

IDENTIFYING THE QUALITIES NEEDED FOR A VIRTUAL LEARNING SPACE IN COMMUNICATION AND INFORMATION TECHNOLOGY SKILLS

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1. Introduction

1.1 Background

Staff development in Communication and Information Technology (C&IT) is one of the major challenges currently facing educational institutions. In addition, while being asked to provide support for a 'lifelong learning' society (Dearing, 1997), higher education institutions look to the implementation of C&IT as a means of supporting developments in this area. C&IT staff development is thus all the more crucial, as identified by the Dearing Report itself, and others (Milligan, 1999; Atkins, 1998).

This paper presents ongoing research and development that will support educational institutions in facing these challenges via the development of a Virtual Learning Space (VLS) for C&IT staff development.

1.2 The Project

Funded by the Scottish Higher Education Funding Council, the VLS project will use a collection of existing web tools to build a 'Virtual Learning Space'. This will aim to develop C&IT skills of staff at three institutions in the North East of Scotland: The Robert Gordon University, University of Aberdeen and Aberdeen College. The creation of a space where staff can come together to share best practice, exchange ideas and establish self help groups is seen as the way forward for developing a cross-institution learning community. The project will expose a wide range of staff in Higher and Further Education to web technology they may otherwise not encounter. It will also

give staff the opportunity to share ideas and explore new tools and materials without the costs associated with travelling to seminars. Once populated with experiences, the VLS will act as a knowledge pool for a wide range of 'just in time' C&IT staff development. The VLS should thus provide a useful space for academic developers, partially addressing the need for such an environment identified by the Talisman C&IT Review (Alexander, 1999).

The VLS focuses on developing C&IT skills, and will incorporate two strands:

- the Resource Pool, containing materials, tools, tips, and other information relating to C&IT skills and their application;
- the VLS Community, which will enable the sharing of ideas, problems, best practice, and other issues associated with C&IT in higher education.

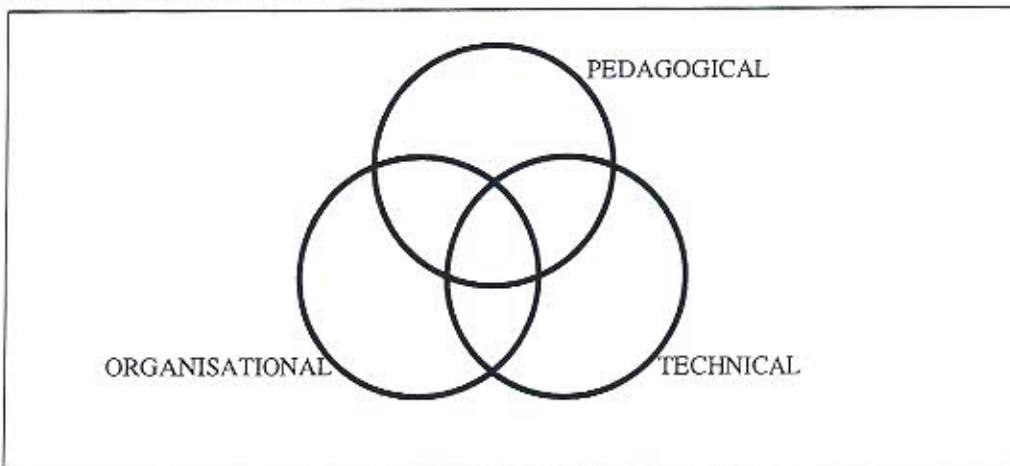
2. Approach used in developing a virtual learning space

The project consists of three stages: investigations of the requirements of the VLS, implementation and population of the VLS community. The first stage, which is reported here, involves three main areas: background investigation, evaluation of web-based tools, and the participation of stakeholders in collaboratively modelling the space. This has included developing a conceptual framework for the VLS, which has been extended in consultation with members of staff. Additionally, staff have been surveyed, to gain a profile of staff needs and expectations in terms of C&IT skills development. To ensure effective implementation, attitudes and potential motivators to participate in the VLS have also been explored in staff focus groups. The outcomes of these processes have been combined here, and the required characteristics of the VLS are discussed.

