Technologies for objects, objects for uses...

STEAD newsletter 4

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STEAD is a project based on educational action and supported by the European Commission. It aims at enhancing (young) people's awareness of science and technology impact on daily life. It is in-keeping with the European Science and Technology Week.

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"I realised that design is not a profession, it is a passion. Some designers create their work in scale model form and then turn defects into quality."

Melvin / Romain Rolland School, Montreuil 93 / Patricia Jouanny's class

Editorial /

To our readers,
One project is coming to an end, others will follow with a will to delve deeper into and expand the methods, but also the issues brought to light during the STEAD Project. This letter has been addressed to many of you. Now presented in the form of a summary review of STEAD, this newsletter will be the last one you receive concerning the 2003 project. We thank you for your interest in this project and invite you to join us again in 2005 for another experimentation.
the editorial committee

STEAD, A Unifying Project with a Targeted Objective

STEAD (Science & Technology impact on Electrical and Electronic Appliance Design) is a European project built over 12 months, starting in January 2003. Eight partners from four European countries have carried it out. Supported by the European Commission as part of the Science and Society activity (5th Community Research Framework programme), it was part of the European Science Week, held from November 3 to 9. It aimed at having 9 to 15 year old students understand the impact of science and technology on their everyday life through their own questioning of the world of objects present in their daily environment. It was also intended to shed a significant and as objective a light as possible on the beneficial aspects of science for the European citizen.

From the World of Objects to Science

Talking about the objects surrounding us, establishing their mode of existence and the reasons for their appearance is not a neutral process. Objects and consumption sometimes have a negative image in society; and so do science and its corollary, technology, which make their production possible. Admittedly, however, for over a century and half, science has given way, through a number of innovations, to advancements in terms of well-being, health and security, comfort, in improving the living environment, etc. Who today would be willing to give up the mobile phone (11 million users in France only!), the refrigerator, the car, the laptop computer, digital photography and, on a more general level, the mechanisation or even the automation of household chores?

Seeing science through some of its applications

If it had not been for Joule's discoveries, Edison might never have been able to create the incandescent lamp. If Christiaan Huygens had not designed the first steam engine, in 1673, cars would not exist and we would still be travelling in horse-drawn buggies.

Through their discoveries over the last and previous century, scientists contributed to a long list of inventions. The STEAD Project starts from the usefulness of things (objects), their omnipresence in our daily life, the way they are designed, made, distributed, used and finally consumed, or even recycled.

Design as a tool to provide an understanding of the impact of science

Design stands out as a means to illustrate the implications between the history of objects, their uses, the conditions surrounding their development. Design is closely linked to science and technology, as these influence the way objects work, how they are produced, manufacturing processes and future advancements related to continued technology development (new technologies, nanotechnologies, artificial intelligence, new materials, etc.). This does not mean, however, that STEAD aimed at promoting design. The basic idea was to have children study different types of appliances with the help of their teachers and instructors (young designers and other specialised advisors). This way, starting from the application (the domestic object) through the production processes, technological developments and history of those objects, it is possible to go back to the source of their invention (scientific discovery, technical process, technology). In this project, design has been used as a grid for the analysis and interpretation of household appliances. Whether they are electrical or electronic, used for household or leisure activities - or even, as in the case of the computer, a means of entertainment, a gateway to knowledge and a work tool as well - the common trait of these objects is that they are familiar to children and are of varying degrees of complexity. They refer to different scientific fields (physics, chemistry, mathematics, materials science, but also to social science, history, economics, etc.)

