A learning design methodology to foster and support creativity in design

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Abstract

This paper describes a project that is exploring the development of a learning design methodology. It describes work to date (user consultations, workshops, interviews and resource/tool development) and in particular iterative development of a prototype learning design system, CompendiumLD, to help designers/teachers create and share learning activities. Our goal is to build on recent research on learning design to develop a methodology that provides support to the course design process with an emphasis on the use of technology-enhanced learning. This includes elicitation of current practice in design, identification of relevant resources and development of a prototype learning design tool. We believe it will be of interest and use to individual teachers and course teams, but also others involved in the design process tasked with helping course teams translate their ideas into technical solutions.

Keywords

Learning design, methodology, learning activities, Compendium

Introduction

It is now more than fifteen years since the Internet began to have an impact on education. We now have a wealth of research literature on the myriad of ways in which teachers have experimented with different technologies to support learning. A constellation of interconnected practices have explored different avenues of interest – the promotion of socio-constructivist ideals, the generation of environments to support problem-based or role playing scenarios, the fostering of computer-mediated communication and different types of online communities. There have been fads and fashions in terms of which technologies are "in" or out (MUDs and MOOs, video conferencing, social networking tools, virtual worlds), as well as shifting trends in terms of the pedagogical focus and forms of research methodology (behaviourist programmes, tailoring of learner environments according to learning styles, embedding of dialogic or constructivist principles). The networked learning community has been a steady rock throughout this period – building on a core collective theoretical stance, exploring the potential of the different forms of networked learning, including the seminal work on understanding CMC, particularly through the numerous studies on asynchronous communications. In addition the networked learning community has developed an associated set of methodological approaches, which are now being applied in e-learning and technology-enhanced learning more broadly.

Despite this there is a gap between the potential of technologies to support learning and the reality of how they are actually used, due in part to a lack of understanding of how technologies can be used to afford specific learning advantages, as well as a lack of appropriate guidance for design. Given the length of time the Internet and associated technologies have now being available and the sheer volume of development and research investment (both in quantitative funding terms and man hours) it is surprisingly that technologies have not had a greater impact. Certainly at a strategic level most institutions do now recognised the central importance of technologies. This is reflected in the way in which institutional structures and roles have changed in the last decade or so – with the emergence of dedicated technology-related support roles and units. It is also evident in institutional policy and strategy and the now almost universal availability of VLEs to support learning. At ground level there is a significant community of practitioners and researchers with an interest in exploring the potential of technologies, of trying out new innovations and evaluating their impact. However, in relative terms the numbers are small; it could be argued that the majority of teachers have not fundamentally changed their practice, that the majority of use of technologies is fairly mundane (such as use of VLEs as content repositories and email for

administrative announcements). This lack of uptake has been the foster of numerous evaluations and its causes are complex and due to a range of inter-connected issues: technological (immature tools, lack of interoperability etc.), organisational (barriers and enablers to uptake, cultural barriers) as well as pedagogical issues. However in this paper we focus on an attempt to address one particular aspect of this – how to support teachers to be creative and innovative in their use of technologies and in particular on what is needed to address individual skills gaps, as well as getting them to think differently.

Support staff in creative use of technologies

Numerous attempts have be made to address the gap between potential and actual use of technologies, with varying degrees of success. Setting up of a suite of staff development activities and workshops is a common approach – such as hands-on workshops giving staff experience of using new tools or sessions which focus more on the pedagogical benefits and possibilities. Most institutions have support structures in place, which provide these kinds of services (both through institutional units tasked with professional development and support in-situ through faculty activities. At a national level, there are complementary activities, such as the work carried out by the HE Academy LTSNs and the Centres of Excellent for Teaching and Learning (CETLs) in the UK. Online 'how to' guides, work-through tutorials and one-stop shops are prevalent, and there are now a plethora of repositories of good practice and case studies of the use of technologies which are intended as a point of contact where people can get new ideas and practice tips on how to effectively use technologies in their teaching. Despite this, as outlined above, evaluation of the effectiveness of much of these excellent resources and support mechanisms is sceptical of their value and impact; actual practice does not radically change.

In recent years there has been a increasing interest in adopting a designing for learning approach to tackling some of these issues and in supporting staff in terms of thinking creativity about using technologies in their teaching. This work takes a broad view of designing for learning, which is trying to understand and express the design process in such a way that is meaningful and useful to teachers. Work includes mechanisms to represent examples of how others have designed and created learning activities through textual and visual representations, collation of resources on learning design and different ways of thinking about the design process, frameworks and taxonomies for thinking about learning activities – what they constitute and what aspects of learning they support, through to online learning design toolkits which take the user through a structured step by step process of designing a learning activity.