2.1 Conceptual framework

From the beginning, we felt the need to establish a framework for use as the basis for the development of the project. This would underlie the analysis of various web tools used to develop the VLS, as well as the overall design of the VLS. An initial framework based on the work of Pereira (2000) was proposed. This involved three main interrelated clusters of issues: pedagogical, organisational and technical (see Figure 1). As suggested in the figure, issues from different clusters would impinge on each other, and some issues may well relate to more than one of the cluster headings. It would therefore be important to consider pedagogical, organisational and technical issues in relation to the VLS, and attempt to carefully balance the emphasis given to each.

Figure 1: Balancing pedagogical, organisational and technical clusters of issues.



Issues within the three clusters that the project team thought would be important to the VLS are discussed in the next section. The framework was also used in discussion with focus groups from the partner institutions. The responses and suggestions from the focus groups are discussed later.

2.2 Expected profiles of issues

Technical issues that might be considered when analysing software tools include available features, specifications and costs. In relation to users, aspects such as reliable software, hardware and networks; ease of use; and access to up to date computers have a high priority (Anstey, 2000; Pereira, 2000). Indeed, a survey carried out by the SCAITS (Staff Communications and Information Technology skills) project at the University of East Anglia showed that access to new computers was second only to more training as the most significant factor needed to progress C&IT use (Anstey, 2000).

Overall, the project team felt that important technical issues would include:

- Efficient and reliable technology;
- Ease of use;
- Flexibility in adapting to fit existing IT infra-structures;
- Flexibility regarding expansion and updating.

Clearly, pedagogical aspects should also be incorporated in the analysis and design of educational software (Britain & Liber, 1999). In relation to C&IT staff development others have emphasised the need for pedagogic-led materials that incorporate a strong evaluation component (Alexander, 1999). While, Vavik (1999) proposed that the effective design and development of any computer-aided learning system should “emerge from the deliberate application of some particular theory of

learning". In identifying a pedagogical basis for the VLS, it was noted that different pedagogical approaches value different forms of learning, and therefore different approaches to the design of C&IT learning applications, see Table 1.

Table 1: Different approaches to the design of learning experiences according to different educational paradigms

<i>Theory</i>	<i>View of learning</i>	<i>Learning activities</i>	<i>Design Models</i>	<i>Criticism</i>
Behaviourism and Information Processing Theories (Cognitive Theories)	The learning process involves outer stimuli and inner conditions: 'Learning is a relatively permanent change of behaviour that arises based on experience.' (Hilgard and Atkinson, 1967)	<ul style="list-style-type: none"> ▪ Trainer oriented, ▪ Highly structured, ▪ Based on drill and practice, ▪ passive transfer and ▪ summative evaluation. 	Instructional System Design is a concept used to describe models based on these approaches, which separate the content of the teaching and the methods (Gagné, 1967).	The prescriptiveness of this model, which views cognition as a kind of computation, does not allow for an interactive exploration of the learning experience, in a critical reflective way. It does not consider the complexity and uncertainties of practice. (See Crook, 1996; Merrill, Li et al., 1990; Owen, 1999.)
Constructivist Theories and Situated Learning	This approach considers the situated character of practice and seeks to encourage the construction of knowledge by the learner, emphasising the importance of social interaction.	<ul style="list-style-type: none"> ▪ Learner oriented ▪ Flexibly structured ▪ Highly interactive ▪ Exploratory ▪ Project based ▪ Collaborative ▪ Critically reflective 	<p>This approach encourages the design of constructive environments, where different tools can be explored by the learner. Other theories, such as socio-cultural theory and critical pedagogy complement the constructivist approach by emphasising the social character of learning and the need for critical reflection, embedded in a meaningful context.</p> <p>Of the design models proposed within this approach, participatory design is the most appropriate to the VLS project.</p>	Activity theory, within the participatory design model, seems to provide the most complete framework, as it takes into consideration a broader set of issues than other constructivist models.

