

Supporting Writing

The role of evaluation in VLE design

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Abstract

Purpose: This paper critiques specific evaluation theories and practices which have been influential in developing a computer-mediated learning environment to support a vocational business discipline and one of its specialist skills (writing).

Methodology/Approach: The paper reviews evaluation models and principles firstly for computer-based learning and computer assisted learning (CBL/CAL) and then virtual learning environments (VLEs), which are more contemporary and applicable to the paper's case study and contemporary higher education environments.

Findings: The models have been applied and utilised in the development of the PR Writing learning environment. The reviewed models have been influential in the learning environment's design, philosophy, systems, structure and content.

Practical implications: The customised learning environment has been described in some detail although the purpose of this paper has been to describe the influence of evaluation models on its theoretical design and practical development and not on the evaluation process itself.

Originality/Value: The paper is original in that it describes a new learning environment which has been designed specifically for a vocational course.

Introduction

This paper aims to look at the evaluation methods and techniques available to support the design and integration of collaborative computer learning and conferencing software into vocational higher education curriculum. This is a broad area of study as authors are contributing from different philosophical and discipline perspectives. Contributions to the debate come from psychology and specifically intelligent systems designers, information technology and computing

spheres as well as education and pedagogic studies at all levels from primary to adult. As such it is necessary to focus this analysis on research and writing into the evaluation of conferencing software in higher education. The analysis of the literature has contributed to the development of the *PR Writing* learning site as discussed and presented in this paper. The next section explores different perspectives, experiences and models of evaluation which have influenced the design

of the learning environment detailed in this paper. The three approaches discussed are the <domain specific evaluation criteria>, <computer supported collaborative learning (CSCL) evaluation> and an <educational model of evaluation> based on and updated from Laurillard's (1993) work.

Domain Specific Evaluation Criteria

The argument that aesthetics is not important is contested by Plass (1998) who regards design and the learning experience for students as mutually dependent. Plass's work is in the area of Second Language Acquisition (SLA) and focuses on the design and development of multimedia educational software for this target group. What Plass is interested in is specifically the user interface of the software and the human computer interactability of the software. Plass argues that the user interface design is often ignored in the development of instructional software. The approaches and criteria used are often based on experience and intuition rather than theory based models. This approach, Plass claims, may make the design highly usable but difficult to systematically evaluate. Plass claims that evaluation criteria must be devised for «domain specific learning processes and activities and on the cognitive processes that these activities involve» (1998, 35).

Plass (1998) is advocating therefore that a taxonomy of software features appropriate to the domain (in the context of the author's discipline, specialist writing for public relations as a vocational business discipline) are developed based on underlying learning theories and principles. This would enable researchers to evaluate how well the individual elements of the software are able to meet the specific need or purpose of the software (desired taxonomy of features). As such Plass provides a four step process for developing domain specific evaluation criteria for a particular software application. This model was applied to the public relations writing learning site. Draper (1996) synthesises a range of perspectives to present four approaches to evaluation or purposes for it. The approaches taken to make these evaluations can vary to include the checklist already mentioned to the perceptual (how users feels); contextualising the project in the whole of a learning programme (i.e. how supported by handbooks, books, notes) and by using an experimental methodology. Draper argues these types of evaluation need not and should not be seen in isolation and that they may form part of a longitudinal monitoring approach.

Jones, Jacobs and Brown (1997) have developed an evaluation model to measure the effect of CBL/CAL to enable learners to follow their preferred learning styles. This links into very early work on how software is both evaluated and classified and therefore Kemmis et al.'s (1977) work on paradigms of software is still pertinent. These include the instructional, revelatory, conjectural and emancipatory paradigms. Defining paradigms in the context of evaluation frameworks is useful in helping understand where a piece of courseware originates and how clear its educational objectives and purpose are defined.

