JISC

G4L - East Midlands NTI Gateway for Learning

Draft Final Report

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Executive Summary

G4L builds upon the ongoing development of a regional partnership of HE/FE Institutions and the Regional Development Agency (EMDA) to provide training to SMEs in Energy and Environmental issues in order to facilitate better resource efficiency and enhance productivity/competitiveness.

The project's aim was to facilitate the delivery of course information and e-learning content to SMEs as part of extended blended learning programmes offered by our consortium partners and deliver this in a form suitable for a Work-Based Learning context. Our primary objectives were:

- To identify an effective methodology (together with appropriate technology), to present learners with a seamless learning experience that meets the needs of SME end-users;
- To provide appropriate levels of personalisation of the learning experience in terms of both individual and organisational needs. This includes the production of effective interfaces for both content delivery and course information.

Our model for the delivery of distributed blended and e-learning elements was developed in consultation with learning technology teams at the partner institutions and specialist e-learning consultants as well as with selected SME end users. This process of engagement, needs analysis and verification resulted in specifications being created for specific components of the toolkit. Subsequently, a package of web-based tools were developed. Interface design, courseware templates and back-end database development were carried out by a combination of internal development staff and contractors.

Our methodology comprised two key stands as part of our integrated information & content management system (ICMS):

1. A content authoring, rendering & packaging tool (CARP). Our model involved the production of a 'bite-size' 1-2 learning hour taster course using re-purposed curriculum materials from a specific existing course. The tool incorporates Flash-rendered content linked to an SQL database. Personalisation of the course is facilitated by (i) the automatic creation of a 'learner's scorecard' that records learner responses throughout the e-learning course and (ii) the ability for learners to select relevant learning objects (including appropriate URLs, documents, event details etc) and to store these in a 'Personal Portfolio' section that is linked to specific topics within the course. Back-end administration is facilitated by a PHP-SQL management interface.

2. A course information system (CIS) that enables course administrators and curriculum developers to effectively catalogue all relevant NTI courses (including e-learning bite-size courses as well as longer mainstream courses). A key facet of the CIS is the ability for end users to search the database for courses that meet specific business criteria. This search returns summaries of relevant courses, information about cost, location, enrolment details and a list of learning outcomes. Where available, mainstream course summaries also provide direct access to the relevant 'bite-size' course.

Achievements and Conclusions

G4L has been successful in meeting its primary objectives. Throughout the project, a pragmatic approach was adopted in which our focus was continually trained upon the needs of our end users (especially curriculum developers and SME learners) rather than on the technology utilised to deliver the toolkit. For this reason, our technical solutions were simple and practical rather than leading-edge - except perhaps for the Flash-to-SQL methodology we have developed for the CARP tool. We believe that the pedagogical aspects of both strands of the toolkit are examples of best practice. This will be explored in more detail in the body of this report

Background

The G4L project was built upon a regional New Technology Initiative consortium in the East Midlands, which provides training and support to SMEs in the areas of Energy and Environmental issues. The NTI group, consisting of 4 Universities and 2 FE colleges, offers learning opportunities at levels 3 and 4 which comprise a range of courses from the different institutions.

The issues related to the relevance of training to business needs are numerous, and the affect of these upon engagement and retention of SME learners are explored later in this report. Our challenge was to provide end-users with a simple, consistent usable interface which enables them to explore all partners' course offerings and, having identified courses that are relevant to their individual and organisational needs, obtain a flavour of the courses to assess their suitability. In addition to being a toolkit that meets appropriate pedagogical requirements, an emergent feature of G4L is that it acts as a marketing tool for training to SMEs, thereby adding further value to the partners' existing provision.

Aims and Objectives

The project's aim was to examine models of blended learning delivery to SMEs, and to develop an e-learning framework suitable for partly work-based learning contexts that utilises resources and administration distributed across a consortium of Universities and FE colleges.

A key objective was to identify an effective methodology, together with appropriate technology, to present learners with a seamless learning experience in which the back-of-house distribution of courses and materials is largely hidden.

Whilst extensive personalisation of the learning experience was not a central objective, the perception of both flexibility and tailorability to personal and organisational needs was key. With this in mind, the development of effective interfaces for learner and content management and administration was given a considerable focus.

Project Methodology

1. A model for the compilation and presentation of distributed e-learning elements was developed in consultation with learning technology teams at the partner institutions and in conjunction with needs analysis of learner end-users.

2. A comprehensive options analysis of the technical approach to be adopted, the effectiveness of the package in delivering seamless learning experiences, and system usability was carried out.

3. The selected technical approaches were validated and a risk assessment was carried out.

4. A package of web-based content tools and a simple course information web-portal was developed. Interface design, courseware templates and back-end database architecture/build were partly contracted in.

5. A specific course (assessed as being most relevant to SME needs) was selected as a case study for 'proof of concept' purposes. This course (from the University of Northampton) was under concurrent development an focussed upon Waste & Energy Management in Small Business and.

6. Evaluation of was carried out via engagement with end-users to measure the effectiveness of the framework.

Implications/ Deliverables/ Stakeholders

This project resulted in a manageable e-learning solution to the need for the consortium of universities and colleges to provide a coherent learning experience built from distributed resources and support.

The delivered system is scalable and provides a model for similar blended training management and delivery scenarios for other sectors/applications, as well as providing a tool-set for blended learning content development.

The key stakeholder groups for this project were tutors, learners, SMEs, course administrators, FE and HE institutions and curriculum developers.

Aims and Objectives

The aim of G4L was to develop an effective blended learning framework in which a coherent programme of courses offered collaboratively by a number of different educational institutions is presented. This includes the development of 'bite-size' e-learning course components which help learners progress to accredited mainstream consortium courses as easily as possible.

The primary project objectives were to:

- Create a system which, from existing consortium course offerings, facilitates personal course planning and management thereby enabling the construction of individual learning programmes based upon specific needs (such as business drivers and job requirements).
- Develop an e-learning content production and management methodology and framework which results in a repository of learning resources matched to mainstream courses within the NTI curriculum.
- For individual learners, enable constructivist personalisation of the G4L e-learning environment via identification, description and storing of relevant learning objects within the e-learning repository.