(Adapted from Pereira, 2000)

Educational research is undergoing a paradigm change, with the emphasis moving from behaviourist and cognitive theories towards constructivist approaches. The latter favour the flexibility demanded by modern day society, together with a learner-centred approach that emphasises lifelong learning. It therefore seemed clear that the design of the VLS should have a constructivist pedagogical basis. This would aid definition of the characteristics required of the learning environment and the web tools used to create it. This implies that we will be looking for tools that:

- are flexible, allowing the use of different media suitable to different learning needs;

- allow exploratory and constructive experiences;
- can be easily personalised;
- allow social interaction to take place; and
- promote critical reflection.

Regard for organisational issues is fundamental to the successful application of C&IT into learning as its effectiveness will depend on integration with the institution's overall structure. By considering organisational issues during the design of a virtual learning environment, more effective coordination and resource negotiation should take place.

For the VLS, it was anticipated that organisational issues would include:

- Integration of online activities into the overall institutional structure, including with existing staff development strategies;
- Cost-effectiveness;
- Motivation of staff to participate.

We thus had a basis on which to build the VLS, and had attempted to anticipate some of the issues the project may need to address. Next, we consider the views and perceived needs of the potential users of the VLS, i.e. staff from the partner institutions.

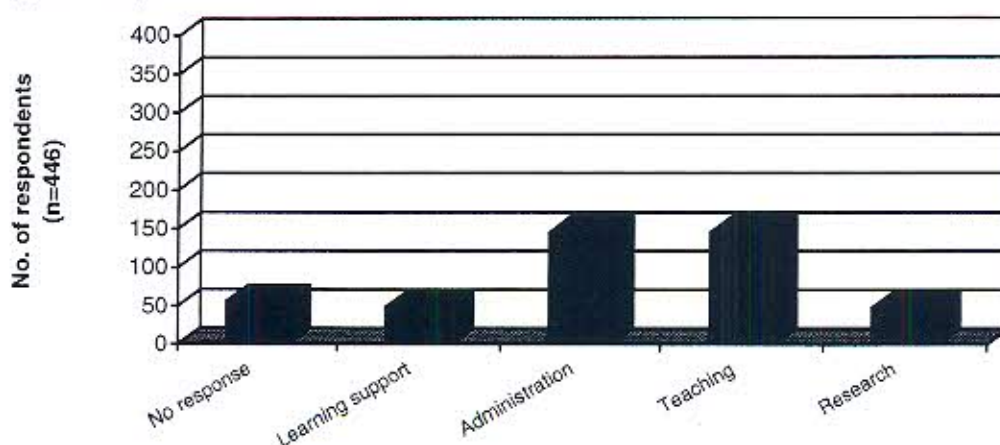
3. Surveying staff perceptions and needs

To estimate current C&IT staff development needs, a questionnaire was applied to all staff at The Robert Gordon University (RGU) in the first semester of 1999/2000. This investigated levels of competence in general C&IT skills; access to computers; use of the Internet and web based tools in general, and specifically in teaching; as well as C&IT training and support needs.

