

Learning through Collaborative Design
in a Virtual Environment:
A Case Study

by

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ABSTRACT

This paper reports on an on-line collaborative design project of which the final outcome was a comprehensive, international World-Wide Web database of experts in the field of Instructional Technology as part of a learning task for post-graduate students in the same field.

The main objective of the study was to determine the extent to which computer-supported collaborative design without face-to-face contact could be used to create a useful resource in this field.

Sub-questions that arose were:

- How does a computer-supported collaborative design process evolve in an open-ended learning environment?
- What support could student designers working on a real-life project expect from their peers and experts in the field?
- How does one judge the success of such a project?
- What direct benefits can students derive from computer-supported collaborative design?

The iterative design process was explored by means of an action research case study methodology.

Three sets of issues fundamental to constructivist learning in an open-ended virtual environment came under scrutiny, viz. collaborative and participatory design, computer-mediated collaboration and collaborative learning.

It was found that computer-supported collaborative design could be a highly effective method both of learning and of producing a valuable artefact.

Keywords:

Collaborative Design; Participatory Design; Computer-Supported Collaborative Learning; Computer-Supported Collaborative Work; Collaborative Learning; Engaged Learning; Situated Learning; Constructionism; Distributed Constructionism; Problem-based Learning.

CHAPTER 1

INTRODUCTION

CHAPTER OUTLINE

- 1.1 Background
- 1.2 Rationale for this study
- 1.3 Research problem
- 1.4 Structure of this report

1.1 Background

In the RBO880 module of the MEd (CAE) programme at the University of Pretoria students were introduced to the Internet as an educational tool.

First-hand experience of computer-supported collaborative learning had to be gained by completing a collaborative Internet-based project. In the process they also had to learn to construct WWW sites.

This mini-thesis reports on a project aimed at constructing a comprehensive, international database of experts in the field of Instructional/Educational Technology as part of a learning task for students in the same field. The purpose of the project was thus the development of a practically useful product as the outcome of an academic programme.

When six of us in the Master's programme in Computer-Assisted Education were given the assignment of creating a database of Instructional Technology experts on the World-Wide Web, we realized that this was not just another simulation. This was the real thing!

It was a daunting challenge, as we were, on average, relatively inexperienced in the 'New Media'. However, as a real-life project that had to produce an artefact useful to an international community of practice, it would provide excellent experiential learning. It also offered valuable opportunities for studying phenomena related to learning through computer-supported collaborative work (CSCW).

This, then, is the story of the *Who's Who in Instructional Technology*, created in the RBO880 module of the MEd (CAE) at the University of Pretoria in 1997. (Available at <http://hagar.up.ac.za/catts/whoswho.html>)

1.2 Rationale for this study

1.2.1 General

The project was the direct result of a real need for a resource. The product had to be a real-life artefact for use by a professional community of practice, and could thus be regarded as being similar to a commission by a client. As a prime example of situated learning, an analysis of the production process may yield useful results for educational purposes.

Bill Trochim notes that "[i]t is surprising, given the importance of this technology and the resources that are being committed to implementing it, that there has been so little effort to date to evaluate it. There is a remarkable absence of studies that examine how websites are conceptualized, developed, and implemented, or that look at the effects of their use" (Trochim, 1996).

According to Trochim Web sites have the following functions:

- Information Dissemination
- Education and Training
- Commerce and Advertising
- Entertainment
- Communication

The *Who's Who* was aimed at the first two categories, and to some extent at the last.

The aim with this study was not to find and fill "a gap in the literature", as conventional research design requires. The main driving forces were contingency, and curiosity about the factors directly pertaining to the collaborative design of an artefact by means of electronic media. Research needs emerged during the creation of the resource.

1.2.2 Need for the resource

A need was identified locally by a fellow-student for a central database of expertise in Educational Technology. On further investigation no such a resource could be found either in conventional form or in the "New Media", i.e. in an Internet format.

It was virtually inconceivable that, in the fast-developing globalized field of Educational Technology, no resource existed that would provide up-to-date networking information to the international community of practice.

The advent of the hypertextual, graphic interface of the WWW and the increasing ease of computer-mediated communication had made it possible for the first time to provide such a service efficiently to a world-wide community. Since most, if not all, of the target group would have access to the 'New Media' by the very nature of their interests and occupations, these media were the ideal vehicles.

1.2.3 Collaborative design and learning

The answer to the need was the creation of a suitable resource, of which the means of development was dictated by the requirements of an academic programme.

Such a project, however, has implications beyond the immediate confines of an academic course. This is clear from assertions from the business world, e.g. that "[t]he knowledge worker of the future will be required to work in virtual teams and distributed projects" (Coleman & Osborne, 1999).

Industry attaches increasing importance to collaborative work facilitated by the so-called 'New Technologies', as a means of achieving greater efficiency and of saving costs. Coleman and Osborne state that "[a]s our society and businesses become more complex and distributed, there is a greater need to manage projects across time and space".

Although a certain percentage of the educational community have responded to such challenges, the bulk of educators still seem to be practising 'time-honoured' approaches and methods.

In answer to the demands of the work-place, the past two or three decades have spawned their share of new perspectives (and the unavoidable terminology) in education and training: Constructivism, Collaborative/Cooperative Learning, Situated Cognition, Cognitive Apprenticeship, Engaged Learning, Flexible Learning, Outcomes-Based Education, Problem-Based Learning, Organizational Learning, Action Learning, and a host of others.

However, a vogue word or phrase tends soon to lose impact if its meaning is not revitalized. Such periodic revitalization may result from novel applications of the particular approach, model or method.

Especially during the eighties and nineties of the past century the notions of practice-oriented group work were 'turbo-charged' by the infusion of technology to create 'new paradigms'. In this context one notes much enthusiasm for Computer-Supported Collaborative Learning (CSCCL) but little to prove that it is more efficient than traditional collaborative work. Debates are also continuing about the effects and benefits of various technologies for learning (Hiltz, 1998).

Lawrence W. Sherman furthermore points out that, despite a considerable body of research into a variety of cooperative learning strategies at the elementary and secondary education levels, little research has been conducted in higher education (Sherman, 1996).

An extensive search on the Internet produced virtually no results on computer-supported collaborative design as an instrument of learning, whether in academia or in industry. The vast majority of sources, both academic and industrial, stem from the fields of architecture, engineering and computer systems. The emphasis is mainly on Computer-Aided Design (CAD) and its derivatives, based on computer software solutions for graphic design or networking. They focus mainly on the 'non-human' aspects in the development processes of artefacts, models, software systems and the like.

'Open-ended' systems such as the Internet do not seem to be considered as viable options in collaborative design, unless integrated into a more rigorously structured system, usually controlled by specially designed software.

1.2.4 Conclusion

It seems that the two main prongs in the thrust for educational renewal are the social nature of learning and the role of technology in facilitating such learning.

The purpose of this exploration is, therefore, twofold: To add to the growing body of knowledge by reflecting on experience, and thereby to illuminate theory about

- learning through collaborative design at the higher education level;
- the usefulness of technology to facilitate such collaboration in learning, and by extension in work.

This report does not present conclusive evidence or final answers. It focuses on issues emerging from one particular case of computer-mediated collaborative design, in an attempt to identify phenomena worthy of further investigation.

Three sets of relevant fundamental issues come under scrutiny, viz.

- Collaborative and participatory design
- Computer-mediated collaboration
- Collaborative learning

Although the focus will be primarily on the process and results of collaborative design, it cannot be divorced from the educational implications. However, the latter will have to be explored in more detail in a further study, as they are too comprehensive and complex for the limits imposed on an essay or mini-thesis. The results of this study will form the basis for further exploration of the nature of computer-supported collaborative learning.

1.3 Research problem

1.3.1 Main research question

The main objective of this study was to determine the extent to which computer-supported collaborative design without face-to-face contact could be used to create an internationally useful resource in educational technology.

1.3.2 Sub-questions

This gave rise to the following sub-questions:

- How does such a computer-supported collaborative design process evolve in an open-ended learning environment?
- What support could a group of student designers working on a real-life collaborative project expect from their peers and experts in the field?
- How does one judge the success of such a project?
- What direct benefits can students derive from computer-supported collaborative design in an educational environment?

1.4 Structure of this report

Firstly a cursory survey of relevant literature will be presented, chiefly to create a pedagogical framework for the reader.

Secondly the research and development procedure will be described.

Thirdly various facets of the iterative design and development of the artefact will be described, explored and discussed.

The testing and evaluation of the resource will be discussed in a separate chapter, although formative evaluation was intertwined in the iterative design process.

Before conclusions are drawn, a brief look-back will be given.

Lastly conclusions will be drawn to answer the research questions. Based on these, certain recommendations for further investigation will be offered.

CHAPTER 2

REVIEW OF LITERATURE

CHAPTER OUTLINE

- 2.1 Introduction
- 2.2 Theories, paradigms, models and concepts of learning
- 2.3 New technologies and learning
- 2.4 Computer-Supported Collaborative Learning and Work
- 2.5 Collaborative and Participatory Design
- 2.6 Topical literature

2.1 Introduction

As a result of externally imposed time constraints on the development of the first iteration of the product, a comprehensive prior literature review was impossible. A useable prototype had to be created as a matter of 'just-enough-just-in-time'.

Therefore, neither the pedagogical underpinnings nor the actual design processes were studied beforehand.

A review of relevant texts was undertaken retrospectively to establish the position of the *Who's Who* project in the realm of learning through computer-mediated collaborative design. Trying to survey the entire scope of each one of all the issues involved in a project such as the *Who's Who* would justify a doctoral thesis (or perhaps a number of these). Therefore only a cursory summary of representative views will be provided in an attempt to create a frame of reference for the reader.

2.2 Theories, paradigms, models and concepts of learning

Laurillard (1996) refers to the fundamentals of learning posited by the thinkers of the past:

"Vygotsky emphasised the social aspect of knowledge. Piaget emphasised the constructive character of learning. Dewey emphasised the importance of integrating

theory with practice. Pask emphasised the link between the descriptive and operational aspects of understanding. Academic learning requires all of these. We certainly cannot get away with a less complex framework".

The notion of '**engaged learning**' seems to embody the current ideals in education. It draws its essential elements from constructivistic cooperative and collaborative learning, situated cognition, cognitive apprenticeship, flexible, open, problem- and project-based learning.

Kearsley and Shneiderman (1999) see the essence of engaged learning as students' being "meaningfully engaged in learning activities through interaction with others and worthwhile tasks". They regard collaborative, project-based efforts with an outside (authentic) focus as the essential elements of engaged learning.

Jones et al. (1996), share the same view: "[...] tasks need to be challenging, authentic, and multidisciplinary." Such tasks are also typically complex and involve sustained amounts of time. The student as explorer must be allowed and able to discover concepts and apply skills, and to reflect upon the discoveries.

Jones et al. furthermore regard ideal engaged learners as being collaborative, self-disciplined and responsible for their own learning. They can set their own learning goals and evaluate their own achievements. They have a "lifelong passion" for problem-solving, and know how to learn and use knowledge creatively.

According to proponents of '**situated learning**' educational practice should be moved "into realistic day-to-day settings" (Holt *et al.*, 1995).

Michael Hannafin's notion of an "**Open-Ended Learning Environment**" would seem to provide a suitable framework for engaged learning. An "OELE" is not tied to particular content, level or purpose, but allows learners to "understand for their own purposes".

"In effect, OELEs impose no particular pedagogical strategy or instructional sequence, but guide learners in invoking their own strategies and generating their own learning sequences." (Hannafin, 1996).

In the same vein Joanna Allan (1996) regards outcomes as "essentially what one ends up with, intended or not, after some form of engagement.

The essentials of successful **cooperative/collaborative** learning, according to Johnson, Johnson and Holubec (1993) are mutual goals, positive interdependence, individual and group accountability, interpersonal and small group skills, and group processing.

It must be noted that some authors distinguish between cooperative and collaborative learning.

Cooperative learning would entail structured group activities aimed at "coming up with the correct answers", whereas *collaborative* learning is aimed at students' developing their own answers through consensus and largely by choosing their own procedures (Panitz, 1996).

Bettina Lankard (1995) observes that "methods and techniques that draw upon workers' previous experiences, link concepts and practices, and encourage reflection and the transfer of knowledge from one situation to another are vital to the learning process".

She identifies **action learning**, **situated learning** and **incidental learning** as the main types of learning occurring in the work place.

- Action learning is just-in-time learning by doing - much as we experienced in our project.
- Situated learning arises from the demands of a particular situation or context, "being in part a product of the activity, context, and culture in which it is developed".
- According to Lankard, incidental learning is defined as "a spontaneous action or transaction, the intention of which is task accomplishment, but which serendipitously increases particular knowledge, skills, or understanding. Incidental learning, then, includes such things as learning from mistakes, learning by doing, learning through networking, learning from a series of interpersonal experiments".

In these regards the learning processes in the *Who's Who* project were remarkably similar to those in a work situation.

2.3 New technologies and learning

Gavriel Salomon remarks that he has often encountered "a common point of departure, the basis for all the rationales: What the Internet, through ALN, CMC and the like can accomplish. Hardly ever did I find a paper that starts out from the learning perspective" (Salomon, 2000).

As if in reply Martin Ryder and Brent Wilson (1996) express the opinion that "the Internet offers countless affordances" to the goals of situated learning.

"... the open architecture of the Internet transfers interactivity from an affordance of designer control to that of user control [...] shifting agency from author to user.[...] We no longer have to contrive interactive `lessons' and exercises. The real world is waiting on the other side of the terminal" (Ryder & Wilson, 1996).

This is in contrast to Diana Laurillard's view of "the overblown blather about the `information superhighway'", reminding one again of the classic Clark/Kozma debate. Laurillard at the time asserted that the Internet "is a useful source of information, but that is all" (Laurillard, 1996).

She further warned that "information technology has led to an alarming expectation that it may be possible to educate students by simply linking them up to the World Wide Web: give them access to information. The notion is often accompanied by the rhetoric of being student-oriented, or learner-centred [...]"

Although new technologies do seem to offer at least partial answers to age-old problems, Laurillard cautions that we should not focus on the technology, but on students' needs instead. She argues that technology "should (a) give students more opportunities to engage with the practice of their subject; and (b) give them more opportunities to discuss and articulate their ideas."

Especially relevant to Laurillard's last remark are the views of some educators on computers as cognitive tools.

Jonassen argues that "technologies [...] afford the most meaningful thinking when used as tools". Among such tools and learning environments he includes "collaborative knowledge construction environments", and states that "cognitive tools require students to think mindfully in order to use the application to represent what they know" (Jonassen, 1994).

Reeves, Laffey and Marlino (1997) report on the effective use of computer software as cognitive tools for analyzing complex problems, solving difficult tasks, accessing information, interpreting and organizing personal knowledge, devising unique solutions, and representing one's learning results to others.

The software included word-processors, spreadsheet programs, presentation programs, e-mail and the World-Wide Web.

Reeves et al. found the results of their experimental group to be superior to those of a control group taught in a traditional, instructor-led class (Reeves *et al*, 1997).

Reeves maintains that "the real power of interactive learning to improve achievement and performance may only be realized when people actively use computers as cognitive tools rather than simply interact with them as tutors or data repositories" (Reeves, 1999).

Apart from using new technologies as tools rather than as tutors, computer-mediated communication (CMC) seems to be central to the new directions in education and training.

Joseph Walther (cited in Davis, 1997) identifies three types of CMC, viz.

- Impersonal (useful for task-oriented, instrumental communication)
- Interpersonal (as used in social communication)
- Hyperinterpersonal (which allows individuals to self-present and edit).

According to Clarke (1998), Hiltz and Wellman (1997) were convinced that, although CMC "is good for communication of information, opinion and suggestions", it is "less suited for communicating agreement or disagreement", and "less effective for social-emotional tasks".

As many enthusiasts there are, as many 'Luddites' there seem to be.

Writers such as Sgouropoulou et al. (2000) assert that "[w]hen it comes to the communication and learning of skills, especially the complex skills that are embedded in real-world working practices, the support offered by this kind of technology [i.e., text-based asynchronous CMC] proves to be insufficient, in the sense that it makes only some forms of exchange about working practices feasible or straightforward".

They use this argument to support their view that asynchronous multimedia conferencing is a better and more effective solution.

Brent Muirhead cautions that "[e]ducators are wondering whether the online format will provide adequate opportunities for genuine dialogue and social interaction that are vital elements in the learning process" (Muirhead, 2000).

Strangely enough, Muirhead notes as late as September 2000 that "interactivity has been a neglected topic and few qualitative research studies have addressed this vital issue" (Muirhead, 2000).

In this thesis I hope to counter such notions.

2.4 Computer-Supported Collaborative Learning and Work

Together with the currently fashionable strategies of collaborative and cooperative efforts in both the classroom and the work place, CMC has spawned a number of off-spring, most notably the twins of Computer-Supported Collaborative Learning (CSCL) and Computer-Supported Collaborative Work (CSCW).

Referring to a number of contemporary studies, Carr-Chellman et al., note that "such works do not address the benefits of CMC over face-to-face instruction for constructivistic ends, and none of this work approaches the problems of authentic problem-based collaboration at a distance" (Carr-Chellman et al, 1999).

Some authors seriously doubt the effectiveness of CSCL/CSCW in completing complex, authentic problem-solving tasks.

In 1998 Starr Roxanne Hiltz, a veteran in the field, asked: "Is online collaborative learning really superior to using the Web for students to individually interact with educational materials? And how do both compare to traditional classrooms of various types (the small seminar style classroom, and the mass lecture hall)?"

Her answer is significant: "Our evidence on these matters is limited [...]" (Hiltz, 1998).

A study by Mark Edwards and Fintan Clear (2001) led them to conclude that asynchronous CMC "appears unlikely to further [collaborative learning of complex skills] in traditional university settings, where students have face-to-face opportunities to meet [...]"

They base their conclusion on the fact that their on-campus students did not use CMC effectively or to any great extent in designing Web pages, preferring rather to collaborate face-to-face. They also cite two other studies by Crook (1997) and Boddy and Tickner (1999) with similar findings to support their view.

Gavriel Salomon summarizes thinking about computers as collaborative tools as follows: "[...] the role best accomplished by the computer is that of affording new opportunities for collaborative learning and supporting it. But whether the opportunities are actually taken and whether taking them upgrades performance and leaves some desired cognitive residue, is less dependent on the technology and far more on other factors" (Salomon, 1995).

Chris Dede ties the expected future demands of work to the concomitant imperatives for education when he says that "skills of information gathering from remote sources and of collaboration with dispersed team members are as central to the future American workplace as learning to perform structured tasks quickly was to the industrial revolution" (Dede, 1996).

Although local realities might differ from the American, it is nevertheless fairly safe to assume that those skills will become more important in any post-industrialized society, if not for the majority of the work force, then at least for a substantial minority of influential decision-makers.

Coleman and Osborne (1999b) are adamant that "[s]uccessful project management in distributed environments through virtual teams is a key competency for organizations if they are to compete effectively today. They must reinvent their project management methods,

establish collaborative infrastructures, and develop virtual teaming ability as core competencies."

2.5 Collaborative and Participatory Design

The most practically useful collaborative application of computers must surely be as tools for design and construction, as it combines the two strongest features of modern computers, viz. as communication media and as work tools.

As noted earlier, *collaborative design* as a dedicated form of CSCW is mostly used in Engineering and Architecture in the form of Computer-Aided Design (CAD). However, much CAD still seems to occur in localized, face-to-face settings.

Among the first 500 results of an Internet search with a specialized search engine on the key phrase "collaborative design", only three were relevant to collaborative design as a vehicle of learning. Very little information could be found on CAD in other fields for purposes of academic learning.

Jonassen (1994) strongly emphasises the value of design activities in learning, both for the teacher and the learner. He maintains that "[t]he people who learn the most from the design and development of instructional materials are the designers". The implication is that designers become learners and learners (should) become designers.

This phenomenon can apply equally well to the design and construction of other kinds of material or artefacts.

Jonassen also points out that, while working "WITH computer technology, instead of being controlled by it, [students] enhance the capabilities of the computer, and the computer enhances their thinking and learning" (Jonassen, 1994).

Should one regard Seymour Papert's notion of Constructionism as being related to CAD, one may 'advance the enquiry', although not strictly in the context of collaboration yet.

Constructionism is based on Constructivist Learning theory, but contends that "people construct new knowledge with particular effectiveness when they are engaged in constructing personally-meaningful products" (Resnick, 1996).

Practitioners such as Mitchel Resnick and Thomas Reeves also subscribe to the value of constructing artefacts as a means of learning.

Reeves's belief in the educational value of design activities is perhaps best reflected in the following extract: "[...] there is considerable evidence that learners develop critical thinking skills as authors, designers, and constructors of multimedia or as active participants in constructivist learning environments" (Reeves, 1999).

Resnick (1996) extends Papert's idea of Constructionism to a collaborative level in his model of Distributed Constructionism. He notes that "a particularly effective way for knowledge-building communities to form and grow is through collaborative activities that involve not just the exchange of information but the design and construction of meaningful artifacts".

Carr-Chellman et al. (1999), found that "it is possible to successfully collaborate on authentic problems at a distance", using CMC.

The industrial notion of "*participatory design*" has started cropping up in educational contexts recently. This seems to be symptomatic of the narrowing chasm between education and the world of work.

Whereas collaborative design usually implies collaboration among peers, participatory design seems to be aimed at getting clients involved in the design process. These delimitations are not clear-cut, however, as one frequently notices writers and participants in on-line discussion groups using the words "cooperative", "collaborative" and "participatory" interchangeably.

Paula Vincini notes that in participatory design "stakeholders [are] involved beyond input and reflection on product design to empowerment with real and substantial decision-making powers". The crucial difference between collaborative design and participatory design is the active involvement of the target group in the latter form of design (Vincini, 2001).

2.6 Topical literature

A number of reports deserve attention because of similarities or close parallels with our project.

At the time the *Who's Who* was designed we were not aware that Lorraine Sherry and Karen Myers had conducted a very similar research project at the University of Colorado (Denver), which provides a close parallel to this study.

Their development team had to create and implement a Web site and mediated learning environment for the School of Education. They used the project to do "developmental research on the collaborative learning and participatory design process".

They concluded that roles in a team change spontaneously according to the developing expertise of members and that the strength of the team lay in the combined expertise of its members. They also concluded that computers were not mere tools "or objects to be programmed", but that they could be used as "a shared representational space that can support knowledge-building and design" (Sherry & Myers, 1998).

Mitchel Resnick reports on three 'distributed constructionist' projects conducted at MIT Media Lab, one of which involved collaborative construction as opposed to merely discussing or sharing constructions. He found that "[c]omputer networks can support a more fundamental change when they enable students not only to share ideas with one another, but to collaborate directly, in real time, on design and construction projects" (Resnick, 1996).

Alison Carr-Chellman, Jeroen Breman and Dean Dyer (Penn State University) conducted a comparative study of authentic problem-based collaborative work in a distance learning and a face-to-face environment respectively. The results are useful for comparison with our experiences, although this report does not concern itself with face-to-face collaboration.

They came to the conclusion that "it is possible to enact authentic learning and distance collaboration within modified and potentially pure distance education when learners are advanced in their studies, have had previous experiences with smaller projects collaborating at a distance, and are prepared for the challenge of authentic experiences by seeing a strong relevance to their own work" (Carr-Chellman et al, 1999).