As we were not successful in obtaining Shibboleth funding for this project, our goal related to seamless student access across institutions according to common registration details needed to be scaled back.

Methodology

Our methodology was developed in light of the needs of specific end user groups, especially SME learners, curriculum developers and course administrators. Having such a needs-driven focus meant that a process of iterative evaluation and verification was required to ensure that outputs developed in a manner appropriate to end-user needs. This also involved research of previous experience of SME e-learning provision.

At the outset, we placed an emphasis on the development of appropriate pedagogy rather than on the technology underpinning the project. This was required for two reasons: firstly, our primary SME end users engage according to the quality of information offered to them, not the quality of the technology used to deliver the information; secondly, our team's expertise was predominantly in the teaching, rather than the technical domain.

Following a legacy system review and consultation with key stakeholders, our development approach included (i) an evaluation of the needs of specific end users, including curriculum developers, course administrators and SME learners; (ii) validation of the resulting specifications against the outputs stated in the original G4L proposal to JISC and (iii) creation of a framework for progress, including suggested technical & design approaches. This resulted in a set of functional requirements along with an outline system structure and components in preparation for the initiation of development. Appropriate technical specifications for both the CARP and the CIS tools were then developed in light of the functional requirements as. These are explored further in the outputs and results section.

In addressing the central objective of producing a system that successfully presents a distributed learning offer in a coherent and SME-orientated form, design decisions were made with reference to the literature on SME training requirements and the findings of our own user consultations. A summary of these considerations and the response in terms of the toolkit design are summarised in the results and outputs section.

After development of the G4L content authoring, rendering & packaging tool, a 'bite-size' 1-2 learning hour taster course using re-purposed curriculum materials from a specific existing course (in this case a University of Northampton course entitled 'Waste management for Small Businesses') was created. This course was selected due to its strong relevance to defined SME business drivers. Within the CARP environment the course incorporates Flash-rendered content linked to an SQL database. Flash was chosen due to (i) its strong browser integration characteristics; (ii) it's ability to integrate mixed media efficiently; (iii) the ease with which pre-existing PPT media can be converted to Flash for browser-based delivery and (iii) the latest ability to link Flash to an SQL back-end

Our method to facilitate personalisation of the bite size course via (i) the automatic creation of a 'learner's scorecard' that records learner responses throughout the e-learning course and (ii) the ability for learners to select relevant learning objects (including appropriate URLs, documents, event details etc) and to store these in a 'Personal Portfolio' section that is linked to specific topics within the course. In this way,

the tool supported the development of a constructivist approach within the bite-size environment.

Following stakeholder engagement, certain other components considered in the early stages of the project (notably a course sequencing authoring tool), were deemed to be secondary to the core objectives, and had a high inherent risk.

Development of the core components of the G4L toolkit commenced using both outside contractors and internal design and programming staff. Having defined the functional requirements, both the content packaging system and the course information tool were developed in parallel. Separate SQL back-ends were developed for each strand to reduce the risk of one tool being compromised due to back-end technical issues.

Road testing and evaluation with end user groups is currently being carried out - these results should be available in 6-8 weeks from the date of this report.

Implementation

Review of legacy systems

Following a first-pass design of a system to meet G4L objectives, relevant staff (e.g. VLE managers) at NTI partner institutes were interviewed to establish the nature of their existing LMSs and methodologies. The feasibility of interfacing with these systems was addressed and it was concluded that for technical, organisational (and in some cases political) reasons, it would not be appropriate to integrate the G4L with existing systems. Instead it was determined that G4L should act as a self-contained system, co-ordinating/managing data relating to training from distributed sources, rather than providing access to these directly.

Having established the key functional components required to achieve G4L objectives, a review of existing applications and technologies was carried out to identify overlap with proposed G4L development work. The existence of applications which either provide functions required now, or a likely to in the near future (e.g. LAMS for learning programme sequencing) resulted in modifications to the project plan, notably a de-emphasis on tools for authoring of course content and structuring

Consultation with key stakeholders (curriculum & technical)

Consultation has been carried out with curriculum developers from with the NTI consortium as well as the NTI manager/administrator. This has resulted in a specification for course metadata and G4L administrative components.

Technical consultation has been carried out via a scoping contract as well as directly with technical designers engaged to develop the G4L technical components. This provided both a technical risk analysis and specifications for the design and implementation of the system now being built.

Development of curriculum quality template

Consultation with the curriculum developers who are providing exemplar course material for re-purposing within G4L was carried out. These materials are currently being used, together with ongoing research and consultation into specific SME course design and presentation requirements in order to produce a quality framework for content conversion.

End user consultation

A key premise of this project was that the system produced should respond to the specific needs of SMEs in finding and accessing appropriate, parsimonious training that addresses their immediate skills requirements. It was anticipated that, often, the optimal training package might comprise a range of learning opportunities, originating from different providers (i.e. a distributed training provision). With this in mind, a number of regional SMEs were consulted to discover:

- How they identify training needs within their organisation
- Where they go to seek training to meet these needs
- The order of priority of the questions they want answered in locating suitable training

In addition to literature-based research on training needs analysis and training provision for smaller businesses, four face-to-face interviews and two telephone interviews were carried out with relevant managers from Small to Medium-Size Enterprises in the East Midlands. These produced valuable information on how managers establish the nature of a training need among their staff, what they then do to locate suitable training and, importantly, what information they need to make a decision as to the suitability of a training offer. The feedback obtained, in particular on the last point, was then used to inform the design of the G4L course information system.

Technical development

Construction of the two main system components, namely the course information system (CIS) and the content packaging and management system (CPMS) was carried out using separate SQL database back-ends. Front-ends for the CPMS was designed using Flash; dynamic SWF content was rendered to the Flash interface from the database, whilst embedded 'Knowledge Base' objects were summarised using XML prior to user selection. The front-end interface for the CIS was constructed using PHP.

Development of the CPMS was outsourced to e-learning design consultants experience in producing interoperable and standards compliant e-learning content and databases. The CIS was developed in-house using experienced database and web programmers. As CIS-relevant standards are still in development, interoperability of the CIS was not given significant focus. It is intended to work with relevant projects (such as XCRI) if G4L obtains further support funding.

