Aligning learning, teaching and assessment using the web: an evaluation of pedagogic approaches

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Abstract
Biggs has argued that teaching is most effective when it supports those activities appropriate to understanding the curriculum objectives. This paper uses Biggs' argument to analyse how a UK higher education initiative, the Chic project, has promoted learning and teaching innovation that supports collaborative, inclusive learning by integrating on-line and face-to-face delivery. Methods by which assessments, teaching processes and learning objectives can be aligned are discussed.

The author identifies two project approaches to the utilisation of on-line materials within curriculum design. Staff and student questionnaires and interviews are evaluated in order to assess whether these processes promote a reflexive approach to learning. Such reflexivity depends upon stimulating the learner's emotional involvement and active engagement in undertaking achievable tasks.

The paper argues that an integrated approach to on-line learning and teaching can be used to promote students' critical use, understanding and application of materials. Moreover, it is argued that this can be liberating for staff and students as long as there is a shared vision and experience upon which to act. Promoting motivation within a supportive and meaningful context is fundamental.

Introduction
The Courseware for History Implementation Consortium (Chic) project was a three-year Higher Education Funding Council for England, Teaching and Learning Technology Programme (TLTP) project, funded from September 1998 until August 2001. It focused upon the effective integration of on-line student support and learning...
materials. The project’s remit was to evaluate the implementation of web-enabled
teaching processes, and the quality of student learning that takes place as a result.

The project worked within fourteen history departments across the UK, as well as
with Design, English, Health and Religious Studies departments. In all, it involved
over 1,500 students and 75 staff in evaluating learning and teaching innovations. The
majority of the resources used were web-based. However, across these departments, or
sub-projects, there was no cohesive approach towards utilising materials, and “fit-for-
purpose” was the departmental brief.

The project evaluated two aspects of course design and delivery. The first utilised twelve
history tutorials developed in phase 2 of the TLTP. These materials can be accessed via
CD-ROM or the internet and contain linked essays, text and image-based primary
sources, learning activities and glossaries. Where these materials do not fit with local
needs they can be customised, for instance, to allow new primary materials or discus-
sion areas to be added. However, in the main these materials are used as extra resources
for seminar and assessment preparation.

The second aspect focused upon the development of web sites that are specific to
particular modules. These sites constitute an approach to curriculum design which
integrates ICTs (information and communication technologies) as the medium of
delivery for course materials. In these sites, pastoral student support materials, such as
ICT helpdesks, course news items and general bulletin boards, co-exist with learning
materials, activities and spaces. The hope is that such web sites will produce a holistic
learning experience which promotes co-operation, engagement and involvement. A
tutor involved in the project promoted this process because “Conventional approaches
to teaching and learning do not meet all of the needs and aspirations of an increasingly
diverse group of students”.

Each of these aspects highlighted different approaches to course provision. In the first,
the web was used as a means to provide learners with extra resources that they could
use within a traditional course structure. However, in the second approach, which
was undertaken at two sites, the web was used to alter the learning structure. The key
to successful implementation was that asynchronous web-based seminars supported
group-based analysis of specific on-line tasks, which were in-turn reinforced by weekly
face-to-face sessions. In the classroom seminars learners would synthesise, criticise and
disseminate their understanding to their peers. Assessment involved the production of
a portfolio which highlighted understanding through a mixture of, for example, case
studies, the production of web pages, source analysis and contributions made to on-line
discussions.

An important outcome of the Chic project was the realisation that ICTs should be used
to help align learning, teaching and assessment. Crucially, this means that reassessing
curriculum design, rather than focusing upon curriculum delivery, is fundamental. An
evaluation of the project’s approaches to curriculum design will form the crux of this paper.

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Aligning learning, teaching and assessment

John Biggs (1999, 11) has written that “Learning is the result of the constructive activity of the student. Teaching is effective when it supports those activities appropriate to understanding the curriculum objectives”. In this view, the learner’s achievement of the stated course learning outcomes depends upon two factors. The first is that the unit assessment, or the learning activities, must be designed to enable the learners to demonstrate their understanding. The second demands that the learning process around which the course is built, must support the student’s approach to fulfilling the course outcomes, and hence understanding the course objectives.

