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QUALITY STANDARDS IN ONLINE TEACHING AND LEARNING: A TOOL FOR AUTHORS AND DEVELOPERS

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Abstract

Higher education institutions have been quick to embrace the power of online technology as a means for improving and enhancing learning within a flexible environment. This growth in online delivery of teaching and learning has been accompanied by increasing interest in strategies for monitoring the quality of online courses within a framework of quality assurance. Formative and summative evaluation processes, whereby academics assess the quality of their materials against agreed standards, have emerged as strategies for addressing such quality concerns. These strategies assume, however, that the academic has access to an agreed set of standards of good practice and has the skill and experience to develop materials that match those standards. This paper outlines an approach which seeks to address quality issues in online teaching and learning by identifying the standards by which online courses are judged, and by providing support for academics to develop their own scholarship of teaching learning in order to make these judgements. The approach involves the development of a review tool comprising a paper-based checklist of agreed good practice, and a supporting website focusing on four areas - instructional design, interface design, use of media and technical aspects. The review tool provides itemised criteria and related standards derived directly from teaching and learning theory, the principles of usability, and guidelines for accessible Web design.

Introduction

The challenges associated with online teaching and learning demand new approaches to quality assurance beyond the framework within which higher education institutions currently operate (DEST, 2003). As Taylor and Richardson (2001) assert, there is a need for quality assurance systems which consider "the standard of online information", and at the same time, support academics in the development of high quality online resources. This paper presents an approach developed by the University of South Australia, which addresses both these aspects of quality - providing the standards by which online courses are judged, and supporting academics as they develop their own scholarship of teaching in the area of online learning.

The Boyer notion of scholarship is a framework for considering academic work that can be applied to online teaching and learning within universities. Boyer identified four scholarships - discovery, teaching

and learning, integration and application (Boyer, 1990). His approach is predicated on an understanding of the communal basis of all scholarly activity: that scholarship by its very nature is a public rather than private activity; that it is open to critique and evaluation by others; and that a field of study is progressed through the scholarly activity of building new ideas which are then open to the same processes of public scrutiny. All of the scholarships are exposed to the same rigorous approaches of peer review as a way of gaining quality, transparency and accountability (Shulman, 2002). Within this framework the scholarship of teaching and learning has emerged as a major theme in the higher education sector.

Central to this notion of the scholarship of teaching and learning is that of the 'learning community' - the recognition of the value of relationships and practices that occur in and through the work practices of staff. One way to support and stimulate this kind of collegial activity is to provide structured opportunities for discussion and reflection (Boyer, 1990; Schön, 1983) through a checklist of agreed good practice. Taylor and Richardson (2001) advocate the application of this approach to the design and construction of information and communication technology (ICT) based teaching resources, arguing that independent peer review requires "...the development of an explicit and shared understanding of the scholarship underlying the design and development of these resources" (p. 8). Such shared understanding, according to Taylor and Richardson (2001), can also form the basis for validating the quality of the resources.

This paper describes the development of a checklist and supporting website, in which shared understanding about the scholarship of teaching and learning in resources developed for online delivery is made explicit. The principles underlying the development of this approach are as follows:

- The criteria for the standards of development have been gathered from the full range of relevant academic literature surrounding online teaching and learning. This affirms the work of academics in the area and provides it in a highly practical form which is accessible to a broadly-based audience.

- The approach locates responsibility for the quality of teaching and learning with the academic staff responsible. Staff can use the items to guide the development or redevelopment of their own courses through reflective processes.

- The instrument and its associated website provide an opportunity for just-in-time academic staff development by providing the accepted standards, information about how to meet these and examples of how others have done this.

- The instrument provides a framework to involve other academics in the process of peer review.

- The website is designed to provide a model of best practice, and has been validated using the W3C Mark-up Validation Service, and the W3C CSS Validation service, and complies with W3C Web Content Accessibility Guidelines 1.0 (1999).

Review of other instruments

In order to pursue this approach, the authors reviewed a range of instruments available through the Internet. Several generic descriptors for online course development and evaluation were identified. A link to the analysis of these instruments is available from URL: http://www.unisanet.unisa.edu.au/resources/online-eval/. Since online teaching and learning is still a developing area of academic activity within universities, and many staff engaged in online approaches have limited expertise, the authors were interested in identifying instruments that provided an educative and explanatory dimension which supported the evaluative function. In effect, this required the instrument to be both comprehensive in scope and specific in detail.

