

Flexible, Structured Support for the Reuse of Online Learning Objects

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ABSTRACT

This paper outlines the development of a digitised tool for the repurposing of online resources for further and higher education. A digitised “learner guide template” that supports the semi-structured use of online educational resources was developed and then trialled by further education tutors. The findings of the trialling are presented here. The implications for the further development of the tool is discussed along with the insights gained into the pedagogical requirements of the learner guide template.

Keywords

Learner guide template, pedagogy, further education, online learning, development

INTRODUCTION

One challenge faced by both the higher and further education teaching communities is that of identifying ways of delivering high quality content to learners. A second challenge is that of delivering that content in a flexible manner (Sturman and Postle, 2003). A ‘learning object’ is a digital resource that can be reused for education (Wiley, 2000), and which can be categorised using metadata (Watson, 2001) and reused. Dalziel (2003) defines it as “an aggregation of one or more digital assets, incorporating metadata, which represents an educationally meaningful stand-alone unit”. Sosteric and Hesemeier (2002) point out that “although many digital objects *could* be construed as learning objects, not all digital files are learning objects ... other objects may or may not become learning objects, as *pedagogical intent* is required for that to happen.” The pedagogical intent that lies behind the use of a learning object is important, as the intent points to the “context” in which the learning object might most appropriately be used. This context in the broad sense, is reflected in the learning object’s associated metadata. It is this metadata that ultimately makes a resource reusable. However, the reuse of learning objects is not only supported through metadata; it is also enabled by the development of particular frameworks that facilitate the *structured yet flexible* use of those learning objects. The learner guide template is a tool that aims to provide such a framework.

Supporting the reuse of learning objects

Since its early days, the world wide web has had a tradition of *access to content*, fostered largely by the majority of sites being free. However, with this freedom of access comes the need to *constrain* and *guide* the activities of learners, to ensure they maximise their use of online resources.

Supporting flexible learning designs

Whilst tutors might be expert in designing lessons using offline resources such as reference books that have been written specifically with their teaching purpose in mind, the (re)use of online resources presents a new set of challenges. Often a resource that is discovered was not originally developed with the education of students as its aim, indeed it may be a serendipitous by-product. The task then for the tutor is to use the resource appropriately, by recontextualising it within an appropriate form of instructional design.

Three key requirements of any tool that aims to support further education teaching are that they support task-focused activities, that they assist in the delivery of specific learning outcomes and that they support reusable content (Ramsay et al, 2003). The development of the digitised learner guide template aims to meet these requirements.

Designing learning

The learner guide template aims to enhance both the tutor's teaching experience through the provision of a tool that helps them maximise their use of online learning objects and also to enhance the student's learning experience by increasing their control over the time, context, and pace of learning. Generally, a learning design specifies the way(s) in which both tutor and learner engage in activities, using specific resources, to promote student learning, sometimes to a pre-specified "learning outcome". Given that process is as important as content within learning design, the design of the online template sought to furnish tutors who wished to create a learner guide, with a framework that was sufficiently structured, but which nevertheless afforded them flexibility to plan their lesson(s) as they desired.

To this end, the learner guide template was anchored by five generic constructs - instructions, aims, resources, tasks and assessments - that might feasibly be represented within a learning activity. Instructions include information about the form the learning episode will take and what the anticipated outcomes might be, resources refer to any supporting material required, such as special software or a calculator required in order to conduct the session and any online learning resources that will need to be accessed. Tasks refer to any tasks or activities related to the learning resource that the learner might be encouraged to do and assessments include any assessment the tutor might deem appropriate. Additionally, tutors were provided with the optional facility to classify newly generated pages as "instructions", "task", "review" or "assessment".

Each page of the new learner guide template contained brief user instructions either on the screen, if appropriate, or within the help section, which could be accessed from each screen in the template by clicking on the ? icon. As the author created the guide, that same guide could be "previewed" locally, from within each page, allowing the user to view the guide as their students would see it, and amend it accordingly. The tutor was able to classify the guide's pages as they wished, to order them as they wished, to make the guide as brief or as lengthy as they wished, and to include those resources they wished. Good practice would suggest that to keep learning effective and aid student retention and motivation the tasks should be achieved within 15- 20 minutes, therefore different outcomes would be delivered by separate Learner Guides.

Structured support for learning

The learner guide template evolved from a paper-based Word document containing section headings. The original 'learner guides' - created as the output of having used the template - were paper-based Word documents, created by subject specialists. Each learner guide contained one learning outcome that students typically found challenging. The learner guide would refer the student to a web-based resource that covered that learning outcome in an appropriate way. The learner guide would then contextualise that learning resource within a relevant series of short learning tasks.

Scoping the learner guide template

Two new digital instances of the learner guide template were developed. The first new version, an interactive online template, using active server pages, was designed to allow the storage of multiple-choice answers to questions that the tutor might decide to include in a learner guide. This template had the facility for adding text, graphics, instructions, multiple-choice and rating-scale questions. A second (xml) version of the template was also developed for use within a learning management system (LMS). This second version was identical in every way to the first one, except that there was no facility to include multiple-choice and rating-scale questions. The design of both versions of the online template incorporated Hartley's (1998) observations that learning instructions should be well-organised, clearly structured and that attention should be paid to the perceptual features of the tasks. These principles were consistent with the principles of user-centred systems design (Norman, 1986, Preece et al, 1994)) used by the development team.

