A critical overview of instruments and approaches for assessing the effectiveness of online teaching

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Abstract: The paper seeks to explore and critically evaluate extant research on evaluation instruments for e-learning and to ask whether they are aligned to what we know about good teaching. Several online instruments are investigated by examining the criteria they apply to the evaluation of the student experience of e-learning. A related issue explored in the paper is the application of current research and theory underpinning effective teaching and learning to the design of evaluation instruments. The question asked is whether commonly used evaluation criteria are aligned with state of the art theoretical knowledge about teaching and learning. It is proposed that more learner–centred and constructivist evaluation instruments are needed that reflect what we know about learning online.

Introduction

Do student evaluations of teaching assess the essential constructivist based principles that are recognised as underpinning effective e-learning and instruction? What other sources, stakeholders and agencies contribute to the current focus on the student experience of e-learning and the associated array of instruments online that seek to evaluate the quality of online learning? While the Web continues to expand, the growth of e-learning is not grounded in compelling evidence that it supports effective student learning outcomes (Oliver, 2005). The aim of the paper is to explore the main indicators of effective e-learning by critiquing a number of evaluation studies and by analysing a range of instruments designed to measure the quality of the student learning experience online. The paper also brings together perspectives from a number of areas to examine the nature and scope of online evaluation instruments.

Apart from the perspective of offering active, student-centred learning, the essential approach in judging the success of an online program of study should be to ask for the individual student/ consumer view. It is now also a common observation that education is becoming a commodity, (Witherspoon & Johnstone, 2001, p. 5) and that there are many powerful drivers encouraging the integration of ICT into the student experience. The most significant recognition of this is the contemporary view that student satisfaction is the most important key to continuing learning (McGraw-Hill Ryerson, 2003). As students pay a greater share of their own educational costs, they expect universities to provide the services they demand in the market at large: better service, lower prices, higher quality and a mix of products that satisfy their own sense of a good education (Zemsky, Massy, & Oedel, 1993, p. 56). According to James & Beckett (2001, p. 8):

> *Students are well equipped to judge the quality of higher education and we should trust their intuitions on these matters. Generally speaking, students are in a reasonable position to judge the more tangible, short-term components of the experience and to judge aspects of the process of higher education."*

As individual consumers, students need to know what they are being offered, rather than being at the mercy of national and global forces. Online, various standards are being developed, such as the "Pedagogical Rating of Online Courses" (www.syllabus.com) and the Department of Education Science and Training (DEST, Australia) quality indicators (2002). These are driven by an entrepreneurial model but they are evidence that online quality standards are being applied and taken seriously. The under 20's are now described as the "net generation" (Oblinger & Oblinger, 2005) and they expect not only to study online but also look to the same medium for information about course selection, support, value for money and quality assessment. It is appropriate that they be asked for feedback

on their experiences of learning online, and communicate with course instructors on all aspect of the learning experience. In recognition of this reality, several guidelines and evaluation measures have been published by different organizations and stakeholder groups regarding the development of quality online courses (Randall, 2002).The purpose of this paper is to review the criteria used in online student evaluation instruments to measure web-based teaching quality, and to assess the extent to which these criteria are aligned with constructivist principles.

Learning environments research

Apart from the quality assurance movement in higher education, which seeks to establish benchmarks and standards for online courses, the research arena known as learning environments research provides further evidence that student perceptions of their learning experiences need to be taken into account in designing instruments for evaluation of online units of study. Since the early 1960's, research in social psychology has focussed on dimensions of learning environments as a decisive component for successful learning outcomes (Anderson & Krathwohl, 2001). Since then, numerous studies have demonstrated that students' perceptions of their educational environments can be measured with survey instruments and the results serve as valid predictors of learning (Fraser, 1997, 1998). Evaluation has turned away from individual student achievement toward the effectiveness of the whole environment, while the focus of learning has moved from individual students toward the quality of the environment as a learning community. Wagner & McCombs (1995) claim that the social processes involved in getting a degree are equally important, as a great deal of learning comes with the quality of interactions that occur in the communities to which students belong, and therefore the social experiences of learners must also be taken into account in the design of evaluation instruments.

