Session 2: ENVIRONMENTAL EDUCATION AND CLIMATE CHANGE EDUCATION

Part 1: Exploring the Essentials of EE, CCE and Challenges, Barriers and Opportunities and Enablers for teaching & learning
What are the barriers & challenges to teaching for environmental protection and climate change in Indonesian schools?
Thinking from a . . .

1. Teacher perspective
2. Administration perspective
3. Educational Supervisor / Teacher Educator perspective
4. Curriculum perspective
5. Teaching and Learning Pedagogy perspective
6. School-based management perspective
Group discussion . . .

What is needed to overcome these challenges and barriers? What are some of your ideas for making it more easy for environmental protection and climate change education to integrated into curriculum / teaching and learning? What are possible ‘enablers’ and opportunities?
Remember what Einstein said . . .

“No problem can be solved from the same consciousness that created it. We have to learn to see the world anew.”

(Albert Einstein)
Sustainability requires shifting from Transactional/Transmissive Teaching & Learning to Transformative Teaching & Learning

Meaning that … a shift from passing on a set body of recited knowledge such as is in a centralised curriculum and/or teaching from a text books (transactional / transmissive) to . . .

. . . recognition that we are all learners learning together and moving into the unknown, to invent and discover new knowledge that contribute to sustainable practices (transformative). . .

. . . Since we must learn our way to sustainability.
ESD represents a shift from Transmissive Type of Education to a Transformative Type of Education

**Characteristics: Bottom-up Approach, Quality Focused, Knowledge Acquisition & its Connection through Action, Participation and Collective Decision Making, Constructing Values and Ethics, Attitude Change, Life Long Learning throughout; Accommodation to the evolving nature of Concept of Sustainability, Vision & Scenario Building**

**Characteristics: Top Down Approach, Quantity Focused, Knowledge Transfer, Focus on Analytical thinking, Cause-effect Relations, Problem Solving,**

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**Transmissive Education**

- **Learners as Defective Model**
- **Skills & Knowledge**
- **Awareness**
- **Experts & Researchers**
- **Learning Environment**

**Transformative Education**

- **Learners / Facilitators**
- **Institutional Capacity / Civil Capacity/ Context / Social Support System**
- **Learning Environment & Opportunities**
- **Action & Participation for Social Change**
- **Learners**

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Transformative Education represents a shift from Transmissive Type of Education to a Transformative Type of Education.

- **Characteristics:** Bottom-up Approach, Quality Focused, Knowledge Acquisition & its Connection through Action, Participation and Collective Decision Making, Constructing Values and Ethics, Attitude Change, Life Long Learning throughout;
- **Accommodation to the evolving nature of Concept of Sustainability, Vision & Scenario Building.**
Transformative Learning is a Process of Perspective Transformation

The three cognitive dimensions of perspective transformation:

1. *Psychological* (changes in understanding of the self);

2. *Convictional* (revision of belief systems);

EMPHASES IN TRANSFORMATIVE EDUCATION

PLACES EMPHSIS ON:

- learning leading to change, highlighting the importance of the individual learner;
- holistic approach to teaching;
- equal value to the emotional, social and cognitive dimensions of learning, and
- Learning that brings change, and this change provides opportunities for more learning.
Transformative education is a process that brings about deep and significant changes (for the better) in an individual and ultimately culminates in similar changes at the societal level, principally brought about through innovative and creative teaching and learning, curriculum reform and appropriate policy at the school level.
“Education for Sustainable Development (ESD) is a transformative education process of learning our way towards sustainability.”
Education that is interdisciplinary and holistic

Education that is values-driven

Education that promotes critical thinking and problem solving skills

Education that centered on a systems thinking approach

Key Attributes (cont’d)...

Education that uses multi-method approaches

Education that encourages and stresses participatory decision-making responsibility

Education that is locally relevant and culturally appropriate

“Education for Sustainable Development integrates concepts and analytical tools from a variety of disciplines to help people better understand the world in which they live.”
# The Evolution of Environmental Education

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Focuses on developing appreciation of the outdoors, particularly outdoor activities and skills like camping.</td>
<td>Focused on appreciation of nature and natural history (learning about different species and ecological relationships)</td>
<td>focuses on developing core concepts and skills that environmentally literate citizens need for responsible action.</td>
</tr>
<tr>
<td>Takes places outdoors</td>
<td>Takes place outdoors</td>
<td>Takes place outdoors and indoors (i.e. classroom or other)</td>
</tr>
<tr>
<td>Experientially based learning</td>
<td>Mostly teacher/expert centered mixed with experiential</td>
<td>Can be teacher-centered or child-centered and content-centered or process centered (experiential education)</td>
</tr>
</tbody>
</table>

