Themata 3
E-learning Archaeology, Theory and Practice

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Archaeology and Construction Engineering Skills: developing e-learning for two sectors *Kenneth Aitchison*

Archaeology and Construction Engineering Skills (ACES) is a transnational project, funded by the European Commission's Lifelong Learning Programme under the Leonardo da Vinci II strand. It brings together archaeologists and engineers from four countries (Norway, Poland, Turkey and UK) to develop learning materials for each others' sector that can be delivered as e-learning CPD (continuing professional development) modules. The learning material is very specifically not intended to make archaeologists into engineers or vice versa, but to provide an opportunity for two sister sectors to learn what we wished they knew! Development and delivery has been achieved through an application developed and hosted by one of the project partners, Adam Mickiewicz University in Poznan, which will allow practitioners to access blended or distance learning in any of the four languages of the project.

Objectives and justification

The general aim of the project is to deepen and broaden professional understanding between two professional sectors, broaden the understanding of professional archaeologists and to help them to recognise the needs and concerns of the construction and civil engineering sector and to help members of the construction engineering industry break through what they can see as the 'professional mystique' of archaeology.

To reach this broad, general aim, the project has a series of specific aims, which are to:

> Identify interdependent skills requirements between construction engineers and archaeologists;
> To review current best practice for archaeologists and engineers in each partner state;
> To identify relevant occupational standards;
> To prepare best practice guidance material for engineers and archaeologists in all four partner states;
> To design training materials;
> To design e-learning delivery mechanisms;
> To elaborate guidelines necessary for appropriate conversion of traditional training material into e-learning modules; and to
> Test the e-learning material and mechanisms.

History of the project

This project originated through a contact seminar organised the Turkish national agency for the European Union's Leonardo da Vinci fund, held in Istanbul in June 2005. Delegates from Pamukkale University, ERBIL construction, who are based in Ankara, PSMB (the Polish Association of Building Mangers) and the Polish-British Construction Partnership happened to be sat at the same table as the representative of the Institute for Archaeologists, and together we realised that there might be potential for a joint archaeology-engineering project based around training. A representative of the Adam Mickiewicz University in Poznan was also at the meeting, and we invited him to join us.

Those initial ideas were structured around a previous, unfulfilled project idea that the Institute for Archaeologists had tried to develop for the Aggregates Levy Sustainability Fund in the United Kingdom. That project idea had involved archaeologists and quarry operators discussing and sharing ideas about training for the two sectors, but it rapidly became apparent that something similar could be done much more effectively and usefully for archaeologists and engineers – a far wider constituency of professional contacts. After a quick discussion regarding acronyms, a plan to launch ACES – Archaeology and Construction Engineering Skills – was born. Informal discussions with a representative of the UK Leonardo Agency who was also at the meeting helped to firm up ideas for the project proposal, and after recruitment of two Norwegian partners, the UK-based Construction Industry Research Association and the transnational European Association of Archaeologists, a 'pre-proposal' bid was made to the European Commission in September 2005.

That pre-proposal led to an invitation to submit a full proposal; the EC had provided some feedback, which was taken on board, the partnership changed

slightly and the bid was submitted. Unfortunately, in June 2006, we learned that we had been unsuccessful.

However, while dispirited, the partners were still keen to try again. The European Commission had been positive about the partnership we had built, we felt we had the makings of a good project and so decided to bid again in March 2007 under the 'Transfer of Innovation' heading. This revised, improved bid was successful, and the project received funding for 70% of the total project costs from the European Commission to allow it to run from November 2007 to October 2009.

Project team

The partnership is made up of nine organisations, representing the two participating sectors – engineering and archaeology – across four countries – Norway, Poland, Turkey and the United Kingdom. In addition to these partners, the transnational European Association of Archaeologists, which has its headquarters in Prague, performs a disseminatory role across Europe for the archaeology sector. The partners are led by the Institute for Archaeologists (IFA), which is the professional association for archaeologists based in the United Kingdom. IFA acts as project promoters, and are responsible for the distribution of EC funds to the other partners and for reporting to the UK National Agency which distributes those funds of behalf of the European Union.

In Poland, two organisations which have worked closely together in the past and are based in Warsaw, PSMB (Polskie Stowarzyszenie Menedzerów Budownictwa) – the Polish Association of Building Managers) and PBCP (the Polish-British Construction Partnership) represent the interests of construction engineering, while the Institute of Prehistory of the Adam Mickiewicz University in Poznan provides input from that sector. This partner is also responsible for the development of the online learning materials.