The OU learning design project

Our prior work in this area and our understanding of the research literature has led us to conclude that there is no one, simple, way to change practice, and neither is there a magic bullet resource or tool to provide designers with the information they need to use technologies in pedagogical effective and innovative ways in their teaching. Therefore a core aspect of the project is that we are developing a learning design methodology. By learning design methodology we mean a set of processes and practices, derived from empirical evidence, which can be used to facilitate and support the design of learning activities. Our approach to the development of a learning design methodology is characterised by four overarching principles. Firstly, articulation of a formal means of describing activities, secondly, facilitation of the reuse of learning activities, thirdly, identification of appropriate scaffolds to support the design process and mechanisms for deploying these through appropriate channels (which might include staff development guidelines, LD workshops or integrated help within an adaptive LD tool) and fourthly development of a shared language and set of representations for learning activities so that individuals or small teams can discuss and share ideas or interrogate repositories of good practice and case studies. We contend that the approach we are adopting offers an innovative and holistic approach to instigating learning design. Rather than focusing on specific staff development activities or the development of a 'learning design tool' we are adopting a multifaceted approach matching evolving user needs with an appropriate set of tools and resources. As we have argued previously (Conole et al., 2007, Conole, 2008a), we see this as important as design is a complex process. Our work focuses on two main overarching research questions: How can we i) gather and represent practice (capture and represent practice) and ii) provide 'scaffolds' or support for staff in creating learning activities which draw on good practice, making effective use of tools and pedagogies (support learning design)?

A key aspiration is to provide effective support for learning design, which enhances the quality, efficiency and innovation of learning activities created and which encourages designers/teachers to included creative and pedagogically effective ways of using new technologies. Our methodology is also about developing a shared vocabulary, which can be used as a basic for communicating and sharing understanding amongst designers/teachers and between designers/teachers and others involved in the learning development and support process. We have identified seven main reasons why adopting a learning design approach is beneficial (Conole et al., 2007):

1. It can act as a means of eliciting designs from academics in a format that can be tested and reviewed with developers, i.e. a common vocabulary and understanding of learning activities.
2. It provides a means by which designs can be reused, as opposed to just sharing content.
3. It can guide individuals through the process of creating new learning activities.
4. It facilitates reflection by the designer, by making the process more explicit
5. It creates an audit trail of academic design decisions.
6. It can highlight policy implications for staff development, resource allocation, quality, etc.
7. It aids learners in complex activities by guiding them through the activity sequence.

Iterative design and development

The project has two main phases: (September 2006-August 2007) and (September 2007-ongoing). Table One lists key activities, many of these occur in parallel and are interconnected in a number of ways, none the less it is useful to illustrate the project work in this way. The ultimate aim is to gain a better understanding of the design process and to collate a Learning Design toolbox of useful resources and tools. This will include the learning design tool we are developing, CompendiumLD, along with external LD tools and a brief explanation of their key strengths. In addition, other LD resources and repositories of case studies and existing learning activities will be made available. Finally, the toolbox will include guidelines and workshop outlines for those wanted to provide a support role.

Activities	Phase		Outputs and progress
	1	2	
Gathering user requirements			Initial understanding of user needs
Capturing existing learning activities through case studies			43 case studies written up and web site produced, categorised by type of activity, tools and discipline, barriers and enablers and key themes identified
Understanding and representing the design process			Range of representations identified, key benefits of each articulated, activity focused, process schema chosen as a primary visual metaphor
Development of a learning design tool			Adaptation of Compendium – CompendiumLD. This includes production of LD icon set and LD process templates, inclusion of adaptive, context sensitive help
Testing and evaluation through focus groups and workshops			Ongoing programme of workshops and focus groups presenting the current toolbox of resources and support. 8 faculty workshop and 1 external workshop run in phase 1.
Identification and collation of learning design resources			External repositories of learning objects and case studies collated, identification of and evaluation of the strength of external tools and resources for learning design.
Interviewing teachers about their approaches to design			15 interviews conducted, data being analysis and themes identified. Will provided empirical evidence of current practice and a better understanding of the design process
In-depth course team evaluation			A new course in educational technology which started being developed in Sept. 07 is being followed in detail as the course progresses to identify all the different stages and ways in which design occurs. Another in Science is currently being negotiated

Iterative reflection and adaptation in the light of feedback and evaluation			Feedback and evaluation is continually shaping the ongoing development activities of the project – from the technical development of CompendiumLD, identification of external resources and tools for inclusion in the overall toolbox, and creation of support materials and workshop formats.