Outputs and Results

Our G4L deliverables include a web-based portal that comprises:

- Access to a 'proof of concept' integrated 'bite-size' content delivery environment which includes personalization of the course around individual needs;
- A course cataloguing and information system which enables courses to be matched against defined SME business needs;
- An effective methodology for the consistent adaptation of courseware and subsequent delivery models across the institutions involved;
- An effective mechanism for learner progression within and between the institutions;

Our research, specification, testing, validation and evaluation results are detailed in a number of project reports. These can be viewed at
http://crestdl.lboro.ac.uk/g4l/reports.htm

End-user consultation results: The training needs of Small to Medium Size Enterprises

Our SME consultation indicated a number of key issues in mapping a distributed training provision to pragmatic business needs. These included:

- SMEs do not generally carry out formal training needs analysis. Instead, managers make training decisions on an ad-hoc basis as a result of their close involvement with their staff and business processes.
- Small company size limits the amount of longer-term staff development that can be supported. Instead, short bursts of training which address pressing skills needs predominate
- There is a need for rapid training solutions that provide the required up-skilling and minimise the amount of extraneous content i.e. succinct, targeted training is what SMEs are looking for.
- The managers interviewed were generally wary of relying on unsubstantiated statements regarding the needs met by training programmes. Most of those spoken to had had disappointing experiences in the past where time and money had been invested in training that was either unsuitable, inefficient or of poor quality. All of the managers consulted stated that they would prefer to be provided with sufficient information in a form they could understand to make an informed decision as to the value and suitability of training offered.

When asked about the characteristics of such course information, there was agreement that it should:

- Be easily accessible
- Be described in terms they could understand and relate to their actual needs
- Include short taster courses and information to aid the identification of training needs (in effect, to support training needs analysis). For example; introducing a new area (such as waste legislation) to a sufficient extent that the manager can decide whether it is something he needs to seek further training in.
- Be sufficiently detailed, to allow them to see what proportion of the offer was relevant to their needs.
- **Ideally, include exemplar material and details on the commitment required from the learner**

Cost, course location, duration and similar issues were consistently stated as being secondary to knowing that the training would meet training needs efficiently and effectively.

The results of these G4L consultations were consistent with previous work in this area[1-11]. Furthermore, it was noted that few sources of training information and provision for SMEs address the defined needs effectively. These findings were fundamental in informing the design of both the G4L course information system and of the content delivery environment so that the integrated system comprises a tailor-made tool to help overcome some of the barriers to training for SME learners. The engagement results (supplemented by previous research in the training barriers and needs of SMEs) also include valuable lessons for the wider HE/FE community in terms of pedagogic and administrative frameworks generally.

The G4L model's value has already been recognised by additional end users, to the extent that further development of an integrated blended learning framework that includes G4L for construction-sector companies has received additional funding from the East Midlands Development Agency. If forthcoming, match funding from JISC will help facilitate this development.

In summary, the development of both the G4L course information system and the content authoring, rendering and packaging environment provide a valuable source of training information and provision for SMEs that address aspects of their defined needs effectively. It is worth noting that there is currently no other equivalent integrated system in the UK to our knowledge.

Table 1 (overleaf) shows a summary of the SME end-user consultation results.

SME requirement	G4L design response
Timeliness SMEs need just in time, bite-sized, to the point learning.	**Course development framework** • Emphasis on bite-size e-learning • Modular – can be broken down for partial study or study over time • Flexible delivery – online or media-based (e.g. CDROM)
Parsimonious, targeted training SME workforce have little time and will look for only what they need, they will need it as soon as possible and very specific to their needs.	**Learner and context-centred approach** • Personalisation through portfolio building • Contextualised through application to their business e.g. energy use calculation • Minimise skills pre-requisites (literacy, numeracy, IT)
Needs Identification SME don't tend to engage in formal training needs analysis. They are capable of (and keen to) make decisions on training themselves, but need sufficient clear information on the training offer, to be able to do so. This is particularly true for new learning domains.	**Course information system design and data presentation supports SME decision making:** • Rich course description: Relevant information, presented in a user-orientated structure (SME key questions addressed at top level); exemplar and taster materials (screen grabs, demo pages); learning/skills outcome centred description • Bite-size courses to introduce areas and keys issues – supports an implicit TNA function i.e. empowers the SME to make an informed decision as to further training requirements
Guidance on the Learning offer A common complaint is that there is too little information on the adequacy and effectiveness of the learning on offer. SMEs want support to help them find which learning opportunity will best match their business and development needs.	**Support for information on the Learning Offer in the CIS** • A course information field (allowing up to 100 words or description) is available within the CIS to provide this information
Course contents "All the sources agree that the most important subject is the core business of the enterprise, "everyday business" (European Commission ref) The equates to skills to help them survive in the market.	**Taster course contents and sector-specific repurposing guidelines** • Relevance to business context e.g. "select your business type" • Reference to relevant current legislation and foreseeable developments in the sector • Direct reference in the course material to impact on competitiveness of the business

Customisation of Course No two SME businesses will have precisely the same requirements. A degree of tailorability by the learner can provide the required differentiation	**Limited Customisation** • Less of a requirement in bite-size courses as they serve a slightly different purpose e.g. providing initial information to support decisions to study further; raising awareness of the issues; providing basic and more generic training • Contextualisation features, as mentioned above (interactions relate to the learner-selected business sector)
Technical Infrastructure Despite advances in the pervasiveness of IT and web connectivity, not all SMEs have the necessary infrastructure for e-learning.	**Technical specification for courseware** • Minimise technical requirements to access and run courses: Flash, small file sizes, streamed media.
User-friendly design Access to learning needs to account for the lack of time SMEs have available to learn how to access learning and study e-learning courses	**Interface design and functionality** Reference was made to the prevailing guidelines on interface design for access and usability in the appropriate literature
Access To Subject Matter Experts And Support Another key issue consistently reported	**Limited support – an area for possible future development** Links are provided from within the exemplar bite-size course and through the Course Information System to the NTI administrator. G4L is, however, reliant on the quality of provision from partner organisations in providing effective subject matter and tutorial support to accompany courses.
Knowledge of Return on Investment (ROI) Businesses in general and SMEs in particular are concerned that any training warrants the financial investment they make	**Limited indication of potential ROI** • The course information sections of the CIS provide an opportunity to suggest how a course can provide a return on investment • The bit-size example also contains specific references to cost savings through action resulting from the training course

Table 2: End-user needs and toolkit design considerations.