In devising course outcomes, Bloom’s taxonomy (Bloom, 1956) which focuses upon a hierarchy of understanding, highlights the student’s demonstration of: knowledge; comprehension; application; analysis; synthesis; and evaluation. Biggs’ own criteria (1999, 27) focus upon the deployment of key verbs, which exhibit the relationships between information. Assessment hinges upon the highest level verb that can be demonstrated by the learner in the assessment tasks. In this way the student’s learning attainment can be said to be at a deep or surface-level. Biggs’ deep-level verbs are: hypothesise, generalise, reflect, apply, integrate, analyse and explain. His surface-level verbs include: classify, describe, identify and recognise. Other authors concur that deep-level learning transforms an individual’s world-view and allows learners to apply their knowledge in new contexts, whilst surface-level learning focuses upon reproducing information (Entwistle, 1992; Prosser and Trigwell, 1999).

For these authors, the achievement of deep-level learning depends upon curriculum design. It is vital that consistency is achieved through: the statement of clear objectives and levels of understanding that the learners need to meet; the deployment of a set of learning activities and teaching processes which are designed to enable those objectives to be met; and the development of assessment tasks which measure the stated objectives (Biggs, 1999). By ensuring that these elements are seen to be directly relevant to each other, or in harmony, the module learning outcomes can be achieved.

Promoting harmony depends upon learners understanding why the design of the curriculum will help them achieve the learning outcomes (Entwistle, 1992). Giving students the big picture will enable them to see “what’s in it for me”, a crucial concept in motivating learning. By engaging with learners about the educational methods that underpin a course and by negotiating the course culture with them, the learning experience can become a holistic process with manageable outcomes.

A clear benefit of this type of approach is promoting the learner’s emotional involvement with a module. Deep-level understanding depends upon creating an environment where the learner wants to be proactive. In order to support this end, several key curriculum issues must be made explicit. These include: assessing what the students already know about a topic; relating the key themes of the module to their understandings; developing a relevant learning agenda, with appropriate opportunities for peer
and tutor support; and, providing learning opportunities which will enable students to generate conceptual and affective understanding.

This last point is crucial because there is a danger that students will see the fulfilment of the course outcomes merely in terms of covering topics, or declarative knowledge. Through the generation of a learning culture which sets agreed standards for learning behaviour, students and tutors can begin to work appropriately and students can actively demonstrate ownership of their learning.

A major factor in enabling conceptual understanding is the provision of opportunities for formative as well as summative assessment. At one Chic project site, opportunities for formative assessment were provided through group-based on-line tasks, upon which peers and the tutor commented. The ground-rules for this approach were discussed and agreed at the start of the course, and it enabled progress to be monitored, whilst allowing the students to reflect upon and evaluate their understanding. The summative assessment, consisting of a case study and portfolio, built upon the formative work. Thus, the students could see that the tasks underpinned the unit assessment.

Aligning learning, teaching and assessment demands consistency in producing course objectives, learning activities and outcomes, and in providing a teaching process to support the students. It is fundamental that the learning experience allows individual learners to achieve the learning outcomes, in terms of what they can do, and the course objectives, in terms of what they understand in relation to a specific topic. Developing a shared agenda between students and staff will allow affective learning to be supported through proactive engagement with the curriculum. The effective use of educational media depends upon curriculum design (Whitston, 1998).

Educational media and learning processes
There is a tendency to view the web as little more than an information-delivery medium. However, the value of the web as an educational medium lies in its ability to fuse information and communication delivery in order to promote the mastery of learning. This mastery can be viewed in terms of content and concepts, or the deep-level verbs noted above. To support this end, the web needs to be seen as a powerful communications tool, able to support dialogue between tutor(s) and student(s), and student(s) and student(s).

