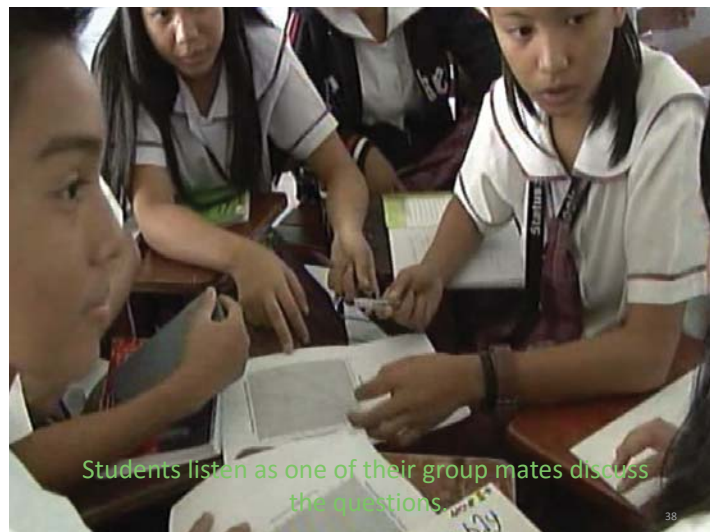
Implementing the Research Lesson



The teacher explains the task.



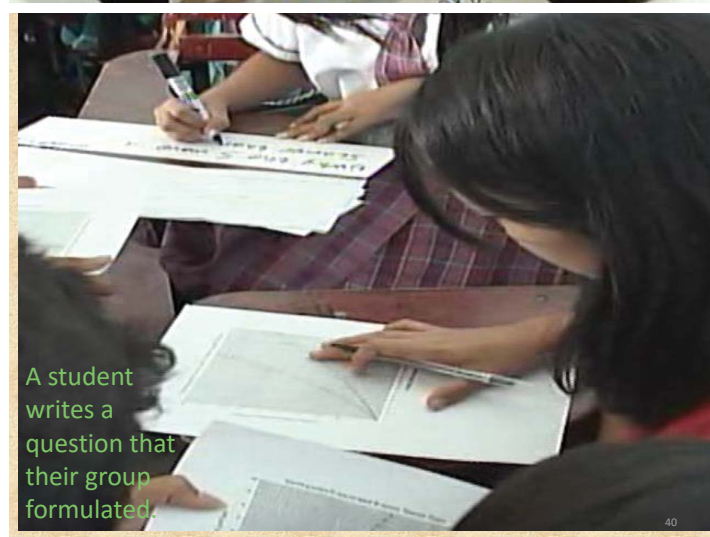
A group of students analyzes the relationship of two changing quantities as shown on the graph.



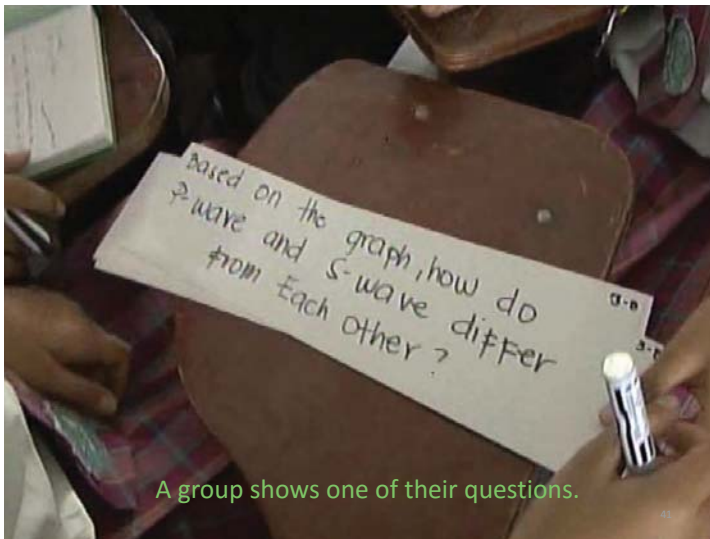
Students listen as one of their group mates discuss the questions.