Gathering user requirements

During 2007, an institution wide user consultation on learning design requirements was undertaken (Nixon, 2007). This consultation demonstrated that the design was complex; elicitation of requirements for tools users are familiar with is very different from trying to define a tool which is essential modelling a new and different way of doing things. It was evident that teachers design processes are very much embedded in their practice and prior experience and are fundamentally tacit in nature, whereas a LD tool would require them to adopt a more formal LD methodology to the design process. Nixon highlighted a number of things about design, which emerged from this user consultation. The first concerns the issue raised above about the difficulty of developing a formal LD specification; namely that learning design does not appear to fit well with current approaches to course design and production. The adoption of learning design would require a significant change in working practice. Cultural change of this nature is likely to be a bigger challenge than implementing the technology. Secondly the value of adopting a learning design approach appeared to be different for different people, some suggested it might provide a means of ensuring consistent tutor support, others saw it as an opportunity to empower tutors, most recognized the value of making designs more explicit so that they could be shared and potentially repurposed by others.

Capturing existing learning activities through case studies

The second area of activity in phase one was an audit of existing practice. 43 learning activity case studies from across the university captured through in-depth interviews with course leaders (Wilson, 2007). The focus was on the pedagogies used to achieve specific learning outcomes and the use of tools (blogs, wikis, e-assessment, *etc.*) to support learning activities. Interviews were semi-structured around four core themes: contextual data (level, subject, *etc.*), details about the learning activity being described and the sub-tasks involved, pedagogical approaches adopted, and barriers and enablers to the creation of the activity (both technical and organisational). Each interview lasted *ca.* one hour and was recorded and transcribed. Following this, the text was edited using a standard template and diagrammatic representation of the learning activity drawn. This content was checked for accuracy with the interviewee. The findings from the case studies complemented the parallel work being done gathering user requirements. Firstly, that design was tacit – teachers relied extensively on their prior experience and local context for development, there was little evidence of explicit use of particular pedagogical framework, although good pedagogy was evidently embedding in many of them. Secondly, making design decisions was difficult given the rapidly changing technological environment. There were concerns about the constantly changing functionality offered by available technologies. This was particularly evident given that these case studies were capture in the midst of a large-scale institution wide implementation of a new VLE (Sclater, forthcoming). Jones (as reported in Jones and Conole, forthcoming) has undertaken an evaluation of the introduction of the VLE, which has indicated that the VLE is seen both as a technical development and a change management process. In terms of issues for design Jones and Conole argue that

> even amongst central staff closely involved with the VLE there is not a single shared conception of what the VLE is, nor of the aims of the OU VLE. Indeed from the interviews we would describe the OU VLE as a contested area with staff in distinct structural positions within the OU seeing the VLE and its aims differently. The key issue for design being that design has to be in relation to a moving target, one dependent on changes in the technical infrastructure and in the understanding of both the infrastructure itself and the aims and purposes associated with it.

Understanding and representing the design process

It was evident that a key issue to resolve was how learning activities be represented. We were informed by our previous work in this area. Conole (2008a) for example outlined a range of mediating artefacts for representing learning activities, ranging from context specific textual narratives such as case studies

through to more abstract visual representations and models. More recently Conole and Mulholland (2008) have taken this work forward, considering how these forms of representation are used both for design and narrative, where design focuses on the creation of a learning activity and narrative focuses on how the activity is seen by the end user/learner. As part of this we chose a visually based representation, which focussed in at the level of activity and represented the tasks, roles and associated assets involved in the activity. It provides a temporal sequence highlighting key aspects of the activity. Conole and Mulholland describe this type of representation as a 'process schema' as opposed to a more generic educational descriptive representation or a detailed technical specification.

Development of a learning design tool

The user consultations, case studies and our review of existing representations of design, indicated that any learning design tool developed needed to take account of the fact that the design process is messy, creative and multi-faceted, hence it needed to be flexible in how it could be used. We choose an existing mind mapping tool and argumentation tool, Compendium (developed in-house by our Knowledge Media Institute in association with Verizon.[1]), as an initial prototype design tools for a number of reasons. A review of existing learning design tools, indicated that whilst each had particular merits, none addressed our central philosophical principle that support for the design process needs to recognise the creative and messy nature of design and therefore needed to support and augment the design process that rather than straight-jacket it. Compendium was easy to use, had good support documentation, appeared to be flexible in how it could be used, and crucially it appeared to be relatively easy to adapt to accommodate learning design specific aspects.