3.1 Outcome of the C&IT skills questionnaire

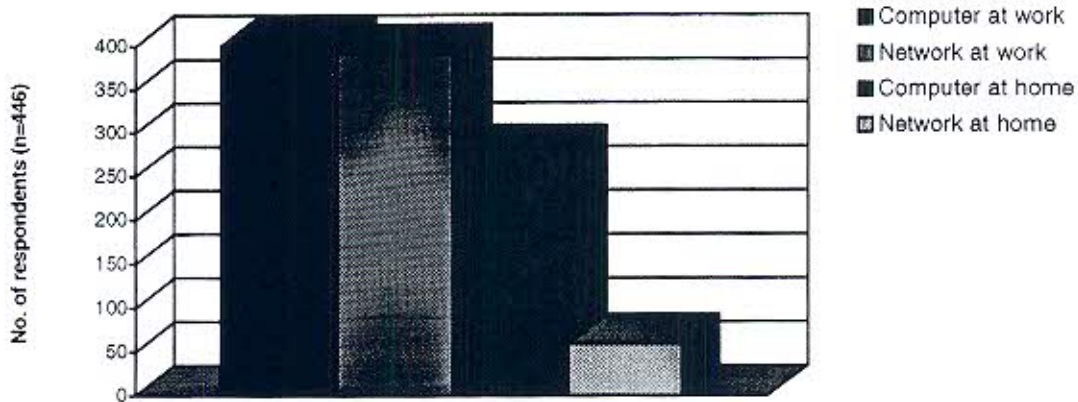
The survey had a response of around one third (n=446) with different categories of staff, academics and non-academics, contributing (see Figure 2).

Figure 2: Respondents' main area of work



Large proportions of the respondents had access to computers and to the network at work. More than half had a computer at home, but just a few of them used their home computers to access a network (see in Figure 3).

Figure 3: Respondents with access to computers



An overview of the respondents' perceived levels of competence for some of the skills included in the questionnaire are presented in Figure 4. Perhaps unsurprisingly, respondents had a high level of competence in applications such as word-processing and spreadsheets packages. The higher proportion of staff with no competence in databases may reflect the population surveyed, in that skill in this area is not a priority for many posts. Over 50% of respondents did, however, consider themselves to be at least intermediate users of web browsers, a response that encourages the development of training via this medium. Despite this, the profile for creating web pages demonstrates a low overall level of competence.

When asked to identify their C&IT training needs, a large number of respondents said that training was not a priority (see Figure 5). This may be a reflection of the demands made on staff time, and the perception of training as time intensive. (This point was highlighted in focus group discussions.) A reasonable number of respondents would like introductory training in database applications (around 27%), web page creation (around 22%), and online assessment (around 19%). The relatively low priority given to some C&IT skills, however, suggests there is still a need for raising awareness regarding the application of C&IT, an issue identified by TALISMAN in 1998 (Tomes & Higgison, 1998).

