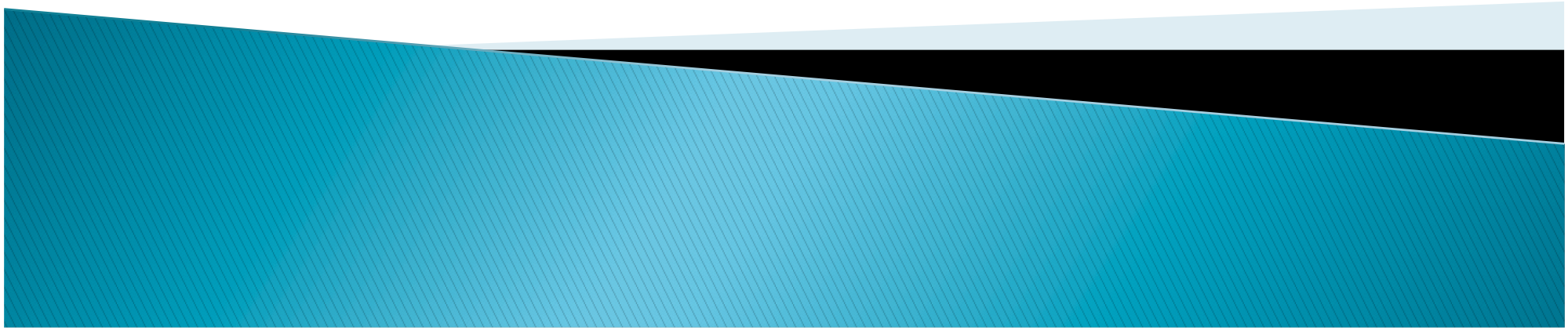
ENVIRONMENTAL EDUCATION CURRICULUM AND CHALLENGES

Rosanelia T. Yangco
UP College of Education

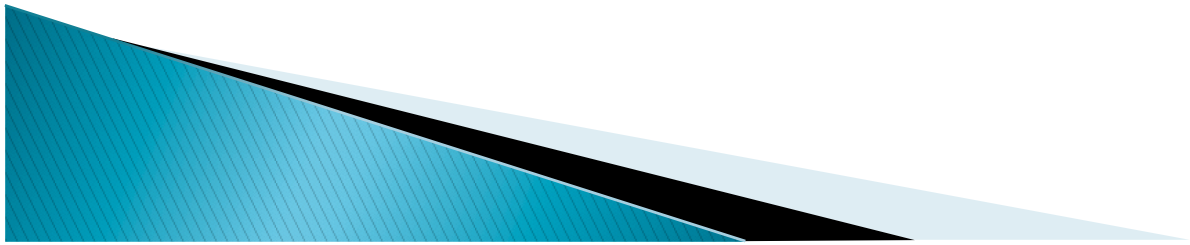


Outline

- 1. Integrating Sustainable Development in Teaching Science and Social Studies by Talisayon, Yangco, & Calingasan
- 2. Lesson Study on Air Pollution for Elementary School Intermediate Students in the Philippines by Manzano & Pawilen
- 3. Five Articles from Science Education for Sustainable Development

Integrating Sustainable Development in Teaching Science and Social Studies

- Talisayon, Yangco, & Calingasan
- UP College of Education

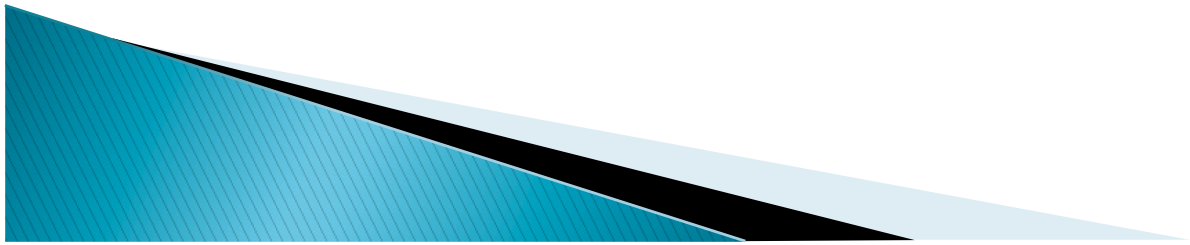


1. **ESD Areas**:

   Gender sensitivity, intercultural understanding, environmental protection, HIV/AIDS prevention, and disaster preparedness