The Norwegian partners are the Riksantikvaren (state heritage agency) and Sintef, a quasi-autonomous non-governmental agency for skills in the construction industry. The Turkish partners are ERBIL Construction Engineering, a private engineering consultancy and Pamukkale University, while in the United Kingdom archaeological and engineering input is provided by Gifford, a multi-disciplinary consultancy which has subcontracted some of the archaeological work to Nexus Heritage, while further archaeological input comes directly from the Institute for Archaeologists (in addition to IFA's project management role).

The European Association for Archaeologists provides pan-continental valorisation (dissemination and promotion) of results for the archaeological sector; initially, it was hoped that a comparable body could be involved for the construction industry, but this proved not to be the case and so Europe-wide valorisation for the construction sector has been subcontracted out of the partnership.

Challenges in transnational working

Working transnationally has been a challenge; early on it was recognised that communication was always going to be key to a successful project, and we had the advantage that most of the partners had met in Istanbul and several had worked together before on other European or national projects.

The partnership timetabled five meetings of all partners over the two years of the project, reviewing progress and planning future activities at the end of each scheduled stage of activity. We also decided to introduce one additional, special meeting to address the development of the online learning material in particular. These meetings have all been carefully structured, two-day meetings (entirely conducted in English, as the official language of the project), with minutes and lists of action points promptly produced and made available by email and through the project's website.

These partner meeting generally work to a common agenda, and are also structured around highlight reports that each partner has to produce on the work that they have achieved in the previous project stage, identifying any issues that they have regarding budget, timetable or resources and allowing these issues to be discussed collectively.

While these meetings may have occasionally been frustrating, they have in general been extremely productive and the partners have appreciated the opportunity for face-to-face contact. This has also been strengthened (where appropriate) with additional social activities, such as project meals and site visits.

Finance has presented an interesting challenge, with a project budget that has to be tracked entirely in Euro but with half of the project partners being from non-EU states and none of the others being within the Eurozone. Indeed, the partner countries can be presented in a clichéd way as being divided between EU-members who do not use the Euro and whose

populations are not keen to join the Eurozone (the United Kingdom, the Czech Republic), EU-members who do not use the Euro but would like to (Poland), non-EU members who want to become members of the Union (Turkey) and non-EU members who do not want to join the Union at all (Norway).

This has meant that, with partners accumulating expenses in five different currencies, together with project meetings distributed across countries using four of those currencies (and occasional valorisation activities taking place within the Eurozone), tracking expenditure and ensuring the correct conversion rates are used is of critical importance. Expenditure in the opening stages of the project had to be converted to Euro using the official European Central Bank rate on the day that the first tranche of funding was released by the UK National Agency for the Lifelong Learning Programme to the project promoters, and for the closing stages using a different rate that applied when the third tranche was released.

Ensuring that appropriate agreements regarding the partners' intellectual property rights are made has also been crucially important. The partnership has reached a nine-point agreement that prioritises the dissemination of project results, allows whichever partner that has developed a product to retain the rights to that product but ensures that all partners have free use of any such product.

This IPR agreement then allows for commercialisation of the results, an approach that the European Commission values and appreciates (if partners or the partnership can economically benefit from the outcomes of a project, then those outcomes are likely to continue to be used and applied post-project). The partners have thus worked to develop a shared agreement that will allow us to use the results and products of the project – the training material and delivery mechanism – that ensures none of the partners will be financially disadvantaged, nor will they have to compete with each other to deliver these products to any target audiences.

ECOTEC, the UK National Agency for the Leonardo programme, provided feedback on the report that had been submitted on the work of the first 12 months of the project, which recognised and identified strengths and weaknesses of the project's processes to that point (the weaknesses related largely to the delays in trying to recruit a transnational engineering partner). This has helped the partnership focus on overcoming identified problems in order to complete successful delivery of the project's objectives; this has also meant a request for the project's timetable to be extended by one month was made and accepted by ECOTEC.

Development and application of learning materials

The ultimate learning materials that the project will produce will be e-learning modules for both sectors, available in the four partner languages. In order to produce these, the partners have gone through a process of reviewing best available practice, using this information to produce 'handbooks' of technical advice, and then distilling these into Sharable Content Objects, or SCOs, which form the basis of each individual online learning encounter or experience under the system used, SCORM (Sharable Content Object Reference Module) – v1.2 standard, which can be uploaded into any virtual learning environment.