In addition to utilising learning environment research to enhance teaching and learning in the individual classroom, there are increasingly strong indicators of the need to accommodate tertiary education students in a globalised economy in order to equip students with the generic skills needed for a range of contexts (DEST, 2002; Salmi, 2000). Given that many universities are aiming at a global market and increasing internationalising the curriculum measures and evidence of effective online delivery must be addressed and include social, affective and cognitive factors that foster student learning online (Yeo, Taylor & Kulski, 2006). Studies that report on the student experience of learning online are growing in number, but continued use of student feedback is critical to the development and improvement of more effective e-learning environments to maximise learning outcomes in an ever-changing landscape (Song, Singleton, Hill & Koh, 2004).

Systematic research into quality student learning has occurred since the 1970's (Biggs, 2003). Globally, the learner-centred movement, in ascendancy since the publication of the 12 learner centered principles by the American Psychological Society (APA,1993), have promoted the principles that learning environments should provide opportunities to construct knowledge, to allow students to actively share and seek information, to generate a diverse array of ideas, to appreciate multiple perspectives, to take ownership in the learning process, to engage in social interaction and dialogue, to develop multiple modes of representation, and to become more self-aware. Essentially, online units of study need to support engagement in meaningful contexts, and through active learning, increase learner ownership over the learning process. Learner-centred pedagogy asks what students need to learn, what their learning preferences are, and what is meaningful to them (Laurillard, 2002). As learners are central to the teaching learning process, information on their needs, views, expectations and experiences become sources of feedback and can be used to deliver more effective instruction. However, the nexus between effective teaching principles and quality online learning from the student viewpoint, is not always evident in evaluation instruments currently used

Instruments for evaluation of online learning

Evaluation in higher education continues to rely almost exclusively on student evaluations of teaching (SET). According to Sproule (2000), SET instruments consist of a number of open and closed question items aligned to course and teaching effectiveness that are administered to students at the end of a semester and data collected anonymously. To examine the quality of online teaching evaluation processes, we compared a number of instruments that assessed online teaching dimensions. Our goal was to determine the extent to which the available instruments commonly used for evaluation purposes are aligned with current constructivist principles of teaching and learning. To identify these instruments/questionnaires/surveys we searched the internet for instruments in use internationally. The next step involved looking at dimensions and indicators of quality teaching and critiquing selected evaluation instruments that have been used and empirically tested. The specific criteria for searching

included tools/surveys/questionnaires specifically designed for the evaluation of online learning that gathered data on students' perspectives and experiences. The instruments, their purpose, context and underlying theories are depicted in Table 1.

A search of the literature from 2001-2006 found 11 instruments used to assess the quality of the student experience, all but one of which, (the CEQ) was administered online. While this is not an exhaustive list of evaluation instruments, these were chosen for investigation as they are currently in use in a range of contexts. The questionnaires focus on students' perception of the quality of their online learning experiences. Out of these articles we found that there was overlap: some use variations of the CEQ dimensions, while others use and have adapted the scales in the COLLES questionnaire. All the instruments selected were aimed at higher education e-teaching, both fully online and blended.

Two questionnaires, the Online Learning Environment Survey (OLLES) and the Constructivist Online Learning Environment Survey (COLLES) were developed based on experience in the area of learning environment research over the last two decades (see Fraser, 1998). Currently, there is increased adaptation of learning environment questionnaires that focus on student perceptions of online learning in higher education. Some questionnaires have been adapted from trials of the OLLES and later validated and tested in the field (Yeo et al 2006). Nevertheless, there are a variety of authors offering complementary or even competing criteria for the evaluation of online learning, and there are also differences in the theories adopted and the degree of explicitness of these theories.

Purpose of instruments

The purpose of the instruments selected for review varies, though all seek student feedback on the quality of their experiences and learning online. Some instruments measure student perceptions of a single unit of study (perhaps 1-2 semesters), while others such as the Course Experience Questionnaire (CEQ) is aimed at measuring overall satisfaction with a full course of study (3-4 years). The CEQ, which measures some aspects of the quality of learning and teaching and the development of generic skills, is used to survey all graduates from all Australian universities soon after graduation. It is considered a useful instrument for the purpose of improving the quality of teaching in universities and also for informing student choice, managing institutional performance and promoting accountability of the higher education sector (Wilson, Lizzio & Ramsden 1996).