2. **Project Site**: College of Education
   University of the Philippines,
   Diliman, Quezon City

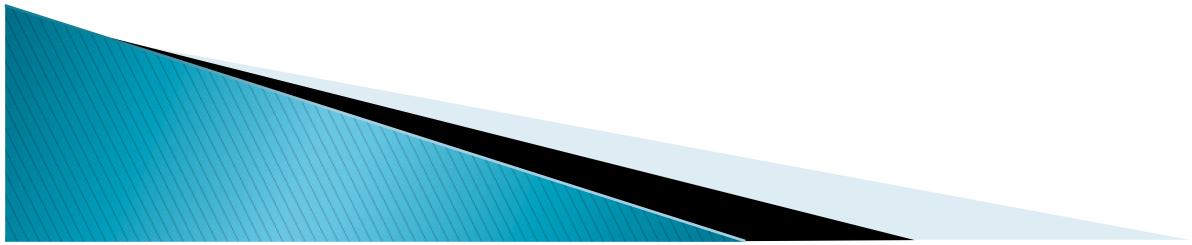
   Time: First Semester 2009-2010



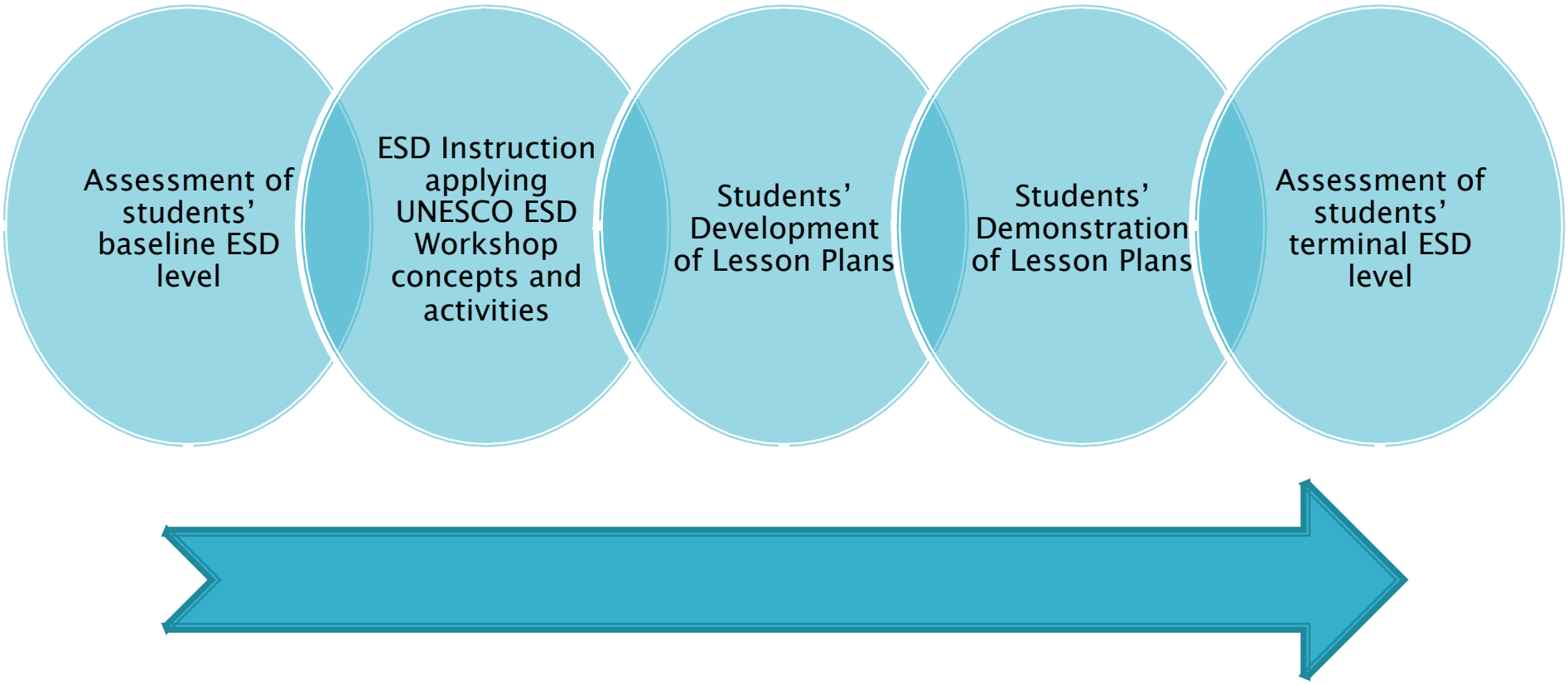
Integrating Sustainable Development in Teaching Science and Social Studies