Course information system: design and specification.
A schematic diagram of the CIS tool is shown below in figure 1. This indicates the relationship between two end-user group interfaces (namely learners and curriculum developers/ administrators) as applied to the CIS tool.

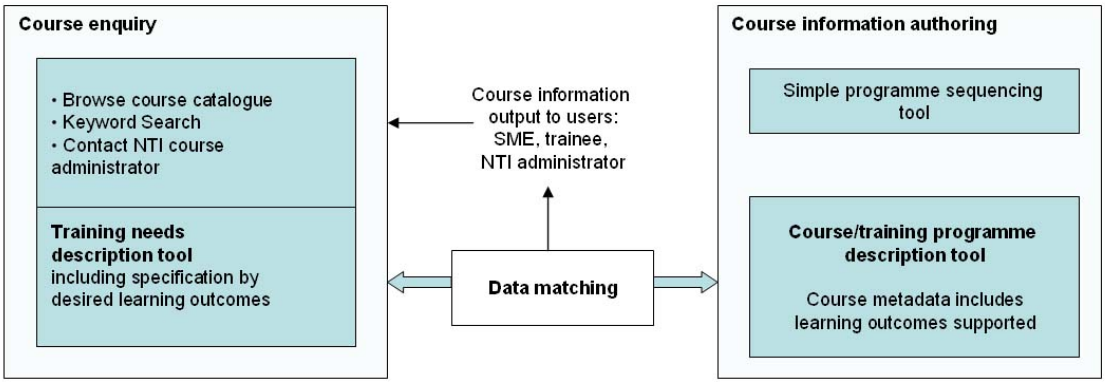

Figure 1: CIS schematic structure

For the CIS tool, the course descriptor schema as defined during our engagement with course administrators and curriculum developers is shown in Appendix 1, along with selected evaluation and feedback comments. We have also included images showing the various user interfaces of the CIS (from the administrator/curriculum developers' perspectives)

Images of the CARP back-end interface and the learners' view are also included in appendix 2. These show how 'Knowledge Base' objects as well as core learning content are rendered in Flash to the learner.

Component Specification and Evaluation

Table 2 (below) shows a summary of technical approaches to each key aspect of the toolkit.

Component	Front-end	Back-end	Output data format	Technical risk
CARP knowledge base object s	PHP	SQL	XML to describe Html, .PDF, .doc etc	Medium –templates should be kept simple. Existing approaches were used as appropriate
CARP content re-purposing and rendering	Flash	SQL	Flash converted from PPT, .doc Xml, pdf, .wmf etc	Medium/high. D/base-integrated Flash rendering is relatively new.
CIS data input and rendering	PHP	SQL	ASCII	Low – some course descriptors already exist. Input and interface issues are straightforward

With regard to pedagogical design considerations, table 2 (overleaf) shows a summary of learner end-user needs analysis and the resulting project design rationale.

Outcomes

At the time of writing this report, final evaluation and road testing of the toolkit with representative stakeholders (especially SME learners) was being carried out. Therefore, it is not yet possible to provide comprehensive evidence for the efficacy of the approach taken. However, initial results have been encouraging, to the extent that an additional industry sector organisation is keen to adopt the G4L model for its own client group (construction companies)

The G4L CIS, course development framework and exemplar course material have all been developed to meet the stakeholder needs identified through consultations and research carried out in the early stages of the project and have received a subjective interim validation through discussions with potential SME users of the system. The planned evaluation phase will provide more detailed data on the success of the system in meeting the stated project objectives.

At face value, however, the objectives of…

1. Presenting learners with a seamless learning experience in which the back-of-house distribution of courses and materials remains largely hidden
2. The production of clear and simple interfaces for leaner and content management and learning administration
3. and the perception of both flexibility and tailorability to personal needs

have all been met successfully.

We believe that the G4L project makes a significant contribution in focusing on the practical needs of the end-users. The system developed provides a translation between the potentially complex array of distributed learning opportunities and the needs, priorities and, indeed, language of those seeking training. The presentation of course information, for example, has been expressly ordered and described in terms that reflect the identified priorities of SME customers in making decisions to take on training. The template for uploading course information by learning providers has been designed to account for both the normal course information categories found in HE and FE and the key considerations stated by SME managers. Upon completion of the full evaluation of G4L, it will be possible to objectively ascertain the impact of the approach taken on the teaching, learning or the research communities.

The main beneficiaries of this project are:

1. Learning providers seeking to contribute to a targeted, distributed provision of training, adapted to the needs of learners in largely work-based settings. This will be achieved through the user-centred design and mapping of the provision to the training information and delivery requirements of learners groups.

2. Learners requiring effective to-the-point learning programmes that accommodate the constraints found in work-based settings. The ability to contextualise the included bite-size course and to create a personal learning environment and record adds to the applied value of the training included in the pilot version of G4L.

3. SME decision-makers who need the right kind of information in order to make informed judgements as to the value of training programmes in meeting their business needs. Help in identifying skills needs and support in compiling suitable learning programmes from the available distributed curriculum is a central objective of the G4L approach

4. Provider-consortium administrators who need a usable tool-set to co-ordinate the provision of distributed learning programmes. The design of the CIS allows easy inspection of relevant course details, allowing administrators to provide advice and guidance to users at both ends of the process (providers and learners) as well as curriculum developers. The simple course management tools included in G4L aid this process.

All the factors described above are applicable to a wide range of other contexts. Indeed, following further development and testing, the G4L toolkit can find immediate application in the fields of both industry and academic training and education, and plans are well progressed to do so.

There are also some practical lessons learned that can inform the application of the G4L model elsewhere. Perhaps foremost are the current barriers to the rapid re-purposing of high quality e-learning content. In this project, the use of a Flash rendering environment created difficulties in iterative improvement of the content. For example, barriers associated with teacher/design team liaison created frustration that required changes were not carried out optimally by the designers. The solution to this is to place the design tools into the hands of the teachers. For example, we are currently developing a model whereby content developed by teachers using the ubiquitous e-learning tool (MS PowerPoint) is modified and converted directly to Flash using commercially available software, complete with interactions. This approach removes designers from the 'critical path' and should facilitate more rapid content development.