A Method, A Process

The children's work - choice of objects, research on the origin of such and such product, disassembling of mechanical parts, analysis, description of their components, re-assembling, "vision of the future", etc. - gave way to drawings, models, writings and photographs. These works have been presented in three national exhibitions (in Belgium, Germany and in the United Kingdom) as well as in a final exhibition held in Paris last November, during the European Science Week. In order to achieve this result, a precise plan of action has been implemented. An initial preparatory phase, from January to June 2003, consisted in the development of common tools based on educational scenarios. A seminar was held in May to assess the progress made by each partner, to share information, to develop synergies, to discuss and debate about "educational solutions". During this period, one of the partners (UNIBRAD - University of Bradford in the United Kingdom) designed and implemented a database using different categories and subcategories of household objects and appliances. This database is now accessible on the web at:
http://www.steaddatabase.com/database.html

For their part, ENSCI-Les Ateliers (National Superior School of Industrial Creation), with the collaboration of an external provider (La Moulinette), endeavoured to develop the project's website, which can be consulted at the following URL: *http://www.placeaudesign.com/stead*

These two productions, the database and the website, are destined to continue on. They serve as channels of communication between partners and of information for people who are external to the project, as well as of a collection of tools to be assimilated and transfor-

med by all teachers, socio-cultural animators, educational staff, who wish to use them to carry out their own experimentations.

A second phase consisted in the organisation of thematic workshops in eighteen primary schools and colleges in the United Kingdom (4 classes), in Belgium (4 classes), in Germany (4 classes) and in France (6 classes). These workshops were held from the start for the school year, in September, to the end of October 2003.

Finally, the third phase, called delivery and dissemination phase, included on one hand the opening, from November 3 to 7, of the national exhibitions in each of the partner countries - in Bradford (UK), Virton (Belgium) and Troisdorf (Germany) - and of the final exhibition in Paris on the premises of the ENSCI-Les Ateliers, and on the other hand, the organisation of a seminar titled "Science and Education: the Place of Design", on Wednesday November 5 from 2 pm to 7 pm, also on the premises of the ENSCI-Les Ateliers. In addition, the project's final report, which is currently being written and is meant to become the project's memory as well as a guide for future experiences, will be published in the course of December.

Throughout the project, the Centre de Design Rhône Alpes (CDRA) engaged their skills to create partnerships between STEAD and household electrical appliances manufacturers. The CDRA also contributed their expertise to set up the seminars.

The STEAD Project was conceived in its entirety by ENSCI-Les Ateliers' External Relations Service (European Projects) and conducted by the Pôle Universitaire Européen de Lorraine - PUEL, which handled the various administrative and financial matters, as well as the strategic tasks of organisation, coordination and management.

A final document detailing the whole experimentation process and including testimonies by students and teachers, will be available on the project's website by the end of the year.

We opened this summary review of the STEAD project by quoting a child. We will conclude it with the opinion expressed by *Patricia Jouanny, from the Romain Rolland School in Montreuil 93*:

"The project immediately aroused the students' curiosity and sparked questions. Everyone could participate in the preparation phase, including students with school-related problems. Through this cross-disciplinary project, which combines science, technology and history, children could develop cross-curricular skills, particularly with regards to oral and written language proficiency."

J. GAUVIN, European Project Manager / ENSCI-Les Ateliers

Education / Culture /

See

Two exhibits are a 'must see' this fall in Mulhouse and in Paris.

In Mulhouse, at the EDF Electropolis Museum (55 rue du Pâturage, 68200 Mulhouse, tel: 0389324850) an exhibit on *the electricity fairy* http://www.electropolis.tm.fr/frames/frreno.html. **What did people do before electricity was invented ?** Electricity was not presented to the public until the 1881 World's Fair held in Paris. It took a while before it became widely used in the homes. The EDF Museum gives children the opportunity to carry out scientific experiments, but also to discover objects related to the mechanization of household chores: irons, washing machines, refrigerators, stoves, etc., and their evolution over the past century.

Starting 28 October and until 31 January, 2004, a variety of activities will take place as part of a series titled *'Man and Robots, from Utopia to Reality'*: display of robots, shows, movies, symposiums, and exhibition. An event worth seeing and following at the Maison de la culture du Japon à Paris (Japan Cultural Institute in Paris) (101, quai Branly - tel: 01 44 37 95 00). Robot demonstrations will be held at the end of January.

Insights /

This section provides a discussion forum for those partners who wish to talk about their experience with this project.