Computer Supported Collaborative Learning (CSCL) evaluation

There are no accepted accreditation or evaluation criteria for users and developers of CSCL. There are a number of reports that evaluate virtual learning environments (VLEs) for technical requirements, costs and aesthetics. These are however inadequate as they do not take into account the social and psychological processes involved in human-human and human-computer interaction. There is limited evidence of analysis of pedagogical evaluation criteria. The Joint Information Systems Committee (JISC) Technology Application Programme Report by Britain and Liber (1999) provides a pedagogic criteria for evaluating resource based collaborative learning. They argue for a holistic approach to evaluating beyond aesthetics, functionality and cost. They aim to understand and evaluate the educational principles behind the VLE systems to enable educators to select appropriate software systems which may be compatible with the way they teach.

Educational model of evaluation

Laurillard (1993) proposed the «conversational framework» for evaluating computer learning which emerges from earlier descriptions of the teaching and learning process as analogous with a conversation and has been developed from Pask's (1976) Conversation Theory and further work by Ramsden (1992):

«In short a teacher faced with a series of classes with a large group of students should plan to do things that encourage deep approaches to learning; these things imply dialogue, structured goals, and activity.....Teaching is a sort of conversation.» (Ramsden 1992: 167-168)

The model's teaching strategy is based on the form of interaction between the teacher and the student and not

just on the student's actions. Therefore the student's action is built around and based on the communication between the student and the teacher and meaningful feedback from the teacher should supplement the process. There should also be opportunities during the process for the student to reflect on their actions and activities. Laurillard highlights four different types of teaching media within the conversational model when applied to the academic context or a learning situation. An indication of what each should facilitate is as follows:

Discursive media

- Teacher's and student's conceptions should each be accessible to the other
- Teacher and students must agree learning goals for the topic and task goals
- The teacher must provide an environment within which students can act on, generate and receive feedback on descriptions appropriate to the topic goal

Adaptive media

- The teacher has the responsibility to use the relationship between their own and the student's conception to determine the focus of the continuing dialogue (and to determine goals for the continuing session)

Interactive media

- The students must act to achieve the task goal
- The teacher must provide meaningful intrinsic feedback on the actions that relate to the nature of the task goal

Reflective media

- The teacher must support the process in which students link the feedback on their actions to the topic goal for every level of description within the topic structure

Laurillard's (1993) «conversational framework» incorporates all four categories of media with adaptation and reflection being internal to both the student and the tutor. The two levels in their dialogue (discursive and interactive) are external processes passed over the media. The conversational model demonstrates the workflow between teacher and student during learning. Both Britain and Liber (1999) and Crawley (1999) have proposed this model as a suitable starting point for

evaluating VLEs. One major problem with the model is its reliance on all communication taking place within the VLE environment. This may be appropriate for distance learning programmes but on campus learning using VLEs in conjunction with traditional delivery mechanisms will involve varying degrees of interaction between students and tutors either face to face; over the telephone in other seminars etc. These types of interaction are not easily accommodated but cannot be discounted. This point has significance for the structure of the learning environment which has been developed for this paper to include both on line and traditional forms of interaction between students and tutors.

Crawley (1999) argues that Laurillard's model has many characteristics which reflect the work of theorists specialising in CSCL evaluation but also claims the model is not designed specifically for collaborative learning and therefore requires some adaptation. Crawley claims the need is to shift the perspective from the traditional teacher initiates, student responds, teacher evaluates pattern (Heap 1985) to a more group focussed, knowledge building discourse. To develop a second «collaborative conversational framework» model Crawley proposed incorporating three characteristics of a group orientated knowledge-building discourse identified by Scardemalia and Bereiter (1994) as follows:

- Focus on problems and depth of understanding (already evident in Laurillard's original model (steps 1 – 4 and 6 –9))
- Decentralised, open knowledge building, with a focus on collective knowledge (Crawley argues is now evident in the relationship between the individuals in the group and the group itself. Group members are simultaneously individuals and group members)
- The broader knowledge community (Crawley claims by removing the specific roles from the model this is now also addressed)

From this second model Crawley developed a final adaptation from Laurillard's work to propose the «computer supported collaborative conversational framework». Crawley claims the completed model combines the three characteristics of CSC, which are: the learning process, participant interaction and computer support. Crawley claims the model is generic to accommodate different learning projects, subjects and methodologies.