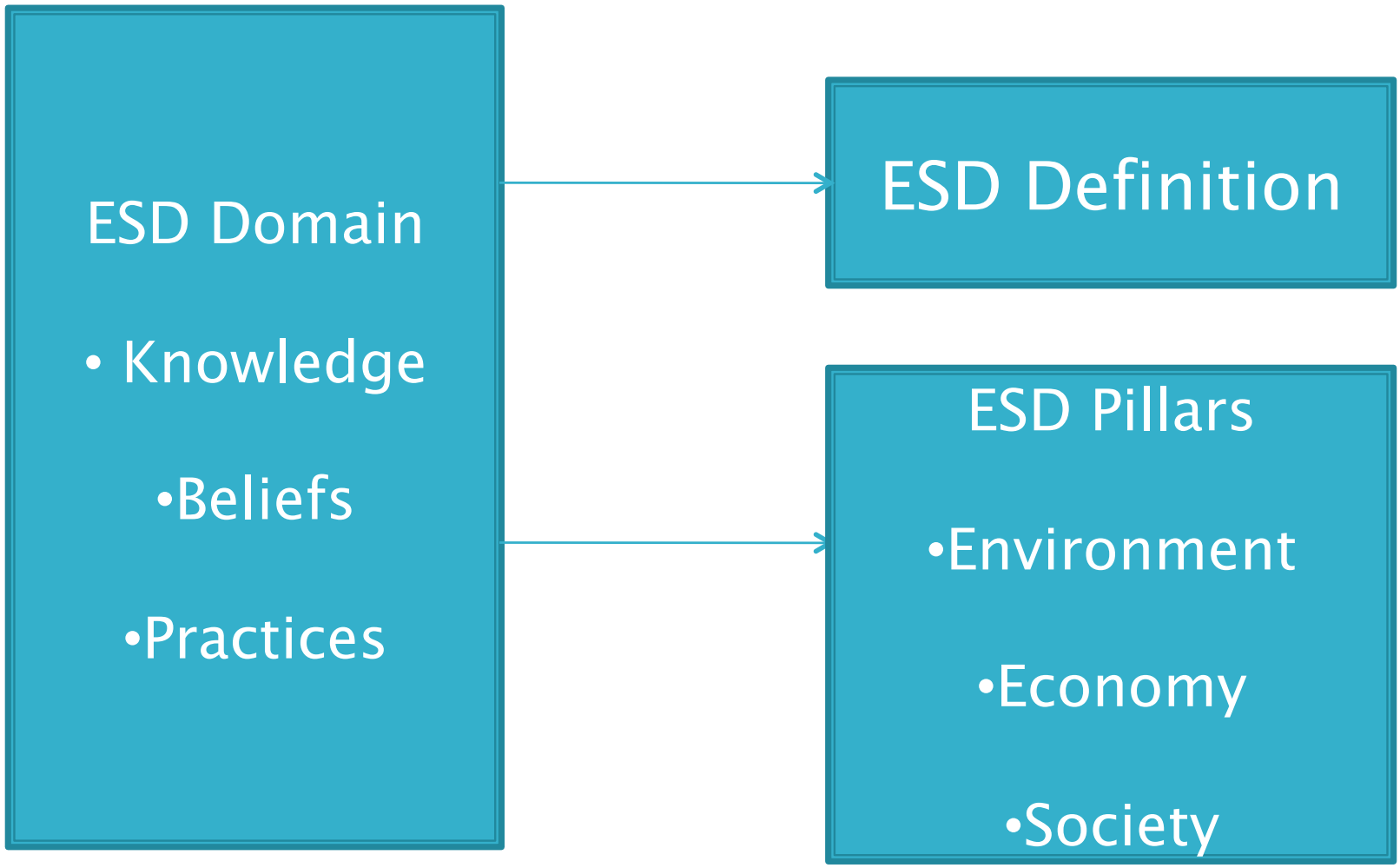
3. Sample composition: 3rd year students from 2 classes (10 students per class):
   EDSC 101 – The Teaching of Science
   EDSSE 161 – The Teaching of Social Studies

