Volvox
A network for European bioscience education

Objectives of the Volvox project
The Volvox project aims to help to enliven school biology teaching, so that more young Europeans will continue to study biological science, follow scientific careers and, as engaged citizens, help to shape Europe's scientific culture and economy. To achieve its aims, Volvox will:

• implement mechanisms to help teachers, scientists and others develop, exchange, translate and adapt resources for biology teaching;
• identify barriers that prevent the exchange of new and novel ideas between those with a professional interest in bioscience education;
• investigate practical means of enhancing the uptake of new and novel ideas by European biology teachers;
• investigate ways in which such innovation networks can be expanded to create a ‘critical mass’ and so become sustainable.

Who is Volvox?
The Volvox project is a partnership between the following organisations:

• Association of Danish Biologists (FaDB), Denmark
• The Max-Planck-Gymnasium, München, Germany
• University of Tartu, Estonia
• COINOR, The University of Naples, Italy
• University of Padova, Italy
• The European School, Luxembourg
• Science Festival School (SFN), The International Institute of Molecular and Cell Biology, Poland
• Ciência Viva, National Agency for Scientific and Technological Culture, Portugal
• Göteborg University, Sweden
• The National Centre for Biotechnology Education (NCBE), University of Reading, United Kingdom

In addition, the project now has a guest partner from France, the École de l’ADN in Nîmes. The project’s working language is English, but it will produce teaching resources in nine languages that will be freely available via the internet.

Why Volvox?
Volvox is an organism that is made up of many cells living together for mutual benefit. It represents a major evolutionary transition from single cells towards co-operative multi-cellular life. All of the cells in a Volvox colony are connected by a network of minute cytoplasmic threads.

Similarly, the Volvox project is a partnership between biologists who are linked by the electronic ‘threads’ of the Internet. The Volvox logo shows these connections in diagrammatic form, and also the connections between each Volvox partner and other ‘external’ organisations in their various countries.

Volvox colonies associate for mutual benefit; the partners in the Volvox project adopt a similar strategy.

The Nucleus cluster
Volvox is a subcontract of EC contract No. 511180 (SAS6), the European Science Teaching Initiative (ESTI), which is co-ordinated by the European Space Agency. Volvox and ESTI form part of the Nucleus cluster of projects in the Science and Society programme within the Sixth Framework. The other Nucleus projects ended during this reporting period, but Volvox and ESTI will continue for another year, until the end of October 2008. After this time, the Volvox resources will continue to be available via the Web sites maintained by each Volvox partner.
Our second full year
Funds were not received by Volvox until October 2005, just ten days before the end of the project’s first Reporting period. The European Commission consequently agreed to the extension of the Volvox project by nine months.

The current Reporting period therefore represents only the second full year of the Volvox project, in which partners have been able to exchange, translate and adapt educational resources. Practical and intellectually rigorous mechanisms for evaluating these resources have also now been developed and tested. The first of the Volvox resources will shortly go online so that they can be used by teachers across the European Union. Many of the resources are currently in a draft state and are not ready for publication — in the final year of the project these resources will be polished, added to and published.

Overview of activities to date
A meeting of the Volvox Management Committee was held in København in March 2007 to set priorities for the current Reporting period and to re-allocate some of the funds from our partners in Denmark, Luxembourg and Germany to our Estonian partner. It was agreed that L’école de l’ADN (Nîmes) should become a guest at all future Volvox Consortium meetings and participate in the project.

Two meetings of the Volvox Consortium have been held during the year: in Lisboa and in Göteborg. The first of these focused on testing the on-line evaluation mechanism and using it to identify priorities for translation and publication. The second meeting collated reports and materials from partners and explored the potential for working with a Novozymes, a Danish biosciences firm.

Two small meetings were also held, in Luxembourg and in Warszawa, to help partners use the InDesign software for typesetting Volvox resources and to plan the Volvox web sites, respectively.

Throughout the year, Volvox partners have worked with Science in School <www.scienceinschool.org>, the science teachers’ journal which is part of the ESTI project. As a member of the journal’s editorial board, the Volvox Co-ordinator has reviewed all articles before publication and participated in the board’s conferences, including a meeting of the editorial board at CERN in Geneva. Several Volvox partners have contributed to the journal, translated articles and distributed paper copies to teachers and attended ESTI events.