Mark Edwards and Fintan Clear at Brunel University (UK) conducted a project with their students very similar to the *Who's Who* project, viz. the collaborative design and construction of a Web site in a flexible learning environment, using CMC. The aim was to determine whether "collaboration aided the learning of Web authoring skills and associated knowledge, and to determine whether CMC militated against the problems some students were having in their collaborative efforts".

Allowing their on-campus students to meet face-to-face (thus diluting the effect of CMC in the project) they conclude that "usage of computer-mediated communication technology and its contribution to collaboration was limited in an activity that was skills-oriented, requiring practical experience" (Edwards & Clear, 2001).

From the world of industry and business, John Gundry and George Metes (1999) report on a computer-supported, international collaborative design project that they undertook. Significantly, they approach the project from the angle of knowledge management in a learning organization, which relates closely to pedagogical perspectives.

They found that CMC was an extremely valuable tool for facilitating collaboration on construction projects and for managing knowledge in the world of work. They also found that the affordance of CMC of automatically storing knowledge and insights as information for future projects was an invaluable benefit to a commercial enterprise.

It is noteworthy that most of the mentioned projects did not require the exclusive use of CMC. Despite extensive literature searches I am not aware of reports on any collaborative design projects in higher education based purely on CMC, except those at the University of Pretoria.

The RBO880 'virtual classroom' has itself been the object of research:

- Patsy Clarke analyzed the RBO880 module extensively in a Master's thesis (1998);
- Johannes Cronjé reported on the course in general in the ITFORUM e-mail discussion group (1998);
- Clarke and Cronjé together reported their findings on the RBO880 course (1998).

Relevant findings and conclusions from their reports are included in the rest of this thesis.

CHAPTER 3

PROCEDURE

CHAPTER OUTLINE

- 3.1 Research methodology
- 3.2 Data collection
- 3.3 Evaluation of research
- 3.4 Brief project description

3.1 Research methodology

3.1.1 Strategy/Approach

Two intertwined research strands run through this report:

- (1) The action research process as it unfolded during the development of the artefact, and
- (2) The post facto qualitative case study reviewing and exploring that process.

In keeping with the iterative design process, an action research approach seemed to be the most suitable for designing and developing the artefact. Afterwards I used a single-case study method to explore the design and development process and its outcomes.

On the whole a qualitative, inductive approach from a phenomenological perspective was used for both purposes. Quantitative data were used merely to support or verify qualitative observations. Statistical analyses were deliberately kept simple, even rudimentary, in order not to bias the qualitative nature of findings and conclusions.

Marie C. Hoepfl states that "[p]henomenological inquiry, or qualitative research, uses a naturalistic approach that seeks to understand phenomena in context-specific settings". Qualitative research problems are often formulated as open-ended questions aimed at the discovery of new information and insights (Hoepfl, 1997). These were precisely the aim of this study.

The core research objectives for the study were

- (1) exploration of phenomena and emergent issues, and
- (2) description of results and observations.

Typically in qualitative research "causal events contributing to the phenomenon, descriptive details of the phenomenon itself and the ramifications of the phenomenon under study" are explored (Hoepfl, 1997). In this study some inevitable conclusions were also drawn.

Thomas Reeves (2000) identifies six major kinds of research goal, viz.

- (1) Theoretical goals
- (2) Empirical goals
- (3) Interpretivist goals
- (4) Postmodern goals
- (5) Development goals
- (6) Action goals

The nature of the *Who's Who* project caused it to fall firmly within the last two categories.

Reeves contends that "[a]ny approach, quantitative, qualitative, critical, and/or mixed methods, is legitimate as long as the goal is to enhance education" (Reeves, 1999).

According to Reeves, development goals are achieved when researchers aim to develop creative solutions to human problems, "while at the same time constructing a body of design principles that can guide future development efforts" (Reeves, 2000).

In action research "the major goal is solving a particular problem in a specific place within a relatively short timeframe" (Reeves, 2000). This was precisely the situation with the *Who's Who*. This essay is "focused on [...] a particular product [...] in an applied setting, for the purpose of describing it, improving it, [and] estimating its effectiveness and worth" (Reeves, 2000).

K. Patricia Cross supports these views in stating that the educational community has become "too dependent on what the authorities in research tell us about learning". She suggests that,

instead of simply reporting formal research findings by experts, teachers and learners should add a "a generous dollop" of their own insights (Cross, 1998).

This study should claim little external validity, i.e. little "generalizability", owing to the localized context of the phenomena under scrutiny, the limited unit(s) of analysis, and the researcher's personal involvement in the decision-making processes. However, it could serve to add to the knowledge base available to the community of Educational Technologists.

The reader is reminded that the project was not the ubiquitous conscious, theory-driven, structured effort to prove the validity of educational theory in practice. Ultimately it was a practical, needs-driven production process during which learning occurred inevitably but spontaneously.

Therefore, the process of inquiry is essentially an open-ended one with no preconceived hypotheses or theories to be proven.

3.1.2 Methods

Action research

Although action research originated for humanitarian reasons in community development and still seems to be applied mainly to human subjects and systems, e.g. to improve personal practice in school education, the essential characteristics seemed to us eminently applicable to the task at hand.

D. Hopkins concisely describes action research as "an informal, qualitative, formative, subjective, interpretive, reflective and experiential model of inquiry" (cited in Gabel, 1995).

Goodyear advocates "some kind of action research, involving the pragmatic solution of real problems, but also reflection, self-evaluation, evidence gathering, and the dissemination of experience" (Goodyear, 1999).

Kock et al. (1997) point out that action research allows for "the possibility of positive intervention from the researcher", which was what was needed for the development of our product, owing to the unfamiliarity of the terrain to the three participants.

Sherry and Myers refer to this kind of research also as Developmental Research that "typically involves an analysis of design, development or evaluation processes which is generalizable even though the instances studied may be context specific" (Sherry & Myers, 1998). (Interestingly they do not distinguish between Action Research and Developmental Research, as does Reeves.)

In the opinion of Richard Winter, Action Research procedures are "equally applicable to the context of professional practice, to the context of developmental innovative projects and to the context of higher education awards" (Winter, 1998).

Gabel (1995) summarizes the steps in action research design as follows:

- (1) Exploration;
- (2) understanding of the problem;
- (3) plans for intervention;
- (4) intervention is carried out;
- (5) observations are collected;
- (6) new intervention is carried out;
- (7) the cyclic process repeats, continuing until a sufficient understanding of (or implementable solution for) the problem is achieved.

In accordance with the nature of action research and iterative design, the qualitative "stages of [research] analysis [...] in practice may occur simultaneously and repeatedly" (Hoepfl, 1997).

Case study

To review the process of designing and producing the artefact, and to complement the nature of the iterative process, reflection based on a case study methodology seemed to be the most appropriate.

According to Lynn Davey the case study is "a method of learning about a complex instance through extensive description and contextual analysis. The product is an articulation of why the instance occurred as it did, and what may be important to explore in similar situations" (Davey, 1991).

Tellis (1997) notes that "[c]ase study can be seen to satisfy the three tenets of the qualitative method: describing, understanding, and explaining". Inexplicably he omits exploration as a basic tenet of qualitative research.

This was mainly a combination of a Critical Instance and an Exploratory case study:

- It was exploratory inasmuch as "fieldwork and data collection [were] undertaken prior to definition of the research questions and hypotheses" (Tellis, 1997).
- Lynn Davey (1991) explains that critical instance case studies often entail the "examination of a situation of unique interest, with little or no interest in generalizability".

Since replication was not possible owing to time constraints, a single-case design was followed.

"The unit of analysis [...] in the case study [...] is typically a system of action rather than an individual or group of individuals. Case studies tend to be selective, focusing on one or two issues that are fundamental to understanding the system being examined" (Tellis, 1997).

In our case the development of an artefact was the "system of action", while the fundamental issues were the phenomenon of collaborative design and the process of learning-by-designing.

Section 3.4 contains a more detailed project description.

3.2 Data collection

Stake (1995), and Yin (1994) (cited in Tellis, 1997) identified at least six data sources in case studies:

- (1) Documents
- (2) Archival records
- (3) Interviews
- (4) Direct observation
- (5) Participant-observation
- (6) Physical artefacts

Hoepfl (1997) notes that "[t]he classic form of data collection in naturalistic [...] research is observation of participants in the context of a natural scene. Observational data are used for the purpose of description of settings, activities, people, and the meanings of what is observed from the perspective of the participants".

As one of the possible observation strategies, the researcher "may act as a full participant in the situation, with either a hidden or known identity" (Hoepfl, 1997).

Apart from observation, interviews are characteristic as a means of data collection in qualitative research. Instead of structured interviews I used records of electronic communications among participants in the *Who's Who* environment.

Data for the case study were obtained through

- (1) participatory observation of the design and development processes;
- (2) analysis of archived e-mail exchanges;
- (3) analysis of responses to a survey questionnaire;
- (4) analysis of usage statistics;
- (5) observation and analysis of the artefact itself.

The *'field notes'* were taken automatically in this project by virtue of the CMC - an additional benefit of the new technologies!

Having been an active participant in the construction of the *Who's Who*, I regard *my own experiences* as valid objects of research. The theme of this report, after all, is learning through personal, innovative and creative design.

The validity of these experiences lies post facto in their application value in my professional work since the inception of the *Who's Who*. I use the insights regularly in my work as an educator.

E-mail *messages exchanged* between team members and among peer group members in the RBO880 module were analyzed qualitatively to identify salient features in the processes of collaborative design.

E-mail exchanges between the developers and the target group were also analyzed from a communicative point of view to determine the nature and extent of interaction, support from the community of practice, and of participatory design.

A *questionnaire* on the *Who's Who* Web site provided information not only for this case study, but also for the formative evaluation and further development of the artefact. A copy is attached as Appendix D.

3.3 Evaluation of research

"Pragmatic validation [of qualitative research] means that the perspective presented is judged by its relevance to and use by those to whom it is presented: their perspective and actions joined to the [researcher's] perspective and actions" (M.Q. Patton, 1990, cited by Hoepfl, 1997).

According to E.W. Eisner (also cited by Hoepfl) three criteria apply to the evaluation of a qualitative research report:

- Coherence of content
- Consensus between presenter and reader
- Instrumental utility, i.e. usefulness

Lincoln and Guba (1985) provide a useful comparison of criteria for quantitative and qualitative research outcomes:

Table 1 : Criteria for judging the quality of quantitative ("conventional") vs. qualitative ("naturalistic") research

Conventional terms	Naturalistic terms
Internal validity	Credibility
External validity	Transferability
Reliability	Dependability
Objectivity	Confirmability

Lincoln and Guba (1985) maintain that "the transferability of a working hypothesis to other situations depends on the degree of similarity between the original situation and the situation

to which it is transferred." They state further that "the researcher cannot specify the transferability of findings"; the reader must determine whether the results are applicable to the new situation, depending on whether the researcher has provided sufficient information.

Lincoln and Guba also argue that "since there can be no [...] credibility without dependability, a demonstration of the former is sufficient to establish the latter".

Hoepfl (1997) remarks that "credibility depends less on sample size than on the richness of the information gathered and on the analytical abilities of the researcher".

Confirmability refers to the "degree to which the researcher can demonstrate the neutrality of the research interpretations, through a 'confirmability audit.' This means providing an audit trail consisting of 1) raw data; 2) analysis notes; 3) reconstruction and synthesis products; 4) process notes; 5) personal notes; and 6) preliminary developmental information" (Lincoln & Guba, 1985).

The ultimate evaluation of the value of this study will, therefore, depend largely on the perspective of the reader.

3.4 Project description

3.4.1 Introduction

Since the research in this case was spawned by a needs-driven project, and not vice versa, a brief project description should ideally have been given before research issues were clarified.

Similar to a collaborative learning support system (COSS) developed by Martin Ryder and Brent Wilson the *Who's Who in Instructional Technology* was not the result of "formal objective design, with a front-end analysis producing a set of design specifications from which the product would be developed, tested and evaluated". It emerged "through the iterative processes of participatory action research, a process which merges designer, user and evaluator into a common functional role" (Ryder & Wilson, 1997).

Since the product development process served as the vehicle for a learning experience, one has to consider two process layers, one superimposed holographically upon the other. The more concrete process was the design, development and implementation of the artefact, the more ephemeral one was the learning taking place. The latter warrants a more detailed investigation and analysis than can be provided in this mini-thesis, and a more extensive study is proposed at a later stage.

I have already referred to the studies by Sherry and Myers, Resnick, Carr-Chellman et al., Edwards and Clear, and Gundry and Metes which also relate remarkably closely to our project. (See Chapter 2.6., p. 17.)

Similar to the mentioned projects, this research project is based on a case study with the data analysis performed after the artefact had been successfully created. Notable differences were that the *Who's Who* had no face-to-face contact at all, and that the group was smaller, with less complex group dynamics.

Our project is also different in that it is still continuing at the time of writing of this report, although not as a collaborative effort any more.

In the RBO880 module students were assigned to co-operative learning groups designed (typically) around a mutual goal, individual responsibility and positive interdependence (Cronjé, 1998).

3.4.2 Conceptual framework

The basic concept was that of Collaborative Design.

Sherry and Myers (1998) note that two parallel processes occurred during their project, viz. "(a) developmental (or action) research and (b) collaborative learning and design".

I propose that for the purpose of analysis the processes of design and learning could also be separated, although in a real-life project they would necessarily be intertwined and interdependent.

Sherry and Myers (1998) further observe that "[t]he practitioner is not confined by structured theory; rather he/she is constructing a dynamic conceptual framework that evolves as the design process progresses."

We found this observation to apply completely to our project. In our case the process of collaborative design was the vehicle for the learning process, both of which eventually became the objects/subjects of research inquiry.

One of the team members remarked aptly about "qualitative research's emergent design - no hypothesis to go out and dis/prove!"

3.4.3 Participants

Initially six students were involved in two 'home' groups with complementary tasks. Group 1 had to collect data and construct a Web site on educators focusing on the technological aspects of Instructional Technology; Group 2 had to do the same for educators involved more in the educational side itself. (See Appendix A for the original, detailed project brief.)

Group 2, for various reasons, disappeared soon after the start of the project, and its tasks were taken over by the remaining group. This latter group consisted of three members of which one was relatively inactive owing to external factors. Of the other two one had some experience of the WWW and e-mail, the other only of e-mail.

The rest of the larger peer group in the particular study module of the M Ed (CAE) had also been divided into groups with a variety of Internet-related tasks. (See Appendix A.)

When the project had progressed some way, the instructor announced its existence in the ITFORUM electronic discussion group. Members of this latter group then started contributing comments and ideas, thereby becoming participatory designers of the artefact.

3.4.4 Communication

The students used e-mail to communicate, and a discussion list was set up for the entire RBO880 peer group. Students were required to post to the list all project-related messages relevant to the group.

Initially materials had to be transferred to the experimental Web server by means of Telnet. The server was later converted from UNIX to Windows NT, and normal Windows-based FTP software could then be used.

Four primary flows of communication occurred during the project:

- (1) Among the team members (by private e-mail);
- (2) Between group members and the instructor (private e-mail, but usually with copies to other team members);
- (3) Among the members of the larger peer group (mostly via the class discussion list);
- (4) Between the project team and the outside world, i.e. the community of practice for whom the artefact was being created (by private e-mail).

All the messages were archived for future reference.

3.4.5 Modus operandi

The procedure followed in this research was to instruct three students, selected on their experience and geographical dispersment, to construct a World-Wide Web site entitled *Who's Who in Instructional Technology* (referred to as the *Who's Who* in this mini-thesis). Their primary resources were (1) a 'listserv' discussion group, ITFORUM, to which were subscribed some 800 practitioners in the field of Instructional/Educational Technology, (2) the WWW itself, and (3) bibliographies of relevant publications. The students had to approach these practitioners and identify key figures to add to their database.

As can be seen from the initial instructions (Appendix A), an adapted 'Jigsaw' cooperative structure was to be used:

"[...] material is divided into discrete chunks [...]. The number of 'chunks' is equal to the size of the groups which are used, approximately 4 to 6 member groups. Each group member becomes an expert on their chunk of information by studying that information with members of other groups who are supposed to be learning the same chunk of information. Then the experts go back to their home groups and are

responsible for making sure the other members of their group know their expert information" (Sherman, 1996).

Within each working group (team) there were three student 'experts' who, in turn, each had specific tasks similar to his/her counterpart in the other team. These 'experts' were supposed to share knowledge before applying it in their respective home groups.

Coupled to the Jigsaw cooperative approach the team used a traditional problem-solving approach:

- (1) Problem identification
- (2) Establishing problem boundaries
- (3) Goal and objective settings
- (4) Establishing a study design
- (5) Data collection and analysis
- (6) Developing alternative solutions
- (7) Assessment of alternatives
- (8) Selection of alternative solution
- (9) Implementation of solution
- (10) Ongoing monitoring and evaluation

As the scope of the project was virtually unlimited, but a substantial product had to be created within a limited time frame of one month, we decided on an iterative design process. This would allow flexibility to develop the product further once the collaborative academic requirements had been met.

Data collection methods have been described in Chapter 3.2. 'Triangulation' of data was carried out by comparing discourse among the designers, among the peer group, between the designers and the target group, responses from a Web site feedback form, and from the literature.

3.4.6 Evaluation

Formative evaluation of the design and development process was conducted by the designers themselves, as well as by their peers, the experts listed in the artefact, and other educators. Details will be provided in the chapter on Testing and Evaluation.

CHAPTER 4

COLLABORATIVE PLANNING AND DESIGN

CHAPTER OUTLINE

- 4.1 Introduction
- 4.2 Needs analysis
- 4.3 Planning
- 4.4 Roles
- 4.5 Networking
- 4.6 Selection of candidates
- 4.7 Information gathering
- 4.8 Design
- 4.9 Reflective learning
- 4.10 Summary

4.1 Introduction

Trochim's (1996) remark that "[m]ost website development is accomplished quickly under considerable time pressure" was corroborated by our experience. He suggests a model for Web site evaluation based on four stages:

- (1) Conceptualization
- (2) Development
- (3) Implementation
- (4) Evaluation

He notes further that "[e]ven if roughly followed, the four phases suggest an iterative process that goes on indefinitely, a process of trial-and-error, of innovation and evaluative feedback" (Trochim, 1996). These intertwined and recurrent phases manifested spontaneously in the development of the *Who's Who*.

In answer to the question how a computer-supported collaborative design process would unfold, the design and development of the artefact are described in this chapter. The thinking and action learning processes and the resultant actions will be explored.

This chapter also provides reflection on the results in terms of the research question: "What direct benefits can students derive from computer-supported collaborative design in an educational environment?"

The focus will mainly be on the period of two months during which the original artefact was created collaboratively. Further development iterations occurred after the end of the 'academic exercise', when the project was continued by a single person.

4.2 Needs analysis

As explained in Chapter 1, the project resulted from a perceived need to provide a central node of contact for practitioners and information on experts in Instructional / Educational Technology and related fields.

One of the team members had asked the tutor where he could get information on such experts. An enquiry to the ITFORUM Listserv discussion group, to which many eminent Instructional Technologists were subscribed, and a subsequent search on the WWW revealed that there was no comprehensive 'database', although isolated Web sites contained limited localized listings and perhaps a few details on such people.

Triangulation was completed retrospectively by posing two questions in the questionnaire on the *Who's Who* Web site, viz.

- "Do you think there was/is a need for a 'database' like this?" and
- "Why do you say so?"

Without exception respondents indicated that there had been a need for this kind of resource. The reasons given mostly revolved around the notions of networking and research. The questionnaire and its results can be found in Appendices D-F.

Neither Coleman and Osborne (1999), nor Gay and Lentini (1995) indicate any formal establishment of the need for the particular product or service before their planning started. It seems that, from the outset, need was assumed instead of investigated.

In our own case the matter was not much different. We reacted to an instruction based on the observation of a single person, viz. that no database of Educational Technologists existed on the WWW. The course instructor (and we) assumed that such a database MAY be useful, therefore we had to create one. It was only afterwards that we could confirm the real necessity perceived by respondents to our questionnaire.

The generally accepted approach in the design of a resource would be similar to a marketing approach, i.e. to conduct an extensive needs analysis through consultation with a large variety of 'stakeholders'.

In contrast, if the designer is a 'consumer' himself, the awareness of a need may arise from personal experience and observation. If the need is urgent enough, an extensive needs analysis may not be necessary or viable.

Perhaps this indicates that practitioners often might not need the obligatory 'needs analysis' before they embark on a project they intuitively regard to be worthwhile to their community of practice.

4.3 Planning

4.3.1 Procedures

The team saw its core task as being twofold:

- Firstly, useful information had to be collected about prominent members of the IT community;
- secondly, this information had to be presented in a useful format on the WWW.

After analyzing the needs and the task at hand we realized that it would be impossible to complete the project within the given time frame of one month. It would have to be continued after the end of the RBO880 module to fulfil its purpose. This necessitated an iterative, developmental research and design approach. Essentially the design followed a pattern similar to that in Figure 1.

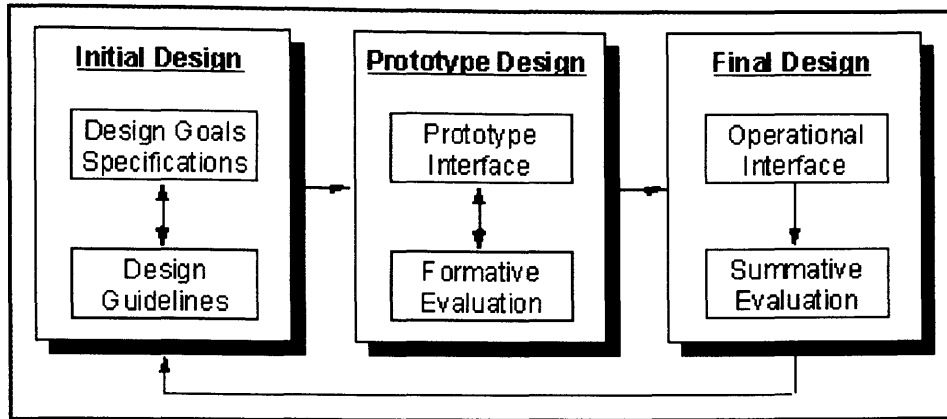


Figure 1: An Iterative Design Model

Coleman and Osborne (1999) describe such an iterative process in industry in more detail:

- (1) Set project targets
- (2) Analyze situation and define needs
- (3) Confirm needs
- (4) Build prototypes and models
- (5) Confirm analysis, check needs
- (6) Design product or define solution
- (7) Confirm design, check analysis
- (8) Build initial product, proof of concept
- (9) Confirm usability, satisfaction, design, needs
- (10) Build products, implement solutions
- (11) Confirm satisfaction, usability, needs
- (12) Start all over for next version of product, or an even better solution

Gay and Lentini (1995) identified the following activities in a similar academic collaborative design project they did at Cornell University:

- (1) Orienting of team members regarding resources, materials, environment, problem, etc.
- (2) Sub-dividing the problem, i.e. defining goals, tasks, requirements and boundaries
- (3) Establishing roles
- (4) Information seeking, both technical and content related to the project
- (5) Information sharing with other team members
- (6) Monitoring of communication and data received
- (7) Negotiating understanding of principles of product design

- (8) Designing the artefact
- (9) Building the artefact
- (10) Evaluating the result

Although these activities formed the framework for our project too, we drafted our own 'plan of action' focused on the main tasks and a number of sub-tasks, as indicated in Table 2 below.