4. Research Model: Action research



Research Process





Conceptual Framework of the Study

Table 10. ESD Integration in lesson plans prepared by science students

Grade level	Lesson title	ESD objective	Part of the lesson
9	Silent but deadly!	Express one's personal responsibility in preventing the spread of HIV	Motivation
8	Go ahead and multiply?	Explain the problems that population growth brings and suggest solutions to them	Lesson proper
10	Hace calor! (It's warm today)	Describe the effects of human intervention on the environment	Lesson proper
8	Welcome to Cell City!	Point out similarities between cellular organization and a society that exhibits sustainable development	Generalization
9	How fast can pollution go?	Appreciate the processes and substances related to pollution	Lesson proper

Table 12. Integration of a recent disaster (typhoon) in social studies lesson plans

Grade level	Lesson title	Disaster integration	Part of lesson plan
Grade 6	Preservation and management of natural resources	Video clip of typhoon Ondoy	Lesson proper
Grade 3	Environmental conservation	Typhoon Ondoy as an example of the effects of global warming	Introduction
Grade 6	Disaster awareness and management	Pictures of typhoon Ondoy and discussion of its possible causes	Motivation
Grade 3	Global warming	Typhoon Ondoy as an experience that validates the effects of global warming	Conclusion

Table 13. Lesson objectives reflecting student beliefs on environmental problems

Lesson title	ESD Objective
Needs and wants	Realize the effects of the massive use of resources on the environment and future generations
Global warming	Realize the importance of preventing global warming
Preservation and management of natural resources	Discuss how abuse of natural resources affects us
Recycling	Realize that recycling is a way to care for the environment

Table 14. Other ESD objectives in student lesson plans in social studies

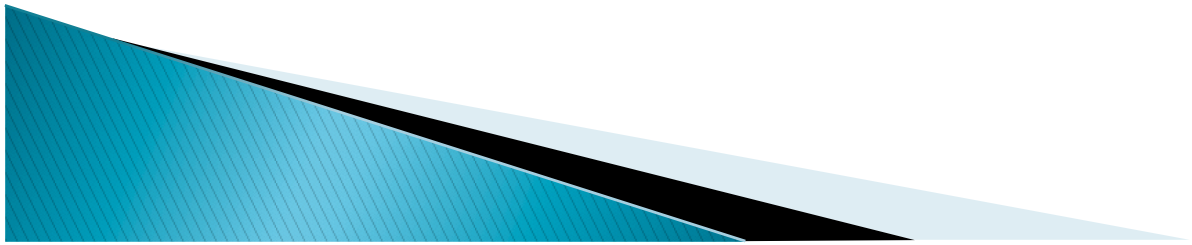
Lesson title	ESD objective
Geography/Where is the Philippines?	Understand the importance of disaster preparedness
Disaster awareness and management	Explain his/her part in a disaster situation and realize himself/herself as an important part of the community
Peace	Determine the importance of having peaceful situation in the home, school , neighborhood, and country
Culture and society of ancient Filipinos	Infer the importance of preserving Filipino culture in relation to sustainable development
Gender	Realize the effects of gender stereotyping in their lives

Conclusions

Science class significantly improved its ESD beliefs but not ESD knowledge.

Social studies class significantly improved its ESD knowledge but not its ESD beliefs.

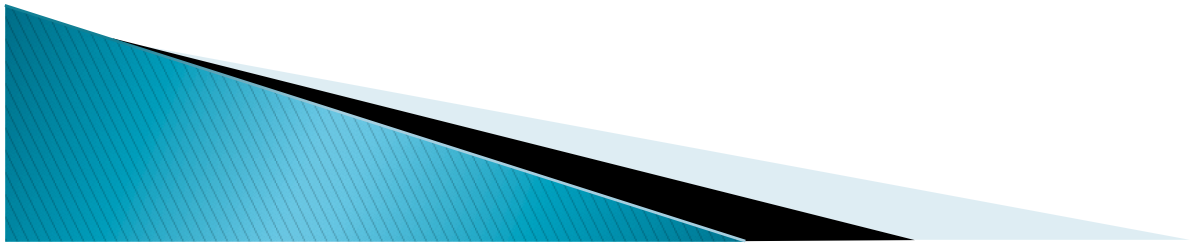
ESD practices significantly improved in both classes.