PROCEDURE FOR DEVELOPMENT

The templates, both the fully interactive and the simpler version, were made visible to the research team via a private URL during the course of their development. The fully interactive version was developed first, as this template contained the superset of functionality (the simpler xml template's functionality was a subset of the full template). "Walkthroughs" of the learner guide template were conducted (Bias, 1994), as each member of the team attempting to create a learner guide. The usage experiences, opinions, feedback and suggestions of each project member was collated and subsequent design modifications negotiated with the designer. Once stabilised, the template was trialled by "real world" FE tutors. Rapid prototyping allowed the template's design to incorporate the tutors' needs to as great an extent as possible, from as early a point as possible during development.

METHOD AND PARTICIPANTS

A representative group of 16 FE tutors (8 female, 8 male) took part in the trialling of the learner guide template. Their subject and core skill specialities included, amongst others, Travel and Tourism, Learning Difficulties, Hospitality and Working with Others. All of the tutors were formally contracted to SFEU, with the remit of using the new learner guide template to create at least one new online learner guide each. Either lecturers or senior lecturers, their years of subject experience ranged from 6 to 26 years. When asked during the screening process whether they felt comfortable with "learning technologies", 4 rated themselves as uncomfortable, 5 said they were neither uncomfortable nor comfortable and 7 said that they were comfortable.

An advert announcing short secondment contracts was sent to further education college principals, college human resource departments and to their staff development officers. The advert also appeared on the SFEU and Scot-FE-ICT website. Individuals were then interviewed by the SFEU project partners. The selected individuals had a range of information technology (IT) ability and covered a range of subject, core skill and special needs domains.

Following interviewing and subsequent engagement, each secondee attended a half-day induction workshop. At these workshops the concept of the learner guide was introduced and the development of the digitised learner guide template was outlined. Secondees were introduced to the work plan and schedule and were invited to ask questions. Sixteen secondees used the learner guide template to create a (minimum of one) new learner guide for their own subject or core skill area. Secondees created their new learner guides in the environment(s) where they would routinely create them. For 11 secondees this meant creating them at home on their private PC. Four created them at their place of work, usually at a shared PC in a staffroom. One tutor prepared their learner guide at SFEU's offices. This form of "contextual enquiry" (Beyer and Holtzblatt, 1998) allowed the gathering of as accurate an insight as possible into the performance of the new templates. The learner guide that they created referenced relevant web resources that they had identified and evaluated as being appropriate, in a previous website review exercise. A total of 16 secondees created a total of 22 learner guides (range 1-6 learner guides).

User instruction

The URL of the prototype learner guide template was released to secondees, together with a minimal manual (Carroll et al, 1987; van der Meij and Carroll, (1995)) - a practical guide that assisted the user in using the various features of the online template.

Experience diaries

To allow naturalistic data capture, each contractee was asked to record their usage experiences in an "experience diary" (Rieman, 1993). Participants were invited to make a diary entry if something happened that they did not expect or that they did not understand or if they would like to do something whilst using the template but were unable to. They recorded what happened, which screen they were using at the time, what they were doing at the time, what they expected to happen, why they think this happened, what they did to recover or get out of the situation, how serious they thought the event was and any further observations. Whilst using the template to create new learner guides, the secondees were also able to contact the researcher at all times if they got into difficulties or had further questions or comments. In the tradition of participatory design (Greenbaum and Kyng, 1991), participants were encouraged to take part in the design process by suggesting design changes in addition to reporting their experiences.

Usability rating-scales

After creating a learner guide, each tutor completed a rating-scale. The rating scale elicited, amongst other things, the respondent's opinion of how usable the template was, how relevant it was to their teaching needs, how confident they were that the template might support their teaching activities and the degree of control they felt when using the template. After having created their new learner guides, each individual was interviewed by telephone. The purpose of the interview was to elicit reflections on their experience of using the learner guide template to support their teaching activities, and to explore their attitude to future use of the template. Each interview lasted approximately thirty minutes and, although having a common agenda, they were semi-structured and open-ended. Each interview was recorded onto mini-disc, with the prior consent of the participant.

Telephone interviews

At the conclusion of the research, nine participants consented to taking part in semi-structured telephone interviews, with the aim of elucidating the degree to which the learner guide template supported their teaching needs. Seven key areas were explored in the course of the interviews: how suitable the template was for the individual's teaching needs, how appropriate the structure of the template was, how the template might be used in practice, whether it might be suitable for use with students who have learning difficulties or special needs, and benefits and concerns. Transcriptions of each interview were prepared and then collated by interview theme. The transcribed quotations were then inspected by the researcher and summarised by frequency and type of response.

RESULTS

Experience diaries: findings

The contents of diaries, emails and telephone conversations were collated and manually examined for evidence of the most commonly reported problems. The full catalogue of more than 200 reported usability issues, together with their respective resolutions is documented elsewhere.