Table 2 : Task analysis

Main task	Sub-tasks
Information retrieval	Selection of candidates according to particular criteria
	Deciding on kind and extent of information to be included
	Determining and implementing methods of collecting information
	Processing information
Design and presentation	Organization of information
	Site structuring
	Style and layout design
	Navigation and search mechanisms
	Usability assessment
	Creating prototype
	Testing and evaluating prototype
	Reiterations
	Maintaining the Web site

Since we had a brief, we decided to get on with the task, therefore we allocated roles in order to divide the workload and get the task done as efficiently as we could.

4.3.2 Reflection

Planning a design and development project under extreme time constraints, as was the case with the *Who's Who*, virtually necessitates an iterative approach and rapid prototyping. Common sense seemed to be the best tool in planning the process.

Neither design nor development followed the neat progression of the planning schedule. The moment we started working, we started changing things too, both in the concept and in its realization.

4.4 Roles

Initially the course leader allocated roles as follows:

Table 3 : Roles allocated for collaborative projects

Role	Tasks
Designer	Manage work distribution; design Web site.
Surfer	Search & collect information.
Author	'Author' project Web site & transfer materials to server.

One team member had some experience of WWW design and Web page construction, another had a limited basic knowledge, and the third knew nothing whatsoever.

Two members had a moderate amount of experience in technical matters such as the use of e-mail, coding and decoding e-mail attachments, File Transfer Protocol, Telnet, WWW searching and Web authoring software. The third member had experience only in using e-mail through a DOS-based system.

Although the group as a whole, therefore, possessed adequate skills for the task, it was clear that we would have to reallocate roles in order to work more efficiently within the time limitations. Very early in the project the initial roles were, therefore, spontaneously abandoned for a less artificial structure. The disintegration of our partner team contributed to this restructuring. The team members then assumed and shared roles according to their knowledge, expertise, time available and personal preferences.

This is consistent with Clarke's findings regarding the other teams in the RBO880 class. She notes that "[m]embers of all three groups [...] implemented more flexible role allocation" (Clarke, 1998).

A spontaneous role allocation seemed to work more efficiently than the original would have had, as it caused a more equitable spread of skills and knowledge among the sub-tasks.

One may conclude that, while role allocation by an instructor may be appropriate for younger, less experienced learners, a natural choice of roles may be more suitable and lead to more efficiency at the adult level.

4.5 Networking

The networking and design infrastructure consisted of students' own computers and tools in distributed localities, linked through dial-up access or academic networks via the Internet.

Three distinct 'networks' emerged:

- (1) Within the collaborative team;
- (2) Within the RBO880 peer group in the MEd course;
- (3) With the wider professional community, mainly via the ITFORUM Listserv discussion list.

Internal networking occurred largely through e-mail and a dedicated peer group discussion list, although members did occasionally use the telephone.

The team members were geographically dispersed. Although two lived in Pretoria where the University is located, one of them worked 60 km away in Johannesburg, and had no e-mail or Internet access at his place of work. He had to use the University's on-campus e-mail facilities at night when he returned from work. The third member lived and worked in Durban, 600 km from Pretoria. Communication thus took place virtually exclusively by e-mail.

Peers in the rest of the RBO880 group were dispersed over South Africa. Since no face-to-face contact was allowed in the study module, the instructor had set up a dedicated electronic discussion list, which served as the common interface for the entire peer group.

Exchanges between the team and the instructor took place entirely by e-mail.

External networking occurred internationally between the team and the experts whom we wanted to include in the database, as well as between team members and other persons in the field.

We found wide networking with a variety of interest groups (i.e. our peers, Instructional Technology experts, and other educators) beneficial, as it afforded multiple perspectives on our work and provided a wider base for the construction of our knowledge.

CMC afforded opportunities for networking that would otherwise be virtually impossible. Feedback from respondents could be interpreted and used immediately in the design and development process.

4.6 Selection of candidates

4.6.1 Criteria

At the outset we had no detailed criteria for selection, the first attempt being very tentative: "[The] tacitly agreed criterion so far has been that the guru(-to-be) must at least be actively involved in some form of IT planning, development, or use."

Shortly afterwards we added the proviso that the person should be considered by others to be an expert in the field. Who the 'others' were supposed to be, we did not specify at the time.

We soon realized, however, that we would have to specify minimum selection criteria to avoid the site being swamped with self-styled experts and inexperienced undergraduates. Two respondents phrased this dilemma aptly when they suggested that the *Who's Who* should not become a "Yellow Pages of Instructional Technology".

As a result a set of criteria was drafted and posted on the Web site. One of the questions in the questionnaire (Appendix D) asked respondents their views on the selection criteria. The responses gave rise to two successive revisions resulting in more stringent criteria. (See Appendix B for the resultant set of criteria.)

An interesting observation was the fact that quite a number of North American candidates 'nominated' themselves, but that relatively few of these met the selection criteria.

An unsuccessful attempt by ITFORUM subscribers to define "instructional technology" caused us to rethink the criteria. If the community of practice could not even delimit its own field, how were we to determine who belonged in the *Who's Who*? We decided that an educational technologist would be a person who deliberately used or promoted the affordances of modern technology to enhance learning.

A valuable contribution on the selection problem was the following:

"Some of the best current research is being conducted by newcomers to IT. The creative energies come not from those who have established their name, but from those who are actively coming to grips with current issues facing the discipline. Newcomers learn from the gurus, this is certain, but it is the newcomers who are actively engaged in current research that is redefining the field and making it vibrant [...]

If you were compiling a print version of *Who's Who*, you would want to be much more conservative in your selection criteria in order to assure credibility over time. But we would expect an online *Who's Who* to offer credibility for this instant in time. Who is pushing the envelope? Who is discovering new insights? What is the *emerging* definition of IT! "

(Martin Ryder, personal e-mail, 7/01/98)

4.6.2 Balance

It soon became clear that we would have to try to create a balance between the overwhelming number of North Americans and the rest of the world if this were to be a truly international resource. Some US respondents to the initial announcement and the questionnaire incidentally mentioned the fact that North Americans tended to forget about the rest of the world.

We therefore put in a concerted effort to trace prominent educational technologists in other parts of the world. This we did by sending requests for names to non-US experts with whom we had had personal contact, or by tracking them on the WWW.

At the time of writing of this thesis the geographical representation was as follows:

Table 4: Geographical representation of members

North America (USA & Canada)	Europe & United Kingdom	Australia & New Zealand	Other parts of the world
61.8%	16.5%	12.9%	8.8%

Furthermore there was a distinct gender imbalance in favour of men, who initially filled 95% of the entries. Consequently we changed the manhunt into a womanhunt, and by July 2001 26.5% of the 170 positions were filled by women. Despite our best efforts we were berated more than once for the 'sexual discrimination' of the site.

4.6.3 Reflection

Trying to determine who should be included in the *Who's Who* made us aware of the limits of our knowledge, caused by inexperience in the field. In this regard the comments from respondents helped greatly to refine the selection criteria - another example of the constructivist nature of such a collaborative project in an authentic setting.

Even so we missed some authoritative researchers who were simply not as widely known as others who were more vociferous about their own work.

The lesson learnt in this regard was that credibility, expertise and authority did not necessarily correlate with fame and number of publications.

In the process we did learn, however, who the most eminent educational technologists in the world were.

4.7 Information gathering

4.7.1 Search strategies

Various methods were used to collect information on possible candidates.

Extensive WWW searches were conducted using mainly three methods, viz. search engines, 'link-tracking' and 'follow-your-nose'. High telephone bills were one of the results, as we spent hours 'surfing the Web'.

The standard procedure was to feed a name or key word to an Internet search engine such as Yahoo!, Altavista, or Webcrawler, refine the search with Boolean parameters if necessary, and then to use both irrational intuition and rational linguistic logic to choose which links to follow from the hundreds of results we sometimes got.

If we found a promising Web site, the next step would be to search the site for further links. We also studied lists of references in on-line publications by the particular expert, which often revealed other significant names. After all, if a person were really an expert one could assume that he/she would refer to other experts in his/her research.

Having repeated this process until we had exhausted the (literal) line of enquiry, we would return to the search engine results and click the next link.

We found that one's adeptness at finding target information efficiently definitely increased with experience. So did one's determination not to give up until one had traced at least an address, be it e-mail or 'snail-mail'.

An example of such a challenge was the search for an on-line presence of Robert B. Kozma, which took several hours spread over three late nights. We finally found an e-mail address (not even his own) through which we could approach him.

E-mail contacts and follow-ups were employed in two ways:

- Once we had traced the name of or information on an expert, we would contact him/her by e-mail and enquire whether he/she would like to be included in the *Who's Who*.

Depending on the reply, we would then ask for the specific information needed for the database.

- If we found a big name without information on the WWW, we would try to find an e-mail address and contact the person. In this way we managed a 'scoop': Robert B. Kozma allowed us to create and host his first biographical Web page.

Literature references were studied to determine which authors were referenced frequently. A WWW search was then conducted to find either a personal home page or an e-mail address followed by a personal message.

The question may be asked why we did not simply request nominations and information from electronic discussion lists such as ITFORUM. Firstly, we did not regard it as proper Netiquette to swamp discussion groups with 'RFIs' (Requests for Information) for our own research purposes. Secondly, we anticipated a flood of nominations of unsuitable candidates, which might have been awkward to reject. We did not want to create partisan animosity in the community of practice! The solution to this particular dilemma was to include an invitation on the *Who's Who* Web site itself.

Nominations were called for by means of the questionnaire that was added to the Web site. (See Appendix D.)

The experiential action learning involved in honing our skills is illustrated by the following extracts from e-mail exchanges between team members.

In coaching an inexperienced member on Web searches, a more experienced member wrote:

"[...] the principle of diminishing returns on a Web search. If I have to search longer than ten minutes, I'd rather send an e-mail (if I've got the address!). A few times I've also sent e-mail to people's colleagues to ask where I can find info.

I've also found that the best/most useful info is often not in the guy's CV. It is often on his other pages that you get a nice summary like the one we're after.

I've also become clever looking for extras, such as pics if there's nothing on his home page. I've discovered that most of the bods have a pic somewhere, usually in the same directory as the 'home.html', and usually under 'name.gif' or 'name.jpg'. And if the guy's pic is 'name2.gif', there's usually a 'name1.gif' or 'name.gif' in that directory - sometimes even a better one than the one on the home page."

4.7.2 Information processing

We found the classical guidelines to the critical evaluation of a message to be helpful, not only in finding information about possible candidates, but also in evaluating the information provided by the candidates themselves:

- Try to establish the source credibility.
- Try to determine the knowledgeability of the author.
- Does the author seem to have adequate experience?
- Does the author have an established reputation in the field?
- What are the motives behind the dissemination of information on the Internet?

After some discussion we decided to include the person's name, title, institution, position, department, summary of teaching and/or other activities in the field, research interests, e-mail address and WWW home page.

Sometimes we received rather impractical requests from respondents, e.g. to add lists of publications of the experts.

Initially one team member undertook most of the searches, while a second served his apprenticeship in Web searching. By the end of the collaborative academic assignment the task was distributed more equitably, with the second member eagerly surfing the 'Net. Owing to his limited Web access, the third member mainly harvested names from print sources and fed them to the other two.

Information would then be sifted and edited before the text for the particular entry was stored on the PC of the team member who physically created the Web pages.

4.7.3 General observations

It was much easier to find information on North Americans than it was to trace European educational technologists. Originally one had the distinct impression that "in the meantime, nothing happened in Europe", to misquote Spike Milligan. However, dogged searching led us to some valuable finds.

In instances where self-nominated persons had not sent biographical information, we requested them to consult the selection criteria on the Web site, and then to send us a tailor-made entry if they complied with the requirements. Most of these candidates never responded again. We have still not found a reason for this.

By contrast someone as prominent as Diana Laurillard, at the time Vice-Chancellor of the Open University of the UK, personally responded with information. So did a number of other 'Great Gurus' ('GGs', as we fondly called them).

Virtually without fail people who were approached were flattered and eager to be included. Perhaps this is not surprising, human nature being what it is. This is a typical reaction (from a highly respected expert):

"I'm flattered!! Please find a brief bio below, in hopefully the format required, as well as an attached JPEG.

Thanks for maintaining this valuable resource and for including me!!"

4.7.4 Reflection

Information retrieval in a networked environment requires new skills owing to the vast amount of totally unstructured data readily available on the Internet.

Firstly, the ease of Internet access to information brings with it the well-known hazard of 'overload'. Even in a project where one knows what one is looking for, the seemingly limitless amount of data bits is the proverbial haystack. Searching efficiently is more of a challenge than with conventional media, where one could rely on the relative stability and limitedness of resources in a library.

Secondly, conventional data collection methods and strategies had to be adapted to the chaotic nature of the Internet, where no neat alphabetical indices exist. At the time most Internet search engines were relatively rudimentary affairs which often provided few gems of information among interminable lists of irrelevant sites.

Self-discipline is perhaps more important than ever in order to avoid haphazardly roaming through the maze of interlinked resources. A certain ruthlessness becomes necessary in discarding data not immediately relevant to the task at hand.

Thirdly, the ease of storage of electronic data holds both advantages and disadvantages. One of the advantages is that countless data units can be stored in a container (the PC 'box') physically three or four times the size of a shoe box. A disadvantage is that a researcher can collect so much data so easily that the temptation to store vast amounts is virtually irresistible. In the end one simply has too much data to process within a given time frame.

The skill of critically evaluating (re)sources may be one of the most important in the Information Age, as so many authors have pointed out.

4.8 Design

4.8.1 General design approach

Discussing stages in problem-solving, Resnick and Ocko (1991) note that "[i]n design, the problem goals are typically ill-structured; defining the problem is part of the designer's job. Moreover, there is a somewhat fuzzy sense of what it means to 'solve' a design task."

Further, they are of the opinion that designers typically seek satisfying rather than optimal solutions - "that is, solutions that roughly satisfy a given set of constraints".

In hindsight, this is precisely what we intended when we planned the *Who's Who*. Certain parameters and basic criteria emerged from our thinking about the project.

The first key principle in the design inevitably had to be **usability**. Donald Norman describes 'user-centred design' as "a philosophy of design centred on the needs and interests of the

user, emphasizing products that are usable and understandable. The user must be able to figure out what to do with an object or system and understand what is going on." (Norman *et al*, 1976).

The second basic principle would have to be **flexibility and adaptability**. As Sherry and Myers (1998) also note: "Design guidelines are not algorithms; they are based on informed opinion rather than established principles."

Jonassen (1995) observes that, although "[m]ental models are the conceptions of a system that develop in the mind of a user [...] users' mental models usually vary, often significantly, from the cognitive or conceptual model promoted by the designers".

As we were both users and designers, we reasoned that our mental model(s) would be a fair approximation of what a typical user would want. We intuitively established a mental usability model similar to the one Norman proposes. He emphasizes adequate 'mapping' between the design model and the user model, and defines the key concepts as follows:

- 'user model': "A mental model developed by the user through interaction with a finished product, and which he uses to explain the product's operation."
- 'design model': "The designer's conceptual model of a system or object to be built. The model is based on the user's task, requirements, and capabilities. Ideally, it also considers the user's background and experience."

and

- 'mapping': "The relationship among the parts of a system, or between the controls and the results. Mapping concerns itself with the connection between what one wants and what appears to be possible."

(Norman, 1995)

The original mental model envisioned a complexly interlinked set of pages, with at least four layers, viz. the general introduction, index and information pages as Layer 1, the information on the experts as Layer 2, their pictures as Layer 3, and their own home pages as (external) Layer 4.

Since we would present this artefact to a world-wide audience we also had to consider ethos, style, and delivery - the elements of classical rhetoric (Ryder & Wilson, 1996). Consequently

we agreed that a fairly formal design and style of language would be the safest for an academic and professional audience.

Accuracy, veracity and reliability would be essential in such a resource. Therefore it would be important to 'triangulate' (i.e. 'double-check') information wherever possible, and to update the site regularly. We realized that, in these respects, we would often have to rely on the good faith of the professionals, as this was not an award-bearing competition but a service to a community of practice.

Sherry and Myers (1998) regard three principles as especially important in collaborative design, viz.

- (1) early exposure to the target audience;
- (2) flexible design based on empirical measurements; and
- (3) iterative design process "promoted by modular implementation and early usability testing.

The iterative design procedure we decided upon proved to be remarkably similar to the procedures described by Sherry and Myers (1998), and Ryder and Wilson (1997) respectively.

However, we agreed to withhold the first prototype of the *Who's Who* until we had something substantial to offer the community of practice. Although it was a case of rapid prototyping, we were very aware of the professional status and expertise of our intended audience, and did not want to present them with an insignificant artefact.

In considering the design issues at a very mundane level, we had to take into account the knowledge and skills of each team member and the logistics involved.

Having debated all these issues, we then created a prototype template for the Web pages on which we would display the experts' information. The original template design was subsequently changed at least twice to accommodate new ideas.

4.8.2 Usability

'Usable' structural and interface features were discussed at length, although at the time we did not know much about Web usability issues. We therefore relied on our prior knowledge of

CBT and 'slide show' screen design, on our own experience and needs as users, on logic, and lastly on 'gut feel'. There was no time to conduct in-depth research on usability issues.

Although we questioned the obvious disparities between WWW screen design practice and that preached by CBT experts, we accepted that the design differences were justified by differing communication intentions.

4.8.3 Interactivity and interaction

The site did not require a high level of interactivity, apart from navigation requirements and an effective search facility.

From the outset we agreed that an on-site search engine would be ideal. However, owing to an unhelpful server administrator we did not succeed in doing so during the first few months. Instead, we designed the alphabetical index mentioned earlier. A search engine hosted by an outside ISP was only implemented some time later.

Interaction between visitors and the listed experts would be accommodated by placing links to the e-mail addresses and WWW home pages of the experts in their entries. This proved to be a wise decision, as confirmed by a knowledgeable expert: "I am especially pleased at the 'lean' model you follow, with minimal but essential linkages" (Denis Hlynka, personal e-mail, 10 May 2001).

Interaction between visitors and the designers would be encouraged by means of the mentioned feedback questionnaire and by supplying the creators' e-mail address prominently on the main Web page.

It was also envisaged that we would periodically send reminders about the *Who's Who* to relevant Internet discussion groups.

4.8.4 Graphical interface

The initial graphical interface design was largely left in the hands of the team member who had had some previous experience. The prototype was discussed in detail both before and after it was placed on the server.

A calculated risk was taken to use a dark blue textured background design with light blue text, against normal principles of screen design. (See Appendix C.) We reasoned that a WWW site like ours had to have a distinctive flavour. A trade-off would be that the information could not conveniently be printed from the screen. However, we did not think this would be a major disadvantage, as the purpose of the site was not to supply complete biographical information, but simply to serve as a node of contact from which users could link to complete materials elsewhere on the Web.

If our users did not like the design, we could change it easily.

4.8.5 Use of photographs

The question whether we should host photographs on our server was debated this way and that, before we decided to do so in the interests of the user, who would then not have to navigate the Internet to find a picture of the particular expert.

">Secondly those links would mean viewers have to go off our site, with no back-link on the GGs Own Home Page. Therefore it might be better in theory and in practice to have CVs and pics on our site - also loads a few kg/s faster.

Yup - makes sense

- >1) It takes a lot of disc space
- > 2) Those pics are different sizes...takes HOURS to download.
- > 4) I also tried putting the stuff into a table format - one cell for
- > the pic, one for the info. <tr><td>pic</td><td>info</td></tr>"

This decision obviously had implications for our design, as graphics take considerably longer to download than HTML text. Only after the prototype of the entire site had been created, did we discover the technique of creating 'thumbnail' pictures. At the time of writing we have not yet implemented our intention of using this technique to decrease download time.

We therefore debated whether we should create a separate Web page for each expert, or whether we should group them together in a more manageable way. Eventually we decided

on the latter option, as the former could become very difficult to administer if the site became large.

The following extract from the e-mail exchange on this topic between two team members is typical of the dynamic nature of a reflective design process and of constructivist learning:

"> a) If we put up a lot of photographs on one page, the thing is
> going to take ages to load.

Q: is it not possible to have the pix as a luxury option - a link
to a "gallery" if they need to put a face to the name -
maybe we could later develop that into a game - too ambitious?

> b) If we put each one on a separate page, we could just as well
put all the GG's info with his pic = tens/ scores of separate
> pages = one helluva HUGE site, which is going to be a nightmare to
> link & maintain.

> c) If we include icons ("Click-for-a-pic") in the list, we either
> have to put the pics together (= problems with download time,
> confusion, HTML tables, etc.), or each on a separate page (back to
> square (b) above).

> 4) If you are willing to help put the stuff into HTML, let me
> know ASAP, and I'll mail you what I have. (Much of it will be in HTML
> anyway, as I downloaded it as HTML from the WWW.)

If you handhold then I can try."

4.8.6 Structuring of content

The next point of debate was how to organize the content. A first suggestion to adhere to geographical distribution was discarded on the grounds that it would, at that stage, be difficult to implement suitable search mechanisms on the Web site. Moreover, some people in this field moved around globally, which would necessitate keeping track of them and moving their entries from one set of pages to another.

"> I suggest we keep the thing simple: Main categories Countries, with a
> clickable country index and alphabet at the start. At the top of each
> country's page we put another clickable alphabet."

Once more the dynamics of collaborative design is illustrated by the reflective exchanges between the designers. From a perceived 'simple' solution we eventually progressed to an even simpler one.

"What we have in mind for the time being is the following (we'll refine it later):

Main categories: Countries

Sub-categories: Alphabetic sections, listings by surname

Sub-sub: Surname, name, title, qualifications, institution, short description of activities, e-mail address, link(s) to home page and/or picture.

User interface:

Main page - live links from country names to country pages

Country pages - live alphabet at the top, linked to alphabetic sections in document (i.e. letter S linked to section S)"

The follow-up message read:

"No, not fine any more - as should be evident from message no. 2 that I sent this morning. I realized my mistake: There would be only one of each letter in the alphabet, but often more than one name starting with a particular letter. So it will be impossible to create n+x links from only one anchor."

We finally decided simply to create an alphabetical structure, which would allow us to use a simple search index linked to individual names.

Our original mental schema was more complex than the eventual product, which turned out not to be multi-layered with intricate webs of linked pages. It consisted of three instead of four layers, viz. Layer 1 being the introductory, index, questionnaire and guidelines pages

linked horizontally, Layer 2 being the linear alphabetically arranged pages on the experts, and Layer 3 the external home pages of the experts themselves. The layers were not arranged as a physical hierarchy in a computer directory, but represented a conceptual 'picture'.

4.8.7 Reflection

Information design in a hypertext environment demanded skills that most of us had not grown up with. Linear, single-layer presentation as in traditional books is easy by comparison. Structuring and presenting information in an environment with the potential for unmanageable chaos requires holistic thinking. There is no simple logical progression from one point to an inevitable second.

A further challenge lay in the presentation issues particular to the medium, such as readability, layout, technical limitations, etc.

The design of the user interface evolved much more intuitively than we had planned or anticipated. What seemed good in theory often did not look good on screen. Technical constraints and our own lack of experience also 'interfered' with our grand ideas.

We, therefore, continually juggled options until we found a satisfactory solution that we could manage.

4.9 Reflective learning

The constructivistic learning that occurred during this period is best illustrated by the reflective processes that were a continuous feature of our collaboration.

```
"> 2) Those pics are different sizes...take HOURS to download.  
> 4) I also tried putting the stuff into a table format - one cell for  
> the pic, one for the info. <tr><td>pic</td><td>info</td></tr>
```

I haven't tried 'rows' and 'data' in tables, yet - but I'll get there.

