



*Technology Enhanced Learning  
in Research-led Institutions*

*TELRI is an HEFCE-funded project led by the Centre for Academic Practice at the University of Warwick in collaboration with the Universities of Oxford, Birmingham, Durham and Southampton.*

**The project is assisting academic staff in making effective use of learning technologies for supporting the development by students of some of the capabilities that researchers possess, of benefit more generally in their studies, in employment and in later life.**

## EDUCATIONAL APPROACHES

There is wide agreement in higher education that gaining a degree means more than mastering subject content. Cognitive skills and subject-specific skills are increasingly emphasised, in the belief that they are transferable to other situations, and course and module descriptions are starting to reflect this. However, it is not easy to produce courses that, through their processes and methods of assessment, truly develop some of the most valuable skills.

The TELRI Project has focused on the cognitive skills of researchers, defined some of them, and suggested how they can be developed and assessed. In particular, we highlight two learning processes (*Table 1*), which are essentially complimentary and mutually supportive. The first is **adoptive learning**, which makes use of established and well-understood knowledge and techniques in bounded situations. The second is **adaptive learning**, which requires higher level thinking in more open situations. We argue that researchers tend to engage in adaptive learning in a way that can be fostered in students' learning when courses are designed appropriately.

<b>ADOPTIVE LEARNING</b>	<b>ADAPTIVE LEARNING</b>
<b>Knowledge and Practice of...</b>	<b>Formation and Generation of...</b>
Facts, Assertions, Rules and Laws	Personal Interpretation, Meaning and Expression
Language and Protocols	Evaluation, Decisions and Justification
Techniques and Procedures	Arguments, Reasoning and Explanations
Organisation and Structure	Synthesis and Conceptualisation
Established Relationships and Principles	Originality, Creativity and Innovation

*Table 1: Two Complimentary Forms of Learning*

The educational framework used by the project has been developed into a set of course design guidelines that aim to provide a means for staff to:

- make powerful and robust decisions and justification for their choices of methods and use of materials for teaching, learning and assessment;
- make explicit statements concerning student learning outcomes and assessment criteria;
- establish coherence in content, structure, methods of delivery, assessment, student progression, support and guidance.

The team believes that designing and assessing courses in ways that emphasise adaptive learning enhances the **quality** of courses. These course design approaches are easily extended to the learning processes and assignment practices across a broad range of educational settings, particularly in professional development, but also in schools and further education.

## TECHNOLOGICAL APPROACHES

The project team has implemented these educational approaches in courses across a range of disciplines in departments at Warwick and Oxford Universities, while at the same time making appropriate use of the benefits offered by learning technologies.

It is fairly straightforward to select technologies that support adoptive learning, e.g. in making research tools, data and information available, and thus contributing to students' disciplinary knowledge and techniques. However, those learning technologies that develop the higher cognitive skills needed in adaptive learning, and in developing research capability, are less clearly identified or explicitly used for this purpose. The potential contributions that electronic document sharing and discussion can make are many, if the tendency to "bolt-on" such methods can be avoided in favour of a more central focus amongst course activities. The integration of traditional and C&IT approaches to support adaptive and adoptive learning is illustrated in Table 2.

	Learning resources	Learning support	Assessment	Integration medium
<b><u>ADOPTIVE learning</u></b>	Provision of course materials	Feedback and guidance on knowledge of .. (see Table 1)		Virtual Learning Environments
<b>Traditional</b>	Lectures Guidance notes Books Journals	Seminars Group classes Lab work	Essays Work/lab books Multiple choice tests	
<b>C&amp;IT -based</b>	Web-based resources CAL, simulations Bibliographic databases Internet sites	Interactive CAL Simulations Applications software <i>E.g. spreadsheets, statistical or textual analysis, CAD, 3-D modelling</i>	Electronic marking Computerised tests, CAL, simulations (that include marking)	
<b><u>ADAPTIVE learning</u></b>	Availability of published work and debate	Feedback and guidance on formation and generation of .. (see Table 1)		Virtual Learning Environments
<b>Traditional</b>	Discussion of work in progress Distribution of marked work	Seminars Group classes	Essays Reflective journals Lab reports	
<b>C&amp;IT-based</b>	Web publishing Discussion archives	Web publishing commenting Email lists & newsgroups Discussion boards Conferencing packages	Published work Discussion contributions	

Table 2: Integrating traditional and C&IT-based learning resources and learning support

C&IT tools that provide opportunities for learners to give meaning and value to information and concepts are particularly useful, whilst the ability to reflect critically on working processes is also vital. Such tools are most effective when they offer immediate feedback to the learner. These links can be summarised thus:

Desired research capability	What C&IT should offer
Ability to be original, creative, innovative	Tools that present and offer resources for open situations
Ability to deal with complexity	Tools that support the learner in evaluating, analysing, selecting and structuring
Ability to work with precision and intensity	Tools that permit a high degree of focus on a particular skill
Ability to reflect on working processes	Tools that make working purpose and processes transparent
Ability to form justified discipline-based judgements	Tools that enable discussion of reasoning, judgements and decisions

Table 3: Linking C&IT tools to developing research capabilities

Bearing in mind the need of lecturers for simplicity, "fitness-for-purpose" and cost-effectiveness of technology solutions, TELRI has developed a simple web publishing tool to enable students to publish work, ideas, comments and discussions, quickly and easily onto the web without requiring any specialised web page publishing or production skills. Two main advantages are apparent. Firstly, lecturers have been able to implement the desired course design approaches far more quickly than would have been possible with large, complex and often expensive applications. Secondly, the increased visibility of student work offered by web publishing, particularly when combined with student discussion and/or tutor feedback, makes the educational *process* of good study practices more explicit to both students and tutors. An examples in Italian Studies is shown in Figure 1.