Rating-scales: findings

Tutors were asked to rate each dimension on a four-point scale, where 1 represented the negative end of the spectrum and 4 represented the positive end of the spectrum. (1-2-3-4). The average rating for each dimension achieved, at the very least, the midpoint of 2.5 (n=11) save for the question "Were you able to do what you wanted to do when using the learner guide template?" which, with an average of 2.3, is below average. There was a significant amount of development work outstanding on the learner guide template, despite this, users trialling the template showed favourable responses. This may, however, be due to the volunteer effect i.e. those who applied for the secondments were possibly individuals who were forgiving of technology under development. Alternatively, their expectations of learning technologies might be low.

Pedagogical support: findings from the telephone interviews

The interviews were transcribed and inspected by the researcher, and the key findings summarised by frequency and type of response. The results appear in table 1.

Table 1 Key pedagogical insights (n = 9)

	Pedagogical insight	Percentage of respondents
1	The template is suitable for my (FE) teaching needs	100%
2	The structure of the template is appropriate	90%
3	The student can control when and how they learn	80%
4	The template can be used to create learner guides that extend current materials	70%
5	The template is suitable for using with students with learning difficulties	61%
6	The template can be used to create revision or reinforcement aids	50%
7	Time to create a guide is a concern. It takes much longer to check the online resource is appropriate to use, than to create the learner guide itself.	50%

These areas are explored in detail in the discussion section.

DISCUSSION

Overall, tutors' reactions to the learner guide template were positive, both with respect to the perceived ease of use and also with respect to the way in which it might support their teaching.

Overall suitability for teaching needs

Tutors provided a range of suggestions as to ways in which the learner guide template might fit with other tools, course materials and resources that they currently provide for their students. The suggestions ranged from "underpinning" knowledge, to revision, extension and homework activities. One lecturer stated that they would not use the learner guide template to assist their teaching of subject content e.g. the installation of non-metallic pipe-work, as it was felt that a very high level of time was required to transfer skilled knowledge to the students. However, they stated that the template would certainly complement the more "unmediated" direct teacher-student communication, by providing additional background information. Some thoughts on this theme from other tutors are included here.

Internal structure of the learner guide template

The structure within the learner guide template was well received overall, with only a few individuals finding it repetitive.

Time invested

The most frequently voiced concern from authors was the length of time it took them to create new learner guides, with estimates ranging from two hours to three days (with breaks) in one case. It is possible that it will take longer to create the first guide, as the tutor is simultaneously learning to use the template whilst thinking about how to use the template to maximise their students' own learning. It is worth observing, however, that anything that causes the tutor to reflect upon their teaching activities is ultimately beneficial to both tutor and student. The intention is that, with time, use of the template will become sufficiently 'transparent' to allow the author to focus solely upon supporting the learners' needs. A student whose learning needs is supported by means of a learner guide is not precluded from supplementing their learning through the type of social interaction that occurs either in the classroom, by observation of others (Bandura, 1977; 1986), or through the more direct application of knowledge (Lave and Wenger, 1991; Salomon, 1994). Indeed, the template was designed in such a way that it might feasibly support a range of scenarios from modular classroom-based teaching to self-organising study networks that amplify knowledge, to open, blended, distance learning, and embracing a range of learning approaches, from problem-based learning (Boud, 1985; Boud, and Feletti, 1997) to experiential learning (Kolb, 1984) to constructivist interaction (MacFarlane, 1997; Vygotsky, 1978) and cooperative group learning (Gillies and Ashman, 2003). The extent to which the template does indeed support these different pedagogical approaches will be considered more fully within future usage studies.

Support for all types of students

One of the key aims of the design of the learner guide template was that it not only reach the World Wide Web Consortium (WSC) accessibility standards, but that tutors deem it suitable for use with students with disabilities, special needs and learning difficulties. Designing a template to comply with accessibility standards does not mean that it will necessarily be *used* by tutors who need to design learning activities for disabled students. As Sturman and Postle (2003) comment, although there has been great emphasis recently upon the *delivery* of more flexible education, the development of such tools needs to go hand-in-hand with an understanding of the accompanying pedagogical requirements. Tutors' previous experiences in using the web to teach disabled students influences their opinion of how appropriate the template might be. Overall, over half of tutors commented that they would use the template to design learning sessions for disabled students as well as students without disabilities.

Likelihood of future use

Every tutor who trialled the learner guide template stated that they would use it for their own teaching activities in the future.

CONCLUSION

The findings from this first round of tutor engagement has revealed that although the learner guide template has been stabilised technically, is usable and broadly supports tutors' teaching needs, there remain important challenges ahead. Meeting these should pave the way for the learner guide template to become a commonly used tool for the repurposing of online learning materials.

Our initial round of development and trialling of the learner guide template has illustrated that the tool is relatively easily used, broadly supports users' pedagogical needs and has revealed indicators that the tool will be well received by the wider community. Next steps include its trialling by FE and HE lecturers for the production of learner guides to be used within their own teaching programmes, evaluation of that use and the development of guidelines for good practice.

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