Figure 4: Respondents' perceived levels of C&IT competence

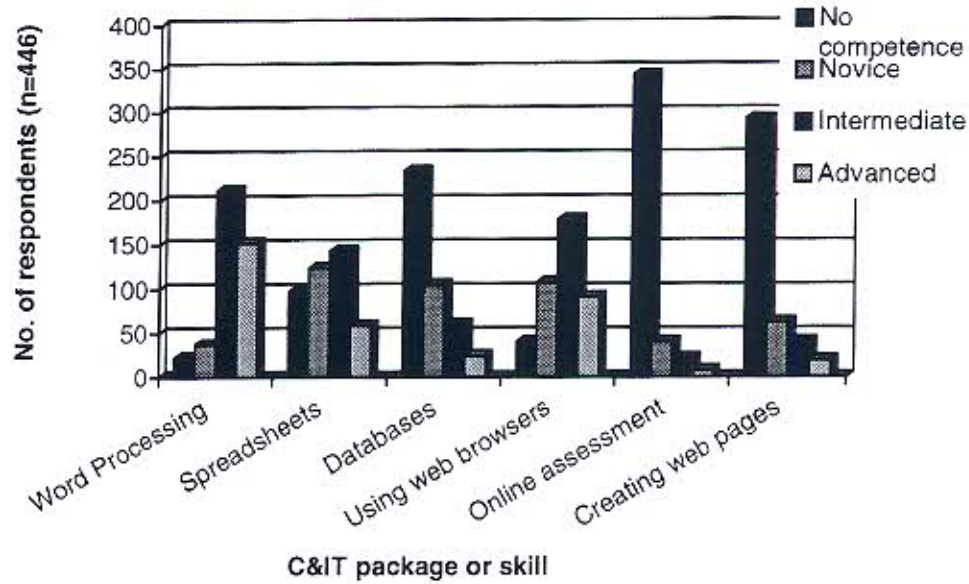
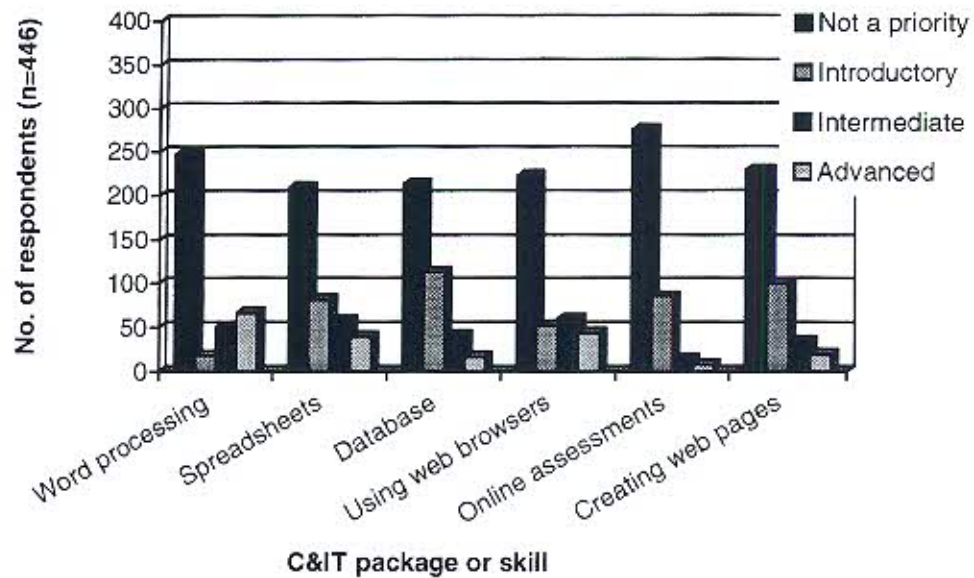
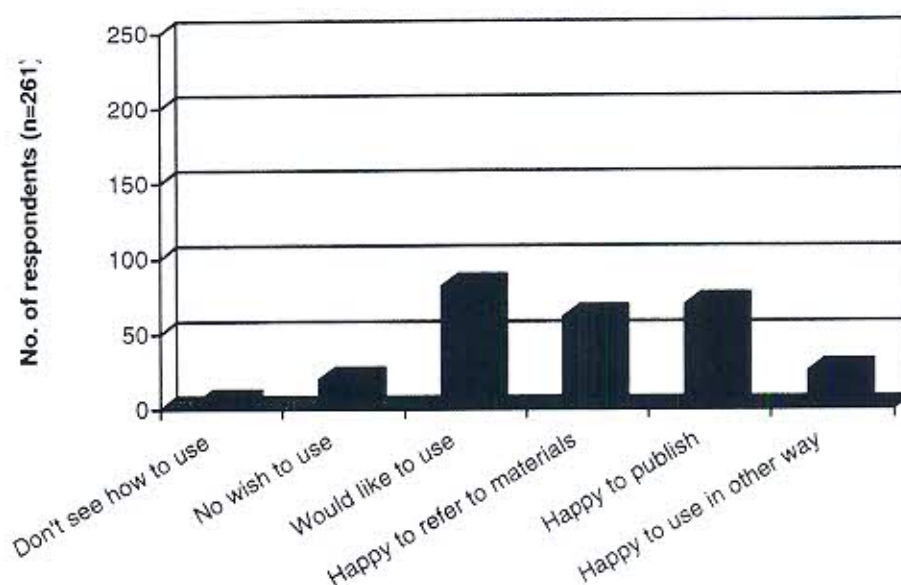


Figure 5: Respondents' C&IT training needs



Regarding the WWW, many respondents already use it for teaching (around 50% in Figure 6). There is still a high demand for support, as more than 30% of the respondents said they would like to use the WWW for teaching.