A review of the instruments available identified several problematic issues. First, several had been developed to address particular aspects of course development and were partial in their scope rather than comprehensive. Second, many of them were very general, open-ended instruments. Although there may be some justification for this in terms of providing a generic framework, these instruments

make considerable assumptions about the level of expertise of those involved in the processes of online teaching and learning. Third, some instruments were found to be comprehensive in their scope, but unnecessarily complex because the instrument and supporting online materials were not integrated. Finally, most of the online instruments (including some listing accessibility as an important criterion for online course development), were found to be inaccessible for users with disabilities.

The authors noted features in some approaches that were consistent with the objectives of the proposed checklist of agreed good practice. Of particular note is the Michigan Virtual University's (MVU) Standards for Quality Online Courses and the accompanying Excel-based Course Evaluator tool.

The standards addressed in the MVU instrument include several criteria proposed for a checklist of agreed good practice including; instructional design, accessibility, usability and technology. However, the authors were concerned about the complexity of this instrument, and in particular, the lack of a seamless integration between the Excel tool and the supporting online material. Furthermore, the authors contend that aspects relating to accessibility and usability need to be embedded within criteria relating to instructional design, interface design, use of media and technological issues, rather than treated as separate considerations.

Design and development

Since the instruments reviewed failed to adequately address all of the needs that the authors had identified as important characteristics of a checklist of agreed good practice, it was necessary to develop a new review tool designed to meet those needs. In doing so, the authors recognised the need to build on the experience gained from the review process which had indicated some consistency in the priority placed on certain criteria. For example, Michigan Virtual University's (2002) *standards for quality online courses*, the *peer review proforma* developed by the Griffith Institute for Higher Education (2001), the Electronic Learning Institute's *criteria and standards used in evaluating Web-based instruction and delivery guidelines*, and Lyn Knowitall's (1994) *expert review checklist* all consider instructional design issues, interface design and/or appropriate use of media (though the peer *review proforma* focuses on the appropriate use of ICT rather than on interface design), and technological issues. The *proactive evaluation* model proposed by Sims *et al* (2002) also places importance on criteria relating to instructional design, interface design and elements of content utility, including the accessibility of the content. Similarly, the MVU standards consider accessibility issues, using the W3C Web Content Accessibility Guidelines 1.0 (1999) Priority 1 criteria as its benchmark. This review of the literature and available evaluation approaches informed the authors' decision to structure the review tool and associated website around the following areas of consideration:

- instructional design
- interface design
- the use of multimedia to engage learners
- the technical aspects of interactive educational multimedia.

The authors opted to embed criteria relating to inclusivity (including accessibility) in items associated with all four areas of consideration, since issues such as accessibility impact on the instructional design, usability, use of media and technical functionality of online course materials.

The review of instruments also identified a range of different approaches employed to measure the extent to which the various items listed under these major areas of consideration meet the stated criteria. These approaches include the complex quantitative rating system delivered via an Excel spreadsheet in the MVU's *evaluator*, simple yes/no checklist formats utilised in Electronic Learning Institute's *criteria and standards used in evaluating Web-based instruction and delivery guidelines*, open-ended qualitative questionnaire formats employed in the Southern Regional Education Board's *criteria for evaluating Web sites*, and the CIDOC Multimedia Working Group's *multimedia evaluation criteria*, and quantitave measures using a rating scale approach with provision for qualitiative responses to open-ended questions, as exemplified in the Griffith Institute for Higher Education's *peer review proforma*. Based on this analysis, the authors decided to adopt a combined approach, employing a 5-point Likert scale to (ranging from strongly agree to strongly disagree for metrics that involve value judgements, and from always to never for metrics that consider the frequency of occurrence) and a free form text area for comments. This approach was considered to be appropriate for the design and development of a checklist of agreed

good practice, since a combination of quantitative (Likert rating scale) and qualitative (open-ended user comments) measures will most likely yield comprehensive results (Laycock and Nowlan, 2000).

In developing this tool, the authors acknowledge that such instruments have inherent limitations, since as Owston observed "....no single model or framework is likely going to satisfactorily capture the complexity of pedagogical, technical, organizational, and institutional issues inherent with Web-based learning" (1999). However, the tool is not intended to be used in isolation from other academic practices. It will be most valuable when it is part of a wider framework of course and program development and evaluation or established peer review processes (see Peer Review of Teaching, 2002). To a very significant extent the intention of the review tool is to generate scholarly discourse around online teaching and learning within the rich environment of an academic community.