Conclusions

- Social aspect of ESD improved in the following:
- ESD knowledge of social studies students
- ESD beliefs and practices of science students.

Science students significantly improved in the economic aspect of their ESD beliefs.



Conclusions

- Social studies students significantly improved in their ESD practices in terms of ESD definition and environmental aspect.

- Lesson plans reflected the high level of ESD knowledge of the students and their appreciation of the interaction of the ESD pillars.

Conclusions

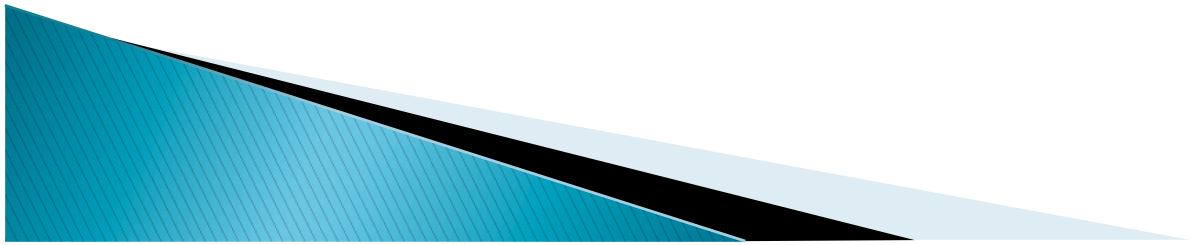
- Lesson plans described ESD practices but it was difficult to infer if these were the personal ESD practices of the students who wrote the lesson plans.

Lesson Study on Air Pollution for Elementary School Intermediate Students in the Philippines

Manzano and Pawilen
UP College of Education

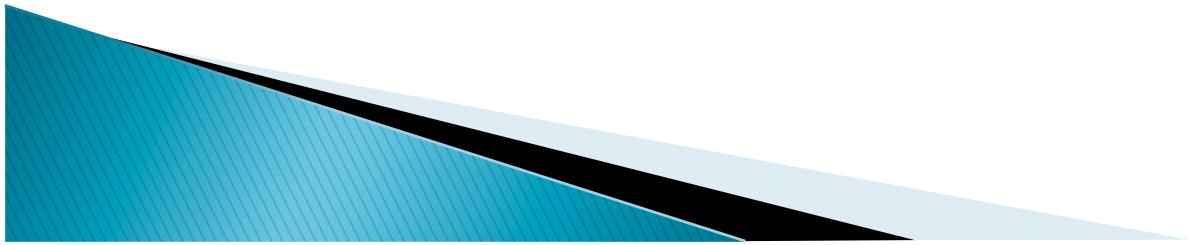
Goal of the Study

- To ascertain concept change on air pollution among intermediate students in a selected elementary school in the Philippines



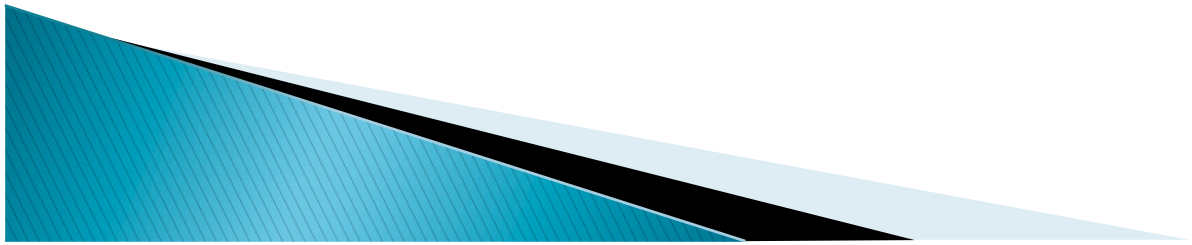
Sample

- 30 Grade 6 students (ages 12 & 13) in an elementary school in Urdaneta, Pangasinan in November 2007