Conclusions

- The needs and barriers to training of specific SME groups have been defined and validated in order to inform the development of the G4L framework;
- An integrated training needs analysis and course information system has been developed and trialled in light of both SME requirements and those of other stakeholders (such as curriculum developers and course administrators;
- A content authoring, rendering and packaging tool has been created that facilitates the rapid development of high quality e-learning content that may be pesonalised by the learner to meet specific needs;
- The integrated tool has been piloted successfully by applying it to courses within an East Midlands NTI consortium.

Implications

Will G4L work for the intended stakeholders? Suitability of the distributed provision

The G4L approach is based on the need to bring together a diverse curriculum which is distributed among HE and FE providers and present it in an appropriate form for WBL/SME learners. Whilst the institutional providers are central to this, the ultimate value of the system has been seen as critically dependent on the learners' experience and the effectiveness and efficiency of the training provided. As such, the major design and implementation decisions have been centred on the supporting learners to build training programmes to meet their own, often unique, needs. In doing this, it has been necessary to make certain assumptions about the suitability of the courses provided and the ways in which they are delivered.

The initial indications are that the G4L approach does respond to the specific requirements of the target learners, providing course information, course content and delivery methods to suit their needs. Using the purpose built taster course as a model, we are confident that the forthcoming evaluations will demonstrate the value of G4L in addressing SME needs. For future

use in distributed learning, however, a number of conditions will need to be met by the training providers. These include:

Course/programme flexibility:

Tailoring training to meet learners' individual needs is likely to require programmes to be compiled from elements residing at different institutions. Unless this can be done easily and with minimal fuss the approach may be undermined. Obvious impediments to this include:

- Courses not sufficiently fine grained i.e. small enough chunks or modules dealing with specific knowledge and skills
- Restrictions in enrolment and payment for courses e.g. the need to be able to enrol on and pay for a single small modules, without committing to more extensive study within an institute
- A lack of meaningful accreditation and credit transfer for bit-size chunks

Technical interoperability

The technical interoperability of the G4L package with other learning systems has not been a central consideration in this project. The nature of both legacy systems and systems in development has been acknowledged and the use of generic technologies (described elsewhere) was intentional, in order not to preclude future interoperation. However, the development of connectivity with, or portability to, other systems was beyond the scope of G4L.

There is, however, an additional issue – interoperability from the users' point of view i.e. how easy is it to quickly pick up the skills needed to study at different colleges or universities. This has the potential to cause significant problems for distributed e-learning. A lack of consistent learning platforms (e.g. VLEs) among providers, together with necessary administrative procedures (enrolment/registration, logon) may undermine the aim of providing seamless learning experiences.

Further Development Work

As discussed, we will work to streamline the content re-purposing process. Although Flash is an extremely efficient method for delivering rich media over minimal bandwidth, the re-purposing of existing content into Flash is not straightforward. Our aforementioned approach may help to ease this problem.

Another aspect that needs further development is comprehensive validation and modification of the course descriptor schema from the curriculum developer/administrator perspective. It is hoped that cooperation with the JISC XCRI team may help in this regard.

We feel that more comprehensive market research, followed by the development of a sound business development plan will help the effective dissemination of the toolkit to other cohorts. We will work to find an appropriate partner with the expertise relevant to this task. Evaluation of the prospective use of G4L to meet the needs of SMEs in the construction sector will help in this regard.

Finally, although the East Midlands Energy and Environment Sector NTI will be wound up in 2006, discussions are ongoing with the NTI Directorate (specifically Hilary Whaley) to implement the G4L toolkit for other NTI sector consortia.

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10. Welsh E, Wanberg C, Brown K and Simmering M (2003) 'e-Learning: emerging issues, empirical results and future directions', International Journal of Training and Development, 8 (4), pp. 245–58.

11. European Commission "e-learning-europa" report http://www.elearningeuropa.info/index.php?page=doc&doc_id=6356&doclng=6&menuzone=2

12. Guidelines on user interface design: http://www.usablenet.com/accessibility_usability/usability.html

Appendix 1: Project Budget

Reporting Period	YR 1 Forecast	YR 1 Spend	YR 1 Balance
Staff *(list all staff with FTEs and salary scale range)*			
Project manager 0.3 FTE	8500	9,100	(600)
Tech support 0.1 FTE	2800	5,187	(2,387)
Designers 0.4FTE	10000	9,262	738
Project Director 0.3 FTE	15000	16,310	(1,310)
Instructional & technical designers (0.4FTE)	9000	7,316	1,685
Travel & Subsistence *(include attendance at relevant programme meetings)*	1500	346	1,154
Equipment *(specify individual items over £10k)*	5200	0	5,200
Dissemination activities	3100	3,792	(692)
Evaluation activities	5300	4,804	496
Other *(please specify)*			-
Consumables	2800	0	2,800
Sub-contractors (design and technical)	31850	31,496	354
			-
Total	95050	87,612	7,438
Total requested from JISC	95050		