Summative and formative evaluation has been an integral aspect of the development of the review tool from the point where the authors identified the need to develop an instrument within their own institution. This involved reviewing a range of instruments which were deemed inadequate for the purpose and audience. After much research, a paper version was developed and circulated to a reference group of online enthusiasts and other interested staff. Feedback was incorporated into a revised version. Using this version, the course materials of a volunteer academic were reviewed and the results were presented to a seminar of staff involved in online teaching and learning. Further revisions were made and a beta version developed. In the next stage of the evaluation, academic staff, professional development staff and students at the University of South Australia will be invited to take part in a trial using the beta version and their feedback incorporated in the final version of the review tool and the online website.

Description of the review tool

The preceding section describes the design and development of a review tool comprising a paper-based checklist of agreed good practice and supporting website which provides an educative function, addresses issues relating to inclusivity, and is constructed around four main areas of focus - instructional design, interface design, use of media and technical aspects. Details of this review tool are provided in the following sections.

Educative function
The educative dimension is central to both the just-in-time approach to professional development and approaches which involve more formal educational development. The associated website (see Figure 1) supports this educative function through the inclusion of features such as hyperlinks to explanations and the relevant literature that are accessed by selecting a "more" link alongside each checklist item, an exemplars section, and additional resources (including links to related downloadable print publications).
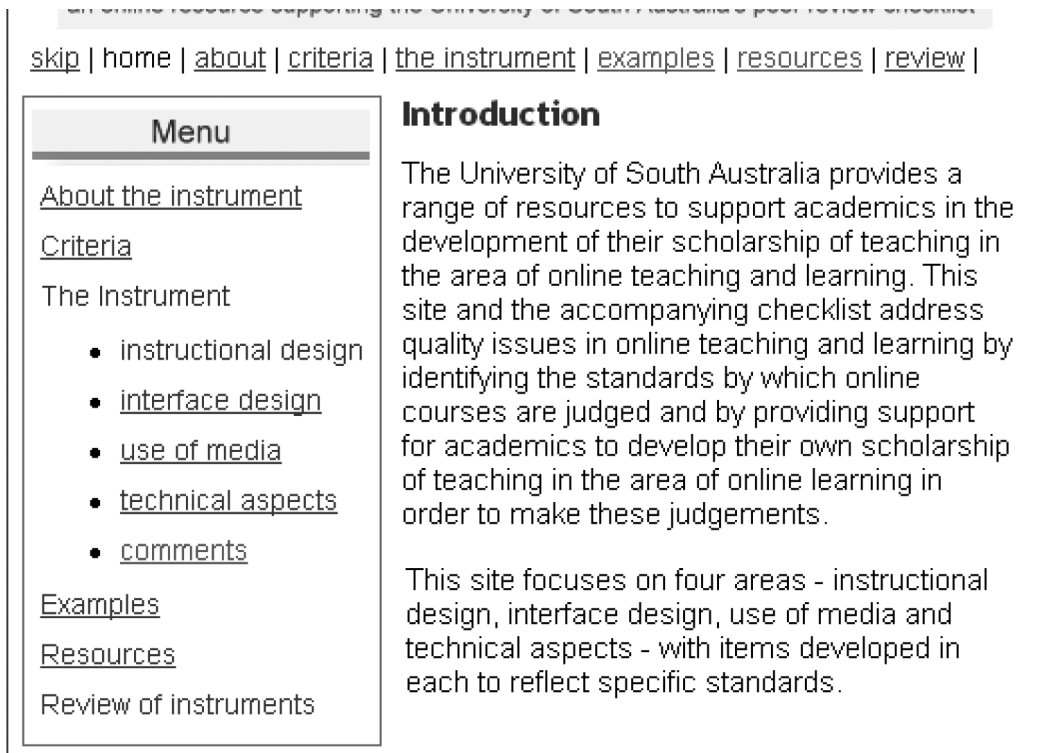
Figure 1: Screen display showing features of the website supporting the checklist

In the following example, the reviewer extends their understanding of the importance of specifying goals and objectives in an online course by selecting the "more" hyperlink alongside the item referring to the statement of objectives or learning outcomes in the "clarity of expectations" sub-section (see Figure 2).

Figure 2: Selecting the "more" hyperlink in the "Clarity of Expectations" sub-section

There is often confusion among reviewers about the difference between general statements about the overall goals and clearly specified objectives. By selecting the "more" link the reviewer can check their understanding of these terms and also learn more about effective techniques for specifying objectives or learning outcomes from the hyperlink references included in the related explanatory screen (see Figure 3).