Laurillard (1993) has argued that discussion, interaction, adaptation and reflection are crucial elements in the effective use of technology in education. Where students are given opportunities to discuss and to interact, they can adapt their understandings and reflect upon them. An important factor in this process is the shared experience of learning. The open, democratic and collaborative power of the web can be a crucial way of engendering an active engagement in the learning process both asynchronously and over time (McConnell, 1994; Salner, 1999). However, trust in the use of discussion spaces is fundamental and underpinned by the established learning culture.
In order to encourage active involvement in learning, course web sites need to be relevant to different types of learner. Moreover, the parameters for their use should be set within a supportive context that clearly explains the relationship between learning objectives, teaching processes and learning outcomes. At one project site web-based tasks were used to highlight the key themes that had been developed in lectures. The tutor perceived that the students’ conceptual understanding would be enhanced by giving them a dedicated web space with feedback on performance, which they could access at their convenience. In this way the key developmental role between discussion, interaction, adaptation and reflection, mediated through the web and collaborative working, was promoted.

Bowden and Marton (1999, 130) have stated that “in these days of increasingly flexible, more electronically distributed, more open, more learner-controlled forms of learning, the “teaching method” will decrease in relative importance”. However, there is a caveat to this, which they note when they add that “the differentiation of... content into isolated and unrelated pieces” can create problems. The learner’s ability to make sense of the learning experience depends upon the course structure, mediated through the tutor as facilitator. The use of synchronous and asynchronous peer-supported learning amongst students can also promote affective learning.

Ramsden (1992, 18) noted that the role of ICTs would emphasise the need for thoughtful personal interventions in the learning context. It is important, therefore, that any implementation of web-based educational innovation recognises that the medium enables the management of complex information flows and the social construction of knowledge with certain caveats. The Chic project’s findings do suggest that to be meaningful, the use of new media must be driven by curriculum design.

A note on evaluation methodology

For the Chic project staff to demonstrate the validity of particular approaches to the use of educational media, effective evaluation was necessary. This allowed staff to make evidence-based claims about specific educational innovations. The arguments developed below have triangulated data collected by several instruments.

1. Pre- and post-implementation questionnaires with staff and students at fourteen sites were utilised by project staff at those sites.
2. Post-implementation interviews, with eleven staff and thirty students, were conducted by the project managers and local project staff.
3. Focus group sessions were run at regular intervals throughout the implementations by the project staff at four institutions.
4. Project reports, which analysed implementations and gave recommendations for action, were produced by sub-project staff.

The evidence was collected over the life-cycle of each implementation in order to map the learning process that each innovation supported, and thereby to iterate educational provision. It was also used by the project managers to assess the appropriateness of specific educational innovations.
A bolt-on pedagogic processes

The pedagogic interventions undertaken by the Chic project have depended upon the views of tutors about the ICTs. Those who are reticent users of educational media view them solely in terms of the delivery of resources. One tutor, teaching students on a level two, depth study module noted that he was “not sure whether such materials will alter the students’ learning—it depends upon whether they regarded them as merely an additional resource, another ‘text’, or as an essential first port-of-call guiding and directing them to other resources. This would depend very much on the quality of the materials on offer, as well as their availability and reliability.” The tutors on this module did not reshape their units in order to embed the new materials. There was a perception that the web was a delivery method to be used where it did not interfere with established processes.

From the outset of the module on-line materials were introduced by the tutors as part of a resource bank. There was a shared culture which prioritised traditional methods of working, namely, the provision of lectures and seminars, and assessment through essays and exams. The only relevance of web-based materials for the students was as an extra resource for meeting normative assessment criteria. Thus, traditional modes of learning were reinforced by the reticence of the tutors to break away from those approaches with which they were comfortable.

The students on this module also saw on-line learning as resource-provision. When asked whether they thought that the web would be beneficial for studying History, thirty-seven out of forty-eight students agreed, but only one saw it supporting communication. However, thirty-five students valued discussions with their peers in supporting their conceptual understanding. Moreover, none stated that the web would enable them to critique or understand knowledge production. One learner declared that the web “will help with access to materials but the actual learning methods will be the same as with all other written material”.