- > It works, but if one wants to have the
- > URL as a VISIBLE link, i.e. to appear on screen, then that screws up the
- > width of the columns - those URLs are sometimes nearly a screen wide.
- > Together with a wide picture it doesn't work. Solution: No visible
- > addresses & reformat whole doc into tables (!)

Do you mean as in pointing the mouse @ the link and the browser showing up the URL at screen bottom???"

Through verbalizing one's thoughts on the design of the artefact, one was forced to clarify concepts for the other person. In the process these concepts became much clearer to oneself, of course: "Man, it's good to discuss this with you! I realize all the moronically stupid mistakes I've made in conceptualizing the thing..."

The following exchange between the team members aptly sums up the essentials of reflective learning:

">Sorry for this incredibly long, convoluted, garbled stream-of-consciousness
> message.

Not at all - your 'garblings' are perfect think aloud protocol type messages - it is cyber-thoughts for me - at least I am able to follow all of it and make sense of most of it..."

'Stream-of-consciousness' learning seems really to come into its own in dialogic form, since the turn-taking propels the argument forward. A monologue or soliloquy tends to turn upon itself, as the writing of this report has frequently proved, having been done in isolation.

We agreed that the reciprocal 'sound-boarding' benefited both conversation partners even more in a computer-mediated environment than in a face-to-face setting. In the latter words are transient, whereas the former allows thoughts and knowledge to be recorded and 're-used'.

Retracing the argument line in archived e-mail messages often caused us to rethink decisions or recognize fallacies in our reasoning. Such retracing is very difficult, if not impossible, in typical face-to-face collaboration where no detailed protocol is kept.

The affordance of CMC for reflection and recording has positive implications for 'knowledge management' (perhaps more correctly called 'information management') in organizations. The re-usability of stored chains and patterns of thought could prevent the unnecessary and uneconomical reinvention of solutions to similar problems, as Gundry and Metes found (1999).

However, we learnt a valuable lesson regarding the structuring and presenting of information in a hypertextual environment with its potentially limitless number of interconnections.

4.10 Summary

As suggested by Trochim (1996), the natural tendency in the development of a Web-based resource is towards an iterative design, in which the various stages are not neatly divided by chronology. They tend to recur randomly and overlapping one another, in an astonishing emulation of real life.

We experienced the process as a quite chaotic one. Unexpected insights and feedback caused us to make unplanned changes in a rather evolutionary and random fashion, reminiscent of processes described in Chaos Theory.

What did we learn from all this?

- Firstly, that collaborative design by means of CMC may be a more protracted process than by face-to-face means, but that it affords more 'leisurely' reflection and discussion owing to the very 'un-immediacy' of CMC. Enhanced by the fact that messages can be revisited and re-thought, this in turn lends depth to reflection that is usually not found in face-to-face exchanges.
- Secondly, that designing a WWW resource requires skills in information design that are quite different from those of conventional media. Using collaborative design with students

would, therefore, require an educator to have a thorough understanding of the affordances of both the medium and the dynamics of collaboration through CMC.

The insights we gained into learning by design would be valuable for our own practice as teachers in Higher Education. Having experienced the joys and tribulations of collaborative design, we should be able better to understand the challenges to our students.

Rupert Wegerif notes that "[f]orming a sense of community, where people feel they will be treated sympathetically by their fellows, seems to be a necessary first step for collaborative learning".

Such a community should allow newcomers "to participate in its practices and move from peripheral to central status as rapidly and smoothly as possible" (Wegerif, 1998).

CHAPTER 5

COLLABORATIVE DEVELOPMENT

CHAPTER OUTLINE

- 5.1 Introduction
- 5.2 Development
- 5.3 Implementation
- 5.4 Support
- 5.5 Communication and interaction
- 5.6 Summary

5.1 Introduction

Although the development and implementation of the resource are described here in a separate chapter, it must be stressed again that in reality the processes were interwoven with the design activities.

5.2 Development

5.2.1 Tools

Typically of a constructivist environment at this level of learning, we had to find our own development tools.

The initial tools and their distribution among team members are listed in Table 5.

Table 5 : Initial tools used in the development of the artefact

	E-mail	Browser	Editor	Graphics	Other
Student A	Pine (DOS)	Netscape 2	None	None	MSWord
Student B	Netscape	Netscape 3	None	None	None
Student C	Pegasus	Netscape 3	DiDa, HTML Pro	PaintShop Pro, LViewPro	WordPerfect

The computer was used in all the 'classical' senses discussed by Perkins (1992), viz. as:

- information bank
- symbol pad
- "phenomenarium"
- task manager
- construction kit

Being networked, the computers added a second dimension apart from the human-computer interaction. They became mediating tools in multi-way communication.

In keeping with the action-learning environment, we adopted new tools as we progressed. Better HTML editors were found, as well as an efficient FTP program. One member also switched from a DOS-based to a Windows-based e-mail package.

The team member who initially had known nothing of Web page creation, was eager to learn more. Therefore, he was initiated into the secret rites. A simple HTML editor was e-mailed to him, he managed to install it successfully, and created a few pages under the guidance of the more experienced member. Cognitive apprenticeship at work!

Learning to use the development tools added another dimension to our learning experience. We had to get to grips with HTML editors, graphics software and Telnet/FTP software.

5.2.2 Creating entries

After having decided on the conceptual framework, we agreed on tasks and deliverables. From the outset the process was one of nearly simultaneous design and revision. In this respect our project differed from that of Sherry and Myers, in which this stage was entered only some time after they had started developing their product (Sherry & Myers, 1998).

We first created a very basic prototype Web page template into which we could insert the entries. Owing to a fast approaching deadline, we decided not to include biographical details on Interests and Activities in the first iteration. The initial entry structure was very simple:

Smith, Sam

Ph.D.

Uitsmijter at Harrod's

Mail him at sam@koos.pofadder

You can also pay him a cyber visit at his homepage at <http://sam.koos.pofadder>

Simultaneously we started collecting information about the experts, which we stored as raw data on one student's PC.

Initially we collected information in whatever format we found it, then processed it by editing, cutting and pasting, and converting the result into HTML. Sometimes this meant skimming through scrolls of Web 'pages' containing exhaustive and exhausting accounts of even the minutest trivia in the illustrious careers of some professionals. It was an inefficient, time-consuming task.

It also meant that we had to create the entry, post it onto the Web site, ask the person to approve it, then alter it if necessary, and post it back onto the Web page. This made the process even more inefficient.

In a next iteration we therefore requested contributions to be in the format already used on the *Who's Who* Web site, if possible. Most contributors complied by copying the HTML source code from the Web page and inserting their tailor-made information before sending it to us. (See Appendix C.)

Upon making contact with a possible candidate, a positive answer was followed by a request for a suitable entry in HTML format, as well as a picture in GIF or JPEG format.

The learning that took place during this activity is illustrated by the following (unedited) excerpt from an e-mail message:

"Took me an hour via PINE (DOS) and then PC PINE (WIN) to locate and save the file, locate it again and then retrieve it - finally (insert virtual cut wrists here) I saved it in PC PINE, did a search in WIN3.1 and bunged it into my DiDa HTML editor thank you very much (bouquets for JV as well as ML, né) and I can see clearly now the pane has come."

5.2.3 Creating the interface

From our experience with CBT we were aware of the importance of contrast and legibility on computer screen.

We tried a variety of background and text combinations. Eventually we went against normal screen design principles, and chose a navy blue textured background with light blue text. We knew we were running a risk, but decided to try it anyway because we liked it. The result can be seen in Appendix C.

Navigation

To keep navigation as simple as possible, we used a linear linking structure, with each entry page linked to the following and back to the searchable index of names.

Searchability

Although we wanted a search engine on the site from the beginning, we abandoned the effort when we ran into the rather unhelpful systems administrator of the server on which the site would be hosted. A search engine was only added much later, using an outside host.

Length of pages

Much debate revolved around the effect of our structuring on the possible length of Web pages. When we finally decided on a straightforward alphabetical structure, we realized that some pages might become inordinately long. This in fact happened with the letters B and P, which would have to be subdivided at a later stage.

Graphics

Originally we thought it impractical to include photographs in the Web entries, as they would cause pages to load very slowly. On second (and third) thoughts, however, we did include photographs, since they would add faces to names and access would be smoother for users than to branch off to experts' home pages. It would also prevent users from being side-tracked to other Web sites - something we had learnt from Web marketing principles!

The idea of inserting 'thumbnail' graphics linked to bigger pictures was eventually tried and discarded as it would mean adding a separate HTML page with a picture for each person. Doing so would negate our earlier decision not to create a page per expert.

The following excerpt from an e-mail query illustrates the mental processes and the learning curve so typical in this project. This message referred to the integration of information in different formats for use on a single Web page.

"IMHO the browsers of each user machine/server will sort out the text uniformity BUT what if my pic is a Polaroid, MCU and yours is a 35mm XCU? An obvious comparison is going to be made and it will end up looking awful - would it not draw too much attention to the (xcuse the pun) negative side rather than merely regarding it as a resource? If we were doing individual home pages then there is no juxtapositioning, right?"

One team member still had to learn about "gifs" and jpegs", and the other about "MCU" and "35mm XCU" !

Logo

Since there was no time and we did not have the necessary expertise to create a logo from scratch, we tried to find a suitable temporary one from existing image archives.

We finally found one we thought might be a humorous and ironic depiction of Instructional Technology at work: The archetypal school mistress with pointing rod.

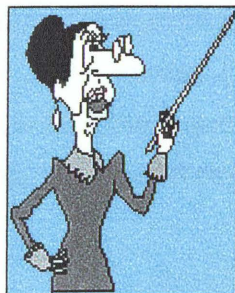


Figure 2: Original logo

Our humour did not seem to be appreciated by others. The only two comments that we received were negative, one suggesting that female members of the community might be offended, the other implying bad taste on our side. Ironically, no female members complained.

5.2.4 Comments

The iterative process causing design and development to occur nearly simultaneously can become quite confusing if not controlled carefully. We did not manage this aspect well at all, as is clear from an analysis of our e-mail exchanges.

This is a typical example:

"So, another change in my befuddled mind - I suggest for tomorrow's deadline we put up a sample of those GGs of whom we already have complete info + pics, like Alessi's, en dan peuter ons verder. (If I'm not mistaken, my hallucinations already produced a similar suggestion a week or perhaps two ago!?)"

We often became bogged down trying to solve relatively insignificant problems, instead of concentrating on the 'mission', especially during the first iteration.

5.3 Implementation

At first Web pages had to be transferred to the UNIX server by Telnet - an extremely unfriendly and confusing routine we had to master. One had to remember UNIX text-string commands, had no idea where one was in the directory structure of the server, and did not know whether one's files had actually been transferred to the right place, if at all. This method caused us much anxiety.

Midway through the RBO880 module, the server was converted to Windows NT, which brought much relief despite a number of technical problems. At least we could transfer our files by means of a Windows FTP-program, allowing us to see where they went. We had no regrets deleting the Telnet program from our PCs.

The switch occurred rather unexpectedly just at a time when we 'newbies' were getting to grips with the quirks of UNIX and Telnet. The adjustment to new conventions for file naming, handling and transfer caused us to lose valuable development time.

Further pressure was added when the instructor could not keep his excitement under control, and prematurely announced the embryonic project in a professional Listserv discussion group. This despite the fact that, although the artefact resided on an open-access Web server from the outset, the URL was not supposed to be made public until we had something substantial to offer.

This turn of events lent even more urgency to the development schedule, and put us under additional pressure to 'deliver the goods'. From that moment we implemented design changes and improvements continually as contributions were received from visitors to the Web site.

We found that the successful implementation of an Internet-based resource depended to a large extent on external factors:

- (1) Infrastructure - the availability of a stable platform from which to launch trial runs.
- (2) Adequate technical support for non-'techies' can relieve much frustration and anxiety.
- (3) Hardware components were not much of an issue, as we each had adequate equipment.
- (4) Familiarity with software suitable to the job was shown to be crucial. We learnt that not being aware of available tools could be costly in terms of time and efficiency.

5.4 Support

5.4.1 Tutor support

Sherry remarks that "[t]he most important factor for successful distance learning is a caring, concerned teacher who is confident, experienced, at ease with the equipment, uses the media creatively, and maintains a high level of interactivity with the students" (Sherry, 1995). The amount of tutor support in general in the RBO880 module is evident from the 89 messages he sent to the class discussion list. The closest number of student contributions from an individual student was 60 (Clarke, 1998).

The following is a typical example of the kind of support the RBO880 group received:

"All the things I expected are beginning to happen.

1. You are working out solutions to problems on your own.

Thanx P. for your initiative concerning the file naming conventions.

2. You are trying things.

Thanx D. for your FTP stuff. I'll be visiting C. [the systems administrator] soon to see how I can sort it all out.

3. You are encouraging one another.

Thanks M. for promising overseas trips and the like.

4. You are helping each other.

Thanks J. for the links and advice.

5. You are questioning deadlines.

Remember you have other modules to do. Remember that all I said was that I wanted proof that you had done that stuff. I did not say you had to do it all alone and without any help.

6. You are calling me names.

Trust D. to start this off.

Remember. There are only two names:

My name is "The one who gives the marks"

Your names are: "The ones who need the marks"

Best wishes"

More specifically relevant to this thesis, Clarke found that the highest proportion of the instructor's messages in the RBO880 module was devoted to the *Who's Who* project, mainly for the purposes of

- making suggestions

- encouraging or praising and
- giving directives.

Reacting to a remark by an outside observer, the instructor said about the RBO880 group: "I really worry about them out there - in the wilderness and unsupported."

Tutor support in our case took the form of encouragement, praise, prompting, pushing, cajoling and even light-hearted threats. We were even offered extension: "Will all of you PLEASE let me know URGENTLY what your status of completion is? If you need extension (as I am sure some of you do) then I do need to know."

There was some cognitive apprenticeship or scaffolding, e.g. when a group member could not figure out how to FTP Web pages to the server and the instructor had to post step-by-step instructions.

The support we received from the tutor is evident from his enthusiasm about the product we were creating. Whenever we got positive reaction from the outside professional community, he would post a message to the RBO880 list, e.g.

"Have you guys EVER been so brilliant before?"

"LOOK LOOK. Jump with excitement. This is an unsolicited response. Just look and see!"

The team also received support from other instructors in the course, e.g.

"Well done on receiving the INTRO (Instructional Technology Research Online) award. You really deserve it after so much work."

5.4.2 Peer support

Both in the team and in the peer group we found support to be exemplary.

Typical of the camaraderie that developed despite the distance was the following encouraging message after one team member had contracted a severe cold:

"Thanks - I appreciate your support and concern [regarding the sender's own individual project]. BTW if Dr Solomon doesn't work then 1GB of Dr Martel or Dr Jameson should send it packing or something :-(hoo (bless you))"

Fortunately such measures were never necessary.

There was no lack of encouragement or praise, both in our team and in the peer group. A good example was when a team member managed to track a very elusive Bob Kozma:

"> BTW, I think we have a scoop here - B.K. He has NO presence on the WWW ...

>> Dis alweer djy ne - supersnoop of the Nineties! Knap knaap!

[It's you again, hey - supersnoop of the Nineties! Fine fellow!]"

Clarke (1998) found that the highest proportion of messages among peers in the RBO880 class concerned suggestions on the *Who's Who*. She also found that a request by the *Who's Who* team for suggestions on compiling a list of IT professionals had one of the highest response rates on the group discussion list. This is a clear indication of the measure of peer support we had in this project.

The kind of support that Clarke found generally in the RBO880 peer group (1998) was also evident in our group:

- supportiveness
- motivating encouragement
- solidarity
- 'hand-holding'

The quality of peer support is illustrated by an incident, cited by Clarke (1998) too, involving one of the experts whom we had invited to join the *Who's Who* list. His reply was a rather rude "Stop bothering me".

A team member posted a message on the class discussion list, reflecting on his reactions and asking for advice on possible replies. The variety of thoughtful contributions is clear from

the extracts included in Appendix I (with Clarke's kind permission, as she already used this example in her thesis).

Peer support also came in the form of cognitive 'scaffolding'. As we were trying to get to grips with UNIX-commands, Telnet, DOS, etc., one member asked: "Can anyone tell me when I should be using *.htm and when *.html?" A series of replies sorted out the problem in characteristic constructivist fashion. (See Appendix J for replies.)

This example is typical of the support one received when stuck with a problem.

A further example was our request for comment on the idea of adding to *the Who's Who* "one of those forms to send one's own HTML-page to a site". The subsequent useful round of discussion helped us decide not to include such a form after all.

When working under pressure as we did and being as inexperienced as we were, one also needs affective 'scaffolding'. I believe this to be true even for highly self-motivated, and even experienced, students.

This affective support was derived from the encouragement, positive criticism and praise from our peers and the instructor.

Unfortunately, despite the excellent support in the immediate peer group, reaction from our South African alumni colleagues was disappointing. An appeal for help was sent out on the C@TTS discussion list, with a hint to a pair who was running a successful CBT business.

One of our peers who wished to be considered for listing on the *Who's Who* asked whether we wanted "photos to scan in". We posted the following message on the group discussion list, to which the mentioned couple were also subscribed:

"We'd prefer pictures already in digital format (.GIF/.JPG), as we don't have a decent scanner available. Perhaps B-B & A would like to render some charity to the family here...? "

No reply whatsoever came forth. Perhaps they were just too busy.

5.4.3 External support

On one hand external support in varying degrees came from our families, friends and colleagues in the form of empathy, sympathy, understanding and the odd bit of advice. On the other hand, the community of practice outside the immediate sphere of the RBO880 group rendered support at both the cognitive and affective levels.

Such support came in the form of both solicited and unsolicited comments. The former resulted from the initial announcement of the resource and from the feedback form on the Web site. Unsolicited comments were few and far between, but were mostly positive.

Supportive messages ranged from simple "Good luck" messages to more elaborate praise. Such messages often served as 'boosters' when we felt overworked and dispirited. (See Appendix K for examples.)

We received useful suggestions and advice on matters such as:

- Tiling of background images to make pages load faster
- Searchability by using a tabled index of names
- Refinement of criteria for inclusion of candidates
- Extension of the service in the form of a Web site on former/deceased/retired IT experts
- A similar Web site for students in Instructional Technology

Apart from the cognitive support, such suggestions indirectly enhanced the affective learning experience, as one realized that others were interested enough in one's efforts to offer advice.

5.4.4 Technical support

Most of us were so new to the 'New Technologies' that the simplest operations caused some of us considerable anxiety: "And I have this irrational fear that I am not going to succeed in ftp-ing and telnetting the damned stuff."

As mentioned earlier, technical support was generally unsatisfactory, as reflected in the following message:

"I have the same problem as D. regarding the counters, log files, etc. We need the darned things for the *Who's Who* too.

Isn't it amazing how these computer types simply assume we uninitiated innocents also know the anatomy, physiology and pathology of hardware and the most intimate psychological secrets of software?"

Replies from the system administrator to our queries were often rather curt and less than helpful.

When we requested help from the Web mistress to set up a search engine, we were advised to download one from the WWW and install it on the server ourselves. "It is simple," she said.

The server administrator then had various excuses why we could not be allowed to install software on his server. In the end we gave up, as we were wasting valuable time on a 'nice-to-have'.

Technical support often came from the instructor himself, or via him from the systems administrator, with whom he obviously had a better relationship than we mere students:

"If you are working in win95, then, PLEASE name your files *.html from the outset.

If you are working in win3.1, then you will have to Telnet to Hagar, move to that directory which C. mentioned, and then rename your files.

The command is: `mv myfile.htm myfile.html`"

The lack of physical technical support and the off-hand attitudes of the staff stood in stark contrast. Their inadequate cooperation prevented us from learning more about technical components of Web sites at a time when it would have fitted naturally into the learning process.

The ensuing frustration detracted from the quality of the learning experience.

5.4.5 Comments

Support means recognition, a powerful extrinsic motivator. I doubt whether we could have achieved the same results without the support from the mentioned quarters. Especially when working on unfamiliar terrain and under pressure, the encouragement, praise and positive criticism from a community of practice can be a decisive factor in the success of a project.

I should challenge assumptions such as those of Feenberg, and Edwards and Clear. In my experience CMC could, in the short- to medium-term at least, provide sufficient means of contact and interaction without the necessity for face-to-face meetings.

In the case of our real-time exchanges, one might argue that telephone conversations might have been more efficient and less costly. However, the advantages were that we had more time to reflect on replies, and our 'conversations' were automatically recorded.

5.5 Communication and interaction

5.5.1 General

Feenberg notes in 1999 that, despite the variety of 'new technologies' that have appeared since he and others pioneered the first on-line education programme in 1981, "the most exciting online pedagogical experiences still rely on human interaction" (Feenberg, 1999).

Brent Muirhead underscores this by stating that "[a] vital academic question involves the social interaction that occurs during online class work" (Muirhead, 2000).

Nevertheless, Feenberg was of the opinion that, since writing had never before been used "as the primary support of small group activity", and decontextualisation was an "essential effect of writing as a medium", this form of written communication was "not self-sufficient but needs to be supplemented by other means of expression".

In 1989 Anthony Kaye predicted that, as "[t]he increased level of communication which conferencing permits might lead to an increased demand for face-to-face and telephone

contact, so it could well be inappropriate to imagine that conferencing will be a substitute either for face-to-face meetings, or even for postal contact and telephone calls" (Kaye, 1989).

Ten years later Farrington still asserts that "for most students and faculty e-mail and Web interaction are simply one additional method of communicating and certainly not the only means by which they interact. Web-based discussion will most likely only increase the participant's interest in meeting and talking 'for real' " (Farrington, 1999).

Carr-Chellman et al. (1999), also report that even dedicated distance education students "felt that face-to-face interaction was preferable [to CMC] and critical".

Paradoxically it may be the "lively, rapid iterations, almost rapid enough to recall spoken conversation" (Feenberg, 1989) that hold the key to the strength of CMC as an interactive medium.

Especially at night we occasionally conducted near-synchronous conversations by e-mail, when two of us were working on the project and happened to go on-line at the same time to check or send e-mail. We would then stay logged on for as long as 30 minutes, exchanging messages.

5.5.2 Language code

Despite the fact that the RBO880 group consisted of both English- and Afrikaans-speaking students, the medium of communication was never an issue.

The participants used both languages, although the former predominated owing to the 'virtual' presence of a British observer. Since our team members were bilingual to a high degree, we switched codes at will. (Some of the examples used in this report were translated into English.)

The outside observer expressed concern to the tutor that her presence might inhibit interaction on the class discussion list: "I hope the fact that I'm around does not put off your Afrikaans preference students from interacting...?"

She need not have feared, as all the RBO880 students were quite comfortable with English, it being either their first or second language.

Language may be a problematic issue in international on-line collaboration, however.

5.5.3 Discourse in the team

Similar to the Sherry and Myers group, our discourse consisted of "asking questions, requesting technical information and seeking opinions about handling problems" (Sherry & Myers, 1998).

We also negotiated, debated, opposed and concurred with one another's views, thereby building new understanding and knowledge of concepts. Our explaining technical terms and procedures to one another forced us to think critically and carefully, as we had to share meaning in order to share tasks.

Although our style of communication was very informal, slangy and often cryptic, witty humour was not as distinctive as it was in the peer group. This could perhaps be ascribed to the work load and time pressure - there was no time for thinking up witty repartee.