The STEAD Project

Science and Technology Impact on Household Electrical and Electronic Appliance Design
Peter Excell and Penny Scaffold / Dept. of Electronic Imaging and Media Communications, University of Bradford

Objectives and philosophy of this project

The project was funded by the EU, in support of the European Week of Science and Technology, although this has not been widely publicised in the UK. The objective was to experiment with ways of increasing the interest of school pupils in science and technology, through understanding the design and functioning of domestic equipment (principally electrical and electronic equipment). The partners in the different countries took differing approaches to this, but all agreed that using children's pleasure and enthusiasm for conceptual design and product aesthetics was the best entry point, rather than the more conventional didactic approach, focused purely on the science and technology.

The approach was successful inasmuch as it generated an enthusiastic response from the great majority of the pupils involved and in that there was a valuable two-way street of interaction, where their ideas often triggered valuable new thoughts for the university team. The ideas and design skills of some of the pupils were competitive with those of professional designers and the university hopes to keep working with some of them to develop the concept of integrated design, which seems to be essential for intelligent personal devices. In this concept, it is necessary to consider all aspects of the product together, giving equal weight to:

› the ergonomics and aesthetics,
› the communications media interface,
› the actual functionality and fitness for purpose,
› the internal engineering, including cost minimisation.

Although this is common sense, this has not been strongly pursued in the past, due to the wide range of skills required, and hence education has tended to focus on just one of these aspects. Our experience has suggested that it is time to consider a reappraisal of this approach, and that a 'holistic' integrated approach is essential for the development of successful products.

The conventional science and technology agenda did not take such a high profile in the project as was originally intended, but this can be linked to a shift in emphasis in high-technology manufacturing, in which successful products are those which can be manufactured on a huge global scale. Here an analogy can be drawn with semiconductor electronic devices, such as microprocessors, which are made in only a small number (believed to be less than 10) of very costly facilities around the world. Education in the detail of the science behind these devices has come to be viewed as not being crucial to the education of electronics graduates and, rather, the development of skills in application of the devices is far more important for the majority of practitioners. Similarly, manufacture of mobile phones (for example) is being concentrated in a few large plants, but new business opportunities are arising in the design and development of content for display on graphics-enabled phones, and new designs of phones, breaking away from the existing 'rectangular block in the pocket' are urgently required.

This is clearly a view that will not be universally accepted, but there is evidence of a strong trend towards this approach, and of success in "solving the problems of industry" by pursuing such a strategy.

Peter Excell and Penny Scaffold / Dept. of Electronic Imaging and Media Communications, University of Bradford

"Behind things"

Workshops and Educational Activities Designed and Carried Out by FONDATION 93 along with the ENSCI- Les Ateliers and the Association Française des Petits Débrouillards - AFPD.

Philosophy behind the project - Topics Addressed - Project Objectives

The **Behind Things** workshop aimed at bringing the children from six fifth-grade (CM2) classes in Seine-Saint-Denis to present their reading of the world (past, present and future) through objects of their everyday home environment.

Therefore, the working situations proposed to them should:

Allow them to become acquainted with the "genealogy of objects" and in broader terms, with what forms the basis of the designer's activity.

› Provide them with hands-on activities assembling, disassembling, do-it-yourself.

› Allow them to debate and to question themselves so they can form their own opinions.
› Lead them to produce something (comments, questions or concrete creations) that will be displayed to the public.

Talking about the things surrounding us: the objects, to talk about why and how things are done.
Design is an activity involving differentiated practices, which can thus be defined in multiple ways. A priori, it is a profession children would not think of. So, as a reference, we will define design as based on the "desire to create things" and on curiosity about "how to do things".
Beyond drawing and shape, design carries within itself an imagination present in every child: that of an inventor, a do-it-yourselfer, a builder, a dreamer: "building treehouses", imagining, constructing, making, touching, looking, knowing, handling, "playing what if…", the child endeavours to discover the world around him or her.