The *Constructivist Online Learning Environment Survey* COLLES (Taylor & Maor, 2000, Yeo et al 2006) seeks to measure students' preferred online learning environment compared to their actual experiences. It is a personalised learning environment instrument that asks how students perceive their involvement, outcomes and participation across a number of dimensions. When aggregated it describes how the whole group or cohort of students experience the environment. While espousing social constructivist principles this questionnaire focuses largely on the students' perception of the degree of relevance, interaction, peer support, teacher support and reflection offered online. The dimensions articulated in the original COLLES instrument (2000) were six criteria including social cognitive, communicative and affective dimensions that foregrounded the learner's experience and comprised the following:

Professional Relevance - the extent to which engagement in the on-line classroom environment is relevant to students' professional worldviews and related practices.
Reflective Thinking - the extent to which critical reflective thinking is occurring in association with online peer discussion.
Interactivity - the extent to which communicative interactivity is occurring on-line between students and between students and tutors.
Cognitive Demand - the extent to which challenges and communicative role modeling is provided by tutors.
Affective Support - the extent to which sensitive and encouraging support is provided by tutors.
Interpretation of Meaning - the extent to which students and tutor co-construct meaning in a congruent and connected manner (Taylor & Maor, 2000).

The OLLES (Clayton 2004) included the same six scales with slight variations but also included: "Computer Competence"- the extent to which the student feels comfortable and enjoys computers in the online environment; "Material Environment"- the extent to which the computer hardware and software are adequate and user friendly; and "Order and Organization"- the extent to which class activities are well organised and assist student comprehension. Like the COLLES, the instrument is administered online. Clayton (2004) used a pilot study with

104 students to evaluate the online learning but with no clear criteria underpinning design of its scales. A later study (Johnson et al 2006) used the original COLLES (2000) survey instrument to measure the quality of blended learning.

Table 1: Instruments for evaluation of teaching in online & blended contexts

Author	Instrument description	Purpose	Context	Espoused Theory
Ramsden (1999)	Course Experience Questionnaire (CEQ) consists of 5 scales (Good Teaching, Clear Goals and Standards, Appropriate Workload, Appropriate Assessment and Generic Skills) and one item asking students' to rate their overall satisfaction.	Asking students' to rate their overall satisfaction with their course	Australian Higher Education Course, administered after graduation. Not specific to online courses, applied to all	Constructivist and student centred learning
Taylor, P., & Maor, D. (2000).	Constructivist OnLine Learning Environment Survey (COLLES) (6 scales 30 items)	To compare students' preferred online learning environment with their actual experiences	Post graduate distance education program for science and mathematics educators.	Social Constructivism
Brorby, M., & Perkins, D. (2003).	Course evaluation Survey, online 30 items & 3 free responses items. 15 items identical to face to face survey	The effectiveness of online courses via streaming video and CD.	Web based course for teacher certification	Not mentioned
Clayton, J. (2004).	Online Learning Environment Survey (OLLES) (8 scales and 61 items) based on the COLLES	To assess student perceptions of the online learning environment.	Generic higher education	Constructivism
Trinidad, S., & Pearson, J. (2004).	The Online Learning Environment Survey- OLES (9 scales 54 items)	Measure students' preferred online learning environment against their actual experiences.	Hong Kong–students in the Master of Science and Information Technology	Supports some elements of constructivism
Bangert, A (2004)	Student Evaluation of Online teaching Effectiveness (SEOTE)	Based on Chickering & Erdmann's (1996) Seven Principles	A range of higher education students	Constructivism (The Seven Principles)
Bates, P., & Obexer, R. (2005).	Survey based on Gunawardena et al (5 scales), social presence, teaching presence, cognitive presence, collaboration and interactivity	Students perceptions of online units of study	Undergraduate course of Aviation Biology and Medicine	Social constructivism but do not mention it.
Johnson, K., McHugo, C., & Hall, T. (2006).	COLLES (6 scales)	To assess student's perception of both their preferred and actual online classroom m-environment	16 undergraduate students studying programming language	Social constructivism
Yeo, S. Taylor, P. & Kulski, M. (2006).	Adapted COLLES (6 scales 24 items)	Evaluation of international student learning	Business studies degree and Diploma courses, with African Virtual university.	Learner-centred education
Ginns & Ellis, 2007	E-learning Experience Questionnaire	Uses CEQ scales; good teaching, clear goals, appropriate workload, fair assessment, generic skills development, interaction and engagement, student management, blended learning	Blended learning environments in higher education	

The OLES (Trinidad & Pearson, 2004) includes 9 scales with two additional distinct scales Equity and Asynchronicity. The OLES research (Trinidad et al., 2004) extended this personalised perception survey instrument to Hong Kong higher education students who were involved in a blended learning approach in three modules. Variables such as equity, enjoyment and student autonomy were included in this instrument with quality of delivery and teacher support. In comparison, an online course for undergraduate professionals (Bates & Obexer, 2005) uses a constructivist-based theoretical framework utilising the five dimensions defined by Gunawardena and Zittle (1996). The five dimensions include a number of dimensions of teaching effectiveness: social presence, interaction, cognitive strategies, collaborative learning and learner centeredness.