The informal register that characterized our interaction is illustrated by the following example: "Work's hectic, family requires attention and I am under the weather. Or under something, what with this bloody non-PC virus. Feels as though Gretel has hit me prematurely." (Gretel was an approaching tropical cyclone.)

The often 'telegrammatic', crammed style is evident from the following message:

"In my attempt to think thru things (TAProtocol style!)I tend to be too transparent/boring

* took me an hour via PINE (DOS) and then PC PINE(WIN) to locate the file and then retrieve it - finally (insert virtual cut wrists here) I saved it in PC PINE, did a search in WIN3.1 and bunged it into my HTML editor - thank you very much (bouquets for J as well as M, eh?), and I can see clearly now the pane has come.

* prob is that my Net link runs off Arcnet thru a fibre backbone - a favour done for me by techies wanting to speed up my access to the WWW etc. So, often when I use PC

PINE the server freezes up - a confusion in protocols? So 9/10 I use PINE for DOS as it's very reliable and fast and the server is happy doing so - we have just had UTP cabling installed, so sometime we should have a faster/reliable link :-)"

On the basis of our experience I have to challenge Kaye's assertion that "CMC is not a substitute for certain properties of voice telephone communication - especially the intimacy and the spontaneity of response" (Kaye, 1989).

Judging from the register and frequency of e-mail exchange between the active members, there was no lack of intimacy or spontaneity either in our project team or in the RBO880 group. Examples from the rest of this section should amply support this view.

Clarke (1999), citing Hiltz and Wellman (1997), notes that "on-line communication is often 'more uninhibited, creative and blunt' " - sure signs of intimacy and spontaneity.

Even between group members and an outside observer who monitored the project as part of her own research, the communication was relaxed and spontaneous: "Hi, S.! Good to see you again! You'll find these MEd people quite nice, I am sure, apart from the obvious loose screws in some cases."

5.5.4 Discourse in the peer group

Clarke (1998) conducted an exhaustive quantitative and qualitative analysis of all e-mail messages exchanged during the RBO880 module. Among other things she found the following:

(1) The two most active partners in the *Who's Who* project were among the four most frequent contributors to the RBO880 discussion list, with by far the highest number of contributions in the entire peer group coming from one of the partners.

(2) The communication was "open, frank and informal".

(3) Students mainly

- provided information,
- asked questions,

- presented problems with which they needed help,
- made suggestions to help solve problems presented by others, and
- expressed appreciation and thanks for the help provided by others on the list.

Despite the serious nature of learning activities the relationship between the students and the tutor was relaxed, friendly and humorous, as reflected in the following exchanges:

Student: "Goodness-gracious-me! All the rigmarole to get these pages up on Hagar! Why can't HWGTM do something for all the money we pay and put up the stuff for us? ;-) (OK-OK! Dis net 'n ou grappie, Pa!) [OK-OK! It's just a little joke, Dad!]"

Instructor: "OK, here's what I'll do. Once you have FTPd your desk to HAGAR, let me know what the file name of your fist page is. Then I shall BUILD a LINK from your desk to that page for you.

That's called meeting you halfway. Now don't take advantage."

And another:

[Instructor]

"I shall be away in Cape Town for tomorrow and Friday.

I shall miss you very much.

I shall be having dinner with PM [a student colleague] in a nice seafood restaurant on Thursday evening.

We will drink crisp, dry Cape white wine.

I shall not miss you at all.

Good luck.

Work hard.

Play nicely.

Don't fight.

Best wishes"

Even in banter pedagogical issues seemed to surface, perhaps indicating the undercurrent of serious academic engagement, in this case with constructivist principles. One group member would attend a conference in Miami and suggested all of us went along for the fun:

Of course we should take him [the instructor] along - who else is going to make the cocktails? And D. will definitely need a caddy on the golf course.

We'll write it all up afterwards and publish it under "R-e-v-e-n-g-e of the c@tts"

[C@TTS = Computer-Assisted Teaching & Training Society, which the instructor and his students had founded.]

D. replied:

No!! I do not want him for a caddy. A caddy is supposed to TELL you the distance to the hole and HAND you the correct club. The caddy you are arranging for me now will advise me to determine the distance and suggest a few hypothetical options, like use an 8 iron on the back foot & go under the branches or a 9 iron with an open clubface to go over, but better yet, contact Gary Player for he has been known to succeed with these things..."

5.5.5 With the community of practice

The egalitarian nature of CMC was very evident in our communication with most of the experts. Despite their academic positions and reputations we were mostly treated as colleagues, not as students.

This, to us pleasantly surprising, phenomenon was proof of an advantage of CMC over face-to-face contact. I doubt whether relations would have been as relaxed had we physically to meet these eminent people to gather information. In conventional communication long-established rules of etiquette and protocol would usually prohibit too intimate a style of conversation between student and professor, between learner and expert.

Rupert Wegerif notes that such a community should allow newcomers "to participate in its practices and move from peripheral to central status as rapidly and smoothly as possible" (Wegerif, 1998).

Although it would be unprofessional to cite names, it was noticeable that the most eminent and well-known experts were often the most humble in their dealings with us. Ironically it was the lesser-known, and often totally insignificant, self-styled 'experts' who announced themselves to us with the greatest fanfare or audacity.

Characteristic of the attitude of such people are the following messages:

"I'm in multiple other kinds of *Who's Who* documents. Please consider me for inclusion. Files attached for directory and photo. Thank you!"

"I am a professor in the Instructional Technology program at the University of [...], and, since I am program chair for the [...] conference in [...] Finland, I guess I'd best be listed."

Some did not even comply with the most basic requirements of etiquette. At one point I observed that "I got something like six or seven 'requests' [for inclusion in the *Who's Who*] - it is remarkable that not a single one used a 'please' anywhere. The requests of one or two of them sound like orders, and another one clearly thinks that he is doing us a gigantic favour by reporting himself (a Name of which I have never heard/read)."

A 'Computer Specialist Teacher' who did not meet the criteria at all, sent a one-line message: "I would like to be listed on your site."

One could possibly do a rewarding study on the nature of self-confidence, based on some of the messages we received.

"Self-nomination to your splendid *Who's Who*. Full CV at [...] Picture and html draft attached."

"I don't know if you accept self-nominations, but just in case you do, here is mine. Photo is also attached."

"I have sent some files for inclusion. I hope they meet with your approval."

Some at least tried a little flattery before thrusting themselves into the limelight. A two-line message from someone whose name appeared in very few bibliographies and who barely met the requirements:

"Many thanks for keeping up the Instructional technology web portal. It is great and very useful. Here is another to add."

This kind of self-promotion came almost exclusively from North American (especially US) academics and the odd Australian. European experts seem to be extraordinarily shy about their achievements, to the point of being brusque in their communication:

"Firstly, formally I am not a Dr. Please see the enclosed CV which have been written for a specific purpose. You may use this information. However, I take for granted that you send me your suggestion for presentation for my acceptance before anything is published on the WWW which I have not distributed myself."

In a follow-up message, the same European wrote:

"I have, of course, no objections to your suggestion of presentation of information in this way.

Although, while previously seeing Internet only as a positive tool, I am starting to find difficulties - especially that so many people can reach you so easily and put in any question and expect replies. Sometimes I feel that I could spend all my working hours just responding to questions and questionnaires."

Others seemed to sublimate their modesty through self-deprecating humour.

"I've just noticed that I am in your compilation of windbags... Honoured, I'm sure."

"Thanks for the invitation. I would be pleased to join this rogues' gallery!"

One suspects cultural differences between the USA and Europe being the reason for the different attitudes to self-promotion. Americans seem to have more of a "marketing" approach about themselves than Europeans.

A few had the decency to acknowledge their immodesty in promoting themselves:

"I am sending you my name - quite immodestly - for inclusion in your *Who's Who*, assuming I qualify.

Attached is a source code (I believe properly edited) and a .jpg."

The numerous examples of supportive and encouraging messages cited in this thesis should, however, illustrate the largely civilized level of discourse and interaction practised by most of the Educational Technology 'fraternity'. (See Appendices J-M.)

Our acceptance into this wider community of practice seems to be illustrated best by a mischievous suggestion that we should have "more naked women" - a deliberate, recklessly 'politically-incorrect' utterance by a respondent noted for his witty style in the ITFORUM group.

5.5.6 Comments

I should like to dispute the notions expressed by Feenberg, Kaye and Farrington that CMC or Web-based discussion would increase students' desire for other forms of communication, such as face-to-face, telephonic or postal contact.

During the entire *Who's Who* project we never even considered 'snail-mail' and had no need or desire for a face-to-face meeting. It was not necessary, despite the apparent chaos in some of our messages. Apart from one telephonic exchange owing to a team member's not having ready access to CMC, no telephone calls were needed.

Based on "more than ten years of experience" with text-based asynchronous computer-mediated conferencing, Sgouropoulou et al. (2000) note that "it can be quite hard to begin and sustain a discussion about specific working practices if the medium of exchange has to be text".

Their scepticism in stating that text-based asynchronous CMC is "insufficient" for accomplishing complex tasks was found to be misguided. In our project CMC worked very well in achieving our goals. The fact that the *Who's Who* was successfully created by means of plain text-based CMC speaks for itself.

Furthermore, in our experience, CMC created a better environment for Habermas's 'ideal speech situation'. It is one which allows "that situation which, through the elimination of all forms of coercion and through ground rules allowing all to speak, best supports the force of good arguments winning out over other, less rational, factors" (cited by Wegerif, 1998).

This was evident in all our interaction - in the team, with our peers, and with people who were much higher on the academic ladder than we.

Citing Lyotard (1979), Feenberg states that "CMC is a privileged technological scene where we may observe the 'atomisation of society into flexible networks of language games' " (Feenberg, 1989).

These 'language games' seemed to us to provide sufficient support for a collaborative design project based on CMC, despite assertions to the contrary.

5.6 Summary

The successful collaborative development of a Web-based artefact depends on two sets of factors, viz. 'hard issues' and 'soft issues'.

The '**hard issues**' included the availability of adequate infrastructure, hardware, software, information and technical support.

Of these the inadequacy of technical support was the only factor that hampered our progress to some extent, although we did eventually overcome the obstacles.

The '**soft issues**' were, of course, equally important.

Skills acquired 'by doing' under pressure seem to be acquired rather quickly!

Interaction with peers and the community of practice contributed considerably to the successful rapid prototyping of the *Who's Who* in limited time. The quick feedback facilitated by CMC proved to be invaluable.

Without *cognitive support* it would not have been possible to get an acceptable product onto the Web in such a fairly short time. The constant 'brainstorming' with team members and peers provided the 'scaffolding' necessary to build applicable knowledge - typical of a constructivist learning environment.

Affective support in the form of encouragement and recognition served as a prime motivator to render one's best under the circumstances.

Trial-and-error seems to be central to *iterative design* and development. The iterative development of an artefact can involve substantial unpredictability about the eventual outcome of the project, as it seems to acquire a momentum and dynamics of its own.

On one hand this can make the learning process so much more exciting, which enhances motivation. On the other hand, however, the uncertainty can at times cause anxiety which, if not controlled, may result in unproductive panicking because "things don't work".

What was originally intended as a local collaborative project became an international project enriched by aspects of participatory design.

CHAPTER 6

TESTING AND EVALUATION

CHAPTER OUTLINE

- 6.1 Criteria
- 6.2 Procedure and methods
- 6.3 Results
- 6.4 Improvements
- 6.5 Summary

6.1 Criteria

This chapter is an attempt to answer the research question on how one judges the success of a computer-supported collaborative design project.

Ultimately we had to determine whether we had accomplished the aims of the educational programme, viz. the successful creation of a Web-based educational resource by means of collaborative work.

However, the most immediate indicator of and common-sense criterion for success at the time was the approval of the professional community, our peers and, of course, HWGTM ("He-who-gives-the-marks"), as the instructor was jokingly called.

Commenting on evaluation issues in on-line learning during a discussion on ITFORUM, one expert noted: "Maybe a really different assessment type would be one that relies on external (real world) criteria such as workplace validation, empirical test - the project does its intended function or does not" (Anderson, 29 August 2001)

Peter Goodyear similarly states that "[o]utcomes achieve a special significance in ODL [Open & Distance Learning] action research projects because they are taken as an index of the success of the project, or at least of some of its innovative elements" (Goodyear, 1999).

Another well-known person in the field remarked that "your resource will be judged - not by how exclusive it is - but by how useful it is for those who are doing research in the field" (Martin Ryder, personal e-mail, 07/01/98).

In Trochim's opinion, "[f]or small websites run by individuals or small organizations, informal evaluative methods will probably be most appropriate. It will usually not be cost effective for an individual to do formal user testing or extensive utilization monitoring" (Trochim, 1996).

Despite this view we did design an evaluation instrument in the form of the previously mentioned questionnaire (Appendix D).

Our own domestic evaluation criteria had to be created almost intuitively and 'on-the-fly', as there was no time for comprehensive research before or during the first iterations of the design and development process. In hindsight one can contemplate existing research in this regard, and decide whether one had actually followed valid evaluation procedures.

Instructional Technology Research On-line (InTRO), a reputable WWW site that also publishes interviews with eminent educational technologists, uses the following broad qualitative criteria to judge Web resources in this field:

- Contribution of the site to the field of Instructional Technology
- Professional aesthetic quality and general appearance of the site
- Amount of information available at the site
- Extent to which the site makes effective use of the Web's capabilities
- Overall quality of the site compared to other sites in its category

6.2 Procedure and methods

Trochim (1996) suggests "an integrative model of evaluation, one that mixes evaluation activities in with planning and development roles, one that involves the evaluator from the very inception of the project".

This is, of course, consistent with an action research and development approach, as has already been illustrated to some extent in the previous chapters. It is also compatible with

case study evaluations, as these "can cover both process and outcomes, because they can include both quantitative and qualitative data" (Tellis, 1997).

Continuous *self-evaluation* occurred spontaneously through reflective discussions in the team, as will be illustrated in the next section.

The prototype was also evaluated informally by the rest of our *peers* in the RBO880 class, either on request or spontaneously during discussions on the electronic forum.

The first *external* testing of the prototype occurred when the instructor unexpectedly (and prematurely, as far as we were concerned) announced its existence on the ITFORUM discussion list with this message:

"I am sorry to break protocol with interrupting in the middle of a discussion, but this has waited long enough, and the excitement is killing me.

About two years ago I enquired about a Who's Who in CBT/IT. I got a few good pointers, but no one-stop solution.

So I got my students to make one.

Please visit the incomplete Who's Who in IT at
<http://hagar.up.ac.za/catts/learner/m1g1/whointro.html>

Please let us have your comments."

Just to rub it in, he sent our group the following message:

"You will by this time have read my posting to ITFORUM. To bad I beat you to it! I just couldn't wait to let the whole world know."

Thus expert evaluation actually began before we could plan it.

As the resource evolved, the need arose to gather more structured feedback on particular issues such as usage and design. As part of a later design iteration the questionnaire

referred to in previous chapters (see Appendix D) was created and posted on the Web site.

The aim was twofold:

- (1) To obtain evaluation feedback
- (2) To obtain information on possible candidates

Responses were analyzed and useful suggestions were discussed and implemented in the design. Statistics obtained from a site counter and from the evaluation questionnaire were also analyzed and qualitatively interpreted.

I did not deem a detailed and meticulously accurate statistical analysis necessary for the purposes of this study. Firstly, this is a qualitative case study, and secondly such an analysis would warrant a separate report, for which there would be no room in a mini-thesis.

The main kinds of information we tried to obtain by means of the questionnaire were on

- (1) usefulness of the resource,
- (2) ease of use, and
- (3) authoritativeness.

Trochim (1996) summarizes some of the salient evaluation methodologies for such a project, i.e. Concept Mapping, Computerized Evaluation, Survey Methodology, Achievement Testing and Measurement, Experimental and Quasi-Experimental Designs.

Of these, a survey methodology was the most useful and appropriate to us, since it "can be conducted during the implementation and evaluation phases to assess user reactions to both the content and usability of the site" (Trochim, 1996). This was precisely what we needed from an evaluation exercise.

6.3 Results

6.3.1 Self-evaluation

Engaged, problem- or project-based learning with open-ended aims of necessity requires continuous formative assessment of one's own activities, especially if the development process is an iterative one. It is the only method of quality assurance in such an environment.

The following (edited) extracts from our e-mail exchanges should illustrate the reflective evaluation we applied to ourselves:

Example 1

```
"> <H3><a name="Smith">Smith</a>, Sam, Ph.D. </H3>  
> Uitsmijter at Harrod's.<BR>  
> Mail him at <a href="mailto:sam@koos.pofadder">sam@koos.pofadder</a><BR>  
> You can also pay him a cyber visit at his <a href="http://www.homepage">  
homepage</a>
```

I like it - it is neat and uncluttered and the access to the GG's e-mail/URL concludes our part of the deal. Nice!

I like this part - it's optional and an interaction - as jy tyd het/of as jy smaak - sê vir haar/hom hullo... [if you've got time/or if you like - say hello to him/her ...] "

Example 2

"Our revised GG pages are up. BUT... I've already discovered new flaws (of course).
1) Spelling errors
2) These pages still take ages to load on my work computer. Perhaps we should do what we initially thought to do: One page per letter of the alphabet. "

Example 3

Having downloaded the first draft Web pages to use as templates for his contributions, a team member remarked:

"Our first test run works okay - except the RETarrow icon that behaves itself as wallpaper instead of being centred. But the second one I can't read - did you say something about ASCII? [...] this second one stops when one wants to read it in the preview screen - then MS gives you one of those 'Using unreg ver of an image lib. file', etc. Maybe if I try to erase it then the rest of the thing might work."

This meant: Back to the drawing board. It would not be the first time either.

Example 4

- > Secondly those links would mean viewers have to go off our site, with
- > no back-link on the GGs Own Home Page. Therefore it might be better
- > in theory and in practice to have CVs and pics on our site - also
- > loads a few kg/s faster.

yup - makes sense “

Example 5

- "> I've noticed that my info is not as complete as I bragged. I have
- > pics of only about half of our present collection of 67.

That's still a m[...] lot, jong."

Although some of these brief exchanges may not readily be recognized as being evaluative, they did serve the purpose of measuring the success of our actions.

6.3.2 Peer evaluation

Our peers in the rest of the RBO880 group contributed enthusiastically.

"I have only just had a look at the GGs page - but IMHO it is b[...] good - I am really impressed with what was achieved ..."

"Your 'Who's Who' project seems a really GOOD example of a group project"

Sometimes we deliberately solicited feedback from the RBO880 group, e.g.

"A. tells me that Eva E. on the Who's Who has graffiti and tattoos all over her face - the text through his browser runs over the picture. Will someone else also have a look, please, and tell me what you see?"

The feedback was then useful in solving the problem immediately, before we had to put out the page for public scrutiny - a kind of internal quality assurance.

6.3.3 Expert evaluation

Clarke (1998) notes in an e-mail to the RBO group discussion list: "Most intriguing but loud and clear is the favourable response to the 'Who's Who'."

The results mentioned in this section emanated from members of professional IT groups.

The reaction to the announcement on ITFORUM was very positive, as can be seen from some of the typical first responses:

"What a terrific idea and a great site.

I found it very engaging (and fascinating) to be able to put a face to some of the names in IT and to read a little about their fields and interests. I also enjoyed the international flavour of the list. I am sure this list will make a significant contribution to encouraging and supporting communication in and around the field of IT.

My congratulations to yourself and your students. I suspect this letter will be one of many [...]"

(R. O.)

"This is a very useful resource for all of us - especially in the US. We are often insulated (or choose to become so) from the interesting efforts and activities of international scholars... Efforts like yours help me to better connect my work with others, as well as to provide a more transnational perspective on the field and state-of-the-art to my students. Your site does a marvellous job of establishing breadth of the field..."

(M. H.)

One of certainly the most famous experts had a special request:

"The only other thing I would request is that your students manipulate my picture so that I don't look so fat! ;-)" (Name withheld.)

We duly complied with the request, and learnt a new facet of using computers as persuasive devices.

Some had specific criticism or requirements:

"I feel that the site lacks corporate representation, but don't want to come off as argumentative. From my perspective there are few resources in this field which are interested in serving the corporate community. All the universities and professional organizations want corporate sponsorship (read: \$\$\$) but don't give corporate practitioners much credence though we actually have the money and audience to implement many bleeding edge tools and methodologies."

(W. T.)

This was a serious allegation in our opinion, and worth our attention.

A compilation of further responses can be found in Appendix L.

About nine months after the Web site had been created, all those listed on it were requested to check their entries and to complete the questionnaire. This solicited evaluation by the gurus themselves provided valuable feedback, as a result of which a further design iteration was undertaken. (This iteration was not done within the collaborative context any more, but by the remaining member who had volunteered to continue the development of the *Who's Who*.)

General comments can be found in Appendix L, while specific suggestions appear in Appendix M.

A year after the creation of the *Who's Who* it received an award as the Best Instructional Technology Web Site for being "the most outstanding contribution to the field of Instructional Technology on the World Wide Web during the year February 1997 - June 1998".

The award was made by the creators of Instructional Technology Research On-line (InTRO), themselves among the most well-known educational technology experts, and was based on the five criteria mentioned under 'Criteria' (Ch. 6.1).

It was also chosen as the Best Instructional Technology Home Page in the Informational or Miscellaneous Category, "for significant achievement in providing valuable information to the field of Instructional Technology on the World Wide Web during the year February 1997 - June 1998".

The International Forum of Educational Technology & Society (IFETS) at Massey University, New Zealand, listed the site as one of its recommended Educational Technology resources.

The *Who's Who* was also deemed worthy enough to be specifically linked on professional Web sites such as ITFORUM, InTRO, and Instructional Technology Connections (Martin Ryder's acclaimed resource).

Some users obviously perceived the *Who's Who* as authoritative enough to use as a primary source for research projects. In compiling *Criteria for Evaluating Multimedia Instructional Courseware*, Graves and Gibbs noted that they "compiled a list of potential study participants from a review of related research literature and the *Who's Who in Instructional Technology* web site." (Graves & Gibbs, s.a).

One of the experts regarded the *Who's Who* so highly that he listed it as one of his 'appointments' on his WWW home page!

"PROFESSOR (2001 -)

Faculty of Education, X University, Canada.

VISITING ASSOCIATE PROFESSOR (1999, 2000)

Department of Educational Psychology & Counselling, Y University, Canada.

VISITING FELLOW (1998 - 1999)

School of Communications and Multimedia, Faculty of Communications, Health and Science, Z University, Australia.

MEMBER (1999 -)

Who's Who in Instructional Technology. "An international gallery of experts from the world of Instructional/Educational Technology and its related fields".

RESEARCH FELLOW (1998)

Centre for the Application of Developmental Science (CADS), X University,
Canada."

Another one listed her inclusion in the *Who's Who* as one of her achievements:

"P. is well known for her independent and systems-oriented approaches to training, performance, and learning technologies and is listed in *Who's Who In Instructional Technology*. She's an often-requested speaker at training and instructional technology conferences, is quoted frequently in training publications, and has contributed numerous chapters to training and instructional technology books."

Yet a third one, who had presented herself for inclusion, noted proudly on her Web site: "She was selected to be a member of *Who's Who in Instructional Technology* [...]"

A fourth member requested a letter of reference to a *Book of Records*, confirming that he was the first in his country to be listed on the *Who's Who*.

Whether justified or not, the *Who's Who* itself seems to have become a norm in the industry.