## The Evolution of Environmental Education

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Aim is a healthy environment</td>
<td>Environment (Quality, Quantity)</td>
<td>e.g. natural resources, climate change, rural development, sustainable urbanisation, and disaster prevention and mitigation</td>
</tr>
<tr>
<td></td>
<td>Development (Economic, Education, Social Services, Capacity Building)</td>
<td>e.g. human rights, peace and human security, gender equality, cultural diversity and inter cultural understanding, health, HIV/AIDS and governance</td>
</tr>
<tr>
<td></td>
<td>Population (Size, Growth, Distribution, Structure)</td>
<td>e.g. poverty reduction, corporate responsibility and accountability, and market economy</td>
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*Source: M. Sato (2004)*
Objectives of Environmental Education

1. Awareness - An awareness of the environment and its problems;
2. Knowledge - Basic knowledge and understanding of the environment and its interrelationship with man;
3. Values & Attitude - Social values and attitudes which are in harmony with environmental quality;
4. Skills - Skills to solve environmental problems;
5. Critical Thinking - Ability to evaluate environmental measures and education programmes;
6. Responsibility & Participation - A sense of responsibility and urgency towards the environment so as to ensure appropriate actions to solve environmental problems.

Source: Center for Environmental Education (CEE), India
“The goal of environmental education is: to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.”
Model for Environmental Education teaching & learning

Education About the environment

Concern (values)
Knowledge & understanding
Concepts
Attitudes
Skills

Experience

Action

Education In and From the environment
The role of the environmental educator

To educate about environment is a challenging task…

- Environment is all encompassing, multidisciplinary and dynamic. An educator has to bring in all dimensions – social, economic and political.
- Practical activities and first hand experiences of real-life situations are essential to make EE meaningful. It must be relevant and personal.
- Objective of EE - spanning awareness to action. Education must be transformative and experiential (learning by doing, reflection, reformalization, and reapplication).
School is one institutional framework through which Environmental Education can be introduced. The main actors that interact within this framework are students, teachers, and the curriculum. Whole-school participation in action and improvement plans should include EE in school planning. Reciprocal community, family, and stakeholder partnerships are essential. Environment can be the 'Integrating Context for Learning' for all subjects in the curriculum; learning occurs both within and outside school context. Participatory learning approaches to develop critical and systemic thinking skills.

- Reducing the school's ecological footprint; i.e. use of resources
A Whole Institution Approach

Values, Principles and Practices reflected in every aspect of school’s activities

- Community partnerships
  And participation

- The school
  ethos, culture and environment

- The mission/vision,
  purpose and shared values

- All institutional policies
  and guidelines

- Behavior of students,
  Teachers and staff

- Teaching/learning process,
  methodology, and pedagogy

- Curricula & learning material
  in all disciplines

- The school
  ethos, culture and environment

- Community partnerships
  And participation
In Indonesia . . .

**Adiwiyata Program** — Lead by the Ministry of Environment to encourage the creation of knowledge and awareness of schools in an effort to conserve the environment.

In this program every school is expected to get involved in school activities toward a healthy environment and avoid the negative impact.

**Four Areas of Adiwiyata Assessment**

1. Development of Environment Care and Environment Culture Policy.
3. Development school activity based on the Participative activity.
4. Development and or managing Supporting Facility of the school.
Climate Change Education

Education needs to take into consideration the following implications of climate change, all of which characteristics of ESD:

- All levels and forms of existing educational and teaching and learning programmes need to be reviewed and re-oriented to address the causes and consequences of Climate change

- Climate Change requires educators to include new content into education, training and public awareness programmes.

- Creativity, problem solving and social transformation skills need to be developed and nurtured.

- Positive, participatory action and solution-centered approach to education and learning need to be developed
Challenges and New Direction of Climate Change Education in Indonesia

Need integrated policy in disseminating Climate Change Education.

→ more than 250,000 schools and more than 20,000 Islamic boarding schools
→ different kind quality of schools

Need improvement on Adiwiyata program concept and mechanism

→ to obtain new values, new behaviour, creative thinking, problem solving skills in mitigate and adapt to Climate Change.

