

TECHNOLOGY ENHANCED LEARNING tel.ac.uk

Ensemble making intelligent use of the web

TEL stories

EVIDENCE from
the TEL research
programme





Ensemble is helping teachers and students tackle fast-changing, complex issues by equipping them with a sophisticated technological toolkit that allows them to engage with problems in new ways. The tools we have developed allow them to work with all the resources on the web, to experiment with them and to shape them to further their learning.

Professor Patrick Carmichael, principal investigator, Ensemble project.

Ensemble... the challenge

The worldwide web is rich in educational resources, but accessing and manipulating them, and incorporating them into learning, has not always been easy. Now, boundaries between data are being broken down and by applying machine 'intelligence', computers can help us find, exchange and interpret data from different sources as part of the development of the 'Linked Web of Data'.

This opens up the possibility of making connections between huge amounts of data irrespective of its format or source. It is also changing our relationship with the web. Once it was an enormous library. Then it became a place for sharing and socialising. Now it is opening the door to new ways of combining and reusing data. Ensemble's work was inspired by the prospect of combining all those attributes to enhance teaching and learning.

In 2008 the project, jointly funded by the Economic and Social Research Council and the Engineering and Physical Sciences Research Council, set out to investigate ways of achieving this aim.

Ensemble targeted teaching, learning and assessment in higher education, concentrating on complex, fast-moving subject areas where traditional curriculums quickly become outdated. In such settings 'cases' are often used to help students get to grips with complex issues. The teams of students, staff and researchers collaborated in deciding how best technology could enhance this 'case-based' learning.



...the challenge

Ensemble... The team developed web applications through building prototypes with students and teachers, rather than for them.

Ensemble... the technology

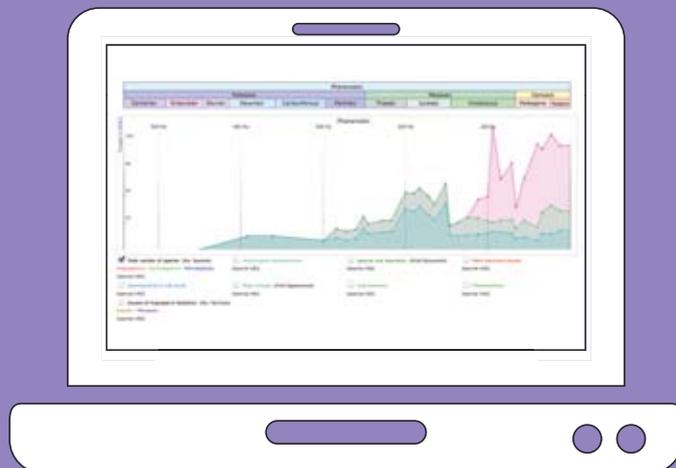
The Ensemble team developed progressively more complex and useful web applications through building prototypes with students and teachers, rather than for them. These bespoke tools improved their ability to store, share, combine, present and annotate digital resources. They also enabled students and teachers to evolve more sophisticated understandings of key issues in their subjects.

Cases initially seen as straightforward – the study of an ancient artefact, a question about the siting of a hydroelectric power station, the development of a new technique in dance – came to be understood instead as multifaceted and multidimensional

problems which could be answered in different ways and which, in turn, could suggest further directions for enquiry.

Thanks to the modularity and flexibility of the new web technologies, the researchers have been able to develop open source tools that improve:

- the manipulation of quantitative and qualitative data;
- the design of assessment activities;
- collaborative and reflective learning;
- engagement in data collection, data sharing and reuse and case construction.



Specifically, the Ensemble team has designed and implemented:

- Data archiving, conversion and reuse tools to enhance existing digital archives;
- Ways of improving access to linked data with applications in teaching and learning;
- Tools to allow annotating and editing of linked data, bringing together the power of semantic web technologies with the ease of use of 'Web 2.0' environments;
- New tools to allow rich markup of video content and its integration into online learning environments;
- Ways of helping learners relate their emerging understandings to the formal representation of knowledge within their disciplines.

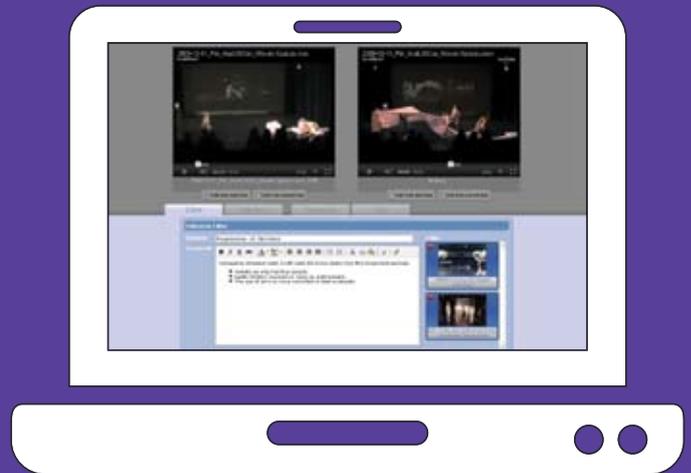
...the technology

Ensemble...

Thanks to Ensemble, contemporary dance students were able to tag segments of their videos with meaningful terms.

Ensemble... in action

- The project team worked with teachers and undergraduates in plant sciences to develop an interactive Timeline of Plant Evolution. This brought together datasets, texts, images, maps and publications, allowing learners to gain broad overviews of trends and patterns before exploring particular aspects in depth.
- The team worked with environmental education teachers to develop an assessed 'case study' in which students had to draw on authentic data (such as climatic records and measurements of river speeds and heights over time) in order to assess the best location for a hydroelectric power station. A combination of linked data, the availability of visualisation tools to help access them, and, critically, the teacher's expertise in shaping and 'bounding' the case study – not too broad, not too directed – made for an engaging yet challenging assessment activity.



- Contemporary dance students working on a performance were generating hours of video content. Thanks to Ensemble, they were able to tag 'segments' of these videos with meaningful terms. This allowed them to sort and select so that they could assess how a particular part of the performance had evolved, or how their own technique had improved. Segments could then be assembled, along with an accompanying narrative, into new video sequences to be shared - with teachers, other students or via social networks such as Facebook or Google+.

Ensemble... find out more

More information about Ensemble is available at www.tel.ac.uk and at www.ensemble.ac.uk. The project is part of the Technology Enhanced Learning (TEL) Research programme. This is...

- a £12m programme funded by the UK ESRC and EPSRC from 2007-2012;
- designing and evaluating systems to advance our understanding of learning and teaching in a technological context;
- supporting eight large interdisciplinary projects;
- working to achieve impact for emerging research results;
- mapping progress on key themes.



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Technology Enhanced Learning Research Programme
London Knowledge Lab, Institute of Education,
University of London, 23-29 Emerald Street,
London, WC1N 3QS

youtube: [youtube.com/tlrptel](https://www.youtube.com/tlrptel)

twitter: @TLRPTEL

email: tlrptel@gmail.com

phone: +44 (0)20 7911 5577

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