6.3.4 Public evaluation

Numerous unsolicited listings of the *Who's Who* on other Web resources in the general field of Education were detected by means of a search engine. These range from links on the personal Web pages of students and academics, through being used as a class resource in both undergraduate and graduate courses, to being included in the standard reference pages of some institutions. (See Appendix N for more details.)

Some time after the InTRO award the site was also adjudged a 'Key Resource in Instructional Technology' by the Links2Go Web service. In the particular category the Web site was deemed to be one of the top "50 of the most representative links".

According to Links2Go the award "is both exclusive and objective. Fewer than one page in one thousand will ever be selected for inclusion [...] based on an analysis of millions of web pages [...] During the course of our analysis, we identify which links are most representative

of each of the thousands of topics in Links2Go, based on how actual page authors, like yourself, index and organize links on their pages” (Links2Go Key Resource, 1998).

On the HELL (The Higher Education Links List) the *Who's Who* was listed as one of the eight "Educational Technology Prime Sites", being one of "the best supersites and directories". This is a classified list of nearly 1000 up-to-date selected links to higher education resources (HELL, 1999).

The International Network Distance Education Center (INDEC), Korea, listed the *Who's Who* among its "selection of some of the best supersites and directories : Educational Technology / Prime Sites". Unfortunately I could not establish the international standing of this body.

The INTO Educational Technology site in Ireland approached us with the message: "Your educational web site has been nominated [...] as being one of high quality and worth recommending to colleagues."

The *Who's Who* seemed also to enjoy wider use, as it was listed in the Higher Education directory of OpenHere.com, as being "one of the 10 largest index and search sites on the Internet and [...] specifically focused on creating resources for the family."

We were not quite sure why it was regarded as a family resource, but were pleased, nevertheless.

Some further noteworthy 'public' education and training resources that listed the *Who's Who* at the time of writing included the ERIC Clearinghouse on Information & Technology and the International Society for Performance Improvement. (See Appendix N for details.)

The UNESCO Institute for Information Technologies in Education (IITE) regarded the *Who's Who* as being among the top 138 IT/ET resources in the world.

The aim of making the *Who's Who* an international resource apparently paid off. Unsolicited references or links appear on institutional sites in Brazil, Venezuela, the USA, Canada, Iceland, Finland, Norway, Sweden, Germany, the Netherlands, Spain, Portugal, France, Switzerland, Austria, the UK, Ireland, the United Arab Emirates, Hong Kong, Malaysia, Japan, Australia, New Zealand and South Africa.

The references are not all in English either. Most of the references in non-English countries are in the local languages.

One respondent to the questionnaire mentioned that "several international colleagues mentioned this page, as have many international students wishing to enrol in our program [...]"

Another one noted: "The international nature of the list is especially valuable because here in the USA we tend to be too insular in our thinking about who contributes what to the field."

I trust that the need for a global resource has been satisfied.

6.3.5 Questionnaire

Although at the time of drafting this thesis only 77 visitors had gone to the trouble of filling in the on-line questionnaire, their responses were helpful and informative.

For various technical reasons we had no access to the log files for the site, therefore it was impossible to calculate the real return rate in relation to the number of site visitors (not visits).

An analysis and discussion of the responses is provided in Appendix F. Here follows a summary of the results, arranged according to the questions.

(1) How did you come across this WWW site?

Most respondents were specifically referred to the Who's Who.

(2) Do you think there was/is a need for a 'database' like this?

The answer was a unanimous "Yes" from all 77 respondents.

(3) Why do you say so?

Most of the respondents felt there was a need for a networking and student resource. Some wanted to see the faces behind the famous names, while some thought there was a need for a central database of Instructional Technologists.

Miscellaneous other needs were mentioned, of which most were either inconsequential, impracticable, or not useful for the purposes of this survey.

Two of the more useful replies were:

“I was often asked who's who. I really need to know as a professional.”

“It is often important when researching concepts to get a sense of the individuals behind those ideas.”

One respondent simply said “Well ... it is a good source of information”, and another remarked: “Nobody else has done it before”.

(4) If you have had any contacts as a result of your own entry on the *Who's Who*, please supply (if at all possible) the number of contacts.

As very few respondents answered this question, I regard the results as statistically insignificant.

The question should perhaps be removed from the Web questionnaire owing to the poor response rate and the difficulty for respondents to identify the original sources of their contacts.

(5) What has been the nature of such contacts?

The results are statistically insignificant for the same reason as in the previous question.

One obviously disgruntled respondent noted that his contacts had asked “questions that could have been answered with some thinking and a bit of time searching published research.”

(6) If you have used the *Who's Who*, please indicate how.

As could be expected, most of the 77 respondents had simply browsed around, while a little more than a third had searched for a particular person. About one fifth indicated that they had actually contacted someone on the *Who's Who*.

Only 6 of 25 respondents who indicated ‘other purposes’ had used it for networking, which is strangely inconsistent with other indications that networking was an important consideration. It also does not tally with the number who maintain that they had actually contacted a person listed on the *Who's Who*.

However, of the relatively few who answered the particular question, the proportions who had used the *Who's Who* for networking, as a student resource, and to link names and faces were consistent with the findings under Question 3.

(7) Approximately how many times have you visited the site?

Of 70 respondents 29 had visited the site once, while 33 had already visited between 2 and 5 times. The highest number of visits per respondent was 25.

Owing to the relatively small sample (compared to the ‘hit counter’ figure on the Web site) these data may not be an accurate indicator of general usage frequency per visitor, but they do indicate the probability that nearly 60% of users visit the site more

than once. This may be interpreted as a sign of satisfaction with the service.

(8) *Approximately how much time have you spent at the site per visit?*

Most respondents spent between 5 and 20 minutes at the site, with an average of 9.94 minutes. The longest was an incredible 180 minutes!

(9) *Have you found any new contacts?*

57 (74%) of the 77 respondents indicated that they had found new contacts through the *Who's Who*.

As only 17 actually made contact with listed members (see Q.6), all the new contacts were apparently not immediately followed up.

(10) *Are you satisfied with the results of your 'networking' through the Who's Who?*

Of 65 relevant responses 54 (more than 83%) were 'definitely' satisfied, 9 were 'moderately' satisfied, and 2 were not satisfied at all. One of the latter provided an extensive explanation, which is discussed elsewhere.

The positive results correlate with those of Q.17. However, there is a puzzling discrepancy between the number of users who were 'definitely satisfied' with their networking and those who had actually 'networked', according to Q.6.

(11) *What did you achieve (if anything) by using the Who's Who?*

Once more networking was ranked first. 38 responses indicated that the service was used firstly for networking (37%), secondly as a resource for students (26%), and thirdly to gain an overview of the field (21%). Searching names and connecting names to faces were mentioned by far fewer respondents.

The ranking of responses is consistent with those under Q.3 and Q.6.

This question overlaps with Q.6 to the extent that it will have to be revised or omitted in a future questionnaire. It also overlaps too much with Q.12, something we realized once we had analyzed the responses.

(12) *What, in your opinion, is the greatest benefit to be derived from such a service?*

Networking again appeared at the top of the list. Consolidation or getting an overview was ranked second, followed by the possibility of connecting names to faces, and doing name searches.

The ranking order of the last three benefits does not correlate with the order found in Q.3, Q.6 or Q.11. (See Appendix F for details.)

(13) *In what respect(s) do you think students might find the site useful?*

First place was (yet again) awarded to networking. Usefulness in students' research

and as a general study resource gained second and third positions respectively, followed by connecting names to faces, and doing name searches.

Arguably the results from this question are not significant enough to include it in future, especially since Q.12 could supply most of the necessary information.

(14) *What is your opinion about the selection criteria on the site?*

Most of the 40 useful responses (75%) indicated satisfaction, while the rest of the respondents wanted more stringent criteria.

(15) *Have you had any difficulty in accessing the site?*

Only 5 of the 77 respondents (i.e. 6.5%) had experienced difficulty, mostly with 'broken' links or server problems.

(16) *How would you rate the value of this resource to the Instructional/Educational Technology community?*

81.8% of users rated the service as Very (31.2%) or Extremely (50.6%) valuable. The results correlate remarkably well with those who were 'definitely' satisfied with their networking efforts (Q.10).

Brief discussion of results:

The sample of 77 respondents from the several thousand who may have used the site does not provide enough data to perform a comprehensive, accurate and reliable statistical analysis. On the other hand, since they represent the full complement of those who did complete the questionnaire, the results could be used as qualitative indicators for diagnostic purposes.

Firstly, the ***need for such a service*** was confirmed unequivocally.

Networking stands at the top of the list both of the needs of the IT community and the uses of the Who's Who. This indicates that it serves its primary function well, although few of the users had actually contacted a listed member by the time they filled in the questionnaire. It seems that the meaning of 'networking' as we intended it (i.e. actual contact and communication) was not always how users understood or meant it. This 'misunderstanding' may have influenced the results, and should be addressed in a future version of the questionnaire.

The three other most frequent needs for such a service and subsequent uses of the site were

for the purposes of *students' research*, gaining an *overview of the field*, and *connecting names to faces*.

The latter two findings corroborate our intuitive 'needs analysis', viz. that a central node of contact was needed in the field. Our decision to add photographs to the entries were also justified.

Although the questionnaire had not originally been designed for formal scientific analysis, one can conclude that it did serve its purpose well, viz.

- (1) To obtain evaluation feedback
- (2) To obtain information on possible candidates

6.3.6 Usage

What one respondent predicted at the time did happen: "Your site has the potential to be a major contribution to the field of IT. It will not be an instant hit, but I suspect that you will find increased usage over time."

Counter figures showed a steadily increasing usage since the counter was installed more than a year after the inception of the *Who's Who*.

According to the counter the site received roughly 15,700 visits between 1 May 1998 and 1 May 2001, i.e. an average of 18 per day. (See Appendix G for detailed figures.)

User figures have not stabilized at the time of writing. There still seems to be a continuous monthly increase, with a daily average of approximately 29 users in July 2001, and 38 in September - an increase of around 50% since April (25 visits per day).

6.3.7 Reflection

It is a pity that all the comments, especially from the community of practice, could not be listed in this mini-thesis, as the codification and quantification of human responses inevitably dehumanize them. I believe a reader would get a much better insight into the nature of the needs and the appreciation of the service by reading though all the responses, rather than having them categorized and counted.

Comments such as the following 'say' so much more than a percentage:

"Firstly, it's great putting a face to the authors of so many articles!! Secondly, having access to so many sites dealing with topics of interest to the readers is wonderful."

"What a wonderful way to make contact with like-minded colleagues around the world. And to see pictures of some of the people whose work I've read but I've never met."

"So many of us work in our own little universes and need a way to find others with whom we can share... and others with whom we can consult."

One may conclude that the active involvement of practitioners and students in evaluating and providing feedback constitutes a certain degree of participatory design.

6.4 Improvements

On the basis of feedback from our peers, the experts and the broader community of practice, certain improvements were made during subsequent iterations.

Although the Web site questionnaire was only added once the academic module had ended, the feedback applied to the collaborative product. Some of the most significant resultant improvements are discussed below.

As a number of the first respondents to the questionnaire felt that the original ***selection criteria*** were too lenient, they were adapted twice in response to comments such as the following:

- "The selection criteria are too unrestrictive. With the current criteria, the database should be 50 times as large."
- "Too easy -- a Master's degree and one article does not make a 'leader'."
- "I think they are okay -- a bit relaxed if anything".
- "Seems very loose. Just about anyone in the field could be listed."

- " I think they should be more stringent, perhaps evidence of sustained research in the area (at least two refereed publications in the field)."
- "Provided that the selection criteria are turned up, it could be valuable. As it is, nearly anyone who has a Master's and has published a vanity press thing can be included. It is not a "who's who" but maybe a "yellow or golden" pages of IT?"

Subsequent upgrades are indicated in Table 6.

Table 6 : Selection criteria

Original	Second version	Third version
At least a Master's degree, its equivalent, OR acknowledged status in a relevant field	At least a Master's degree, its equivalent, OR acknowledged status in a relevant field or in the industry	At least a Master's degree, its equivalent, OR acknowledged status in a relevant field or in the industry
At least three relevant publications or products	At least three relevant publications or products apart from that required for academic qualification purposes	At least five relevant publications or products apart from that required for academic qualification purposes
		Nominations endorsed by people already listed on the Who's Who will enjoy priority

The **site counter** was added in May 1998. Although one cannot be sure of the number of individual people who visited the site, it at least indicates the number of times people use the site. This is helpful in determining its sustained or increasing usefulness.

An alphabetical, tabled **index of names** linked to entries was added at the suggestion of a respondent.

Someone suggested that the site be "[s]earchable by keyword, name, or affiliation; a recommended keyword list for research area. These two would improve the utility of the site."

After sporadic efforts at finding a suitable, user-friendly **search engine**, one was finally added in July 2000. At the time of writing this thesis the weekly and monthly search reports received by e-mail are being analyzed to determine patterns and further users' needs.

Once a large enough body of data has been built up, it will lead to further improvements to the site.

A respondent suggested a "**Who WAS Who**" - a similar listing of great Instructional Technologists who had already passed away or who had retired. We thought it to be an excellent idea. It will receive attention once this thesis has been completed.

After the query mentioned earlier, we realized that there were really very few "**corporate practitioners**" in the *Who's Who*. We found it surprisingly difficult to trace such people, as they did not publish much, did not really participate in discussion groups, and were seldom found at conference Web sites. We also found that corporate Web sites, for security and privacy reasons, often had little or no biographical information on their employees, not even e-mail addresses.

There seems to be few corporate Educational Technologists who had not gone through academia, however. Some work still needs to be done in tracing such people.

"As per M.H.'s suggestion to provide greater linkage between your *Who's Who* site and our InTRO site, can I suggest that you add <a name> tags to each of the persons described at your site? In that way, it would be easier for other sites to create pointers directly to the individuals listed."

This request was accommodated when we created the **alphabetical index** linked to individual entries.

"Perhaps you could provide **links to other professional organizations** around the world who are dedicated to the improvement of instruction through the wise use of technology".

We subsequently did link to some organizations and resources, but decided to keep it limited, as it was not really part of the intended purpose of the *Who's Who*. After all, it was not supposed to be a 'Yellow Pages'.

"It would be good to put in **update dates** so that people can judge how recent the information is."

JavaScript is now doing this job automatically.

"I think a **list of students** working on theses or having done recent theses with abstracts of their research would be a useful addition to this site."

This seemed to us to be a rather tall order, firstly as the *Who's Who* was supposed to list EXPERTS in the profession, and secondly because there must be a good few thousand postgraduate students in the field world-wide. We asked the proposer whether he would be prepared to help build and maintain the database, but never received a reply.

"Advertise it!", was a suggestion from someone who discovered the *Who's Who* only in 2000.

Nevertheless the URL was submitted to a number of search engines and Webmasters of significant sites were asked to put links on their pages. In turn theirs were also listed on the *Who's Who*.

Owing to the (few) complaints about the **original logo** (cf. Figure 2, p. 59) we decided to replace it with a more neutral one, viz. the one in Figure 3.



Figure 3: New logo

We felt that the objects depicted in this logo were timeless, generic and all-encompassing symbols of technology in its widest sense being used to convey knowledge. Having received no reaction to the change, we conveniently and unscientifically assumed that "no news is good news".

Surprisingly only three respondents gave negative feedback on the slightly *risky interface design* (apart from the comments on our original logo):

- "Colours are horrendous." (This from one of our compatriots, studying at the same university to boot!)
- "The light blue text is hard to read before the dark blue background loads. The red text is impossible to read on a blue background."
- "I worry a little bit about the small text in some places and close contrast for those with visual impairments."

This was in direct contrast to the only other specific comment on the combination of background and foreground colours:

"You have a delicate design issue related to the close relationship of the values and hues you have chosen for the background and two text colors -- enough contrast to be readable and yet close enough in contrast to be subtle. Good job."

We subsequently changed to a larger font size and tested its legibility in various screen resolutions.

We also tested the foreground/background contrast by means of a black-and-white printout of a Web page. It seemed to be acceptable, although not excellent. We decided that we might change the graphical interface at a later stage.

6.5 Summary

If the proof is in the pudding, we got more than one helping. Unfortunately a substantial amount only came long after the collaborative part of the project had ended.

Although the number of daily visits to the Web site does not rank among the top figures on the Internet, the continuous increase is gratifying. One should bear in mind that the *Who's Who* is a fairly static kind of service, with a very specific focus, aimed at an exclusive group.

The need for and usefulness of such a service seems to have been established beyond any doubt. The unanimous positive feedback to the particular question in the on-line questionnaire confirmed the reality of the need for a resource such as the *Who's Who*.

Students' needs were summarized well in a response to the questionnaire: "This is especially useful for IT students, in that it provides a centralized means for locating contact information of well-known IT professors."

Furthermore, it seems that, in general, respondents value the exclusivity of such a database. They seem to want assurance of the quality of those included.

In retrospect the first round of reaction after the premature announcement by the instructor was the "workplace validation, [the] empirical test". It served as a potent motivator to improve the prototype post-haste.

We had learnt to create a Web resource for educators, by all indications successfully. We had done so in a collaborative setting. We met the criteria for success of the educational module RBO880. More valuable to us, though, was the realization that we as initiates had created a unique resource in the field of Educational Technology. According to the criteria applied by the InTRO service, the *Who's Who* had achieved its aims and more than adequately fulfilled the function for which it had been created.

In terms of the criteria discussed at the beginning of this chapter I humbly conclude that the project was successful:

- Firstly, we and it had met the required outcomes of the academic exercise, viz. the "successful creation of a Web-based educational resource by means of collaborative work".
- Secondly, the end product had received the "approval of the professional community, our peers and [...] HWGTM", the latter being the instructor, who awarded it a distinction.
- Thirdly, its daily use is still increasing.

It can safely be said that the *Who's Who in Instructional Technology* "does its intended function".

CHAPTER 7

CONCLUSIONS

CHAPTER OUTLINE

- 7.1 Learning results
- 7.2 Research questions
- 7.3 Reflection
- 7.4 Final word

7.1 Learning results

7.1.1 Introduction

Before final conclusions are drawn, one should perhaps compare our experience with issues mentioned in the Literature Review.

It may also be useful briefly to put our practical experience in the context of learning concepts and theories. Learning was, after all, the original purpose of the project.

7.1.2 Comparison with literature

Based on personal experience outside the ambit of this study, I believe that Carr-Chellman et al. (1999), are right when they state that "it is possible to enact authentic learning and distance collaboration [...]" with advanced learners (but not with inexperienced undergraduates).

I do not agree, however, that students should "have had previous experiences with smaller projects", and that they should be "prepared for the challenge of authentic experiences by seeing a strong relevance to their own work". Neither of the latter two conditions applied to the *Who's Who* team, or to any of the other teams in the RBO880 module. Yet, we were motivated and eager to learn, and our product was successful.

Furthermore, in contrast to the perceptions of Carr-Chellman's students that a collaborative project "would have been extremely frustrating if not impossible" using only CMC, we learnt that it was indeed possible.

Sherry and Myers (1998) maintain that their "model" of collaborative design is distinctly different from other such models in the literature. "Whereas other models tend to begin with student-generated research questions, in the model presented here, research questions emerged as part of the design and learning process."

As the *Who's Who* had not produced any publications at the time, Sherry and Myers could not have known that our "model" was much the same as theirs. It was a logical consequence of an open-ended iterative design process.

Edwards and Clear conclude that "the value of the contribution of CMC to the success of collaborative learning remained unproven".

I do not find their conclusion surprising in the context of their study. Given a choice, as their students were, most people would rather meet face-to-face than use CMC in collaborative tasks. The question arises why CMC was used at all!

Such studies prove nothing about the efficacy of computer-mediated collaborative learning. They merely suggest that most human beings historically and naturally prefer face-to-face contact to technology-mediated communication.

I concur with Mitchel Resnick that "to collaborate directly, in real time, on design and construction projects" is a more fundamental learning experience than merely sharing information, knowledge or insights via computer networks.

Gay and Lentini (1995) conclude after their collaborative design experiment that "[b]ecause group interactions are often unpredictable, we need to design flexible systems that can readily adapt to change".

I believe that a computer-mediated collaborative design project like the one described in this study can provide such a flexible system for learning. If Chaos Theory and the Theory of

Complex Adaptive Systems have any value, they could explain why such an open-ended design exercise could be successful.

Gundry and Metes made me realize that the insights gained from the *Who's Who* project had implications beyond the world of academe. The skills and knowledge we acquired in this project could be transferred to the world of work.

Whereas the worth of collaborative/cooperative learning and work has been proven to a large extent, the efficacy of computer-mediated collaboration is still disputed. A successful computer-mediated collaborative design venture such as the *Who's Who* project casts doubt on the blanket notion that CMC is not adequate for complex learning and working tasks. (Cf. Sgouropoulou, Feenberg, Kaye, and others.)

Computer networks, more than any other communication medium, seem to provide the means to extend efficient human collaboration to (nearly) 'anywhere, anytime'.

7.1.3 Learning theory

This project has shown that collaborative design incorporates constructivistic cooperative and collaborative learning, situated cognition, cognitive apprenticeship, flexible, open, problem- and project-based learning. A collaborative design project therefore seems to be the ideal vehicle for multidimensional learning.

It should also be clear from the previous chapters of this essay that collaborative design certainly engenders 'engaged learning'.

By nature collaborative design fosters setting of mutual goals, positive interdependence, individual and group accountability, interpersonal and small group skills, and group processing - the main criteria for successful cooperative work.

Collaborative design by means of the Internet refutes the objection that technology itself rules the roost. In our experience the affordances of the technology are not enough to produce a useful artefact. Those affordances have to be exploited in creative activities that are, nevertheless, not necessarily tied to any particular technology. For the kind of resource that we created the technology was a necessary, but not sufficient, ingredient.

The *Who's Who* is the successful outcome of a fully-fledged collaborative design effort. To be classified as a participatory design project, however, the design and development process would need more direct involvement of the 'clients' in decision-making and production, instead of simply getting feedback and suggestions.

Perhaps a real participatory design project would bring students even closer to the actual work place than a merely collaborative assignment.

Our experience leads me to believe that the most effective learning occurs when a learner actively interacts with the real-life environment in a way that forces him/her to reflect on the insights gained, recognize problems, think of practical solutions, and apply the idiosyncratically constructed knowledge to solve those problems.

7.2 Research questions

True to the nature of a qualitative action research project a summative evaluation, i.e. drawing final conclusions, was difficult to do. The wealth of experience and knowledge gained during the project is virtually impossible to describe in a concrete manner.

The main objective of this study was ***to determine the extent to which computer-supported collaborative design without face-to-face contact could be used to create an internationally useful resource in educational technology.***

This case study has shown that it is possible collaboratively to design and develop an artefact of this nature completely 'on-line' in a virtual environment.

Even with relatively inexperienced students such a project was found to be feasible, provided they were well-motivated and keen to succeed.

The second question was ***how such a computer-supported collaborative design process evolves in an open-ended learning environment.***

It seems that, left to their own devices, a collaborative group at the postgraduate level may produce surprising results in a real-life context. The process may seem to be fairly chaotic,

but the mixture of 'scientifically' rational thinking with spontaneous, and often intuitive, decision-making strategies produced a valuable artefact in this case.

We found that the nature of such a project, under constraints of time and members' (in)experience, caused it to evolve spontaneously into an iterative design pattern.

We experienced that such a process acquired a dynamic of its own, reminding one of a Complex Adaptive System. Fortunately the delayed turn-taking inherent to asynchronous CMC caused the necessary 'cool-down' time before hasty decisions could be implemented.