Lesson on Air Pollution

- 1. Hydrogen chloride
- 2. Sulfur oxides & nitrogen oxides
- 3. Green chemistry



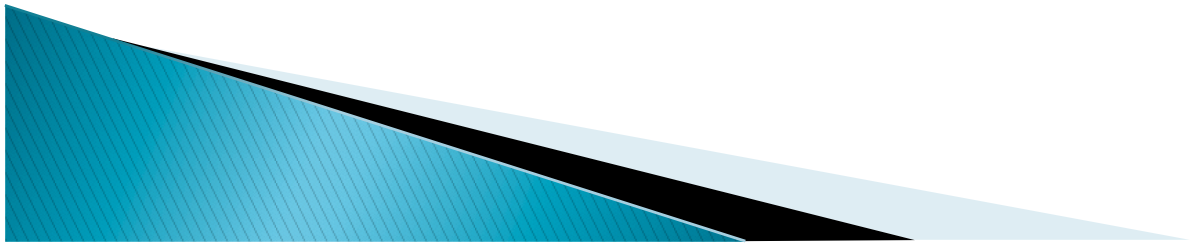
Conclusion

- Clear understanding of the concepts
- Lesson provided students the chance to explore various learning resources
- Carefully planned lesson enhanced meaningful learning
- Teacher is a key factor in the promotion of the lesson on air pollution

Science Education for Sustainable Development, 2008

- 1. Teaching Sustainable Development
- to High School Students

- Marina E. Balce
- UP NISMED



Approach

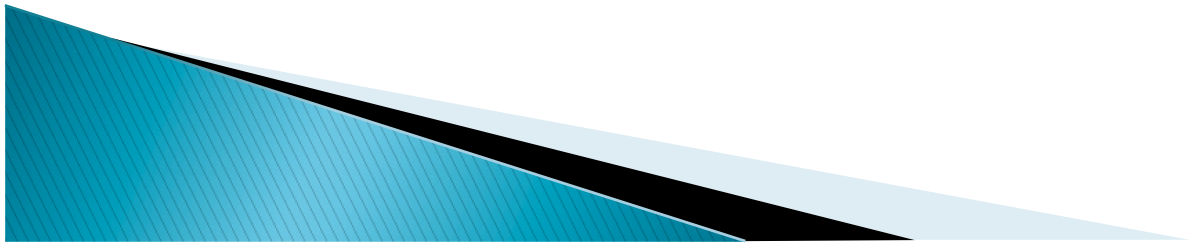
- Use of a 20-minute video entitled *Population and Carrying Capacity* – Land, water, air and all living organisms, including humans, are integral parts of the ecosystem.

Science Education for Sustainable Development, 2008

- **2. Integrating History and Philosophy of Science in the Chemistry Curriculum for Sustainable Development**

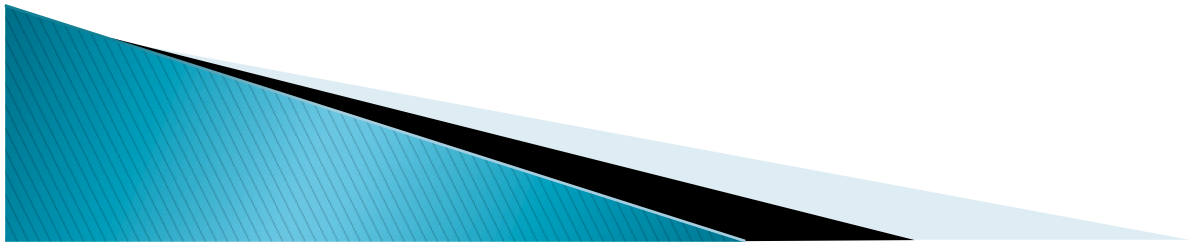
- Edwehna Elinore P. Gayon
- UP College of Education

- Integration of HPS with chemistry provides greater context for students and understanding of the nature of chemistry



Example:

- Rivalry between Thomson and Rutherford about the alpha particle scattering experiment
- – They had different interpretations of the same results.



Another Example:

- Ionic bond and Covalent bond

- “The idea of covalent bond had to compete with the ionic bond, as the latter was the central model until about 1920” (Niaz & Rodriguez, 2001).

