Project Based Learning and Environmental Studies in NCF-2005

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This Talk

- Why PBL?
- What is PBL?
- EVS and PBL
- PBL and EVS in NCF-2005

Why PBL?

- The driving question:
  - Students are naturally curious, observant and active.

BUT

  - In school, they are passive; motivated at best by marks, rarely by learning.

How to make the students active?

- Hands-on activity based learning
- Examples
  - Make a walkie-talkie by tying two cups with a string
  - Blow bubbles from soap-water
- Result
  - Students are happy.
  - They appear to be motivated.
  - Are they learning?
  - Hands-on only or minds-on?
- Problems
  - Activity is initiated and structured by the teacher
  - Goal of the activity may not be clear.
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How to make the activity goal-driven?

- Inquiry-based learning
  - Includes activity
  - It is driven by a question (goal).
  - It aims to cognitively engage the students.
  - It uses processes of science.

Examples

- What factors affect the rate of evaporation of water?
- What is the difference between a shadow and an image?

Inquiry-based learning

- Possible problems
  - Scope may be limited to a single topic.
  - The context may be restricted.
  - Inquiry may be limited in time.
  - Goal set by the teachers, may not be shared by the student.
  - Scope for collaboration may be limited.

How to enhance the scope of inquiry?

- Students should help set the goals.
- Inquiry should occur in a real-world context.
- The questions and context should be important to students.
- Interdisciplinarity; Critical thinking; Analysis
- Authentic inquiry, Purposive learning
- Collaborative work

These are the defining qualities of PBL.

What is PBL?

- Limited View
  - Projects are an add-on to the curriculum.
- Strong View
  - Learning is centred around projects.
  - Projects are driven by a goal (driving question).

Science in NCF-2005

- The objectives at this (primary) stage are to nurture the curiosity of the child about the world.. to have the child engage in exploratory and hands-on activities for acquiring the basic cognitive and psychomotor skills..
- At the upper primary stage, the child should be engaged in learning the principles of science through familiar experiences, working with hands to design simple technological units and modules (e.g. designing and making a working model of a windmill to lift weights) and continuing to learn more about the environment and health..through activities and surveys. Scientific concepts are to be arrived at mainly from activities and experiments..Group activities, discussions with peers and teachers, surveys, organisation of data and their display through exhibitions, etc. in schools and the neighbourhood should be important components of pedagogy..
- At the secondary stage,..in working with hands and tools to design more advanced technological modules..and in activities and analyses on issues concerning the environment and health.. working on locally significant projects involving science and technology, are to be important parts of the curriculum at this stage.

NCF-2005, pp- 48-49

A vital driving question for us all

- *The question of human survival*
- "You see that pale, blue dot? That's us. Everything that has ever happened in all of human history, has happened on that pixel. All the triumphs and all the tragedies, all the wars all the famines, all the major advances... it's our only home. And that is what is at stake, our ability to live on planet earth, to have a future as a civilisation. I believe this is a moral issue... it is our time to rise again to secure our future."

Al Gore, An Inconvenient Truth, 2006

- The truth is: the natural world is changing. And we are totally dependent on that world. It provides our food, water and air. It is the most precious thing we have and we need to defend it.

David Attenborough, Force of nature: Interview with Robin McKie, The Observer, Sunday 28 October 2012

Objectives of Environmental Education

- Learning about the environment
- Learning through the environment
- Learning for the environment

The main focus of EE should be to *expose students to the real-life world, natural and social*, in which they live; to enable them to analyze, evaluate, and draw inferences about problems and concerns related to the environment; to add, where possible, to our understanding of environmental issues; and *to promote positive environmental actions* in order to facilitate the move towards sustainable development.