The partners worked together within each of the two sectors in doing this, with individual partners charged with producing individual SCOs, and then this work was reviewed by the 'other' sector – so archaeologists produced the material that will form the basis of 'archaeology for engineers', which was then reviewed by the engineering partners and vice versa.

Throughout, this was undertaken to the requirements set out by the Adam Mickiewicz University in Poznan e-learning delivery specialists.

Once this syllabus of SCOs was agreed, it could then be transformed into interactive and visually appealing learning materials, and then translated (using support software) into the four partner languages.

Production of learning materials

The learning materials developed by the archaeological partners for use by engineers cover

SCO1	What is Archaeology? Why does it matter?
SCO2	International framework
SCO3	Licensing and Standards
SCO4	Roles and responsibilities of archaeological organisations
SCO5	Stewardship of the historic environment
SCO6	Types of Sites – non portable
SCO7	Types of Sites – Portable

SCO8	Degrees of importance
SCO9	Types of development – introduction
SCO10	Types of development – Greenfield
SCO11	Types of development – Brownfield
SCO12	Types of development – Bluefield
SCO13	Types of development – Marine
SCO14	Archaeological techniques – introduction
SCO15	Archaeological techniques – non-invasive
SCO16	Archaeological techniques – invasive
SCO17	Archaeological techniques – excavation
SCO18	Archaeological techniques – sampling
SCO19	Post-excavation – Analysis
SCO20	Post-excavation – Publication
SCO21	Post-excavation – Public archaeology
SCO22	Timescale and risk overview
SCO23	Feasibility and design
SCO24	Application stage
SCO25	Enabling works
SCO26	Construction
SCO27	Case Studies
	> Poland
	> Norway
	> Turkey
	> UK

The materials produced by the engineers for archaeologists are deliberately not a direct mirror of the archaeological SCOs, but there are some critical commonalities and some SCOs are shared materials (Health and Safety and Case Studies).

SCO 1	Engineering Course for archaeologists – introduction
SCO 2	Who's who in a construction project?
SCO 3	Procurement routes & Types of contracts
SCO 4	Public clients – contractual / financial issues
SCO 5	Private clients – contractual / financial issues
SCO 6	Engineering Soils
SCO 7	Plant and Equipment
SCO 8	In-ground structures in Rural areas
SCO 9	In ground structures in Urban areas
SCO 10	Health & Safety
SCO 11	Contaminated Land
SCO 12	Stages in the building project – including timescales
SCO 13	Design process
SCO 14	Pre-planning desk top investigations
SCO 15	Geotechnical investigations
SCO 16	Environmental Evaluation
SCO 17	Site investigation techniques
SCO 18	Risk management
SCO 19	Physical Mitigation
SCO 20	Contractual aspects of Mitigation
SCO 21	Pre-excavation ground modelling
SCO 22	Construction: Advanced works
SCO 23	Construction: Concurrent working
SCO 24	Construction: Watching brief
SCO 25	Engineering Works in a Historic Landscape Context
SCO 26	Urban (brown field) – Poland
SCO 27	Best practice Norway-Marine
SCO 28	Turkey – Subterranean

To test the materials, distance training was arranged in each country with identified trainers and volunteer trainees. Training is anticipated to take place over a 1 – 2 week period, with a total of 1 – 1½ hours required by each trainee to complete the distance training.

The project chose to follow the model of facilitated web-based training – e-modules and online trainers only, and while the platform is accessible in Polish and English only, courses will be in all four national languages. Access to the course will be restricted by making it only accessible during a set timetable, which would be determined in advance by each country, and

trainees can log-in from another webpage (such as the ACES site) or directly to the login-page which is situated on the UAMP host site.

'Training Scenario' information is sent to each trainee participant – explaining aims of training and any other required information. This will show what students should know, what they will learn, start/end dates and other details, and trainees are encouraged to communicate with their trainers and fellow trainees through the course online forum only and not by email, to ensure group discussion and to maximise information dissemination.

Post-project application

The project has now developed learning materials and applied them through e-learning methodologies, transferring innovation from the academic sector to the applied archaeological and engineering sectors, opening up new routes for learning for early-career and aspirant professionals.

'Working with partners from a range of European countries, each with their own systems for dealing with the archaeology-construction relationship, has thrown up some interesting challenges, but the sharing of experience and best practice has been very valuable. As a result, the project has not only promoted a better understanding between the archaeology and construction sectors but has also enabled a better understanding between archaeologists and engineers across the partner countries' (Geary 2009).

Further details at www.aces-project.eu

References

Geary, K., 2009. 'The ACES project – building a better understanding'. *The Archaeologist* 73, 9.