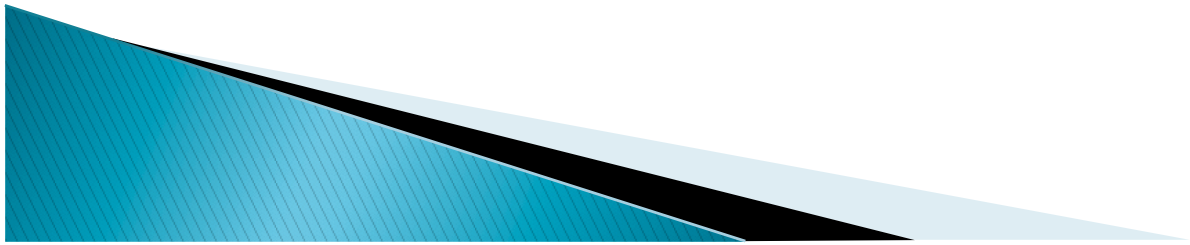
Science Education for Sustainable Development, 2008

- **3. Integrating Project-Based Service-Learning with Teaching Selected Physical Chemistry Concepts Using the Environment as Context**

Pia C. Campo (UP NISMED) & Maria Carmina Ramos (UPCEd graduate student)

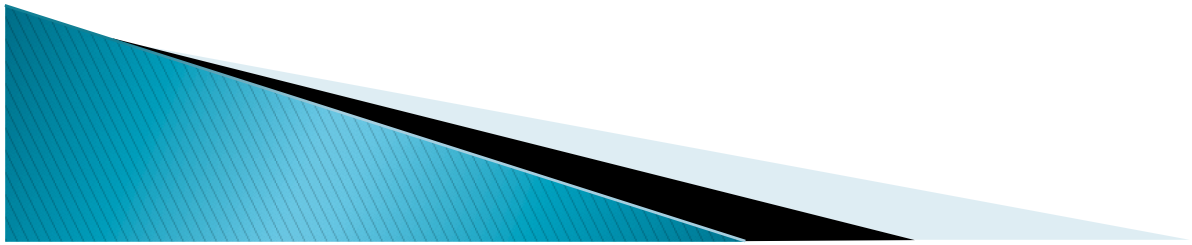
Science Education for Sustainable Development, 2008

- Service learning (experiential learning)
  - links academic instruction with community service



Example:

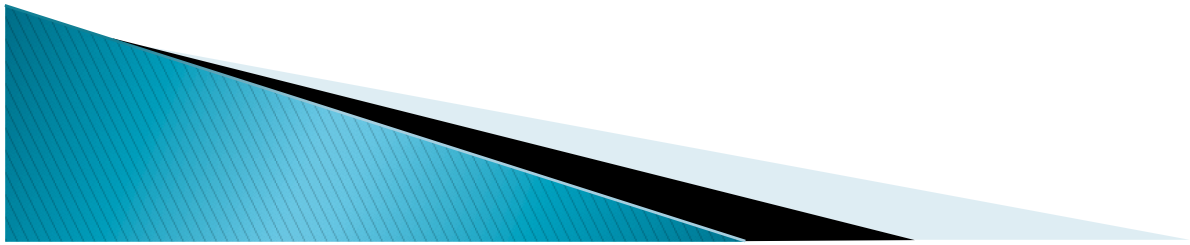
- Topic: Effect of Temperature on the Rate of Reactions
- Application/Context: Composting
- Student Activities:
- 1. students compost biodegradable materials and record the temperature of the heap over a period of time
- 2. students teach composting to the community



Science Education for Sustainable Development, 2008

- **4. Teaching Physics for Sustainable Development**

- Talisayon (UP College of Education), Regalado (UP Integrated School), Hilario, Allas, & Apolonio (UPCEd graduate students)



Example

SD Principle	BEC Physics LC	Teaching Strategy
Participatory Democracy	Explain effects of nuclear radiation on living things and environment	Organize a student debate Encourage collaborative work
Development of Human Potential	Evaluate risks and benefits associated with energy development	Students critique risks and benefits of power plant development

Science Education for Sustainable Development, 2008

- **5. Integrating Sustainable Development Principles in Teaching History of Physics**

- Sheryl Lyn C. Monterola
- UP Integrated School – now with UP College of Education

Example:

SD Principle	History of Physics Component
Full participation of women	Marie Curie is the most famous of all the female physicists. There are about 83 women who contributed to different subfields in physics.
Denouncement of warfare impact of peace on development	The Manhattan Project was the antithesis of this SD principle. Scientists were involved in a secret mission to create an atomic bomb ahead of Germany. Eventually the two bombs were detonated in Nagasaki and Hiroshima. Dr. Robert Oppenheimer was written in the history of physics as the director of the project.

Thank you very much!