National Focus Group on Habitat and Learning (NCERT, 2006), pp. 4-5

PBL and EVS in NCF - 2005

- Actvities constructed for life situations become a meaningful means for the engagement of learners.
- Data on such (rainfall) variations..can be used to promote many interesting activities in Physics and Mathematics.
- In Physics, simple experiments may be devised to visualise patterns of flow of fluids over uneven terrain..to demonstrate how the ascent of air leads to cooling and precipitation
- In Mathematics, a careful analysis of data...on decline in rainfall provides excellent possibilities for projects relating to data representation, visualisation and interpretation.
- ..effluents from sewage treatment plants can form meaningful raw material for a variety of projects in chemistry.
- ..schools could work with panchayats, municipalities and city corporations to document biodiversity resources and associated knowledge...can take up projects in Biology addressing.. the occurrence and utilisation of medicinal plants or the protection of rare and endangered fish in a body of water.. ..Recording such knowledge is part of the mandate of preparing of people's biodiversity registers, and students can fruitfully be engaged in projects on the preparation of such registers.
- ..Projects assessing the nutritional role of wild plants, which provide important nutritional supplements in the diets of tribal communities, can be worthwhile components of health education.
- ..preparation of maps of the immediate environment, documentation of environmental History, and analysis of political issues related to the environment may be made part of projects in geography, History and political science. Conflicts over water at the local, state, national and international levels offer a rich source for designing a variety of activities and projects..

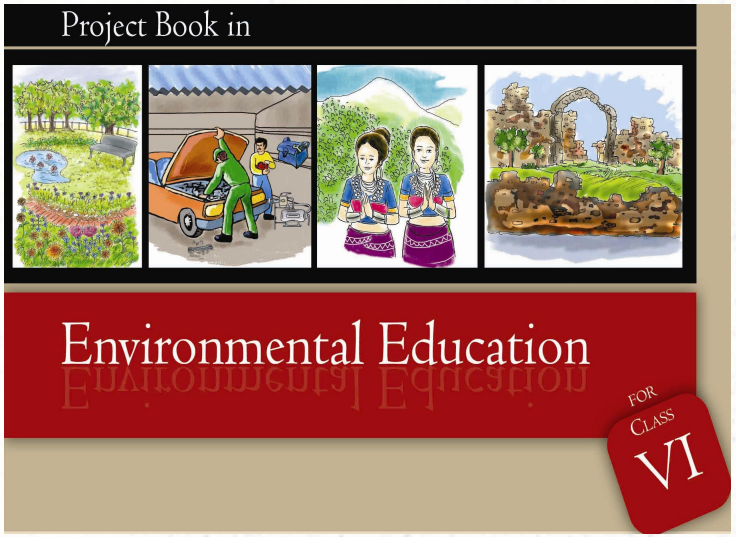
NCF, 2005, pp: 64-65 (emphasis own)