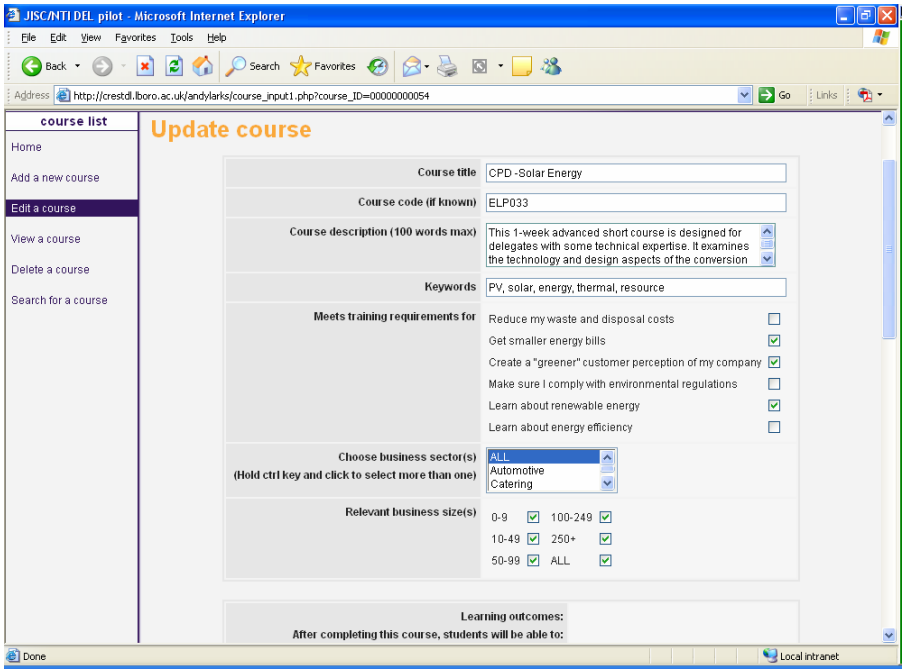
Appendix 2: CIS course descriptor schema

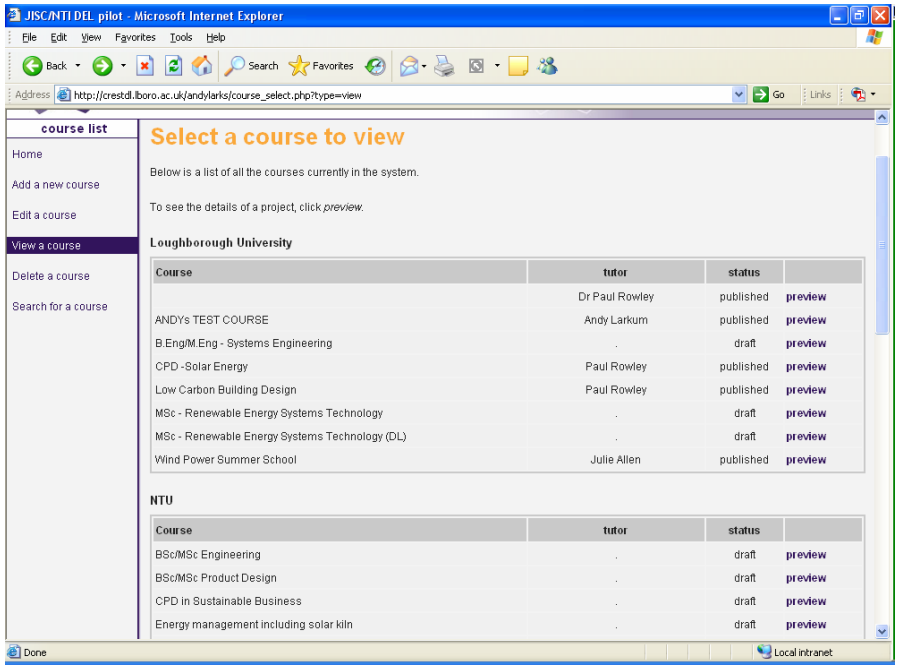
Course descriptor		Descriptor selection options	Test evaluation comments
1	Course title	Free text input	
2	Course code (if known)	Free text input	
3	Course description (100 words max)	Free text input	
4	Keywords	Free text input	Current keyword search via course title and description - should include additional user selection options (cost, location etc)
5	Relevant to which business drivers?	Multi-option select from: Reduce my waste and disposal costs Get smaller energy bills Create a "greener" customer perception of my company Make sure I comply with environmental regulations Learn about renewable energy Learn about energy efficiency	Drivers were defined via needs analysis with sample SMEs in target sectors for this project. Future applications for other sectors and groups will require evaluation of specific 'driver' sets.
6	Relevant business sector(s)	Multi-option select from 20+ business sectors	This needs more consideration – the temptation for the user is to tick 'all' which defeats the purpose of providing SMEs with guidance on relevant courses.
7	Relevant business size(s)	Select one from: 0-9; 10-49; 50-99; 100-249; 250+; ALL	As above. Both 6 & 7 provide useful market research data.
8	Learning outcomes	Up to 10 free text input outcomes permitted per course	Works best at module level – very difficult to succinctly describe learning outcomes for e.g. a 4/5 year programme
9	Cost (£)	Free text input	Currently only one price input permitted. Need additional options for e.g. home/overseas fees, unemployed rates etc.

10	Accreditation/qualification gained	Select one from: HNC/HND; Professional Institution (cpd); Bachelor degree; Masters degree; PhD; None	
11	No self guided learning hours	Free text input	Guidance required on definition of "self-guided" vs. "contact".
12	No. contact hours	Free text input	As above
13	Total learning hours	Calculated from 11 & 12	
14	Delivery format	Select one from: Distance learning; Full-time; Lectures; On-line learning; Part-time; Site visits; Tutorials	This has proved to be problematic – next version needs this category to be split into more logical category groups.
15	Entry qualification	Select one from: None; GCSE/NVQ/C&G; GCE/HND/HNC; BSc/BA/BEng; Masters	
16	Dates of delivery	Select from drop down	Could include calendar function
17	Duration	Select one from: 1 day; 2 days; 1 week; 2 weeks; 1 month; 3 months; 1 year; 2 years; 3 years; 5 years	Some obvious missing values need adding.
18	Is this course assessed?	If yes, multi-option select from: Unseen multiple-choice tests; Open-book written examination; Closed-book written examination; Computer-aided assessments; Design studies; Essays and reports; Laboratory logbooks; Laboratory formal reports; Project reports and/or papers; Project logbooks; Oral presentations; Visual presentations	Too many categories – assessment at this level of detail is often not defined or known (especially if inputted by an administrator) – reduce to 4 generic categories.
19	IPR	Select one from: LU, NTU, UCN, Tresham, DMU, BMC	
20	Learning & teaching resources	Multi-option select from: Powerpoint presentations, Study/lecture notes, Case studies, Multi-media resources, Past exam papers, Worked examples, Practice question sets, Text book(s), Web-based complete course, Other.	As for 18 – often not known or changes rapidly – reduce to generic categories

