

The challenge for static online resources: The future is dynamic

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More universities are providing online courses in response to demands for greater flexibility which consequently places pressure on learning support services, such as, academic skills centres, to follow suit. The increasing numbers of students are stretching the existing capacities of such centres to adequately address student learning needs in traditional ways, and therefore more flexible offerings through an e-learning environment are required. Nonetheless developing online resources and learning activities require significant development time, and it is not clear whether these resources are effective, since very little research examines what or how learning may be achieved. To explore this issue, this paper reviews the available literature on the topic with the aim of identifying ways to evaluate such resources, and considers the sustainability of pursuing static texts. The paper proposes combining knowledge of best practice with an evaluation research framework, and urges the design of more dynamic resources.

Keywords: online resources, effectiveness, pedagogical usability, evaluation framework

Context

Most universities have academic skills centres, often referred to as Academic Language and Learning (ALL) centres, with sites dedicated to providing academic skills information to students. The information typically applies to the development of writing, thinking, researching, and speaking skills in the sense of what is X and how to do X. The information may be packaged as downloadable documents, or presented as online tutorials, podcasts, or videos. Over the last five years, some sites have changed from being repositories for information to addressing student engagement through interactivity. Leslie-McCarthy and Tutty (2011) claim that ALL sites 'have a more complex context and broader scope than is the case for a course-based online learning site' (p. A-24) because of the different purposes and audiences. Their study of ALL sites in Australia revealed that the main purpose of such sites is to provide resources to students. Other purposes include an administrative function, a marketing function (telling people about the centre) and serving the needs of academics (Leslie-McCarthy & Tutty, 2011). As part of the same study, ALL practitioners were asked who used their sites, and two thirds of those surveyed did not know exactly. This highlights gaps in our knowledge about users. Other gaps exist, including a lack of information regarding the usefulness of resources for learning, and if students were able to find answers to their questions. Overall then, it appears that resources are developed for a broad student cohort without clear evidence regarding effectiveness.

Typically, the effectiveness of learning within a particular course is measured by student performance. However, this is not a measure for evaluating the learning effectiveness of material on ALL sites, mainly because of the general nature of the material. In contrast, a course has a set of learning outcomes, and assessments which measure the success in achieving those outcomes. Other factors, such as, student motivation in learning content and improving performance for a course are very different from the motivation in accessing ALL sites for generic skills assistance. Nonetheless, as some library studies have shown, it is possible to evaluate resources through surveys, focus groups and interviews (Blummer & Kritskaya, 2009). University libraries have sites similar to ALL sites in that there are generic resources provided for skill development, and much effort is required in creating the resources. Other information is available that could help guide the creation of resources for online consumption that include the concepts of usability (does it function as it is supposed to?), and evaluation guided by good teaching principles in higher education (Ramsden, 2003). It is possible that since these methods require resourcing, little evaluation of ALL resources has occurred. However, without evaluation, there is no knowledge about their effectiveness.

Literature review

Reviewing the literature reveals a complexity in terminology and approaches to evaluating the pedagogical effectiveness of online sites. This is due to the changing nature of the area, the diverse range of disciplines and backgrounds, and therefore the different interpretations of researchers. The intersection of a number of disciplines has resulted in the development of a variety of e-learning frameworks incorporating website

usability, human-computer interaction, instructional design and pedagogy each with different emphases, interpretations and methodologies. As an example, the various terms for online resources include: digital learning material, web-based learning tools/resources/materials, and learning objects. It is also the name of the environment to which they relate that varies, sometimes called online learning environment, e-learning, web learning, communication and information technologies, virtual learning environment, technology-based learning. Sometimes an online resource is also a learning system. Following Phillips, McNaught and Kennedy (2012), the term e-learning is used here which Littlejohn and Pegler (2007, p. 15) define as 'the process of learning and teaching with computers and other associated technologies, particularly through the use of the Internet'.

In higher education, courses are often evaluated using student performance and peer review, while websites are typically evaluated through usability studies. For an e-learning site, these evaluation types are combined, which has given rise to the term pedagogical usability. 'Pedagogical usability is used to denote whether the tools, content, interface and tasks of the online environment support learners to learn in various learning contexts according to selected pedagogical objectives' (Cuturic 2011, p. 26). Pedagogical usability developed by Nokelainen (2006, cited in Hadjerrouit, 2010) expanded usability to account for learning and usefulness of educational software. Using a set of ten criteria, this expanded on the traditional concept of website usability which has focused more on technical and navigational elements as highlighted by usability expert, Jakob Nielsen, among others. The aim of conventional usability is to reduce any potential for increased cognitive load when using software without diverting attention unnecessarily. Cognitive load is minimized when there is consistency, small number of user actions, minimal memory load, and reduction of complexity (Hadjerrouit, 2010). Hadjerrouit (2010) further expanded the criteria for pedagogical usability. A number of other approaches using the term pedagogical usability include Muir, Shield, and Kukulaska-Hulme (2003), with two different approaches reviewed in Zaharias and Koutsabasis (2012), and others mentioned in Jeffels (2011).

For the novice, the field can be confusing, particularly since little information is given about the type of research or disciplinary approach. Citing Conole and Oliver (2007) and Friesen (2007), Phillips, McNaught and Kennedy (2012) classify e-learning research into four types: pedagogical, organisational, technical and socio-cultural acknowledging that there are overlaps of the types. From this perspective, pedagogical usability combines both technical and pedagogical aspects, but to evaluate the effectiveness of resources, the emphasis may be better placed on pedagogy. This is indeed the emphasis in the framework proposed by Phillips, McNaught and Kennedy (2012) which consists of the learning environment (including curriculum design, the learning design and the design of any e-learning artefact, such as, a learning management system, computer games or a single learning activity), learning processes (the ways or how learning may occur), and learning outcomes. Their framework, also known as LEPO, is concerned mainly with pedagogy taking a holistic view of learning environments and the way tools are used to enhance their effectiveness.