Britain and Liber (1999) converted these discussions into a practical framework and suggested evaluation

based on the conversational model could best be achieved by firstly constructing a table that described the VLE tools at each stage of interaction in the model. Then describe the support provided or available for structuring conversations and activities. They claim this is important in describing how well integrated the individual tools are within the environment because many of the tools can be found separately and it is their synthesis which is the primary strength (or weakness) of a VLE environment. This evaluation framework for VLEs uses the interaction in the conversational model as criteria to identify tools and the level of «structuring» provided by the VLE. The model highlights Britain and Liber's perception of what they would look for at each interaction in an integrated VLE. Having applied the model however, Britain and Liber found the same information repeated regarding tools. To overcome this they suggested compressing the information by building the table using the principles of Laurillard's conversational model rather than the stages i.e. discursive, adaptable, interactive, reflective. Britain and Liber saw the principles approach as easier to use. The adapted conversation model focuses on interactions between student and tutor which helps to evaluate whether VLEs are set up to allow individualised activities. In the context of the learning environment developed for this paper this is achieved with the negotiation and writing of a news release for assessment. The proposed <conversation model> aims to evaluate whether the activities are based on a prior discussion with the students. For the case study learning environment *PR Writing* the activities include discussions using email and feedback to help the students to develop their own projects for writing. The development of this learning environment is described in the following section.

***PR Writing* – the influence of evaluation on the development of a learning environment**

The *PR Writing* learning environment has been developed and refined over a two year period and has been influenced by critical reviews of existing collaborative learning environments and reviews of the literature. A number of collaborative systems were identified which attempted to achieve some of the objectives of the proposed learning site for this research. However more detailed analysis also highlighted some flaws with these systems or their incompatibility with the researched university's network environment. The outcome of these investigations was that the author proposed developing a customised, web based learning environment and

incorporating some of the key characteristics of other systems and designs.

While reviewing the literature on CBL and VLEs and their related evaluative frameworks, examples of potential VLEs have been collected which have similarities to and are applicable to this research. However a number of factors mitigated against incorporating an existing learning environment. Firstly the target university was involved in an intense internal strategic discussion on which propriety collaborative learning environment to adopt institution wide. The commercial suppliers being evaluated were Blackboard and WebCT. During the timescales of the development work for this research no clear decision was forthcoming and a pilot needing developing. This research has used theories and mechanisms defined in this chapter to evaluate existing systems for their strengths and weaknesses to enable the development of a customised, web based learning environment. The principles behind the design are therefore based on the evaluation literature, previous experience of other applications in context and their classroom effectiveness (Squires and McDougall 1994).

An awareness of software paradigms (Kemmis et al. 1977) has been influential with the «conjectural paradigm» applicable to the setting to allow for increased control by students over the learning environment to enable them to test ideas and hypothesis. The opportunity for building on colleagues as a support (Nystrand 1986) has been accommodated and Neuwirth and Wojahn's (1996) evidence of peer review in action with a software supported writing programme has also influenced the design.

Motivation to learn is acknowledged in the design and is influenced by Marton, Hounsell and Entwistle's (1997) discussions on deep and surface learning, with deeper learning linked to intrinsic motivation which the learning site design attempts to emulate. The intrinsic motivation is influenced by interest and perceived relevance – in the case study supported by the link to public relations practice and the emphasised importance given by practitioners to competence in writing (Tench 2000) and in HE generally Tench (2003). Muffoletto's (1997) research claimed that collaboration works well with graduate or professional courses where student homogeneity is high. This supports the use of collaboration within the public relations curriculum as an applied, vocational discipline.