Inclusivity

Items relating to inclusivity such as gender, culture and accessibility have been embedded across the four sections of the instrument. The decision to embed these items rather than to extract them into separate categories was based on the view that essentially the items reflect good teaching and ought to be seen in a more integrated way. Since the supporting website was designed to provide a model of good practice, it has been necessary to ensure that that it too meets W3C Web Content Accessibility Guidelines 1.0 (1999). The accessibility design features incorporated into the design of the site are as follows:

- All pages validate at HTML 4.01 transitional using the W3C MarkUp Validation Service.
- Cascading style sheets are applied for layout and style, and have been validated using the W3C CSS Validation Service.
- Alt text attributes and captions have been applied to all visuals and image maps.
- Redundant text links are provided as footers on each page.
- Care has been taken to ensure that sufficient contrast is provided between foreground and background images, and that content does not rely on colour alone.
- The primary natural language of all Web pages has been specified.
- All tables linearise appropriately.
- Use of scripting languages and reliance on non-html languages has been avoided
- Links open as new pages rather than as new windows.
- All links can be accessed via keyboard control as well as mouse control.
- Menus are grouped logically and skip links are provided.

Figure 3: Additional information that can be obtained by clicking on the "more" link

Areas of focus

The review tool is constructed around four sets of considerations: instructional design, interface design, the use of multimedia to engage learners, and the technical aspects of interactive educational multimedia. These areas have been developed through consideration of the literature and are described in the following sub-sections.

Instructional design

Instructional design criteria consider how the strategies and techniques derived from learning theories are applied to the solution of instructional problems in interactive multimedia applications (adapted from Berger and Kam, 1996). The importance of pedagogically driven instructional design in the creation of educational multimedia is well documented (e.g. Reeves, 1997; Reushle, 1995; Sonwalker, 2002). The features considered in instructional design criteria include:

- whether the learning objectives are clearly stated (Palomba *et al*, 2000; Clark 1995);
- the appropriateness and accuracy of the content (Biggs, 1999; Wilson, 1997; Beck, 1997);
- the sequencing of instruction (Brown, Collins & Duguid, 1989; Reigeluth, 1999; Wilson & Cole, 1992);
- whether the topics are applied in "real" contexts (Brown, Collins & Duguid, 1989; Reigeluth, 1999; Wild and Quinn,1998);
- assessment strategies (Biggs, 1999; Palomba *et al*, 2000) and
- the appropriate use of feedback (Draper, 1999; Reushle, 1995; Rowntree, 1983; Wilson, Jonassen, and Cole, 1993).

For ease of access, theses criteria have been grouped into the following sub-categories in the review tool: clarity of expectations; building student knowledge; learning activities; assessment; evaluation; human interaction and support. Examples of relevant items include:
Objectives or learning outcomes are clearly stated for each section or module.
The course provides ways for students to review/gain assumed knowledge.
Summative assessment requirements are directly related to the stated learning outcomes of the course.
Feedback from the teacher is timely and designed to encourage learners to engage in further discussion.

Interface design

Interface design critieria address the quality of the end-user interface and how it affects "... users' perception of the product, what they can do with it and how completely it engages them" (Barker and King, 1993). Reushle (1995) and Sonwalker (2002) contend that interface design and related usability factors will have a significant influence on the success of instructional interactive multimedia. As Sonwalker (2002) explains, "Users interact with online Web courses through a graphical user interface, so the design of graphic elements, the color scheme, the type fonts, and navigational elements can all affect how a course is organized and perceived by students". Interface design criteria address all of these usability factors as well as accessibility criteria since as Dey (2000) advises "the interface needs to be accessible to as wide an audience as possible".

Examples of relevant items considered in the review tool include:
Fonts are restricted to two families per page. Extended text generally uses san serif typeface.
Hyperlinks use words that clearly identify where they lead.
There is sufficient contrast between the type and images and the background.

Use of media

Effective use of media is a key aspect of educational design. This area of concern considers issues relating to the effective use of interactive multimedia, writing style and accuracy of text and copyright.

The term interactive multimedia is used to identify the capacity of digital media to facilitate a range of interactive experiences (Reushle, 1995; Laurillard, 2002; Kennedy *et al*, 1998; Wills, 1996); the aim being to promote active learner engagement. Evaluation of the appropriate use of of interactive multimedia considers the ways in which multimedia technologies are integrated into the teaching and learning process to support the learning objectives, promote learner control and "...actively engage learners in creation of knowledge that reflects their comprehension and conception of the information..."