Need correct content and appropriate yet interesting method in disseminating CCE.
CONCLUSION AND RECOMMENDATION from MoE Indonesia

- Cooperation and partnership from multi stakeholders will be needed in order to develop Climate Change education program.

- It is imperative to prepare our children for the future to be able to respond to the consequences of climate change and to be able to contribute to mitigate the worst scenario. Education plays main role to make that happen.

- However, introducing new content about climate change, its causes, consequences and solutions will not be an adequate response to this global challenges.

- All effort in overcome the problems caused by Climate change has to be integrated and synergized in order to make significant impact.
Climate Stabilization & Community Sustainability

Mitigation

Adaptation

Causes

Consequences

Climate Change Education
Session 2: ENVIRONMENTAL EDUCATION AND CLIMATE CHANGE EDUCATION

Part 2

Practical Exercises for exploring whole system thinking and Environmental Literacy Competencies
• Sustainability
• Sustainable education
• Sustainable development
• Education for Sustainable Development (ESD)
We must learn to see and understand the world as a whole system not a collection of individual parts.

Source: John Gerber, Systems Thinking Introduction, 2007
For example, here are some Sustainable Development Challenges

<table>
<thead>
<tr>
<th>Economic</th>
<th>Nature</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Investment</td>
<td>• Climate change</td>
<td>• Democracy</td>
</tr>
<tr>
<td>• Jobs &amp; Wages</td>
<td>• Deforestation</td>
<td>• Corruption</td>
</tr>
<tr>
<td>• Markets</td>
<td>• Biodiversity loss</td>
<td>• Education</td>
</tr>
<tr>
<td>• Energy security</td>
<td>• Water quality &amp; quantity</td>
<td>• Urban migration</td>
</tr>
<tr>
<td>• Poverty</td>
<td>• Solid waste &amp; pollution</td>
<td>• Gender equity</td>
</tr>
<tr>
<td>• Rural development</td>
<td>• Natural disasters</td>
<td>• Food security</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Well being</th>
<th>How do we tend to see these issue?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Quality of Life</td>
<td>How to we tend to solve these problems?</td>
</tr>
<tr>
<td>• Individual health</td>
<td>Do we ever create new problems with our solutions? Why?</td>
</tr>
<tr>
<td>• Family relationships</td>
<td></td>
</tr>
<tr>
<td>• Peace and non violence</td>
<td></td>
</tr>
<tr>
<td>• Personal security</td>
<td></td>
</tr>
</tbody>
</table>
This is how they really should be seen

**Economic**
- Investment
- Jobs & Wages
- Markets
- Energy security
- Poverty
- urban & Rural development

**Nature**
- Climate change
- Deforestation
- Biodiversity loss
- Water quality & quantity
- Solid waste & pollution
- Land degradation
- Natural disasters

**Social**
- Democracy
- Corruption
- Education
- Urban migration
- Gender equity
- Food security

**Well being**
- Quality of Life
- Individual health
- Family relationships
- Peace and non violence
- Personal security
Sustainability Challenges are interconnected.

Linkages are invisible.

Thus, students need new skills and values to make informed decisions.

Think holistically, critically and reflectively…
How can we assist our students to see the big picture and understand the multi-perspectives around any issue or topic?
How do Environmental Issue Connect to other Areas Human Life?

Using the AtKisson Sustainability Compass

An Orientation Tool and Thinking Lens for Sustainability
The Compass is a thinking tool or lens for inculcating a ‘sustainability habit of mind’
Definitions of the four Compass Points

Economically Responsible & Viable
Making income opportune fulfillment happiness possible

Socially Responsible Cohesive and involved

Environmentally healthy
Living within Earth's physical and biological limits

Supporting social stability, equity, and development

System Conditions for Sustainability
Nature

- Natural Resources use and mgmt. (water, air, soil, forests, etc)
- Environmental values and ethics
- Land use patterns
- Pollution & Environmental Quality
- Environmental policy, laws & regulations
- Biodiversity & Ecosystem
- Ecosystem Services (e.g. clean water, oxygen generation, CO\textsubscript{2} sequestration)
- Urban built environment
Compass Exercise: The Lorax
Compass Exercise: The Lorax

Instruction

• Each person will have a Compass note taking template
• We will watch The Lorax video, and each person will take notes on the story using the Compass to organize your note taking; identify the key pieces, messages, related to the story from your compass point.
• Discuss and share your notes as a group and fill in the large Compass Template Flip Chart using the appropriately colored Post-it Notes
Insights

From the Lorax story…

1. What was the story about?
2. How did it make you feel?
3. What were the key messages?
4. What elements did you identify from each of the 4 Compass perspectives
Holistic Big Picture Thinking . . . Finding system linkages

Instructions

• Using the Compass Template as a backdrop, draw out a cause and effect relationship diagram showing illustrating your understanding of the relationship between the different pieces in the Lorax story that your group identified.