Secondly «achievement motivation» which is created by developing a focus within the learning environment for

a final written output or project which is both rewarded with marks and with external approval through a real life client and then sent to a media distribution list. Jones et al. (1997) have also presented argument for CBL design to accommodate both holistic and serialist learning styles by using «blocks» or «packets» of information. These ideas have also been incorporated into the system's design by having a non linear structure of learning sessions (see Figure 2).

Applying theory to practice – developing the learning environment

In principle the designed system outlined in this paper was structured to be web based with a collaborative communication component (email based). The first step was to develop evaluative experience of other programmes and Plass's (1998) generic CBL/CAL model to evaluate «domain specific» learning processes and activities was applied. The first step of Plass's (1998) applied model above involves the selection of the instructional activity needed to support the skill/ cognitive competence that is to be developed (e.g. specialist writing in the context of this research). This is achieved through a needs assessment; analysis of learner needs; task and content analysis and the determination of the goals and objectives of the learning experience. This was engaged in for this study by investigating the strengths and weaknesses of students' writing (Tench 2001) which used students and employers as the research sample. Applied to this study this could pose the question does the learning environment aim to achieve problem solving in the development of specialist writing or advancement of communication skills and activities or a balance between the two?

The second step is the determination of the attributes of the interface. After selecting the desired activities you need to consider the attributes of the design and how this will fit with the activities. This, Plass claims, can be influenced by cognitive and educational psychology regarding memory, attention, interest and motivation. The third step is the consideration of design having looked at the instructional activity required and the attributes of the interface. This is the actual feature and form of presentation. Constraints here could be placed by steps one and two as well as cost. You need to put the user, the content and the instructional activity in the centre of the design process. Cognitive processes are considered as are the experiences of instructional systems design models and CASE tools (computer

assisted software engineering).

The fourth step is the evaluation of the support the design features offer the cognitive processes. This could include whether the design can accommodate learner differences e.g. of cognitive strategies or learning styles (Honey and Mumford 1987). This approach is specifically designed for user interface evaluation but does offer some areas for discussion around domain specific application which is summarised as the intention/potential for the approach.

The learning environment was designed to be held on the internet off the university campus to avoid some of the problems already detailed with the institution's computer-based learning deliberations. The URL address for the learning site is <http://www.prwrite.freeuk.com>. The following two Figures (1 and 2) demonstrate the web-based appearance of the *PR Writing* learning environment as well as its content structure:

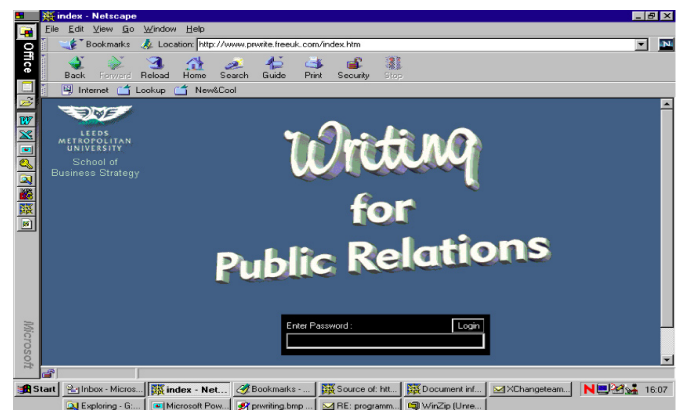


Figure 1 – PR Writing home page (Tench 2005)