Figure 6: Respondents' attitudes to using the WWW for teaching



(Although there were only 146 respondents primarily involved in teaching, responses to the above were also provided by researchers and learning support staff who take part in some teaching.)

In general, there seems to be an ongoing need for intermediate/advanced development in 'standard' C&IT skills, and more introductory support in the newer skills, such as web page creation. Given the perceived level of expertise in using the web, and the potential of this media to support just-in-time training, e.g. small chunks available at the desktop, the VLS could provide a positive and innovative way of meeting some of the highlighted C&IT needs.

3.2 Investigating needs in focus groups

Focus groups were organised at the three partner institutions with two main objectives, to:

- identify staff needs and expectations in relation to C&IT skills development;
- and disseminate details of the project, thereby initiating a VLS community.

At RGU and the University of Aberdeen, focus groups with academic and training related staff took place separately, but at Aberdeen College both categories participated in the same focus group. With one exception, attendance at the focus groups varied from 6 to 12 participants, a reasonable number according to the literature on the subject (Stewart & Shamdasani, 1990).

The focus groups programme started with an overview of the VLS project, and moved on to review the conceptual framework. This was used as the basis for discussions on issues that the project should address. Academic staff also discussed their C&IT needs, and considered whether the greatest need was for training, the ability to share experiences, a helpdesk type consultancy, or

some other form of support. The sessions finished with an online delphi type exercise in which participants were asked to enter features that would encourage them to participate in the project. All entered points were then fed back to participants, who rated each one, and overall scores for each point were compiled. This resulted in a list of ranked key motivators.

Outcome of the focus groups

The most common needs identified in the focus groups were:

- The ability to exchange experiences and ideas via a supportive community
- Recognition of time constraints
- Provision of advanced training
- Motivation

Regarding the latter, several potential motivating factors were identified. These included: user friendliness; online support; and a reliable pool of resources that provides solutions to common problems. While, the most cited staff expectations towards the VLS in terms of its qualities were:

- A supportive community that allows sharing of experiences, learning from others and reassurance
- Consultant type of advice that is concise and immediately accessible

Differences among institutions

The three institutions shared the main concern of developing a collaborative community. However, there were some differences, which portray the different characteristics of the three institutions. Aberdeen University staff emphasised the need for motivation and combining research and teaching. RGU staff put further emphasis on time constraints and the need for advanced training. Finally, Aberdeen College staff demonstrated interest in more specific issues, such as plagiarism, multilinguality, and special needs training.

Academic and training related staff views

Understandably, academic staff showed more concern with the use of C&IT in teaching. One of their main concerns being to make material available for students on the web. They were also interested in specialised IT skills and software.

Training related staff tended to be more interested in organisational and technical issues, such as integration with the strategic aims of the institution, e.g. staff development policies; accreditation; accessibility of the VLS; and the costs of production, evaluation & maintenance.

3.3 Evaluating web tools within the framework of staff needs

The proposed qualities of the VLS were used to analyse existing web-based tools, in conjunction with different evaluation studies. These included studies that focused on features, technical

aspects and costs (such as the landonline review <http://www.ctt.bc.ca/landonline/reviews.html>) and more theoretical approaches that incorporate pedagogical and also some organisational issues (Britain & Liber, 1999). Several virtual learning environments were analysed, with the conclusion that none had all of the qualities thought to be necessary for an effective VLS for C&IT staff development. It was therefore decided to attempt to combine features from different tools into an environment that would provide a flexible basis for further development. Studies have started on the implementation of a version of RGU's Virtual Campus. This has the advantage of providing the project team with easy access to the developers of this environment, and could also facilitate the continuity of the VLS beyond the lifetime of the project. The emphasis should, however, be on developing the VLS via a continuous process of evaluation, which involves the participation of users from the three partner institutions.

