

Shaktipur needs electricity: using role play to introduce middle school students to democratic problem solving

Saurav Shome, Ankita Patel and Chitra Natarajan
Homi Bhabha Centre for Science Education (TIFR)
Mumbai

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Saurav Shome
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Introduction

- Conventional classroom teaching of science seldom introduces social dimensions.
- Science teaching in school should help generate scientifically literate citizens.
- Students should be able to apply science to real life situations.
- Simulating real world contexts in classroom have several pedagogic advantages (Brown 1989).

Role play and debate

- Role plays help simulate social contexts.
- Context can be chosen to provide opportunities for students to express themselves, sort out their biases, negotiate ideas, etc. (Simonneaux 2002).
- Need to consider social aspects of situations and content required of students (Simonneaux 2002).

Role play and debate

- The purpose of discussion of controversial issues would be (Bridges 1979, in Gayford 1993)
 - sharing perspectives between members of the group
 - reaching an understanding
 - making a choice
 - finding a rational resolution for differing points of view .

Role play and debate

- The role play may be a debate or could involve a debate. During arguments, students are in situations of inter or intra subjective conflict (Simonneaux, 2001).
- “...to have a good grasp on your own view point you must understand the arguments of those with whom you disagree.”(Bender and Leone 1981, as in Proulx 2004).

Role play and debate

- After role play, teachers need to discuss and deal with the misconceptions revealed by students. Students may encounter complex situations needing multidimensional thinking. (Bell 1985, Barker 1986 as in Eisen & Stavy 1993).

Description of the work: Objective

- To develop a course on Energy and Environment for middle school students.
- To explore their understanding of energy and its flow through life forms.
- Emphasise **the link between humans, environment and energy**.
- **Framework** for students' ecological understanding was adapted from Carlsson (2002).

Sample

- A purposive and convenient sampling was used.
- 40 students of Class VIII - 30 Boys, 10 Girls
- Mean age 13 years
- From 3 English medium schools affiliated to the CBSE system
- Course was announced and students voluntarily participated in the course. Parent/ Guardian's written permission was taken.

Structure & Data

Course structure

- 8 days, 2 sessions each day, 20 students each session
- Included a variety of activities, discussions etc.
- **This paper focuses only on role play.**

Data

- Writings
- Audio-visual recordings of discussions and structured presentations
- Researcher's observations and notes

Pedagogic advantages of role play on energy

- Students understand that making decisions can be complex,
- Need to attribute advantages and disadvantages of different energy sources,
- Participate in both descriptive and normative discourse,
- Express their ideas and defend them,
- Critique others' ideas and viewpoints.

Outline of context: A power-plant for Shaktipur

- An industrialising town called Shaktipur faces a crisis in electrical energy availability.
- The context in detail was provided on a sheet given to students.
- The students were given
 - a set of roles
 - reading materials and
 - instructions

Roles

- Chief Minister;
- Minister of Energy;
- Minister of Industries and Mines;
- Industrialist;
- Environmentalists;
- Researchers working on Coal, Nuclear;
- Observers from national organisations;
- Observers from WHO, UNICEF.
- Additionally, in morning session:
- Researchers working on Solar, and Hydroelectricity;
- Observers from HBCSE, CEE, SACEP, UNDP.

List of activities carried out by students

- Chief minister explained problem to participants of meeting and asked for their views.
- Discussions and clarifications among the participants.
- Participants, (facilitated by teacher/ author) summarised advantages and disadvantages of power-plants from different energy sources.
- Presented their consolidated views and arrived at a decision (facilitated by teacher/ author).

Major findings - 1

- 2 sessions on selecting energy options for a power plant for Shaktipur, small town
- Largely chose from among 6 energy sources for the power plant: solar, wind, biomass, coal, nuclear and hydroelectric
- Session 1: Solar energy with one other renewable source; only 3 out of 19 students present chose nuclear power plant - with a biomass plant
- Session 2: Chose among 3 options; largely nuclear

Major findings -2

- Morning session: Many participants changed their opinion both during the role play as well as after intervention by teacher/ author.
- Afternoon session: All participants stuck to their opinion till end of role play. Neither arguments by peers nor by teacher/author made any impact on their decisions.

Students' performance - 1

- Most students presented their stance in accordance with the role assigned to them.
- Some were less aware of the role they were playing, especially as students were not exposed to organisations like SACEP, WHO, UNESCO, etc. and their activities.
- Some students were yet too shy to express themselves often.

Students' performance - 2

- Morning session: Broader and deeper discussions of the energy options.
- The CM of the morning session kept changing his mind, and was influenced by any group that could put forward a strong argument.

Students' views - 1

- Environmentalist: India has less Uranium and thorium; we need to import from other countries.
- Research scientist nuclear: Nuclear energy is cheap and does not pollute air. There are radiation hazards, but can be controlled through proper safety measure.
- Environmentalist: Due to dam construction farming land will be submerged.
- Observer from CEE: We have to reduce energy demand through efficient energy use.

Students' views - 2

- Minister of Industries and mines:
- Morning session – Mining of Uranium is less costly and less hazardous (than coal). Government can create awareness in favour of Uranium mining.
- Afternoon session – Nuclear power plant gives a large amount of electricity, no emission of greenhouse gases.

Conclusion

- With adequate content knowledge and sufficient time and opportunities for preparation, role play can lead to meaningful decision making by students.
- Conducting role play in normal classroom settings is a challenging task for teachers.
- Confusion between role play and drama is to be avoided.
- Role play can introduce democratic nature of society and complexity of decision making.

Discussion

Thank You