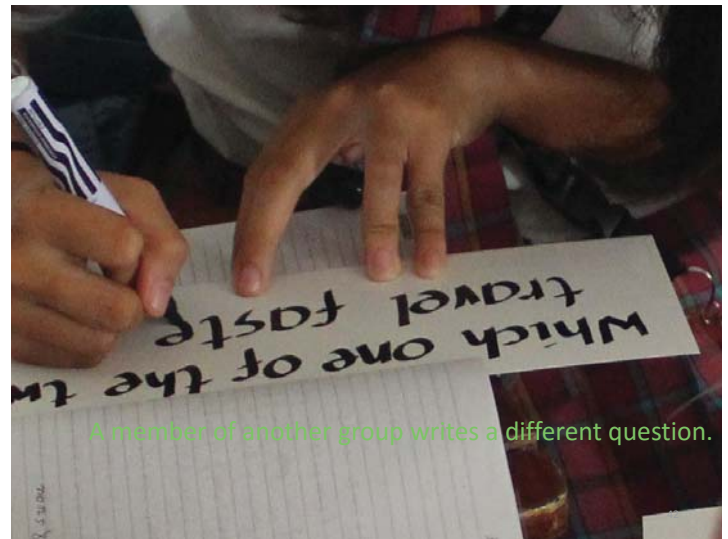
Students reflect on their questions.



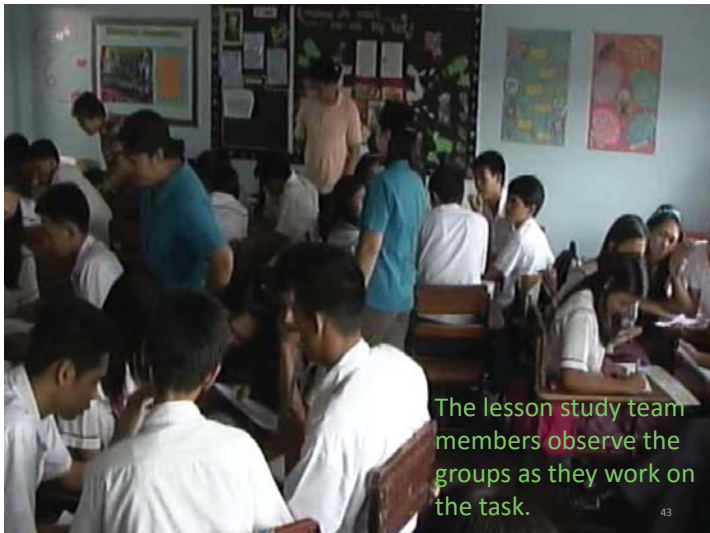
A student writes a question that their group formulated.



A group shows one of their questions.



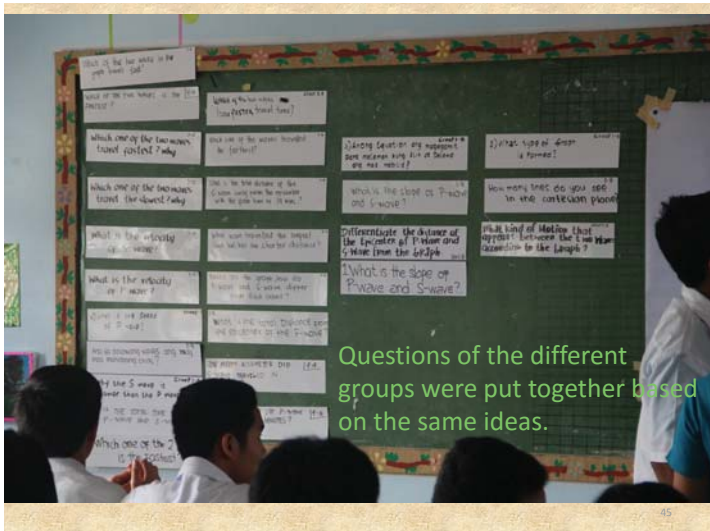
A member of another group writes a different question.



The lesson study team members observe the groups as they work on the task.



Groups post their work on the board.



Questions of the different groups were put together based on the same ideas.

Lesson Study: Curriculum Development and Teacher Professional Development

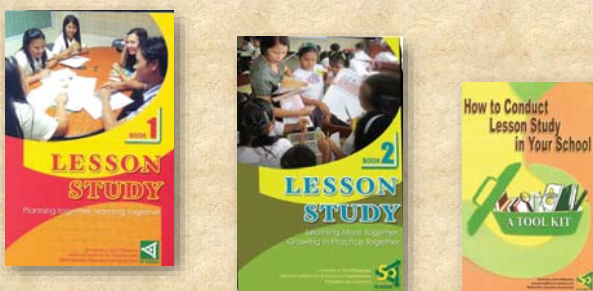


Post-lesson Reflection and Discussion

"I was overwhelmed by the enormity of their questions."
 "I found out that they know how to observe a graph."
 "They also really think."

Lesson Study: Curriculum Development and Teacher Professional Development

UP NISMED's Lesson Study Publications



Lesson Study: Curriculum Development and Teacher Professional Development

<http://lessonstudy.nismed.upd.edu.ph/>



Future International Education Cooperation: Lesson Study

Lesson study to empower teachers for the
Philippine K to 12 curriculum reform

- Sustainability
- Scalability
- Joint research

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Thank you.

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