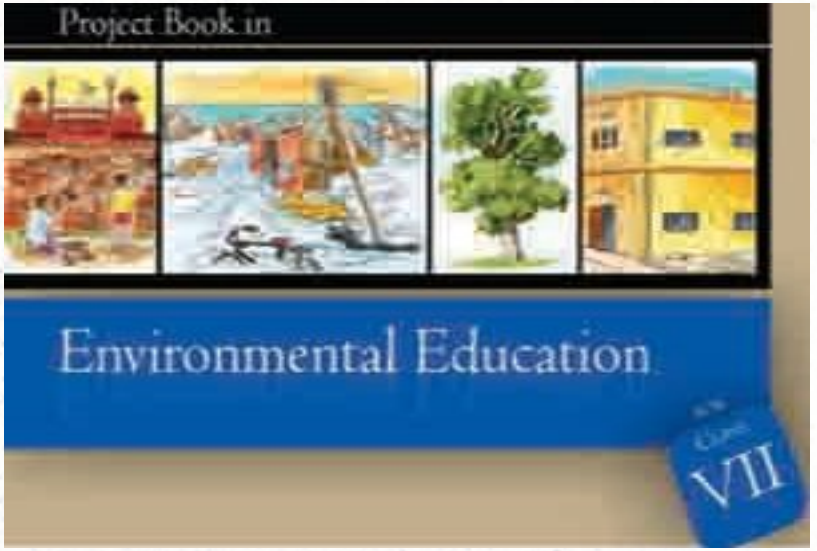
PBL-EVS: Uniquely compatible

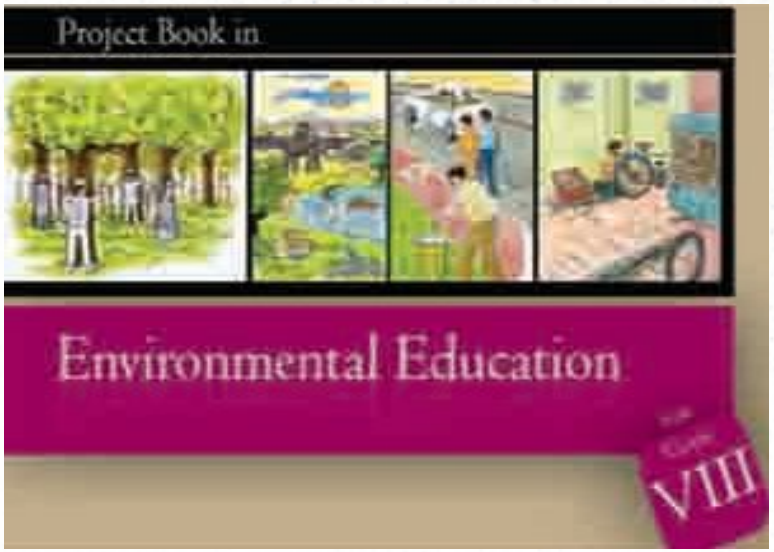
- Multi-disciplinary thinking: interconnected nature of the physical–biological–social–economic system pertinent to environmental issues
- Problem-solving attitude: a pro-active role to undertake positive environmental actions
- Requirement of first-hand experiences to appreciate the local variation in details of environmental concerns

All these aspects of EVS are brought about through PBL.

Project books in Environmental Education (NCERT, 2009)







EVS and Projects

- In the context of environment-related awareness, NCF–2005's vision implies *an approach which cuts across the traditional boundaries separating one subject from another*. According to this approach, *knowledge of environmental concerns and the activities, which might deepen this knowledge and develop a positive attitude*, need to be infused in the subject matter of all areas of the school curriculum at different stages.
- A notable feature of environmental issues is their tremendous variability. This means that the details are important and *environmental issues are therefore best appreciated in terms of first-hand experiences*. The curriculum, therefore, emphasises *student activities as the main vehicle of learning.*

NCERT proposes a project-based compulsory qualifying course comprising a core and projects for all students. The core focuses on *interconnected nature of the physical–biological–social–economic system pertinent to environmental issues.*

Teachers' Handbook on Environmental Education for the Higher Secondary Stage, NCERT, 2011.

A project based EVS syllabus

- The aim of the project based syllabus is
  - to build capacity for critical and *multi-disciplinary thinking* and a positive and *problem-solving attitude*.
  - exposing students to the real-life world around them, both in nature and society, in order to enable them *to examine, assess and interpret the problems and concerns related to the environment*.

- The teachers are encouraged to view environmental issues from *a systems perspective* and to emphasise this systems view and try to apply it in teaching the various topics in the syllabus.

Teachers' Handbook on Environmental Education for the Higher Secondary Stage, NCERT, 2011.