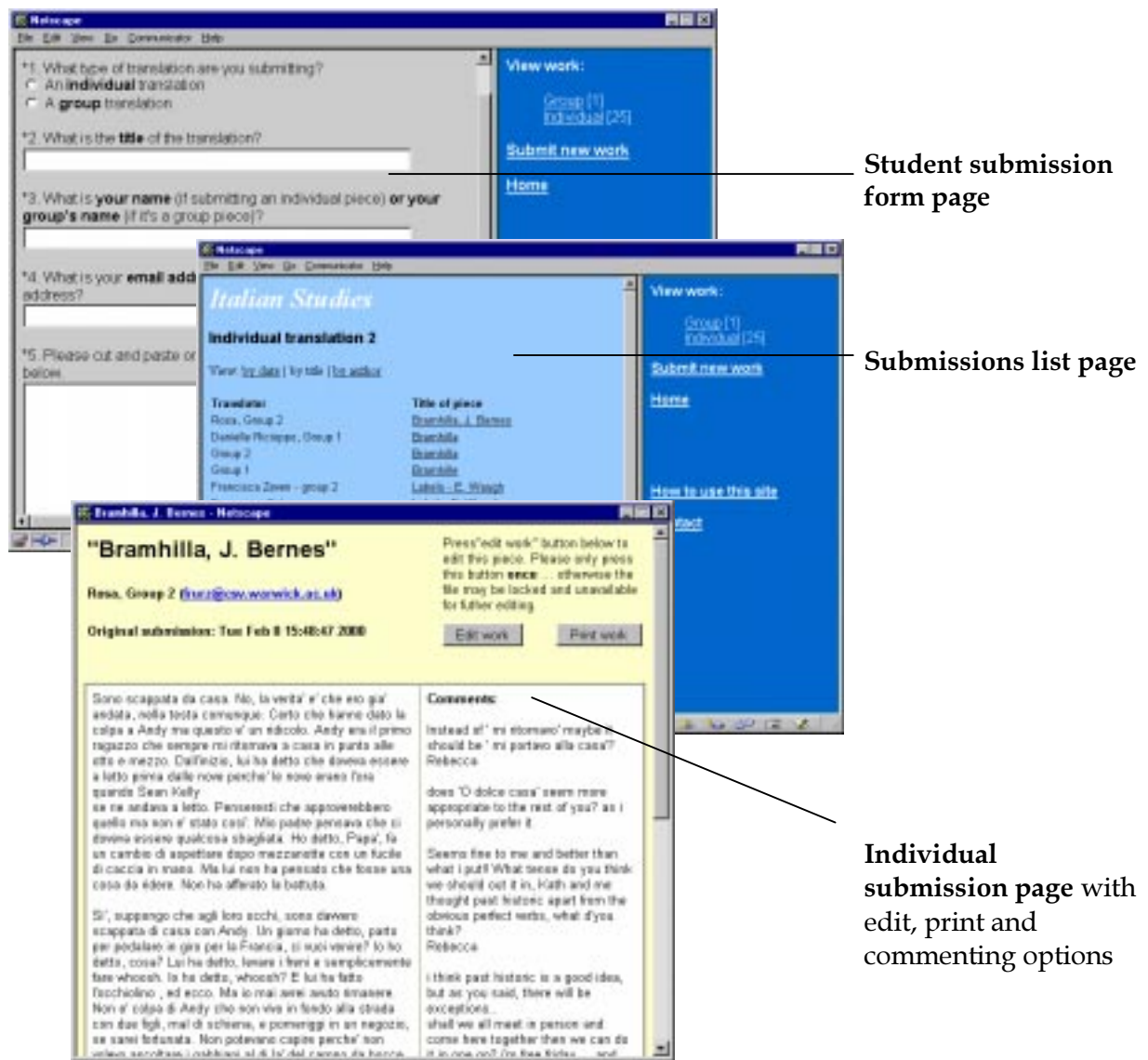
## PROJECT MATERIALS

An overview of the TELRI educational approaches, the course design guidelines, examples of implementation in courses and details of the web publishing tool can be found on the TELRI web site at:

[www.warwick.ac.uk/ETS/TELRI/](http://www.warwick.ac.uk/ETS/TELRI/)



Figure 1: Web publishing used in an Italian cultural studies module to support students' critical analysis in individual and group translation work.



## PROJECT CONTACTS



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