Energy Education Programmes: New Tendencies

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Synopsis

The way we teach children in our schools about energy is changing. Traditional subject divisions are falling in favour of integration. What are the trends?

Introduction

Education on energy issues was in vogue at the beginning of the 1980s due to the pressures from energy prices. What will happen to it now that these pressures have diminished considerably and show signs of diminishing further in the context of deregulation, which is sweeping the US and Europe.

We will examine here, through several case studies, two indicative tendencies which are not, however, intended to be an exhaustive analysis of this subject:

- the treatment of energy in national curricula;
- the sensitisation of children through their life at school.

This poster paper should be viewed very much as a prologue to the issues at stake which perhaps could be given more detailed treatment at a future ECEEE session.

1. The National Curriculum

We will look at two case studies: the work of the Lawrence Hall of Science (California, USA) which is considered in a Californian context, and the revision of the curriculum for 15-16 year-olds in France.

The Lawrence Hall of Science decided to work on the concept of Global System Science" about four year ago, and settled on a series of nine books[1], which could form the basis of a secondary school course of between one and one and a half years. They present the scientific issues in a new way, without the traditional division into chemistry, physics…with the aim of recapturing the interest of students in the sciences. The curriculum was developed and tested by 100 science teachers. The aim: to convince 10,000 teachers to use the programme by the time it is finalised in 1999. Of this programme, a good half is dedicated to energy itself.

In France, energy conservation was traditionally a subject covered in history/geography, since the oil crisis, while the conceptual aspects were covered in physics. This has been abandoned, little by little, and 1994 saw instead the introduction of "The Greenhouse Effect" in the "Life Sciences" course for 15 and 16 year-olds. For "arts" students, a large amount of time in science courses is given over to energy.

What should we make of this tendency by which issues of energy and energy efficiency are making the transition from the physical sciences (considered both in France and the US as the pure sciences) to other areas of teaching (called "Global" in the US and "Life Sciences" in France) ?

First of all this change accompanies a social reflection. Energy has moved from being considered as a problem of supply to being one of pollution, and energy saving is only of interest as a by-product of other considerations.

Furthermore, it demonstrates the marginalisation of energy as an issue (a hypothesis which remains to be confirmed by examining how this transfer takes place in other countries).

But finally, perhaps we should also consider how this trend marks a change in direction which will herald the closer involvement of al citizens in dealing with energy issues. If we take the case of France, energy used to be part of the physical sciences curriculum and geography, seen as pure sciences in the French context, and areas in which average students felt they had little grasp. In contrast, it is now part of technology and life sciences courses, much more relevant to the individual, where the consequences of personal choices can be investigated from a technological and environmental point of view.

2. Demonstrating Energy Saving in School Buildings

We are going to present three examples from the United States, the United Kingdom and Germany.

The first, and longest running, is taking place in the outskirts of Chicago.

The 54 district of Schaumburg covers 21 primary schools and five secondary schools, namely 16,000 students up to the 8th grade. CARE got underway in 1978 as a result of the oil crisis, and had a support budget from the federal government of $80,000 for four years. In 1981, the district decided to prolong the programme because it sent out a good political signal (see below) and was good leadership experience for the students. By the by, it also cut $50,000 dollars off the districts' energy bills.

After 18 years, people at State level think that this is a project which should be preserved, especially now that the scheme is established and requires less funding.

Every year 20 CARE Kids per school are chosen from the 5th and 6th grades. At the start of the scheme it was possible to count on a dozen or so volunteers. Now, the scheme has had so much success that between 80 and 90% of youngsters in the classes concerned ask to be CARE Kids. Teachers are even put under pressure from parents wishing to ensure that their children join the group. In addition, 2 teachers per school are involved. The CARE Teachers receive $800 to organise a weekly meeting for the CARE Kids and to manage their activities for a year.

Each CARE Kid adopts a younger class (from kindergarten to 4th grade) and tries to help them achieve the best possible energy saving results. They also give six lessons on energy, with the help of the class teacher, an approach formulated little by little, through trial and error.