PBL integrates knowledge

- An example: Project Book in Env Edu Class 6, NCERT

Sr. no.	Project title	Connection
1.	Reducing wastage of food	
2.	Nutrients in food	(Science - Ch 2: Components of food)
3.	Getting to know trees	(Science - Ch 7: Getting to know plants)
4.	Where do animals live?	(Science - Ch 9: The living organisms and their surrounding)
5.	Creating your own garden	(Science - Ch 7: Getting to know plants)
6.	Controlling vehicular pollution	(Science - Ch 15: Air around us)
7.	All plants are useful	
8.	Life in diverse regions	(Geography - Ch 6: Major landforms of the earth; Ch 7: Our country- India; Civics Ch 1: Understanding Diversity)
9.	Social interdependence	
10.	Compassion for living creatures	
11.	Beauty in diversity	(Civics - Ch 1: Understanding Diversity)
12.	Sharing space	
13.	Importance of terrace farming	(Geography - Ch 5: Major domains of the earth)
14.	Development of urban slums	(Civics - Ch 9: Urban Livelihoods)
15.	Exploring historical objects and places	(Entire History textbook)
16.	Knowing about cave art	(History - Ch 1: What, where, how and when?; Ch 2: On the trail of the earliest people)
17.	Exploring community crafts persons	(History - Ch 9: Vital villages, thriving towns)
18.	Exploring the history of a village or a city	(Entire History textbook)
19.	Great personalities of the past	
20.	Let's keep our surroundings clean	

Analysis by Saurav Shome, HBCSE

Example of a project: Peoples' Biodiversity Register

- Peoples Biodiversity Registers (PBR) is an initiative launched by National Biodiversity Authority (NBA), which involves *local documentation of biological resources, their medicinal or any other use and any other traditional knowledge associated with them*. This aims *to promote conservation, sustainable use of resources and equitable sharing of benefits*.
- Student-teacher groups of a locality can contribute to a PBR, while carrying out a project-work.
- The information becomes a part of country-wide networked database Biodiversity Information Services (BIS).

"The younger generation is becoming increasingly alienated from the natural world. Regrettably, our educational system does little to encourage students to get acquainted with the diversity of life in their own surroundings, or to absorb the pertinent knowledge of the older generation."

People's Biodiversity Register: A Methodology Manual, Madhav Gadgil, Centre for Ecological Sciences, IISc, 2005

Resources

http://www.ceeindia.org/cee/material.html : JOY OF LEARNING, Handbook of Environmental Education Activities: Std 3-5, 6-8

Thrust areas: environment, ecology, wildlife, energy, habitat, health, pollution, population, conservation, agriculture, forestry, nutrition.

http://www.greenteacher.org/index.php : project and activity bank, discussion forum, eco-club, journals and papers on Environment Education and Education for Sustainable Development

http://pbl-online.org/: project designing, research reviews

http://www.bie.org/tools/freebies : planning forms, student handouts, rubrics, articles, DIYs, project libraries

- http://my-ecoach.com/online/webresourcelist.php?rlid=6499: global PBL tools, resources, project sites
- http://www.innovationunit.org/sites/default/files/Teacher%27s%20Guide%20to%20Project-based%20Learning.pdf

References

- National Curriculum Framework, 2005
- National Focus Group on Habitat and Learning, NCERT, 2006
- Project Books in Environmental Education Classes (6-10), NCERT, 2009
  http://www.ncert.nic.in/recent/env_edu.html
- Teachers' Handbook on Environmental Education for the Higher Secondary Stage, NCERT, 2011
- People's Biodiversity Register: A Methodology Manual, Madhav Gadgil, Centre for Ecological Sciences, IISc, 2005
- Introductory photograph: http://my.opera.com/Playstar/albums/showpic.dml?album=1593631&picture=21719041

Thanks to

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Geetanjali Date

(HBCSE)

Thank You!

Biodiversity

•Ministry of Environment and Forests

•National Biodiversity Authority (NBA) : National Level

•State Board of Biodiversity (SBB): State Level

•Biodiversity Management Committe (BMC): District/Panchayat Level (responsible for PBR)

Maharashtra

•156 BMCs in Maharashtra, no PBRs from Maharashtra

Relevant people

•Maharashtra SBB: Director at Bharati Vidyapith Inst of Environment Education and Research, Pune 020-24375684

• Principal Chief Conservator of Forests (PCCF), Nagpur, 0712-2556791
•http://www.mahaforest.nic.in/internal.php?id=26
•http://nbaindia.org/content/20/35/2/bmc.html
•http://nbaindia.org/content/105/30/2/pbr.html