Figure 1 provides a screenshot of Compendium, showing the generic set of icons on the far left-hand side, along with our initial learning design stencil set and the user workspace. Compendium comes with a predefined set of icons (question, answer, map, list, pros, cons, reference, notes, decision, and argumentation). The creation of a map is simple, users drag icons across and can start to build up relationships between these through connecting arrows. Each icon can have an associated name attached with more details contained inside the node, an asterisk appears next to the icon and if the user hovers their mouse over this the content inside the node is revealed. Other types of electronic files can also be easily incorporated into the map such as image files, Word files or PowerPoint presentations. The reference node enables you to link directly to external websites. Icons can also be meta-tagged using either a pre-defined set of key words or through user generated terms. Maps can be exported in a variety of ways from simple diagrammatic jpeg files through to inter-linked web pages.
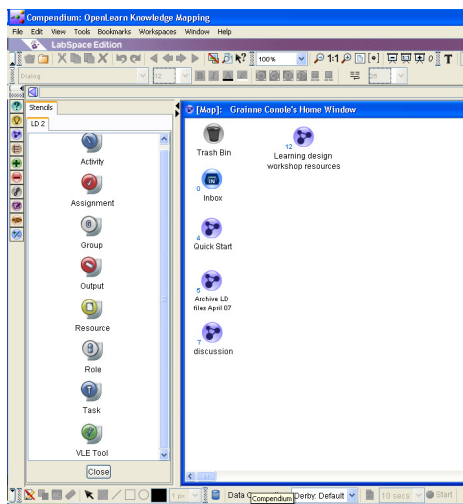

Figure 1: Screenshot of Compendium with the LD2 learning design stencil set of icons

The dedicated learning design icons, complement the generic set. We choose a simplified list of icons to represent key aspects of the design process (task, role, tool, resource, output, group, assignment, and activity). All of the learning design icons are of the same underlying Compendium node type, except for the activity icon, which is a variant of the generic map type. A core functionality of Compendium allows users to create, name and incorporate new sets of icons, called 'stencils', in to the list of available stencils (opened via the tool menu). As with the core Compendium icon stencil set, when dragged in to the map window, users are able to re-label the caption text beneath the icons to something more appropriate and descriptive to their context.

Testing and evaluation through focus groups and workshops

Eight faculty-based OU workshops were run using the improved learning design-focused Compendium tool and associated resources. The workshops included an introduction to the concept of learning design and a series of exercises getting participants to reflect on their current strategies for design. The second part included a hands-on session where users worked in groups to represent their own learning activities in Compendium. A comparable workshop was also run at the University of Porto. Additional feedback was obtained on use of the tool by members of the LD team working with individuals across the faculties and externally at conference to map up interesting learning activities in Compendium. An example of a learning activity by Bernd Ruchscoff, collected during EUROCALL 2007, is showed in Figure 2. In the workshops, participants adapted the column-based role and asset structure we presented to suit their own needs; importantly the flexibility of Compendium as a tool did not appear to unduly stifle their creativity. We were surprised at how far the participants got in representing their designs and it did seem that Compendium acted as a useful tool to help them articulate and share their thought processes. Overall evaluation was positive and users felt that the tool helped make the design process more explicit.
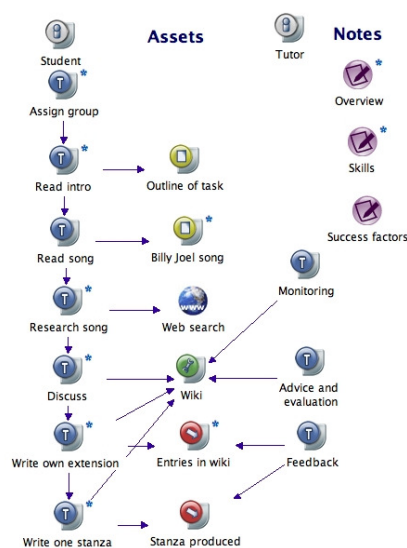

Figure 2: Analysis of a popsong using a wiki

Identification and collation of learning design resources

An ongoing activity is the identification of external resources and other LD tools, which can be included in the LD toolbox. Beetham and Sharpe (2007) and Lockyer et al. (forthcoming) provide a valuable overview of current learning design activities, and associated tools and resources. An outline of tools and resources we are evaluating is discussed in more detail elsewhere (Conole, 2008b) but include a number of learning design tools currently being produced as part of the JISC design for learning programme (http://www.jisc.ac.uk/elp_designlearn.html) as well as international repositories of good practice. We are also interested in collating approaches to design and different ways of thinking about the design process. For example the 8LEM model (Leclercq, D. and Poumay, M., 2005) encourages the designer to think about the types of activity a learner might do; categorising these into 8 types (creates, explores, practices, imitates, received, debates, experiments, meta-learns). In contrast, Warburton (2007) provides a mapping of tools against three dimensions of use (passive-active, isolated-social and formal-informal).