Interaction with other Nucleus partners has ceased, initially due to changes in key staff at these projects, the lack of a forum for communication with them and subsequently by the completion of these projects, one year before Volvox and ESTI are due to finish.

Volvox management meeting in København
The Volvox Management Committee met in March 2007. The Committee evaluated spending and achievements by the project and re-allocated some funds to enable the Estonians to further develop the computer-based resources for the project.

The Committee also considered the cost of inviting L’école de l’ADN to participate in future Volvox meetings, which had in principle been agreed by the Consortium. The inclusion of a French participant will not only allow more of the Volvox materials to be produced in French but also allow access to a wider range of educational resources. Several Volvox partners have worked with Novozymes for years; the Committee visited the firm to explore the potential for future co-operation, particularly with regard to work with enzymes in schools.

Volvox partners helped with four issues of ‘Science in School’ in the current reporting period by contributing and translating articles and helping to advertise and distribute the journal.

The Consortium meeting in Lisboa provided an opportunity to test the on-line evaluation mechanism and identify priorities for translation and publication.

At their meeting in København, members of the Volvox Management committee visited the headquarters of the biosciences firm, Novozymes.
Volvox Consortium meeting in Lisboa

Early in the Volvox project, the idea of allowing teachers to evaluate the project’s resources using a simple ‘star’ rating was discussed. It was felt, however, that a more sophisticated mechanism would allow teachers, students and others to supply more meaningful feedback. A set of three complementary questionnaires was therefore devised in the preceding reporting period, so that users of the Volvox materials could (ideally) provide feedback on-line or, where access to the internet was limited, through pencil-and-paper questionnaires.

Following limited trials of the paper version by Volvox partners at practical workshops, the Consortium meeting held in Lisboa during May provided an opportunity to test the electronic system. Before the meeting, project partners submitted abstracts of the resources that they were developing. Each partner was then asked to present at least three of these resources during the meeting, so that they could be evaluated by other project partners.

Pairs of Volvox partners independently evaluated each resource, and the data was collated and presented as a spreadsheet. The purpose of this exercise was two-fold. Firstly, it allowed a realistic test of the on-line evaluation mechanism devised by the project’s Estonian partner, using over 400 individual responses to 42 resources.

Secondly, the results of the exercise allowed Volvox partners to identify resources that would be of interest to as many other partners as possible, and therefore to prioritize future work. The trial proved that the technical operation of the system was successful, and also that the questions that had been devised by the team over the preceding 18 months could be applied successfully to a wide range of educational resources and contexts. A shortlist of 42 resources was drawn up and 11 of these were prioritized for translation.

InDesign meeting in Luxembourg

Unlike previous EC-funded projects, such as The European Initiative for Biotechnology Education (www.eibe.info), in which almost all of the documents were typeset by one partner and published on a single website, Volvox adopts a decentralised approach. The intention is that all partners will develop the necessary skills to produce high-quality educational materials and crucially, to maintain and update them, should they wish to do so, when the Volvox project ends. In this way Volvox should have a lasting legacy.

So that partners could practise using the page-layout software, Adobe InDesign, and also develop mechanisms for the translation of documents, a small meeting was held at European School 1 in Luxembourg in June. Each partner sent one delegate to the meeting.

A sample document was prepared by importing English language text into InDesign, typesetting it, then exporting the text so that the typestyles were retained. This styled text was then translated using a normal word processor and re-imported into InDesign. Although some technical problems were encountered (such as the loss of some Polish and Swedish letters), the process proved largely successful and should lead to far more efficient production of materials in many languages.

A set of guidelines for translators who would not, it is assumed, have access to either InDesign or the specific typefaces used in Volvox documents was prepared along with a checklist of items that translators should be provided with. A slightly revised version of the Volvox style guide and Volvox Symbols typeface were also given to partners at the meeting.

Volvox partners assembled, translated and exported to PDF a sample document using photos, images and styled text.
Web meeting in Warszawa

The bulk of Volvox's educational resources will become available towards the end of the project. Volvox now has a substantial body of materials to offer teachers which are ready or almost ready for publication. With this in mind a small meeting to plan the project’s web sites was held in Warszawa from 6–9 September 2007.

The purpose of the meeting was to determine the requirements that partners would have to meet (such as the amount of server space and the technical requirements for linking to the Estonian evaluation system), to define the overall tone of the sites and to describe their appearance, and to determine the functionality that would be required to meet the needs of teachers and other users of the sites.