In the Yeo et al.'s (2006) study, the process of validation of the COLLES internationalised the instrument and established the validity and reliability of the six initial scales. This differs from the original instrument as it assumes a blended approach to learning, where students experience a variety of learning modes. The wording of the original instrument was modified slightly to accommodate an international audience. A similar approach was adopted by Ginns & Ellis (2007), who designed the E-learning Experience Questionnaire to evaluate the quality of blended learning experiences. According to these authors "*Evaluating the contribution of the technologies in blended learning requires research methodologies sufficiently sensitive so that they can recognise and acknowledge the relational nature of the technologies to the quality of learning*" (Ginns & Ellis, 2007, p54). Both the COLLES (Yeo et al, 2006) and the E-learning Experience Questionnaire (Ginns & Ellis, 2007) represent a new phase of development for online evaluation instruments, as both address complex and diverse aspects of student learning in blended contexts. Previously there has been little systematic research in this area.

Nevertheless, there are also significant differences between these instruments and approaches and in their interpretation of what constructivism means in practice. In some cases no clear evidence is presented that core constructivist principles are applied to the design of the online evaluation instruments (Bonk & Cunningham, 1998). As they are presented in Table 1, and in the papers that accompany them, several instruments do not contain items specifically written to address learner-centred teaching practices that have been identified as indicators of quality online instruction.

The exception to this is the *Student Evaluation on Online Teaching Effectiveness* (Bangert, 2004). Bangert's *Student Evaluation of Online Teaching Effectiveness* (SEOTE) was extensively trialed and tested across a number of contexts. This instrument is based on the Seven Principles of Effective Teaching (Chickering and Erhmann, 1996) and includes the following scales:

1. *Student-faculty Contact (SFC): 4 subscales on teacher-student interactions*
2. *Cooperation among Students: 3 (subscales)*
3. *Active Learning: (4 subscales)*
4. *Prompt Feedback: (3 subscales)*
5. *Time on Task: (3 subscales)*
6. *High Expectations ((4 subscales)*
7. *Diverse Talents and Ways of Learning: ((5 subscales)*

The other instruments contain some but not all of the essential aspects of constructivist pedagogy, indicating that research findings on constructivist teaching have not been applied in practice. Teaching quality is becoming increasingly well defined, though some researchers reject the possibility that teaching quality is inherently stable (Kember, Leong & Kwan, 2002). It would appear that there are many contextual variables that impact on quality teaching and with a diverse student population and multiple dimensions to address; there are a large number of instruments in circulation. Consequently, substantial variations in the criteria for effective teaching online are being applied. Many instruments are not aligned with constructivist learning principles, and while they may suit particular institutional contexts, they do not appear to reflect a balanced perspective.

Conclusion and future research

While constructivist learning models and paradigms have been recommended widely as a guideline for the design and delivery of e-learning courses, the actual principles underlying this paradigm have not been effectively translated into evaluation instruments by universities and practitioners. The foundation of constructivism is to enable learners to create knowledge through collaboration and authentic experiences which include challenging tasks and reflection on learning. Very few of the acknowledged and well known learner centered principles have

been built into evaluation instruments, nor are these principles fully assessed by student evaluations of teaching. It is recognised that teaching is a complex and multi-faceted activity that is comprised a number of instructional procedures and interactions, processes and communication patterns. This presents challenges to researchers who try to write specific items to represent a wide range of factors that lead to effective online instruction. In many cases, learning environments are blended, and evaluation instruments do not take this complexity into account. It is recommended that instructors and evaluators design evaluation instruments that are aligned with constructive principles such as the Seven Principles (Chickering & Ermann, 1996). In addition, as technologies change, it is likely that emerging dimensions of the learner experience with technology (for example, mobility and social connectivity) will have to be included in evaluation instruments as learning is a dynamic process. While there are many different technologies tools that can be used to support e-learning, the main issue in delivering effective e-learning is the quality and depth of constructivist pedagogy and support provided by the online facilitator to creating authentic tasks and learner engagement. Instruments that are designed to assess the quality of online learning need to be based on these important dimensions and to used to obtain diagnostic and summative feedback about student perceptions of teaching effectiveness.

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