(Jonassen, undated). Multimedia components such as animations, video and audio also present challenges for users who have disabilities, and those living in locations with restricted bandwidths. The criteria must therefore also consider accessibility features, such as the provision of synchronised captions (see Figure 4), to avoid precluding certain groups of students from engaging in the learning experience.
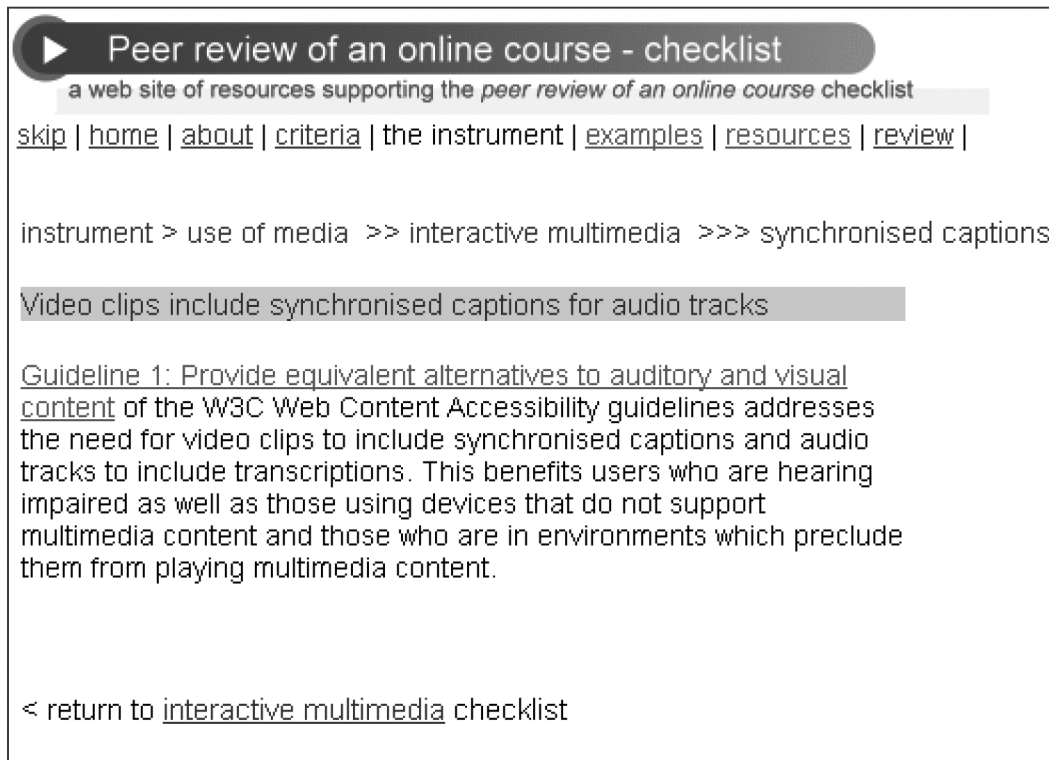

Figure 4: Additional information relating to accessibility obtained by clicking on the "more" link

Examples of relevant items relating to use of media include:
Media are designed to achieve specific learning outcomes.
Diagrams and graphics are appropriate in terms of their informational content.
Materials from external sources are used within the boundaries of the copyright law.

Technical Aspects
The technical aspects of interactive multimedia are considered in reviewing educational applications because software and hardware problems can undermine learners' confidence and their ability to form good models of how computers work (Nielsen, 2001). Accroding to Sonwalker (2002), the issues influencing the technological success of online courses include available bandwidth, target system configuration, server capacity, browser software, and database connectivity. In addition to these factors, evaluation of the effectiveness of interactive multimedia applications in online education needs to consider the extent to which the course materials are accessible to all users across different platforms and browsers, if plug-ins (such as media players etc) are required whether the user is informed and links are provided, whether all hyperlinks are active and the overall robustness of the application.

Examples of relevant items include:
The system requirements are specified.
Functional even when features such as JavaScript are not supported.
Page download times within the courses site do not exceed 10 seconds.

Conclusion

This paper outlines an approach to quality assurance in online teaching and learning that considers the standard of online information, and at the same time, supports academics in the development of high quality online resources. This approach involves the development of a review tool comprising a paper-based checklist of agreed good practice and supporting website focusing on four areas - instructional design, interface design, use of media and technical aspects. The criteria addressed in this review tool directly relate to quality concerns agreed in the literature, are expressed in non-technical ways and embed considerations relating to inclusivity such as culture, gender and accessibility. The review tool provides an opportunity for just-in-time academic staff development by providing the accepted standards, information about how to meet these and examples of good practice, as well as providing a framework for involving other academics in the process of peer review. The authors contend that the approach outlined in this paper is consistent with a scholarly approach to teaching and learning because it supports staff in reflective practice and provides a structured and informed approach to peer review.

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