Such a dynamically evolving design process seemed to provide the ideal open-ended environment for constructivist learning. One constantly had to build on or implement knowledge just gained in a Hegelian dialectic process of thesis - antithesis - synthesis.

Thirdly the question arose as to *what support a group of learners working on a real-life collaborative project could expect from their peers and experts in the field.*

We found that from both groups we got cognitive as well as affective support.

Cognitive support was given in abundance. In the RBO880 peer group many knowledge gaps were filled by advice being given freely and eagerly. From the expert group we received valuable solicited and unsolicited feedback. This contributed greatly to the improvement of the product through successive iterations. It obviously also added to the knowledge of the designer(s).

The affective support in the form of encouragement and praise, especially from the experts, provided tremendous motivation. The interest and enthusiasm from some of them were sometimes literally amazing.

Appreciation of one's efforts enhances self-esteem and a sense of achievement, especially as a 'newbie' in a community of practice among whose members are the leaders in the field.

Attempting to answer the **fourth question**, viz. *how one judges the success of such a project*, one realizes that one is walking a tight-rope suspended above a mine field. Eminent experts have written much about the evaluation of computer-assisted education. However, it

does not fall within the scope of a mini-thesis fully to investigate all the issues related to 'best practice(s)' in evaluation.

Radical thinking leads one to accept Joanna Allan's view that educational outcomes are not only those that are predefined, but also those that emerge naturally from a learning process or task and which can (possibly) only be recognized and formulated after the learning has happened.

On these grounds I propose that the success of a computer-assisted collaborative design project in higher education should ultimately be judged by

- (1) the measure of acceptance of the artefact by the intended audience,
- (2) the significance and relevance of the learning gains made by the producers, and
- (3) the significance and effectiveness of CMC in the project.

Lastly we set out to determine *what direct benefits students could derive from computer-supported collaborative design in an educational environment.*

I conclude that, apart from the 'hidden' benefit of additions to our knowledge, we gained skills in the following areas:

- (1) Information and knowledge management - we learnt how to find and process information from the Internet, and how to manage data and knowledge resources.
- (2) Technical skills in constructing a WWW resource (e.g. HTML-authoring, handling of graphics, and transferring of materials)
- (3) Collaboration and negotiation ('people skills') - we learnt much about the typical 'give-and-take' nature of decision-making in a group context where members do not always share the same ideas and perceptions.
- (4) Project management - in planning the design and development we learnt to integrate the essentials of human and technical resources, available experience and skills, and time management.

(5) Information design - we acquired valuable knowledge and skills in the design and effective presentation of information on the WWW.

It seems clear that authentic experience in CSCW at academic institutions can provide students with valuable work-place skills even before they enter the world of work.

One could summarize by stating that, at the outset we did not know how to create a useful Web resource for a community of practice, but by the end we did and we could!

7.3 Reflection

In an e-mail exchange when the *Who's Who* had already become a feature of Instructional/Educational Technology on the WWW, the instructor remarked:

"I am still trying to establish why your project has worked so well, while HUNDREDS of other student projects [...] landed on the shelves."

I replied:

"Firstly I think there was a real need for something like this, even though it looks rather simple.

Secondly perhaps because people like showing their faces to the world and saying how cute they are! It's the same reason why we are feeling good about the *Who's Who*, isn't it? Recognition from the community of practice that one has done something useful and noticeable in the faceless global community."

Although the second reason may sound somewhat cynical, the underlying truth is perhaps that most people really want recognition of their worth in society. Appearing in a *Who's Who* enhances one's self-esteem, a need high on the hierarchy, according to A.H. Maslow. This was confirmed by the number of people who presented themselves for inclusion in the *Who's Who*, and those who regarded their inclusion as an achievement.

The instructor furthermore noted that "if one wants to work constructivistically, one must give the students assignments". However, often "students do learn [from them], but the products

are not useful [...] On the other hand people make commercially successful products that harbour very little thinking, and they get away with it."

I believe another reason for the success of our product is that, precisely owing to the widening scope and increased ease of human contact via the Internet, the need and desire for communicating with one's ilk have grown proportionately.

Amid the thousands of 'portals' on the WWW, people like finding one dedicated to channelling their interests directly in the right direction. We believe that we used the affordances of the technology to create something unique for that particular environment.

Among the issues that warrant further investigation and research are the following:

- (1) The correlation between educational theory and experience in CSCL;
- (2) The implications of CSCL and CSCW for Higher Education, and more specifically those of collaborative design;
- (3) The physical, cognitive, and affective factors in CSCL, including motivation;
- (4) The chaotic nature of network-based, open-ended learning and the desirability of its effects.

7.4 Final word

The notion that a useful artefact in 'cyberspace' can be created successfully and effectively through on-line collaborative work was shown to be practicable, judging by the international acclaim and positive feedback from users.

David F. Noble (1998) quotes an apt statement by a group of academics at the University of Washington Seattle: "Education is not reducible to the downloading of information, much less to the passive and solitary activity of staring at a screen. Education is an intersubjective and social process, involving hands-on activity, spontaneity, and the communal experience of sharing in the learning enterprise [...]"

The academics were protesting against on-line education and "digital diploma mills", a phrase coined by Noble (Noble, 1998).

Ironically, the *Who's Who* project and the others in the RBO880 course module have proven that what those educators wanted, could be achieved through computer-supported collaborative learning and work.

We like to believe that our artefact has become a valuable affordance to the community of educational technologists.

Perhaps it is appropriate that a member of the target audience has the last word:

"This is an excellent database and my students, colleagues and myself are thrilled to have access to such a resource and such a well constructed one too."

* * *

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Appendix A

COLLABORATIVE PROJECT INSTRUCTIONS ON THE WEB SITE OF THE RBO880 MODULE

Cooperative Learning Tasks

The Groups

Below are two matrices. You will notice that both have the same home group and expert group names. That is because both will be doing the same work. You may collude if you wish, but I want *unique* products from each home group.

Matrix One

Groups	Expt A	Expt B	Expt C
Home 1	Naidoo	Viljoen	Vorster
Home 2	Lazenby	Pete	Steyn
Home 3	Coetzee	Cilliers	Clarke

Matrix Two

Groups	Expt A	Expt B	Expt C
Home 1	De Jager	Strehler	Du Preez
Home 2	Mokoka	Carstens	Jordaan
Home 3	Another	Onemore	Nogeen

The Tasks

Homegroup One:

Construct a Website for a Who's Who in Computer-Assisted Education.

Ideally the site should contain a picture, a brief (five line) resume and a link to the person's own home page. A starting point may be the current site on <http://hagar.up.ac.za/catts>. Here is a further hint of names you might want to include. Donald P Ely, Tjeerd Plomp, RM Gagne, Donald L Kirkpatrick, Fred S Keller, Stan Trollip, Steve Alessi, Mike Hannafin, Rob Riser, Walter Dick, etc etc.

You may also want to look at the list of most often quoted authors I gave you in the LRO module last year. **Matrix One's** group should concentrate more on the *technological experts* while **Matrix Two's** group should concentrate on people of primarily *educational* importance.

Homegroup Two:

Construct a Website to discuss the implications of computer-based communication for human resource development.

Consider the *possibilities and constraints* in the discourse between educational institutions by means of electronic networks. Discuss the implications of electronic data resources for life long learning. Consider the needs of learners with regards to worldwide networks in institutions of learning. Discuss the possibilities provided by computer-mediated communication for improved learning, and the possibilities which the internet provides for third-world countries. (i.e. Show how the net can be used to counter the increasing polarisation between the technological "haves" and "have nots". Here are some references to start you off.

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Home group 3:

Create a Web Site about the sociological issues of the Internet and Learning.

Consider stuff such as

- Road kill on the Information Highway: Here you might look at various abuses of the net, such as confidence tricking, scams, rumor mongering, credit card fraud, etc. You might also consider hazards such as "mail bombs", etc. Also show what measures there are to counter this, e.g. netiquette, etc.
- Child Safety on the Information Highway: Include aspects such as pornography, gender bias, racial stereotyping, etc. Discuss various ways of dealing with these hazards. You might want to start with my article on [Cybersex and Dirty Teaching](#).
- The birth of the Cybernerd: Traditionally computers have been the realm of the socially unadjusted misfit - the nerd. Now, with the growth of the Internet, this nerd has become a powerful, potentially wealthy species. In a way this is empowerment to a previously disempowered group. On the other hand, does this not create a bunch of people who are unable to communicate face to face, and need to communicate only through the safety of cybercomms?
- The Colonisation of Cyberspace: The principle of colonisation is that any space which does not belong to anyone can be claimed. This is why it was possible for various countries to colonize Africa. In fact, the country *did* belong to people, but they did not have the resources to defend it. Much the same is happening with the Internet. It used to belong to "nobody" in the form of the US Government and Universities. It has, however been effectively "colonized" by big business. This has led to vast improvements in infrastructure and technology, but it has also meant that the original owners, the academics and educators, have been marginalised, having to struggle with insufficient bandwidth and, now also having to pay for access which, in the past, was free. Another issue is that of language colonisation - Why is the net so English? You may find more information from John Litchfield litchfld@central.murdoch.edu.au

The Experts

Expert Group A: The Designers.

You are the Home Group Chairperson. It is your responsibility to make sure your work is evenly distributed among all three your home group members. Apart from this you need to develop expertise in Web Site design. What constitutes a good website? How is a website best designed to yield its information easily? What attracts people to your website? What is the optimum grain size? How can you prevent people from getting lost in cyberspace? Checkout

Expert Group B: The Surfers.

You are the hunters. You need to conduct searches to find the information required for your teams. Also use this to build up a network of contacts. Web pages all have "Mailto" functions. Send mail to the creators of the pages and see what other info they can give you.

Expert Group C: The Authors.

You are responsible for the creation of the page. You need to collect resources such as HTML editors, graphics editors, JAVA script editors, etc. You also need to determine the level of HTML in which you are going to work, for instance, are you going to use frames, etc. It is also your responsibility to FTP the material onto Hagar and to Telnet it across into position.

General Comments

- A good starting point for all expert groups would be <http://hagar.up.ac.za/catts/weblearn.html>
- Use unique filenames which give a clue to the content of your page, but will not easily be used by another group.
- Use **lower case filenames only**. Unix, as you know, is case sensitive. Our Webmaster has decided to standardise on *lower case*. If you ignore this, some of your links may not work.
- Enjoy your project. Remember this is a team effort. Each team member is responsible for the success of this venture.

Back to the Classroom

Appendix B

SELECTION CRITERIA FOR MEMBERSHIP OF THE *WHO'S WHO*

This is a copy of the text on the Web site as the criteria were at the time of writing of this report.

CRITERIA FOR INCLUSION

in

WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY

1. To prevent this site from becoming unmanageable and to guarantee that it represents at least a certain level of expertise, we now only accept candidates who meet the following minimum requirements (Updated 13 May 2001):
 - a. At least a Master's degree, its equivalent, OR acknowledged status in a relevant field or in the industry; and
 - b. at least five relevant peer-reviewed publications or products apart from that required for academic qualification purposes.
 - c. Candidates from a non-academic environment will be accepted on merit.
2. Nominations endorsed by people already listed on the Who's Who will enjoy priority.
3. Please submit names and information for consideration to Johan Viljoen at jhcv@mweb.co.za.
4. It will save us much time if details for inclusion could be submitted in the format you find in the pages. (Simply copy the HTML source and insert details before e-mailing to us, please.)
5. Pictures can be sent via e-mail, or we could fetch them from the WWW if you prefer.

Appendix C

THE INTERFACE OF THE *WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY*

The following pages contain screen captures of typical *Who's Who* pages, illustrating the development of the interface from prototype to final form, and the kind of entry for each expert.

WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY

A



Alessi, Steve

Professor, University of Iowa: Associate Professor of Instructional Design & Technology.

Field/Interests:

Relationship between realism, complexity, and instructional sequence with specific focus on simulation fidelity, cognitive learning factors in computer-based instruction. Also enthusiastic about cooperative learning and "group friendly" materials.

E-mail: steve-alessi@uiowa.edu

URL: <http://www.uiowa.edu/~coe2/facstaff/salessi.htm>



http://hagar.up.ac.za/catts/learner/m1g1/who_a.html

Updated on 27 March 1997



Document: Done





WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY

Maintained by
Johan Viljoen

Updated on 28 March 2001

Welcome to this international gallery of experts from the world of Instructional / Educational Technology and its related fields.

PURPOSE: To provide a node of contact, not to duplicate biographies available elsewhere on the Internet.

Owing to the many photographs, you may prefer to turn off your browser's image-loading option before going to the pages.

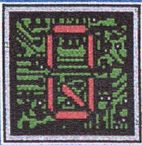


Friendly NOTE TO STUDENTS: Please do not bother these people with queries unless you have studied their Web sites and publications thoroughly and can ask intelligent, informed questions!




Document: Done






WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY




Quinn, Clark N.




Doctor. Director of Cognitive Systems, Knowledge Universe Interactive Studio.

Field/Interests:
Applied Cognitive Science (Learning facilitation, design, problem-solving skills, analogy and mental models); *Computers and Education* (Computer games and learning environments, computer support for cognitive skill instruction, methods for developing engaging and effective learning environments); *Human-Computer Interaction* (cognitive aspects of user-system interactions; novel interfaces and novice users; role of problem-solving in the user interface, software support for design and development).

E-mail: cquinn@knowledgeuniverse.com
URL: <http://www.knowledgeuniverse.com>



Document: Done 

QUESTIONNAIRE

This is a plain text version of the evaluation and feedback questionnaire on the Web site. The questions could be answered on-line by means of a mixture of tick boxes and text boxes.

YOUR FEEDBACK

about

WHO'S WHO IN INSTRUCTIONAL TECHNOLOGY

Your comments about this site will be appreciated greatly, as they will help us to improve this service to the IT community. Please be kind enough to answer the few questions below.

1. How did you come across this WWW site?

2. Do you think there was/is a need for a 'database' like this?

Yes

No

3. Why do you say so?

4. If you have had any contacts as a result of your own entry on the Who's Who, please supply (if at all possible) the number of

a. peer contacts:

b. student contacts:

5. What has been the nature of such contacts?

6. If you have used the Who's Who, please indicate how:

a. Simply browsed around

b. Searched for a particular person

c. Contacted someone

Multiple items may be chosen.

d. If you have used it for other purposes, please tell us about it:

7. Approximately how many times have you visited the site?

8. Approximately how much time have you spent at the site per visit?

9. Have you found any new contacts ?

Yes

No

If so, how many?

10. Are you satisfied with the results of your 'networking' through the Who's Who?

Yes, definitely

Moderately

No

Not applicable

11. What did you achieve (if anything) by using the Who's Who?

12. What, in your opinion, is the greatest benefit to be derived from such a service?

13. In what respect(s) do you think students might find the site useful?

14. What is your opinion about the selection criteria on the site?

15. Have you had any difficulty in accessing the site?

No

Yes

If 'Yes', please explain briefly.

16. If you have found any faulty links on the Who's Who, please list them here:

17. How would you rate the value of this resource to the Instructional/Educational Technology community?

Extremely valuable (5)

Very valuable (4)

Moderately valuable (3)

Little value (2)

No value (1)

18. Do you have any suggestions for improving the site or the service?

19. Please tell us something about yourself:

Name:

E-mail address:

Position/occupation:

Institution/organization:

Field of work/research:

Qualifications:

20. If you would like to suggest candidates for inclusion, please supply as much of the following information as possible: Name, Institution, E-mail address, WWW page (URL).

PROCESSING AND ANALYSIS OF RESPONSES TO QUESTIONNAIRE

1. Individual responses were classified as either Useful or Not Useful, the latter being those that were either irrelevant to the question or that contained vague, inconsistent or inconsequential information. Non-useful responses were ignored in the discussion or conclusions.
2. Qualitative responses were categorized and coded as indicated in the table below, before being counted. This facilitated qualitative interpretation. Individual responses that contained particularly useful information were isolated and used in the evaluation and improvement of the product.

C	Consolidation/overview of experts in the field
EX	Finding examples of work
F	Seeing faces connected to names
IR	Information requests received by respondent
IS	Information requests sent by respondent
M	Miscellaneous within the category
N	Networking/contacts
NS	Name search
RR	Research requests received by respondent
RS	Research requests sent by respondent
SR	Student resource in general
SRH	Help with students' research
TS	Topic search
Z	Irrelevant or insignificant response

3. Brief comments were added to results where I deemed them necessary. Otherwise the results should speak for themselves.

Appendix F

RESPONSES TO QUESTIONNAIRE

1. *How did you come across this WWW site?*

Responses: 73

Useful: 64

Source	Responses	%
Informed by site author	15	23.4
Personal reference (colleague, friend, instructor)	12	18.8
From ITFORUM discussion group	12	18.8
WWW topic search	8	12.5
Link f 9 Link from anot.5 2U12.5		
WWW name search	4	6.3
From InTRO Web site	3	4.7
Listserv/newsletter	2	3.2

Summary:

39 of 73 (60.9%) were specifically referred to the site, while 25 (39.1%) landed there incidentally, mostly through unsolicited references on other Web sites and in electronic discussion groups.

2. *Do you think there was/is a need for a 'database' like this?*

Responses: 77

100% indicated "Yes".

3. *Why do you say so?*

Responses: 77

Category	Responses	%
N	27	35.1
SR	18	23.4
M	16	20.8
F	10	12.9
C	9	11.7

Summary:

Most of the 77 respondents (35%) needed the resource for networking or as student resources (23.4%). 13% wanted to see the faces behind the famous names, while 12% thought there was a need for a central database of Instructional Technologists.

Miscellaneous other needs were mentioned (21%), of which most were either inconsequential, impracticable, or not useful for the purposes of this survey.

4. If you have had any contacts as a result of your own entry on the Who's Who, please supply (if at all possible) the number of

- a. **peer contacts:** Only 8 responses
Ranged from 0 to 6, with an average of 3.
- b. **student contacts:** Only 8 responses
Ranged from 0 to 5, with an average of 3 and one respondent indicating 50 contacts. The latter may have been a typing mistake.

Comment:

The results are statistically insignificant.
This question should be removed owing to the poor response rate and the difficulty in establishing the requested information.

5. What has been the nature of such contacts?

Responses: 21
Useful: 9

- a. Research requests received: 2
- b. Information requests received: 7

Comment:

The results are statistically insignificant. See comment on Q.4.

6. If you have used the Who's Who, please indicate how:

Responses: 77
Ratios were not calculated, as more than one answer was allowed.

- a. **Simply browsed around:** 75
- b. **Searched for a particular person:** 28
- c. **Contacted someone:** 17
- d. **If you have used it for other purposes, please tell us about it.**
Responses: 25
Useful: 13

Category	Responses	%
N	6	46.2
SR	5	38.5
F	2	15.4

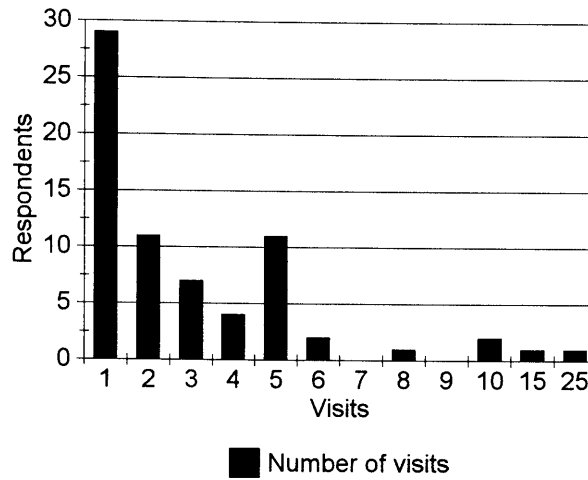
Summary & comment:

46% of the 13 who answered this question had used it for networking purposes, 38.5% as a student resource, and 15% in order to link names and faces. The proportions are consistent with the findings under Question 3.

7. Approximately how many times have you visited the site?

Responses: 70
Useful: 69

- a. 42% visited once only
- b. 89.9% had already visited between 1 and 5 times



Comment:

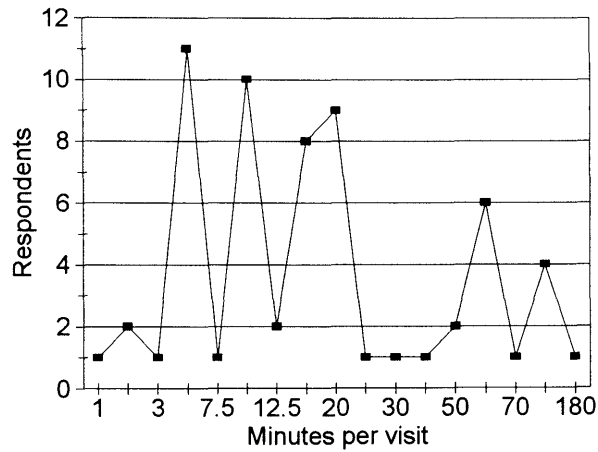
A variable that was not taken into account was the number of times the respondent might have visited the site after answering the questionnaire. These data are therefore not reliable as an indicator of usage frequency per visitor.

8. Approximately how much time have you spent at the site per visit?

Responses: 62
Useful: 62

Minutes per visit	Respondents
1	1
2	2
3	1
5	11
7.5	1
10	10
12.5	2
15	8
20	9
25	1
30	1

Minutes per visit	Respondents
35	1
50	2
60	6
70	1
90	4
180	1



Summary:

- a. 66.1% spent between 5 & 20 minutes
- b. Average: 9.94 minutes

9. Have you found any new contacts?

Responses: 77

- a. **Yes:** 57
- b. **No:** 20
- c. **If so, how many?** (24 useful responses)
 Range: 1-12 contacts
 Average: 5 contacts

Summary:

74% found new contacts, ranging from 1 to 12 (average 5).

Comment:

The result of Q.9.a. does not seem to tally with that of Q.6.c., unless all the new contacts were not immediately followed up.

10. Are you satisfied with the results of your 'networking' through the Who's Who?

Responses: 77

Relevant answers: 65

- a. **Yes, definitely:** 54 (83.1%)
- b. **Moderately:** 9 (13.8%)
- c. **No:** 2 (3.1%)

Comment:

The results correlate remarkably well with Q.17 a.-d.

11. What did you achieve (if anything) by using the Who's Who?

Total responses: 53

Useful: 38

Category	Responses	%
N	14	37
SR	10	26
C	8	21
NS	4	11
M	3	8
F	2	5
TS	1	3
IS	1	3

Summary:

- a. Mostly used for networking (37%)
- b. As a resource for students (26%)
- c. To gain an overview (21%)
- d. To do a search by name (11%)
- e. To connect names to faces (5%)

Comment:

Results of Q.11.a & b. are consistent with those of Q.3 and Q.6.d.

12. What, in your opinion, is the greatest benefit to be derived from such a service?

Total responses: 51

Useful: 36

Category	Responses	%
N	18	50
C	14	39
F	3	8
NS	2	6
RS	1	3
TS	1	3
PU	1	3

Summary:

- a. Networking (50%)
- b. Consolidation/overview (39%)
- c. Connecting names to faces (8%)
- d. To do a search by name (6%)

Comment:

There are discrepancies among these results and those of Q.3 and 6.