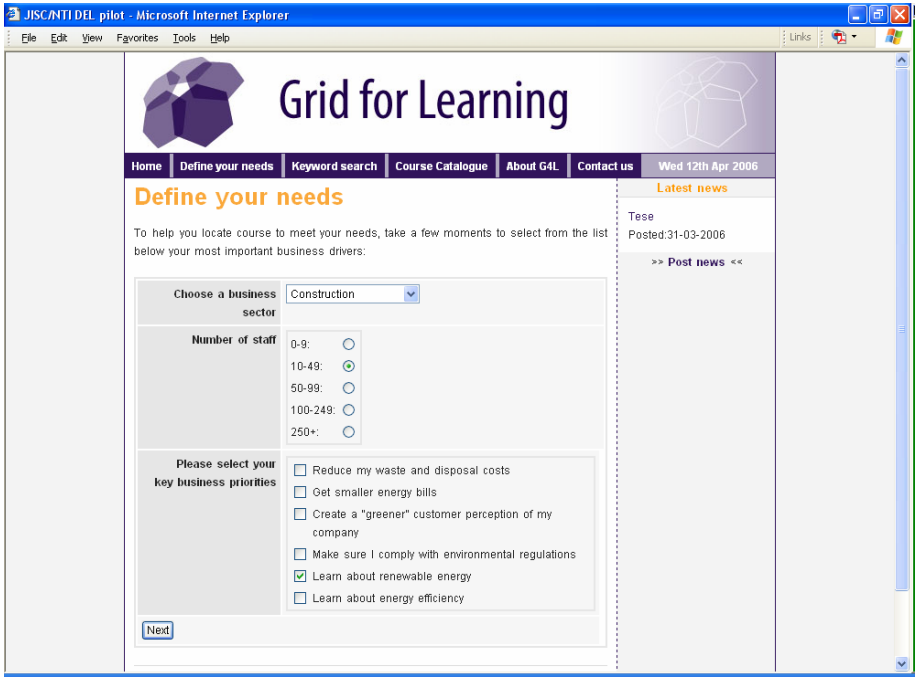
21	Learner's ICT access & skills required.	Multi-option select from: Equipment: Access to a PC, preferably running Windows 2000 or above; Minimum 200 MHz Pentium Processor and 64 MB of RAM; Access to the WWW; E-mail programme and account; Broadband connection; CDROM drive; DVDROm drive. Skills: Open, copy, and move files and directories on your hard drive; Copy and paste text from one application to another; Move around the desktop with several applications (programmes) opened at the same time; Create documents using a software package such as MS Word or similar.	An important descriptor category, but too prescriptive and in-depth for the purposes of this tool. Needs to be reduced to generic categories for both equipment and skills.
22	Location details	Taught at: Select one from LU, NTU, UCN, Tresham, DMU, BMC Building/Room number: Free text input Upload location map: Select file from local drive via Explorer.	Needs additional option to input location map URL (eg Streetmap, Multimap etc.)
23	Lead tutor contact details	Free text input for: Name; Telelephone; Email	
24	Additional course details (URL)	Free text input	
25	Course taster (URL)	Free text input	
26	Screen shot	Select graphic file from local drive via Explorer	Graphic size needs to be forced to fit allotted area for screen shot.
27	Enrolment details (URL)	Free text input	
28	Related courses (if any)	Multi-option select from all other courses currently published in database.	
29	Is this course ready to publish?	Select one from: Yes; no.	