Phillips, McNaught and Kennedy (2012) acknowledge that any e-learning artefact needs to be designed and undergo the appropriate design process. This process is a design-based research approach that analyses problems, develops solutions, and evaluates these through iterations of testing and refinement. Reflection and feedback help to improve the design principles. This process is similar to the plan, act, reflect cycle that is the core of reflective practice used in education environments, and it is also similar to iterative usability approaches. Figure 1. below illustrates the process.

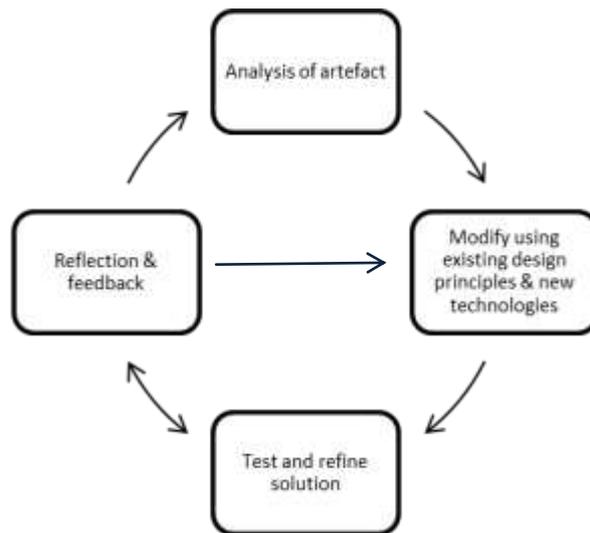


Figure 1: Design life cycle for existing e-learning artefact (modified from Reeves, 2006)

The LEPO framework appears to focus more on learning in comparison to some other models since key learning factors, that is, learning process and learning outcomes, form the foundation of the framework (Phillips, McNaught and Kennedy, 2012). The LEPO framework is broader and contextualises learning using clarity in terminology for processes, products and outcomes, as well as clarity about the framework itself. Another benefit of the framework is that it is a pragmatic model allowing for other approaches in evaluating and researching the effectiveness of e-learning artefacts from a pedagogical perspective, recognising that some are more appropriate than others, depending on the item being evaluated or the research question. In sum, trialling this framework and following the evaluation research design life cycle approach is recommended.

There are some factors around usability and e-learning that is already known and can be utilized. For instance there is information from website usability studies about how people read online, or about navigation. Recent eye-tracking studies (Rakoczi, 2010) highlight the importance of the structure of teaching materials. This is confirmed by readability analyses (Lim, 2010) and focus group feedback (Bowles-Terry, Hensley & Hinchliffe, 2010; Nagra & Coiffe, 2010). We also know that students in general want flexibility, and that they have less study time available than ten years ago (Crisp et al., 2009). All this information can be used to ensure that as much as possible the e-learning environment and associated artefacts address needs and satisfy known criteria, so that the focus is on the learning outcomes or on the specific question to address. The next step is to evaluate using data collected from a range of sources, since it is known that this improves the quality of information. For example, to determine if resources are working as designed and meet the needs of users, data from observations and interviews, among other sources, provide the depth that is missing from surveys. An example of a possible evaluation matrix for an evaluation is given in Table 1. Other information from studies on library resources could help to inform the design of the evaluation or the set of guidelines.

Table 1: Evaluation matrix for e-learning artefacts (modified from Phillips, McNaught & Gregor, 2012)

Criteria	Data sources						
	<i>activities</i>	<i>interviews</i>	<i>surveys</i>	<i>observation</i>	<i>usage logs</i>	<i>think aloud</i>	
Evidence of learning	x	x					
Influence of environment on learner's engagement				x	x		
Behaviour of learners if artefact was designed to be engaging				x	x	x	
How is the artefact being used?				x	x		
How useful is the artefact?		x	x				

The findings of evaluations can be used in refining the design of artefacts. The question is whether this is enough given the generic quality of the artefact and the broad range of users, particularly with demand for learner-centred, personalised, flexible as well as authentic, learning materials. Perhaps a more sustainable alternative is to design artefacts that are dynamic, based on a diagnostic to determine learner needs for a specific purpose, for example, the learner has to write an essay, it is the first one she has written, and it is for political

science. This could be combined with any feedback from previous assignments, helping to ensure that the information presented is personalised and authentic. Somewhat similar to advanced searching, it would be possible to say what is not wanted as well. Such a dynamic system would require a kind of adaptive technology which exists in search engines and in technologies, such as speech recognition. This could mean that a generic static text could evolve into a context-dependent and learner specific text. Some aspects of evaluation could be automated to collect information that might help refine and improve such texts for the next time.

Conclusion

The challenge for ALL sites is to provide effective resources both now and in the future. Given the nature of e-learning, determining the methods for evaluating online study skills resources can be difficult. However, using a framework for evaluation research where the focus on pedagogy is appropriate due to the focus on learning. In addition, conducting iterative usability analyses will help to refine resources as part of the design process. Supplementing these analyses with data from a range of sources, both quantitative and qualitative, can help determine what is learned and how, and therefore, what is effective. There are questions about the sustainability of designing and evaluating the current static nature of resources, when in fact resources developed dynamically, through diagnostics and sophisticated searching, may lead to more pedagogically effective solutions. Here learning for the future is about adapting content and activities for specific purposes and specific learners.

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