To this end, a questionnaire developed by professional web site designers provided a framework for the groups’ discussions. The results of this questionnaire and a consideration of other organisations’ web sites that supply educational resources for schools informed the design of a prototype Volvox web site. Partners who do not wish to implement the full Volvox structure, or are prevented from doing so by their institution or organisation will be expected to adhere to a set of ‘minimum requirements’.

Web site structure

A web site structure was proposed that will allow visitors to rapidly identify resources of interest to them and download them, usually within two or three ‘clicks’ (links) from the front (home) page. This is shown on page 7.

The home page is designed to be simple and quick to download. It has to explain what Volvox is and the types of resource that are available. To emphasise the international nature of the project, examples of resources contributed by different Volvox partners will be highlighted. The examples shown will change with each visit to the site. For those who have visited the site before and know what they are looking for, a search field will provide quick access to resources (the search will be based upon the abstracts of each resource that Volvox partners have prepared).

A menu on the home page will provide access to each of the different types of resource available. These could comprise: practical protocols, animations and models, text-based activities, images, presentations, podcasts (that is, small audio and video recordings) and other materials.

This first menu will link to a different menu page for each type of educational resource on offer. Teachers will scroll down these pages, assisted in their selection by a short description of each resource and a small image. A flag icon will indicate the origin of the work.

Each resource will have a third and final page of its own. This will have a full description of the resource (again using information from the abstracts that Volvox partners have prepared), indicating the age and/or ability range that the work is best suited to, any special equipment and materials required and so on. If a teacher decides that the resource is of interest to them, they may download it, or link to it in the case of resources designed to be used on-line. This page will also provide an opportunity for visitors to evaluate the resource, using a link to the Estonian server on which the evaluation database will be hosted.

Content management system

In 2003 the original Volvox proposal aimed to develop a bespoke Content Management System (CMS) to host the project’s web sites. The European Commission cut the funds allocated to Volvox by 50% however, suggesting that the project could use instead the facilities provided by European SchoolNet. For a variety of reasons this proved impossible to implement. Fortunately, however, easy-to-use, open source CMSs that are free-of-charge are now available. For those project partners who wish to use it, Volvox is planning to use Joomla! <www.joomla.org>.

Joomla! is a highly-acclaimed open source CMS.
Proposed structure of the Volvox web sites

1 Home page

- The widely-available fonts Helvetica and Verdana are used for the title and body text respectively.
- The menu bar uses icons rather than words to minimise translation and ensure a consistent appearance.
- The Volvox logo and name is required on the front page of the each site.
- Introduction to the project.
- Examples on the front page highlight resources from different countries.
- The European Commission’s support is acknowledged (link to more information).
- Copyright/Origin details should be on every page (link to more information).

2 Menu pages

- One for each type of resource.
- A menu of the types of resource available appears on each page.
- Search facility.
- Partner’s branding.

3 Resource pages

- One for each resource.
- Downloadable items or links, in several languages, where available.
- Full description of the resource.
Consortium meeting in Sweden
The fifth Volvox Consortium meeting was hosted by Göteborg university in Sweden from 27–30 September 2007. The main purpose of the meeting was collation of documents for the Periodic Activity Report for 2006–7.

The proposed web site structure that had been devised by the group which met in Warszawa a few weeks before was also presented to project partners and discussed. The integration of the web site with the on-line evaluation system was explained.

Time was given to considering some of the resources that are under development by Volvox partners. This included finished versions of the numerous on-line biochemistry animations that our Estonian partners have been working on for several years.

Two representatives from the biosciences firm Novozymes attended the meeting and discussed how that firm might be able to work with the Volvox team in the future.

A Volvox Management Committee was also elected for the final year of the project. Two Consortium meetings will be held in the forthcoming Reporting period; these are planned for the United Kingdom (April 2008) and Luxembourg (Autumn 2008). Other small meetings to assist with the development of particular resources may also be held in 2008.

The Volvox Recipe Book
Recipes with a scientific flavour from across Europe

Visitors to the Volvox web sites could be offered an incentive to encourage them to register and contribute feedback. One such ‘reward’ might be a downloadable book of scientifically-inspired recipes.

Some of the Volvox team from Poland missed the Göteborg meeting — they were busy at home using Volvox materials at the Science Researchers’ Night during the annual Science Festival in Warszawa.