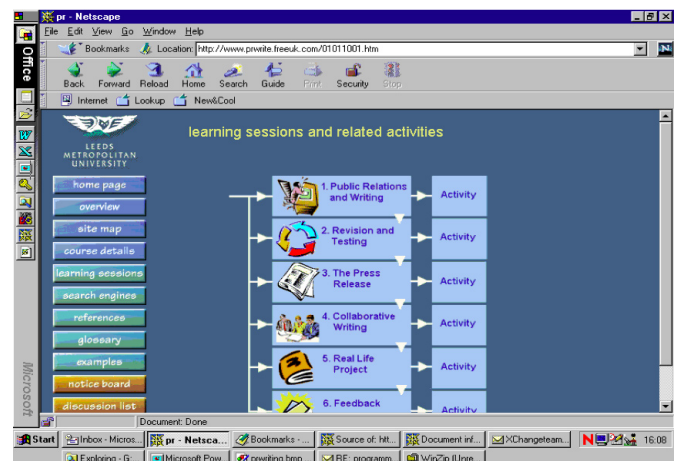


Figure 2 – The content structure of the PR Writing learning environment (Tench 2005)

The learning sessions detailed in Figure 2 are designed as «packets» of information (Jones et al. 1997) which can be undertaken in a non linear format, although the real life project is a summative piece of collaborative work with an assessment deadline at the end of the semester and so in practice is most likely to be attempted at the end of the learning programme. Each learning session has links to information websites, which can support students in their writing and specifically their public relations writing. Corresponding with each learning session there is also an activity page with a range of tasks and directed work, which the students are encouraged to attempt either in groups or as individuals depending on the subject or task. Although the *PR Writing* learning environment is a stand alone part of the students' learning experience it has also been incorporated within a core first year module across a range of public relations courses. As such a specification of the learning objectives and delivery methodologies has been developed.

Figure 2 provides some detail of what is included specifically on the web-based learning site such as noticeboards; a glossary; web or hot links to other relevant search engines or websites; an email discussion list using the Campus Pipeline system at the target post 1992 UK university. The learning environment also involves integrating with other mediums (Crawley 1999) such as audio, video and text. The structure of the learning programme and its integration within the Introduction to Public Relations module includes:

- 2 lectures
- 3 seminars/workshops
- Tutor email contact
- 5 learning sessions and activities
- Multiple submission of practice writing via email to tutor and colleagues for feedback
- Final assessment submitted via email and in hard copy/release to the media

During the development of the learning environment the proposed design was evaluated using Britain and Liber's (1999) adaptation of Laurillard's (1993) conversational framework and its principles of discursive, adaptive, interactive and reflective aspects rather than the stages of her original model. This model was applied to the *PR Writing* site designed for this research. The model demonstrates which tools are available within the learning environment and the support available to structure conversations and activities. The model

demonstrates the customised design of the *PR Writing* learning environment and how the tools have been integrated within the site. Britain and Liber (1999) argued this synthesis of the tools is a key strength of effective VLE environments.

Summary – literature influence on the design of the *PR Writing* learning environment

The design of the *PR Writing* learning environment has been informed by early CBL evaluation studies and writing such as the checklist approach (Reay 1985); aesthetics (Harvey 1996) and Stoner (1996); efficiency and cost (Clark 1985); and, significantly, Plass's writing on the importance of human interactability and domain specific learning processes and activities. For the customised design of the *PR Writing* learning environment this also links to Edwards' (1998) arguments for tutor visibility and class contact and Jones and Cawood's (1998) advocacy for relationships to be built outside the technology. Therefore the learning environment structure is supported with lectures, seminars, drop-ins and surgeries. Building on the concept of communicative opportunities in the learning environment, Mugny and Doise (1978) argue how cognitive performance increases when there is opportunity for interaction. This leads on to the other important evaluative model influencing the *PR Writing* design, Britain and Liber's (1999) adaptation of Laurillard's (1993) «conversational framework» and its principles and its focus on the interaction between actors (students and teachers).

This paper has attempted to review evaluation models and principles firstly for CBL/CAL and then VLEs, which are more contemporary and applicable to this case study. The models have been applied during the development process of the *PR Writing* learning environment and have been influential in its design, structure and content.

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