Tools and methods
Development of the proposed plan:
- 1st SITUATION: **The history of things is our history** (1 two-hour session)
Discovering the evolution of behaviours and uses starting from a century-long history of a family of objects (About lamps; about the radio; about the camera; about TV; about toys).
Before the session - After selecting one of the five proposed families of objects, the tutoring designer gathers together the most representative achievements of this family's evolution over the past century. For their part, the pupils, who have been informed of the family chosen by the designer, also collect documents.
During the session - The designer reveals his story of the family to the pupils so they have an overview of its history. The idea is that the pupils have common reference points. In concrete terms, students fill out the timeline provided by the designer. This timeline, which depicts the history of the selected objects, must be completed, as it includes only a few broad reference points (on the family of objects but also reference points shared by all - history of the automobile, of clothes - to provide the children with clear images for them to look back to the past).
Students detail each object one by one, from the oldest to the most recent, and formulate hypotheses to explain their evolutions.

- 2nd SITUATION: **How things are done** (2 two-hour sessions)
Understanding the outside and the inside of an object: shape, functions, technology…
* 1st working session: Understanding
<u>First part: observing/disassembling - example</u>
One of the objects belonging to the family studied in the previous session is selected for observation by the class.
With the help of the designer, the pupils describe what they see: the shape, apparent functions, technologies used… This object is used as an example so that students understand how to observe the outside and the inside.
<u>Second part: observing/disassembling</u>
The class is divided into small groups of 3 or 4 students. Each group is given an object closely related to the one described in Part 1, a few tools and a guide.
Each group takes their object apart step by step, following the guide instructions. This little

guide asks a number of questions, suggests experiments, stimulates comments, etc. The group must fill it in throughout their exploration with the help of the teacher and the designer.

* 2nd working session (two hours): Representing/modifying

- Prior to this session, the designer reviews the small guides filled out by each group and prepares a series of questions for the class, using the most interesting comments.
- S/he then asks each group to produce a "critical" 3D exploded view of their object. This "critical" exploded view thus takes into account all the comments set out in the guides. The view will then be an objective representation as well as an interpretation of the object (for example, pupils who find that such and such component is useless, or do not like the way it looks, etc. may decide to discard it or to modify it.)

The idea here is not to create the ideal object, but rather to have a clear and critical view on the daily objects surrounding us.

- 3rd SITUATION: **What will tomorrow be like ?** (2 two-hour sessions)

Starting from the object analysed in the previous situation, each group must imagine a new shape, new uses and functions.

* 1st working session: Thinking of uses and functions

The designer begins with a discussion with the pupils to encourage them to dream, to fantasize about their ideal object. Pupils must try, as much as possible, to leave behind current objects to really come up with new uses, functions, etc.

A pupil who worked on a video recorder might suddenly suggest to make a videocookie. This round-shaped and very colourful device makes it possible to project a cartoon using any medium, while handing out different kinds of cookies.

Each pupil must associate his or her object with (for example): Verbs (to eat, to walk...); technical terms (button, dial...); visual terms (round, green ...)
Each group writes down this oral description in a document and hand it in to the designer.
Children can also be asked to sketch out drawings of their proposed objects.

* 2nd working session (two hours): Giving a shape

Based on the documents collected from the pupils, the designer comes back to the classroom with the material each group needs to produce their ideal objects. This production can be a scale model, the drawing of a prototype, etc.

Delivery

This part consists in an exhibition structured around a film and some of the pupils' productions. A CD version will also be available later on.
This film is meant to show all the reflective processes of pupils during the experience.

Note: Concurrently with each working session, all students keep a record, a kind of rough notebook where they can write down the steps they followed to do their work, questions and thoughts. They include notes, unfinished drawings, etc.

Appraisal

Each working session demonstrated that children have a close relation with objects of their

everyday life. By developing a critical view of these objects, they could keep a bit of perspective on them.
Design has been chosen as a gateway to look into the technological environment we live in. By taking an interest in the history of those objects, in what they are and what they can become, children questioned how much importance they want to give to these objects in their everyday life. They understood that they have their say, that they can decide what is necessary for them and what is not.
Thibault Narmand - Fondation 93 /