At a separate institution most of the 150 first-level students on an outline course said that they preferred traditional methods of teaching, with only a third believing that the web would make a difference to their learning. When asked after the course how using the web had affected the way they learned, the students either saw it making no difference, improving their skills, or giving them access to a much greater range of sources.

At this institution, unlike the first, a specific module web site was created. This linked student support materials and an on-line handbook to a seminar listing, bibliography and series of web-based primary sources. It was regularly updated and students were encouraged to access the site. However, none of the summative assessment was linked to it, and the teaching process was focused on lectures and seminars linked to essays and exams. Learners raised concerns about the lack of depth of materials, and declared that the site channelled their thinking. One complained that they were “given no freedom, told exactly what to do every step of the way, a bit like school”.

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The staff hoped that such a portal would encourage the students’ independence, allow them to learn at their own pace, and interact more with other researchers. Despite these hopes, there was no structure in place to encourage such an independent, critical approach. One clear lesson for the staff was that informing students of resource availability will not encourage such reflection unless the teaching process and assessment are aligned.

A third institution utilized some courseware that was housed in a module web site in a level three, in-depth study course. A key element for the tutor on this course was how to make the web site matter. In retrospect, he noted that “the key would be to force the students to engage with the resources more fully”. by linking them to the assessment and learning activities. This view was echoed by the head of department at a fourth institution. Over the course of his department’s two second-level implementations, the proportion of the sixty-eight students who thought that on-line resources would either make a difference to, or support, their understanding halved (from 94 per cent to 47 per cent). He felt that “the specification of learning activities” was the key driver in supporting affective learning.

This snapshot reveals that the web is often seen by both tutors and students as an information tool that is best utilised within an established learning process. However, resource banks can be alienating and do not necessarily support deep-level learning. A first-year student noted that “History should be about us having to find out, rather than logging on to a computer to find out what someone has put there ready for us”. It is crucial that educational media are not seen in isolation and the key factor is structuring the process of learning. What activities and assessment strategies will enable students to understand the course objectives and hence achieve its outcomes? How can web-based resources motivate learners?

**An embedded pedagogic process**

In two departments the value of educational media has been directly related to the learning experience. The argument runs that a holistic experience depends upon a coherent structure being defined for a whole course so that the rationale behind the course, and the ways in which that will be achieved, are articulated to students from the outset and are seen to matter to them.

The two modules under consideration were a first-level course on death and dying in early modern England, and a second-level course on enclosure in a eighteenth century community. The learning outcomes for each course focused upon: identifying and deploying key conceptual and methodological approaches; testing and extrapolating from hypotheses; the translation and integration of flexibly-delivered source materials and flexibly-generated knowledge across a range of contexts; and demonstrating understanding and critical reflection individually and collaboratively.

As one of the tutors noted, “the key question guiding the approach and the construction of the Web environment was what kinds of thinking should electronic delivery
embrace and promote if it is to secure any improvement in students’ learning?” In order to support this approach, the outcomes were related to the learning experience in the opening sessions of each course. Once the tutor had explained his agenda for the learning activities and assessment, and the rationale behind supplying materials and discussion spaces on-line, the students discussed them.

Thus, the outcomes were set within a module learning culture, which had clearly negotiated and articulated expectations for face-to-face and on-line work and that explained how the course aims could best be achieved. It was important for learners to recognise that the on-line and face-to-face elements were mutually reinforcing, and would allow them to actively engage in learning activities synchronously and asynchronously, in manageable and meaningful ways.

However, problems can be exacerbated when the learning medium alters, and at first the students were concerned about the effects of such change on their learning. Initially, two-thirds of the sixty-three students saw the web merely in terms of information flows, and the role of communications was felt to be negligible in the learning process. Only one student noted that it would affect his understanding when he wrote that “it will teach me different ways of learning and thinking”. His a priori perception was only matched by other students after the event.