Interviewing teachers about their approaches to design

We are currently conducting a series of interviews with teachers. The focus is specifically on the design process rather than the nature of activities, which was the focus of the first round of institutional case studies. We wanted to gather views on how people design their courses and what approaches, strategies and help they use. In addition we wanted to gather views on what additional support they would find helpful - in terms of support material, workshops or interactive design tools. Our semi-structured interviews are designed to ask a series of questions about learning design, both as an individual and collective process, and focus on five main areas: process, support, representation, barriers, and evaluation.

In-depth course team evaluation

To complement the interviews, we also wanted to conduct more in-depth evaluations by following a course team over a period of time in order to elicit how they design and the dynamics of the process. As part of this we have started working with a course team designing a new masters-level course. Initial work with this team is encouraging and we are gaining a lot of in-depth detail on the holistic nature of the design process, how it works across team members, over time and how it oscillates between different levels of granularity. A snap shot of the outcomes of an early course brainstorm, illustrating the wide ranging and interconnected set of issues discussed in the meeting, is provided in Figure 3. We are also exploring the possibly of working with a second course team, based in the Science faculty.
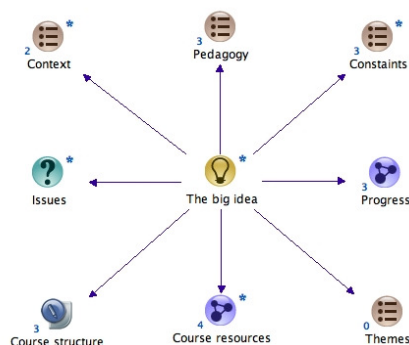

Figure 3: Mind-map of issues raised in an early meeting of the Course. Created in Compendium

Iterative reflection and adaptation in the light of feedback and evaluation

Currently our tool and resource development is focusing on adapting Compendium to include tailored and contextual help at various points in the design process. Several other features have been added to the functionality of Compendium to create the CompendiumLD version, for example the type of each node created by a designer using the LD stencil set is registered by the application, which enables features to facilitate the design process, and to support in the design process. In terms of facilitation, the designer is prompted to select a sub-type for a role or VLE tool node as they drag and drop it onto an activity design. The sub-types available to be chosen for the tool nodes are: blog, chat, e-portfolio, forum, instant messaging, podcast, simulation, virtual world, wiki, student, group of students and tutor for a role node. In terms of support, CompendiumLD offers context-sensitive help to the designer. For example, as the designer types into a task description label, the words typed are scanned and help related to selected verbs (e.g. collaborate, consider. discuss, reflect etc.) pops up. For example if the designer types 'Debate' into the task label: this prompts the application to pop up a window showing tools to support debating and existing activities that include tasks which include the word 'debate'. The set of tools shown in this help window are selected using a verb-to-tool look-up table; the set of activities is generated by searching the database maintained by Compendium for activities including tasks with 'debate' in their label. Further help is provided by the 'About..' buttons'. These buttons initiate a customised Google search of selected web sites. The web sites were chosen because of the quantity and quality of the information they provide about use of tools in learning and include sites such as http://www.learningdesigns.uow.edu.au/ and http://www.educause.edu/.

Conclusions

We are continuing to develop CompendiumLD and collate relevant resources for the overall LD toolbox. We are planning to run a series of focus groups and workshops during 2008 to present progress and elicit feedback. We will use these, in conjunction with our analysis of the interviews and in-depth course evaluations, to gain a bettern understanding of the design progress and to take the work forward. Work in this area is challenging and in our research field at the moment it is imperative to find a means of addressing our two overarching questions: 'How can we gather and represent practice' and 'How can we provide 'scaffolds' or support for staff in creating learning activities which draw on good practice, making effective use of tools and pedagogies (support learning design)? In this paper we have described the approach we are adopting, which we argue is pragmatic, grounded in the best in current research in learning design, and coupled with our knowledge and understanding of practitioner needs. We argue that a holistic and interactive approach provides a more realistic and feasible means of moving towards some means of providing a solution to these questions.

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