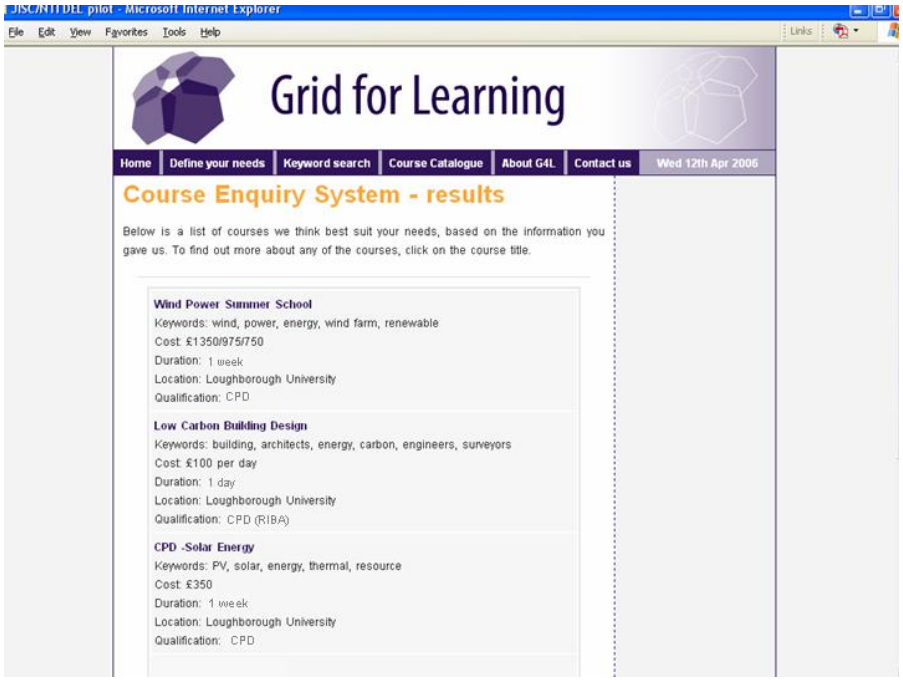
Appendix 3: CIS and CARP interfaces



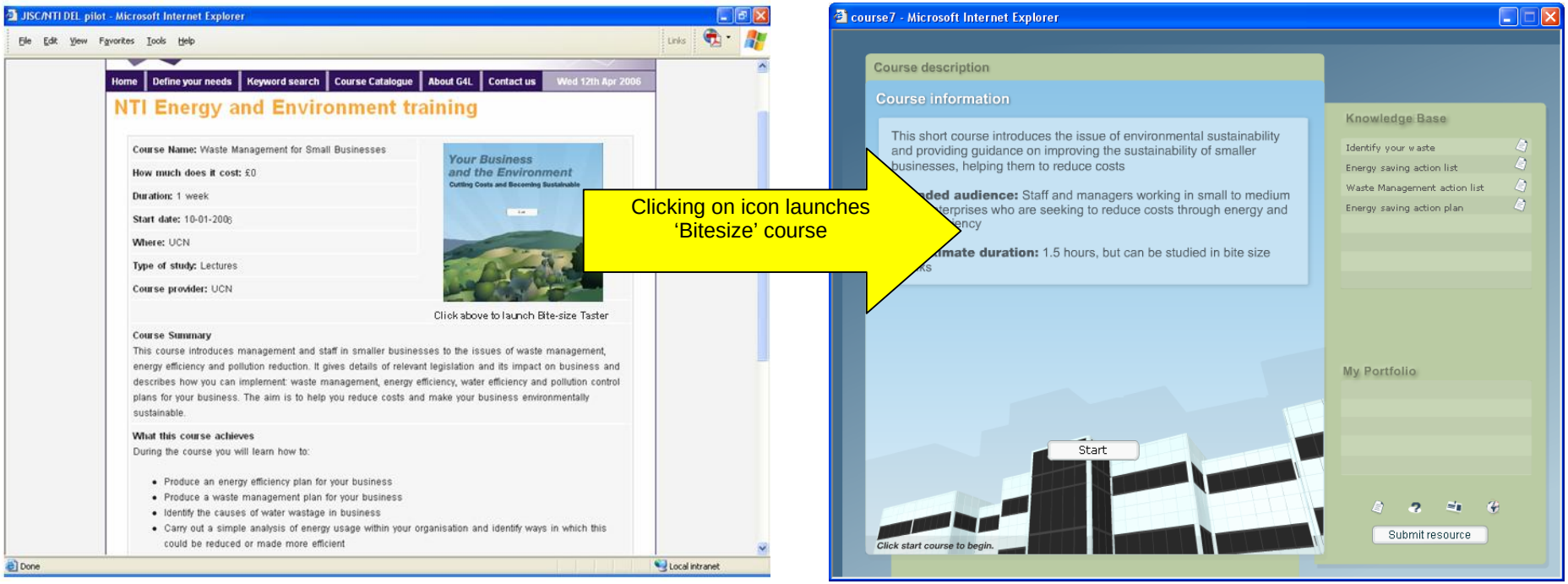


Figs 1& 2: Detail of CIS administrator/curriculum developers' interface: (i) Course descriptor input and (ii) Course listing screens.

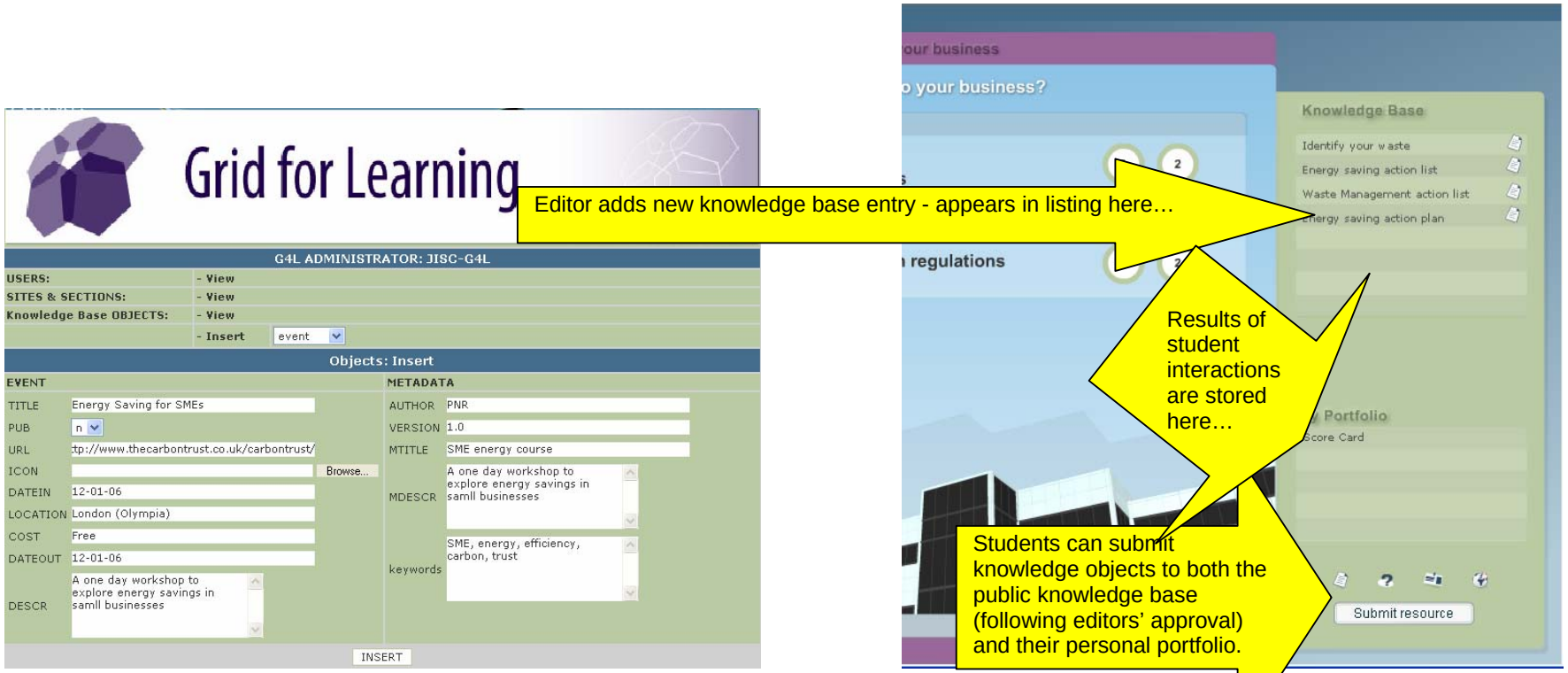




Figs 3 & 4: Detail of CIS learners' interface: (i) Defining training needs (ii) Relevant course listing screens.



Figs 5 & 6: Detail of CIS learners' interface: (i) Course detail interface and (ii) Launched Bitesize interface.



Figs 7 & 8: Detail of content packaging interface: (i) Editor/administrator's interface (object input detail included) and (ii) resulting learners' interface.