Despite this reticence, it was hoped that the articulation of a course culture, underpinned by the module web sites and discussion areas would ensure that learning communities were supported. One of the two tutors noted that ICT was a bridge to “determining and planning a systematic approach to the educational experience of the learner”. In order to support this the methods of assessment included: group-based projects which tested theory and application of historical thought; analysis of source material; and case studies of interpretations. These assessments then related to the objectives through task work, which was analysed in whole-class seminars, and which was underpinned by lectures which placed problems in context. As one tutor said, “the learning process was articulated through a clear learning structure for students to follow which allows them to model discipline-based ways of thinking, and to capture the intellectual characteristics articulated in course objectives”.

This approach married elements of student support with a flexible application of theory to source materials. It extended resource availability, but allowed students to critique those resources, to locate and comment upon new materials, and to generate multiple perspectives. Through the use of discussion boards and group areas, monitoring and formative assessment could underpin reflexivity amongst the learners. The understandings generated in face-to-face sessions were reinforced in this process.

One student felt that “you can have a stab and get feedback and get pointers for your own research”, whilst one of her peers added that that this approach encouraged her “to question the information rather than taking it and putting it in your own words”. These students clearly felt that they could focus on the course objectives through the
embedded use of educational media within a clear learning structure. Here was a specification of meaningful learning tasks that underpinned an active approach to critiquing knowledge.

To be motivating learning has to matter and has to be engaging. One learner said “a bad student experience of using web-based resources is likely to have a knock-on effect and will not promote wider use”. A different student declared that although “a lot of preparation is required the web workshops are exciting. The workshops are balanced with the lectures—the two go together”. The tutor noted that his aim was “to give the students a more interactive role in the learning process” and to “make it as human as possible and avoid the bureaucratic and dull”. Whilst motivation can encourage freelance free-thinking, an important conclusion is that all students need to understand the structure of the learning experience.

One of the tutors, analysing the 475 email messages that were posted in the four private email groups during the six weeks of group-work, saw clear learning benefits develop. He felt that genuine interaction was increased over time and that questioning, problem-solving, interpreting and suggesting alternatives had slowly become the norm. He saw a deeper engagement from all except four students on the course, evidenced by the task work, the quality of the dialogue, and the ways in which on-line discussions were fed into coursework. Students in a focus group clarified this position. One stated that “You question everything, you actually look at resources and ask where it comes from, is it accurate and are there big gaps, and does it satisfy what I want in answering the question? And, because it is on-line, some [students] supply answers you have never even thought about.”

This level of commitment was not shared by all of the students and some resented the amount of work that they were asked to do. The time taken to update the web site and interact with students, and the cost of web development were key factors for the tutors. Other reservations focused upon poor group dynamics and cohesion, and uncritical assessment criteria. One tutor felt that deeper learning was occasionally not transferred from the bulletin boards and the formative tasks to the summative case studies. Acknowledging the need to promote the student’s background reading, he stated that the assessment would need to be iterated to incorporate elements which would address specific problems in the task work.

Despite these concerns, these courses clearly demonstrated that meaningful self-reflection and understanding can be generated through a holistic restructuring of curricula. The tutors involved felt that their ability to build in learning activities that directly related to course objectives and outcomes had extended their students’ learning experiences and enabled the groups to see themselves as learning communities.

**Conclusions**

The most fundamental aspect of utilising educational media is that course design underpins success. An important issue for tutors is what they want their students to be
able to achieve and how they can offer effective support. In stimulating discursive, interactive, adaptive and reflective learning, the context in which learners access materials, and the value, relevance and feasibility of learning activities are crucial elements.

Promoting metacognition depends upon the alignment of the learning objectives for a course with both the teaching process and the assessment criteria. In this way, an embedded approach can move learners and tutors away from seeing the web solely as an information delivery medium. Enabling a problem-based, dialogical approach to learning through the reinforcement of web and face-to-face contexts will allow learners to engage on a deeper level.

Clearly, there are trade-offs for tutors in terms of time and cost, and the management of the student experience, and for students in terms of a commitment to active and collaborative learning. However, as Biggs (1999, 65) argues, there is tremendous value in providing an organised setting with clear goals and feedback on progress. A shared culture can help to motivate students and develop deep approaches to learning. An integrated approach to aligning learning, teaching and assessment, focused around the relationship between learning activities, delivery media and course outcomes can help students become more proactive.

References