The objectives: at kindergarten level—to learn what energy is; in 1st grade—cover different forms of energy; in 2nd grade—cover sources of energy; 3rd grade—cover energy history; 4th grade—cover fossil fuels. Involving older students in energy teaching in this way reaps rewards from an educational point of view, but also has the benefit of guaranteeing the place of energy teaching where teachers wouldn't find the time otherwise.

Outside of the help/monitoring and teaching roles, the CARE Kids have to educate themselves: they have the weekly meetings with the CARE Teachers and tasks to complete at home—a detailed audit of their school and their family home. They also have to find at least ten people who promise to recycle aluminium, which means passing all their cans etc. to the CARE Kids, who take them in for recycling, earning around 30 to $40 in the process. The reward for this work is an 8-week camp where the CARE Kids, who pay $100 for this Energy Encounter, are in charge.

This scheme was put together a piece at a time, until today, all the "bugs" have been eliminated. However, the surrounding districts have not followed this example, first because funding for education programmes was cut off in 1991, but mostly for administrative reasons (the need to change the way the schools operate, so that in one area there is the unusual situation that the pupils are responsible for everything).

The second example is that of England and Wales where, after the recent introduction of a new law, schools must

now take in hand their own energy expenses. The introduction of this law was accompanied by the setting up of organisations to help schools organise activities to improve their energy management. The most complete programmes target pupils, their teachers, maintenance staff, cleaners, canteen personnel, administrative staff, laboratory assistants and even parents and visitors to the school. The savings achieved can reach 15%.

The third example is in Germany, where, following decisions taken in numerous municipalities concerning the greenhouse effect, the authorities took action in local schools. The oldest and most remarkable example of this era is that of Hamburg, where a scheme started two years ago, and now involves 40 schools. Reductions in energy costs have been evaluated at between 7 and 10%, solely as a result in changes in behaviour and totally independent of the state of the buildings.

Since then, many other local authorities have invested in this sector: Hannover, Heidelberg, Saarbrücken, to name the largest towns. Schemes can concentrate on any of primary, secondary or other types of school. In Mainz, the programme called KESch[3] started on the 1st January 1997, with two secondary schools volunteering. Teams consisting of teachers, pupils and maintenance staff have been set up. They work out of school hours and have to propose a set of measures within the next two to three months. The motivation to participate is driven by refunding of savings to the school.

The problems when developing this sort of scheme are:

- One or two keen teachers is not enough to get results, so it is necessary to generate motivation throughout the school.
- This sort of motivation requires that new issues be covered during lessons, so some authorities have approached the German Land (State) of which they are a part to ask for time in which to prepare new lessons relating to energy and to ask for these issues to be integrated into the curriculum.
- The method used to evaluate energy savings requires a consensus between the schools and local authorities.

So it would seem very interesting to examine in detail how the “energy saving culture” has managed to penetrate the field of education and surmount the obstacles that are to be found in all countries: the weight of teaching unions, the inertia of the curriculum, regulations relating to the safety of children in school, the training of teachers.

Bearing in mind the Schaumburg experience, are there threshold effects when trying to involve new schools? In any case, evolution on this theme is in full swing in many countries, including the United States, where there are at least three “Green School” programmes being set up by private environmental organisations and an Energy Net linking more than 60 schools in Illinois.

In conclusion

Other educational trends deserve further study, but space does not permit on this poster:

Is the schoolroom the best place to deal with issues of energy conservation?
Many case studies would be possible: SERIES—Science Experiences and Resources for Informal Educational Settings (UCCE Davis, USA), Résau Ecole et Nature (France)….

What is the role of teacher networks in this process?
ARENE has set up a network of teachers interested in energy in Provence-Alpes-Côte d’Azur, and networks already exist in the USA (NEED…)

How can the effects of long-term changes in behaviour be evaluated?
One reason to engage in energy education is to be active in educating the citizens of tomorrow. But in terms of energy savings resulting from such schemes, amongst all the energy agencies, numerous distributors of educational materials and universities in the United States, we have found only one example of a medium term evaluation of the impact on youngsters of this sort of citizenship education, relating to energy issues.

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