4. Conclusion

This paper presented the process used for identifying the qualities needed for a virtual learning space in C&IT skills. It described the first stage of the Virtual Learning Space project, which aims to develop an online community and resources pool to support C&IT staff development at three educational institutions.

An initial framework based on the need to consider interrelated pedagogical, organisational and technical issues was proposed to guide further development of the project. It was used as a basis for discussion and analysis of findings within focus groups. The latter involved users from the three institutions and was useful in identifying common issues as well as differences.

As might have been predicted, staff highlighted different needs according to their roles within institutions and their responses reflected institutional differences. There was, however, a high level of similarity regarding main interests, expectations and motivational issues.

The findings of the focus groups confirmed the need for a VLS that allows interaction and the exchange of resources and ideas, within a collaborative and supportive community. The project should also heed participants concerns regarding time constraints, potentially by providing relevant information that is easily and quickly accessible, and perhaps by offering a consultant type advice option. The relevance of information could be enhanced by enabling self-assessment and reflection, thereby highlighting individuals' true C&IT needs. The VLS should also be reliable, well structured and up to date, and flexible enough to accommodate the different needs of individuals within different institutions.

It is clear from the use of the proposed framework that an effective approach for C&IT staff development should incorporate organisational, pedagogical and technical issues. As these issues are highly interrelated, the success of the VLS environment will depend on actions being taken in all three areas, and on a strong institutional integration and commitment.

REFERENCES:

- Alexander, W. (1999) *TALISMAN C&IT Review*. <http://www.talisman.hw.ac.uk/CITreview>.
- Anstey, P. (2000) *C&IT Skills: Developing staff C&IT capability in Higher Education*. JISC workshop, Stirling.
- Atkins (1998) *An Evaluation of the Computers in Teaching Initiative and the Teaching and Learning Technology Support Network*. (HEFCE Report 98/47): http://www.niss.ac.uk/education/hefce/pub98/98_47.html
- Britain, S. and Liber, O. (1999) *A Pedagogical Framework for the Evaluation of Virtual Learning Environments*. Bangor, University of Wales: <http://www.jtap.ac.uk>
- Crook, C. (1996) *Computers and the collaborative experience of learning*. London, Routledge.
- Dearing, R. and The National Commission for Investigation in Higher Education (1997) *Higher Education in the learning society*. <http://www.ex.ac.uk/dearing.html>
- Gagné, R.M. (1967) *The conditions of learning and theory of instruction*. New York, Holt Rheinhardt Wilson.
- Hilgard, E.R. and Atkinson, R.C. (1967) *Introduction to psychology*. New York: Harcourt, Brace & World. 4th ed.
- Merril, M.D., Li, Z. et al. (1990) "Second generation instructional design". *Education Technology* 30(2): 7-14.
- Milligan, C. (1998) *The role of VLEs in on-line delivery of staff development*. JTAP Report 573. <http://www.icbl.hw.ac.uk/jtap-573>.
- Owen, M. (1999) *Paradigms for curriculum design: The design of reflective, situated, collaborative professional development supported by virtual learning environments*. Bangor, School of Education, University of Wales.
- Pereira, M.A. (2000) *ArchCAL: a conceptual basis for the application of information technology into learning and teaching technical subjects in architectural education*. Submitted PhD Thesis, University of Sheffield

Tomes, N. and Higgison, C.A. (1998) *TALISMAN Training Needs Analysis*. A Report for The Scottish Higher Education Funding Council. <http://www.talisman.hw.ac.uk/>

Stewart, D. W. and Shamdasani, P. N. (1990) *Focus Groups: Theory and Practice*. London: Sage Publications.

Vavik, L. (1999). *Pedagogy in Open Learning: Lesson 11 - Pedagogy and design of ICT based learning*. <http://www.Idb.hist.no/fag/X-PedagogyInOpenLearning-EU/lessons/11/design-ict.htm>