15 minutes
Compass System Diagram

Nature
- Biodiversity loss
- Environment Quality
- Natural beauty & Aesthetics

Economy
- Discharge from factories
- Urban development
- Maximize Profit
- Economic Growth & Investment

Society
- Government Policy & Laws
- Participation in politics (voting)
- Equity for all

Wellbeing
- People’s Health
- Quality of Life
- Quality of Teaching & learning
- Level of Education
Example Compass System Diagram

Nature
- Environment Quality
  - Natural beauty & Aesthetics
  - Biodiversity loss
- Water Pollution
  - Discharge from factories
- Urban development
  - Maximize Profit
  - Economic Growth & Investment

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- Environment Quality
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- Water Pollution
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- Economic Growth & Investment
- Government Policy & Laws
- Equity for all
- Participation in politics (voting)
- People’s Health
- Quality of Life
- Level of Education
- Quality of Teaching & learning
Creating a Systems Story?

Building a Systems Understanding

• The take 4-5 issues total, at least one from each compass point and create a story (Once upon a time…) showing the linkages.

• Use the large flip chart paper and markers provided to develop a systems story through pictures and symbols (art) that creates a ‘story’ of the event from the four Compass perspectives and also links them together in a relationship.

• Each Compass Group will quickly present their story in a creative way.

15 minutes
System Story Presentations
In Summary . . . System Thinking and Causal Systems Mapping as a tool for critical thinking and action

- **System Mapping** is a simplified model-building exercise, using Issues or Indicators as a starting point.

- It consists of *drawing schematic diagrams showing the cause-and-effect relationships among Issues / Indicators* (i.e. the issues they represent). In the course of the mapping exercise, additional variables are usually identified.

- Doing this exercise with a group facilitates building their understanding of critical cause-and-effect linkages, and results in the identification of higher-priority points of intervention in the system, the so-called "Leverage Points."
Other ways to teach systems thinking

- Systems Dice Game
- A Common Dilemma
- Webbing
- Triangles Game
- Post card Stories
- Mind Mapping
- Story telling
A frame of thinking that creates a ‘habit of mind’ of thinking and acting sustainably.

- Adds depth
- Deepens understanding
- Makes it relevant
- Makes it meaningful
- Motivates further inquiry
Towards Environmental Literacy
Ecological sustainability is our responsibility . . . Just like safe driving.
The Transformative Learner . . . learning with a sustainable perspective

**Reflective and Deep Thinker**
Makes sense of and understands the complexity of environmental concepts and the interdependence of ideas underpinning sustainability

**Autonomous Learner**
Self-directed and motivated, with an on-going interest in learning about the world that they live in.

**Ethical and responsible citizen**
Empathetic to others and able to make ethical decisions about environmental, social and economic issues, events and actions.

**Connected Learner**
Engaged, interested and enthusiastic about exploring the world around them and capable of working with others.
Learning Competencies for the 21st Century


- Learning to be
- Learning to know
- Learning to do
- Learning to live together
Evolution in EE

- Thinking about Education and Learning
- Leadership and Partnership
- Conceptualizing the environment
- Communications and access to knowledge
- Emphasis on Issues
- Sites of learning and participation in learning

General objectives to environmental literacy
Environmental Literacy Competencies

Knowledge
(e.g. how to access information)

Values/Attitudes
(e.g. respect for others)

Skills
(e.g. holistic / systemic thinking)

Informed, appropriate decisions
Staircase Metaphor of Understanding

Understanding about Sustainability

Expanding Knowledge & Experience

Questions and Inquiry

Implications & Relevance to one’s own life

Perceived ability to make change or ‘do something’

Worldview

Point of departure for the leaner: center of interest, needs, relevance

Sustainability Concept and/or Theme
Teaching for Environmental Literacy

Possessing knowledge about the environment and issues related to it; capable of, and inclined to, further self-directed environmental learning and/or action.

Environmental literacy consists of four essential aspects:

1. developing inquiry, investigative, and analysis skills;
2. acquiring knowledge of environmental processes and human systems;
3. developing skills for understanding and addressing environmental issues;
4. practicing personal and civic responsibility for environmental decisions.

Source: North American Association of Environmental Education
Critical thinking and reflection

- Learning to question our current mental models and belief systems and to recognize the assumptions underlying our knowledge, perspective and opinions.
- Critical thinking skills help people learn to examine economic, environmental, social and cultural structures in the context of sustainable development.
Systems Thinking

- Systems thinking looks at the whole, puts things into context and looks for patterns in relationships;
- It helps us to move focus away from events and symptoms and toward system structure.
- A system’s understanding give us better mental models that lead to better decisions about how to lead the transition to sustainability.

Source: Adapted from Tilbury, D. and Wortman, D (2004), Engaging People in Sustainability
Participation in Decision-Making

- Through participation, learners are at the center of the active participatory experience with learning, facilitation and decision-making in the hands of learners themselves;
- Important in recognizing the value and relevance of local knowledge
- Empowers people and give “non-specialists” the opportunity to actively participate, build knowledge and develop leadership skills that contribute to action.

Source: Adapted from Tilbury, D. and Wortman, D (2004), Engaging People in Sustainability Participation in Decision-Making.
ESD Competencies

- The ability to communicate effectively (both orally and in writing).
- The ability to think about systems (both natural and social sciences).
- The ability to think in time - to forecast, to think ahead, and to plan.
- The ability to think critically about value issues.
- The ability to see issues and problems from multiple perspectives

ESD Competencies

- The ability to separate number, quantity, quality, and value.
- The ability to work cooperatively with other people.
- The capacity to use these processes: knowing, inquiring, acting, judging, imagining, connecting, valuing, and choosing.
- The capacity to develop an aesthetic response to the environment.
- The capacity to move from awareness to knowledge to action.

Exercise: Identifying EE/CCE Learning Competences

Instructions:
Discuss with the people in your group and identify the knowledge, skills, values and perspectives that your students should possess in order to effectively understand and work towards solving your priority issue, and to turn it around into an opportunity for sustainable development in Indonesia.
Environmental Literacy Competencies

- **Knowledge** - *What knowledge is needed in order for students to understand this issue so that they can actively contribute in addressing it?*

- **Skills – (cognitive / technical)** *What cognitive and technical skills would they need in order to both understand and contribute to solving it? (graphing, analysis, research, etc, …)*

- **Skills – (social/emotional)** *What social and emotional skills are needed to address this issue? (cooperation, empathy, …)*

- **Values and Attitudes** - *What values and attitudes are needed in order for them to want to address this issue?*

- **Perspectives** - *What are the different perspectives they need to consider in order for students to understand the issue and collaboratively work with others to solve it?*
Example Competency Matrix – Primary Grade

**Grade Level:** High School

**Environmental Topic/Issue:** Extreme Weather Events & Disaster Preparedness

**Assignment:** Develop a disaster preparedness plan for our community

<table>
<thead>
<tr>
<th>Competency Area</th>
<th>Competencies</th>
<th>Subject</th>
</tr>
</thead>
</table>
| Knowledge       | - what is waste and what can be recycled  
- What 3Rs mean (reduce, reuse, recycle)  
- What happens to garbage  
- Why people throw things away  
- Where do germs come from | Health  
Social studies |
| Skills          | - Ability to separate garbage into different recycling types (paper, plastic, metal, non-recyclable)  
- How to compost  
- Ability to collect data and analyze it and make graphs and to add and subtract | Math  
Other |
| Values / Attitudes | - ecological value not polluting and littering  
- thriftiness and not wasting money  
- cleanliness and hygiene is good  
- appreciation of clean environment | Science  
Social Studies  
Health |
| Perspectives    | - why people do not recycle or practice 3Rs  
- other living creatures need clean environment | Social Studies  
Science |
Environmental Protection... where to start

1. First... identify what are the local, national and global environmental issues are and how they relate to each other... especially between the local issues and the national / global ones.

2. Assess who are the key stakeholders involved in this issue (who do you think is causing the problem, who benefits from the actions, who is hurt or harmed by the continuation of the issue, etc.

3. What resources are available in our community to help us understand and teach about this issue? This includes both human resources and other site specific resources like outdoor sites for teaching and field trips;

4. Find appropriate planning and teaching tools, methods, approaches for integrating environmental issue into curriculum beyond science and social studies (interdisciplinary curriculum mapping)

5. Train teachers, build understanding and motivation
Conclusion & Final Thoughts

Education = future