13. In what respect(s) do you think students might find the site useful?

Total responses: 48

Useful: 37

Category	Responses	%
N	19	51
SRH	11	30
SR	11	30
C	4	11
F	4	11
NS	2	5
EX	1	3

Summary:

- a. For networking (51%)
- b. For help with students' research (30%)
- c. As a general study resource (30%)
- d. To get an overview of experts in the field (11%)
- e. To link faces to names (11%)

14. What is your opinion about the selection criteria on the site?

Total responses: 50
Useful: 40

Comment category	Responses	%
1 Fine	18	45
2 All right	12	30
3 Not strict enough	10	25
4 No comment / Irrelevant	10	-

15. Have you had any difficulty in accessing the site?

- a. **No:** 93.5%
- b. **Yes:** 6.5%
- c. **If 'Yes', please explain briefly:** Mostly 'broken' links or server problems.

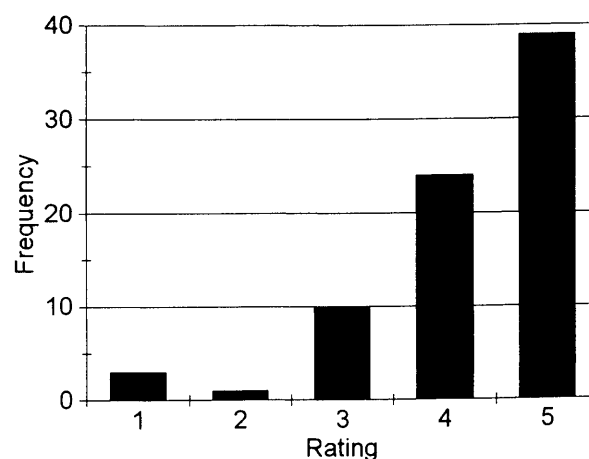
16. If you have found any faulty links on the Who's Who, please list them here

(Responses not relevant to evaluation of resource.)

17. How would you rate the value of this resource to the Instructional/Educational Technology community?

Responses: 77

Rating	Frequency	%
1 (No value)	3	3.9
2 (Little value)	1	1.3
3 (Moderately valuable)	10	13
4 (Very valuable)	24	31.2
5 (Extremely valuable)	39	50.6



Summary:

81.8% of users rated the service as Very or Extremely valuable.

Comment:

The results of a.-d. correlate remarkably well with Q.10 a.-c.

18. Do you have any suggestions for improving the site or the service?

(Responses not relevant to evaluation of resource.)

COUNTER STATISTICS 1998-2001

	1998	1999	2000	2001
January	0	312	0	679
February	0	421	0	698
March	0	314	885	860
April	0	344	738	779
May	204	444	849	0
June	274	265	742	0
July	280	330	489	0
August	222	279	626	0
September	375	487	923	0
October	335	307	685	0
November	276	(91)	719	0
December	173	0	448	0
TOTALS	2139	3412	7104	3016
Monthly av.	267.4	341.2	710.4	754
Daily av.	8.9	11.4	23.7	25 (27?)

DYNAMICS OF COLLABORATIVE DESIGN

A transcript of an e-mail exchange to illustrate the dynamics involved in the design process.

"Hi Y'all

- > 1) I suggest we keep the thing simple: Main categories Countries, with a
- > clickable country index and alphabet at the start. At the top of each
- > country's page we put another clickable alphabet.

That sounds like good design -

? will this have to be done manually or do you have a program to do this?

- > We (I, if you don't have time) can then refine the thing later into
- > sub-categories.

That I would like to do - it'll probably be a less fiery baptism by fire... would you have to send stuff to me or would I access it from 'Hagar' [the server] or what? - I would then like to think that, good teacher-guide-resource that you are - you would be a mere e-mail link away to respond to my Qs re: trouble shooting of my contribution to the project - and there would be many.

- > 2) I suggest this as I haven't heard from the other Home Group yet.
- > Since we don't know which people they want to include in their list, we
- > might as well slap up as many as we have/can.

Yes! KL has done her first project and has not contacted me re: the Expert A group - I'll wait

- > 3) I want to chat to JC [the instructor] about this again - it seems stupid for us to
- > put up CV's and photographs if the things are already available on the
- > 'Net. JC himself believes in not reinventing the wheel (his famous
- > just-enough-just-in-time principle), so why should we do it? I would
- > imagine a sort of HTML database containing Name, Brief description,
- > E-mail address, and WWW home page URL should be sufficient. (Preferably
- > NOT in tables, as this causes havock if someone wants to copy the page
- > as *.txt file to his HDD.)

Yes - you have just answered a Q that I had about the tool to be used - I thought a table - but didn't think of the NFC (need for copy/ies)

- > a) If we put up a lot of photographs on one page, the thing is
- > going to take ages to load.

Q: is it not possible to have the pix as a luxury option - a link to a "gallery" if they need to put a face to the name - maybe we could later develop that into a game - too ambitious?

- > b) If we put each one on a separate page, we could just as well put all the GG's info with his pic = tens/ scores of separate pages = one helluva HUGE site, which is going to be a nightmare to link & maintain.
- >
- > c) If we include icons ("Click-for-a-pic") in the list, we either have to put the pics together (= problems with download time, confusion, HTML tables, etc.), or each on a separate page (back to square (b) above).
- > 4) If you are willing to help put the stuff into HTML, let me know ASAP, and I'll mail you what I have. (Much of it will be in HTML anyway, as I downloaded it as HTML from the WWW.)

If you handhold then I can try."

EXAMPLE OF PEER SUPPORT

[Initial message from student]

"I have to share this with you, as my mind needs some clearing. I requested lacking information from some of the GGs in IT. This is the response I got from one of the gods, *SH*

>Stop bothering me.

Great, hey? (BTW: I had never contacted him in this regard before. Have you, *A*?)
I must confess I was left rather speechless by the blunt rudeness from such an eminent scholar, especially after the positive, encouraging and friendly responses from many of his peers. After all, this is additional advertising for them, isn't it?

My reaction, once I had recovered from the slight shock, was an equally rude equivalent of "Go forth and multiply" (to quote *JC*). I have amended the text in the Who's Who to read as follows:

>>*H, S*

>>Upon a request to check whether the information that previously

>>appeared here was correct and satisfactory, Professor *H*

>>responded: "Stop bothering me."

>>Therefore we had no choice but to remove the entry, since it might

>>contain information of which he did not approve.

I propose we remove his entry completely, since he is obviously not keen on having it there.

I am not sure how one should reply to his e-mail. Should one try to rise above the pettiness of replying in kind?

Should one reply at all?

Should one simply thank him for the kind message?

I can think of quite a few nice and nasty things to say, but will it serve any purpose other than soothing my own wounded ego?

I'd be interested to hear how each of you would have responded. In the meantime I'll count to 1 000 000 before I do any damage.

.....

[Reply from a second]

Leave what you had originally. I tend to be quite philosophical about these things. You know - different strokes for different folks.

I know it sounds trite, but accept the fellow the way he is. Maybe he's stressed out. Maybe he was born obnoxious.

...

[Reply from a third student]

Who knows- the bod in question may have an automatic filter on that sends automatic (& blunt) replies automatically to any message that includes a request or some phrases that he thinks are to do with commercial/ ad emails.

OR - as happened on our campus - perhaps the bod left his computer unattended and his email un-password protected and some malicious student sent the message without his knowledge. On our campus the offending message was to a lecturer AND the message was pretty diabolical from what I hear.

The result of this latter is that the dept. in question has made a ruling that any message that goes

out from your email is YOUR responsibility even if someone else sent it without your knowledge. The penalty the dept imposes for not complying is complete and permanent removal of all email privileges.

As the dept is electronic engineering they feel they are making good electronic practises compulsory. (I have always password protected my mailer(s) and never leave my mailer resident when I leave my desk.)

Having said all of the above - I would still have been VERY tempted to send an exceedingly gentle and REALLY polite, low key kind of message that made reference to the sharing of knowledge and "hands across cyberspace" etc in such a way to make the receiver squirm with embarrassment.

Of course if you have read stuff written by the man and could quote an extract or two so that he knows that he would have been really a useful link to have - and perhaps how he could have benefited from the link - you know a freebie w/e at Stilwater Sun casting pearls of wisdom before us poor 3rd world swine----- or something?

But hang in there guys - he is only a nanoblip in the vast, warm cyber - ocean. regards from...

.....

[Reply from a fourth student]

I tend to agree. Lets leave the poor "s.". Perhaps he thinks we are part of some kind of old SA intelligence service. Or he is like our own Joost who can't even walk in public without being harassed.

Perhaps CBT is BIG where he comes from and people never leave him alone.

What would the *ES* thing be to do?

.....

[Reply from original student]

Thanks for all the wise responses to my ethico-moral dilemma in handling the *H* phenomenon! I got so many equally valid points of view that I might register it as a research project ;-) No, seriously: Thanks! You've all been wonderfully supportive! Groetnis

SCAFFOLDING

The kind of 'scaffolding' that occurred constantly among the peer group should be evident from this example from an e-mail discussion:

"Firstly: If you are working/editing in DOS based packages or anything that does NOT allow longer file names then only the *.htm will be recognised anyway but

Secondly: Not sure about the current situation of browsers but at one time not all of them recognised the *.html either. As a result I always use *.HTM even when I am on a Unix machine that does recognise almost anything.

On the subject of browsers - i.e. that software program with which we read the WWW stuff - it would be interesting to know what versions and what brands all the RBO-ers are using - as well as 'HeWhoGivesTheMarks'*. (Any one else agree that this new title has a more sophisticated ring than the previous 'ABC'?)

I am already finding that the GNPRESS html editor - (32 bit version) which I have started using at the suggesting of '*HWGTM' (no, NOT a new hypertext editor - see clue in previous paragraph) and which I like VERY much but it does not always talk totally the same dialect as the very smart version of Netscape (Gold ver 3.01) that I started using yesterday - compatible with Windows95 as I now am.

Different versions - some newer than others and with extra functionality - also means that one does not necessarily know EXACTLY what each version of browser is going to see and how. Also some users 'turn off' graphics in their browser for example- to save uploading time on slow modems - which is why one can edit in some text that will appear on screen for such cases and thereby assist the reader.

An obvious difference is that only 'newer' browsers are 'frames' aware /compatible though I have not yet found good use for frames in any work I have done before.

The other variable is screendriver - I use a 800X600 resolution with large fonts as I have extra RAM (memory) for this and am currently uncertain how a browser will treat fonts and sizes and nice resolution pics on some other lower resolution. A while back I viewed the 'Kwa-Zulu Concept burger' from Cape Town from a friend with a low resolution screen - AND a slow modem. The bits that finally appeared on screen looked quite awful - not a bit like they do 'back home' on my campus machine.

None of this is meant to alarm anyone - just a cautionary suggestion that if anyone has the luxury to view what they do from

different browser /site perspectives it might add an extra dimension to how/what is presented. I tend to throw caution to the wind and use lots of graphics anyway in the hope that technology will catchup soon make it OK. ;-)

[Follow-up by another group member]

M. found this bug first. The 3.1ers amongst us have to save our files as .htm for the sake of file-naming conventions.

BUT!

Now the links *inside* the pages refer to .htm files. After renaming via Telnet these .htm names do not exist.

Between the two of us(in a extra curricular phone conversation) we came up with the following solution: Open the files in "write" . " NO conversion" (or note pad) Add the "l" to the "htm" in all the inside links and save them.

If there is an easier way - let us know please.”

EXTERNAL SUPPORT

These are examples of the kind of support we received from the community of practice. (In order to illustrate the 'level' of support, names have deliberately been indicated.)

"Good luck with your project." (Bob Kozma, Linda Harasim)

"Thank you for your persistence with this task. I think the results will be useful." (John Keller)

"It's really a great service. Thanks for having the idea and making it a reality (and of course doing all the upkeep, which I know is time consuming)." (Mable Kinzie)

"Thank you for your hard work, compiling the Who's Who homepage." (Brent Wilson)

"It deserves the time you have invested so far, and your continued energies would be well invested [...]" (Martin Ryder)

Thanks for all your efforts on behalf of the IT community! (Lloyd Rieber)

"Thank you for your kind note and your efforts." (Diana Laurillard)

"Keep up the good work!" (Greg Kearsley)

"You should know that the Who's Who website is a real favorite among our students. It serves a very important role. I know it's hard for people to get that 'pat on the back' with this sort of thing. Please keep up the wonderful work." (Rita Richey)

"It looks terrific! I do hope you will continue to offer this useful service. I am proud to be included in such a professional endeavor." (Thomas Russell)

"Nice project, good luck!" (John Mueller)

"Keep up the excellent work!" (Richard Cornell)

"The site is a great resource for students and faculty!" (Gary Morrison)

EXPERT EVALUATION OF THE *WHO'S WHO*

"I just sent our General Secretary a quick note suggesting she look at your site as that is exactly the kind of site I would hope we might eventually have. Your site has such a real touch of class and excellent instructional design that I will also be referring to it in my classes." (Richard Cornell)

"I visited your site a few hours ago, and was very impressed by how it was designed and organized. Also, saw pictures and biographies of a lot of friends and professional colleagues. I think this is a great project, and I wish you success." (Fahrad Saba)

"Firstly, may I say that I have visited your website and it is indeed very impressive and unique. I believe that the information located at your site is indeed useful and pertinent to all members of the IT community, and trust that field & industry stakeholders will provide you with additional input for comprehensiveness. Congratulations on your initiative!" (Valerie Gafka)

"Creating new knowledge is nothing more than an exercise of restructuring what we already know. You have done this in a very practical and unique way, constructing a catalog that attempts to represent the field of IT by listing its more well-known theorists and practitioners. By providing links to their online work, you have created an extremely valuable index. I can already anticipate multiple uses for your site in my own research." (Martin Ryder)

"Your site has the potential to be a major contribution to the field of IT [...] It is the kind of site that people will bookmark. Many of us will include links to your site from our own." (Martin Ryder)

"This is an excellent database and my students, colleagues and myself are thrilled to have access to such a resource and such a well constructed one too [...] I can only say ' What a great resource - you should be paid for what you are doing for this community of scholars!!' " (Kar-Tin Lee)

"It's a brilliant and well designed home page and I certainly wouldn't mind being part of it." (Temba Bassoppo-Moyo)

"I am very happy to be included in your Web page." (Robin Mason)

"Thank you for including me in your excellent instructional technology information source. Thank you for your effort on behalf of our field, it is an honor to be included in your site." (Martin Tessmer)

"It is a real service to us in the profession." (Don Ely)

"Well done! A much needed (and appreciated) resource!!" (Greg Ketcham)

"Very nicely done. The field interest comments are of very particular importance. A good source for some commissioning of expertise. Many thanks." (Jade v.d. Merwe)

"You have done a very nice job putting together the site. This will be a useful resource for our graduate students. Thanks for taking the time to assemble the materials and design the site." (Ed Caffarella)

"Your excellent pages in instructional technology were recently brought to my attention." (Brian

Sloan)

"Thanks again for a great service." (Ken Masters)

"You have a wonderful idea here & it's going to be of great use to the field. Thanks so much. Students really think the entire Who's Who site is very useful. We appreciate your hard work."
(Rita Richey)

"[...] your Who's Who web site is a great resource." (Barney Dalgarno)

"[...] you're doing a great service." (Tom Reeves)

"I am very impressed with the site as a whole. It is a terrific resource. Thanks for setting it up."
(Lorraine Sherry)

"It looks great! Thanks very much for this valuable service." (Rob Foshay)

"I filled in the feedback form with very positive comments as the site deserves." (Ron Oliver)

"The whole site is really interesting. Thanks for the work you made. It's really useful to have such a repertoire..." (Daniel Peraya)

"Your who's who site is developing into a very useful resource. My students may be raiding it next term." (Ian Hart)

"I think you are doing a very valuable service [...] In short, Bravo!" (Marilyn Mantei-Tremaine)

"You're doing a great job, many I am sure have benefited as I have." (Cheryl Keeton)

"What a nice resource you've produced!" (Allison Rossett)

"Ausgezeichnet!" (Frank Borchardt)

"I do think you provide a very valuable service to the IT community." (William Milheim)

"Thanks for maintaining this valuable resource." (Terry Anderson)

Looks to me like you're doing a great job, and a real service to the community (Earl Misanchuk)

"I have looked at it carefully and am impressed. Indeed, I have gone to some of the links and found them very useful. I am especially pleased at the 'lean' model you follow, with minimal but essential linkages." (Denis Hlynka)

Some more indications of appreciation:

"Great idea."
(Rob Phillips)

"What a nice thing to do [...] a great public service."
(Clark Quinn)

... excellent resource, and my students and I shall find it quite useful.
(Tom Reeves)

"... excellent instructional technology information source."
(Martin Tessmer)

"... a real service to us in the profession."

(Don Ely)

"I ... was very impressed by how it was designed and organized. Also, saw pictures and biographies of a lot of friends and professional colleagues."

(Fahrad Saba)

"A much needed (and appreciated) resource."

(Greg Ketcham)

"... useful resource."

(Ed Caffarella)

"Overall, the site is really wonderful. Well done."

(Ken Masters)

FEEDBACK NOVEMBER 1997

These are examples of the responses we received when the listed members were asked to check their information nine months after the Who's Who had been started:

"Thanks for your message and suggestion. Sorry, I don't really qualify for it since I am not involved in any research in the IT field for the moment.

Saw your very interesting site and noticed that the two names I was going to suggest to you are already there! (Mendelsohn and Peraya), very well representing IT research in the French speaking Switzerland. Try to complete it with some names for the German part of the country."
(Maurice Bettex)

"You asked in a note that Dick forwarded to me how useful this site is for the field. I'm not a good person to ask because I spend as little time as possible on the Web, but I am definitely in the minority. I bet most professionals love it!"

(Barbara Martin)

"If you are looking for scholars in the field you might set the criteria as something like at least six articles. If you are looking for leaders in the field you might set the criteria as having held an office in one of the many professional associations. Many individuals will meet both criteria."
(Edward P. Caffarella)

"One question : is English the only working language ? working in Switzerland and in Belgium, most of my papers and publications are written in French.... Is it necessary to translate contributions I would submit ?"

(Daniel Peraya)

"You described that listings as 'exclusive' - which was literally accurate but professionally maybe a bit overstated."

Dick Clark (not Richard E. Clark)

"The decorative visual on the first page is a major negative. First, it portrays an image that is hardly representative of the concept of IT or of the people in IT. Second, it may be considered demeaning by female visitors."

(Michael Molenda)

"Consider a who WAS who in Instructional technology, with tributes to some of the greats who are no longer with us.

Why not add a form allowing others to nominate someone? In fact, you could require that the nomination include most of the work -- a statement of the person's contributions, a URL or an attachment to provide the image, etc."

(Kyle Peck)

LISTINGS AND USES OF THE WHO'S WHO

A potpourri of references to the Who's Who found on the WWW in a random search:

"Instructional Technology Research Online (InTRO). This is another Georgia State University site. They have a nice set of links and some research document, but what I like is the Who's Who in Instructional Technology section. Try it." (!!)

Judd Butler, ISD, Florida State University: <http://garnet.acns.fsu.edu/~jrb1957/links.html>

2c Hirumi: <http://inst.cl.uh.edu/sites.htm> hirumi@cl.uh.edu

Benson - Assignment: <http://faculty.ed.uiuc.edu/abenson/HRE384/WA09112001.html>

Bobbi Kerlin's home page: <http://kerlins.net/bobbi/education/onlineed/>

CALL: <http://www.jaist.ac.jp/~mark/index.html>

Center for Instructional Development and Technology, Southeastern Oklahoma State University: http://www.sosu.edu/cidt/resources/general_it.htm

Center for Academic Excellence, The Instructional Development Support Center, Portland State University

The Winter Technology/Pedagogy Institute

<http://www.idsc-cae.pdx.edu/wtppi/resources.html>

Deborah MacDonald Stirling: <http://www.stirlinglaw.com/deborah/Internet/home.htm>

Instructor: Research Methods in Technology-based Education

Arizona State University

Department of Computer Education and Instructional Technology, Middle East Technical University, Ankara, Turkey: <http://bote.fedu.metu.edu.tr/botehome/linkt.htm>

Dr Dale Doaks, Professor Emeritus of Instructional Technology, COE, U. of Tennessee, Knoxville: <http://coe337.coe.utk.edu/itg/seminar.htm>

ERIC ClearingHouse on Information & Technology:

<http://www.ericit.org/edtechassociations.shtml>

<http://oak.cats.ohiou.edu/~tc879588/it.htm>

IFETS: http://ifets.massey.ac.nz/links/pages/Educational_technology_resources/more4.html

INDEC, Korea (International Network Distance Education Center):

http://www.dec.or.kr/prople_edu.htm

"Pretoria U (ZA), Who's Who in Instructional Technology. Johan Viljoen's international gallery of experts from the world of instructional / educational technology & its related fields, includes biographies & photographs. A selection of some of the best supersites and directories :

Educational Technology / Prime Sites"

Jornal Universitário, Brazilian Open University:

<http://www.bou-edu.com.br/jornal/outroslinks.asp>

"Who's Who in instructional Technology - Quem é quem em tecnologia instrucional"

Instructional Technology Resources, HOFSTRA UNIVERSITY Hempstead, NY:
http://www.hofstra.edu/studentserv/CC/FCS/FCS_ITResources.cfm

Instructional Technology (R&D), Utah State University:
<http://www.coe.usu.edu/it/research/resources.html>

International Society for Performance Improvement: <http://www.ispimi.org/links/>

Center for Instructional Technology, Mary Washington College:
http://inte.mwc.edu/ayersman/it_resources.html

Jennifer Gose, graduate student, University of Georgia:
http://www.arches.uga.edu/~jengose/instructional_technology_links.html

Mandi Axmann & Berni Poole, U. of Pittsburgh, Johnstown:
<http://www.pitt.edu/~poole/onlinelearning.html>

Mark Peterson, Japan Advanced Institute of Science and Technology:
<http://www.jaist.ac.jp/~mark/research.html>

Marshall University Center for Instructional Technology: <http://www.marshall.edu/it/cit/itlinks.asp>

Máximo P. Flores Abalos, 1999. Santiago-Chile: <http://members.tripod.com/mfa/link/disenho.htm>
"Maintained by Johan Viljoen. Si quieres saber quién esta haciendo algo y cómo lo hace en Tecnología Instruccional, busca por medio de una lista alfabética. **Excelente.**"

La Escuela de Educación de la Universidad de Carabobo, Valencia, Venezuela
<http://www.face.uc.edu.ve/~acadena/Portafolio.htm>

Nessman's home page: <http://www.backflip.com/members/nessman/9959138>

Ras Al Khaimah Men's College
PO Box 4793 Ras Al Khaimah, UAE
http://rkm.hct.ac.ae/et_site/et_links.htm

Selected Reference Resources - Educational Technology, U. of New South Wales, AUS ("a list of resources in the area of Educational Technology designed to support teaching staff and postgraduate students in the Faculty of Medicine"):
http://www.library.unsw.edu.au/~biomed/subject/Educational_Technology/edutechref.html

Texas Center for Educational Technology, University of North Texas:
<http://www.tcet.unt.edu/journal.htm>

Tom Murray, <http://helios.hampshire.edu/~tjmCCS/WWWBookmarks/InstrTechLinks.html>

UNESCO Institute for Information Technologies in Education (IITE)
http://is.iite.ru/docs/spec_is_catalogue/eng.html

University of South Florida, College of Education: http://www.coedu.usf.edu/INST_TECH

Webography, Andrew W. Mellon Foundation: <http://www.ceutt.org/L2WebBib.HTM>

West Texas A&M University:
http://wtonline.wtamu.edu/courses/sample/edt5510_2/admin/links.htm

Puríður Jóhannsdóttir: <http://ust.khi.is/tjona/kraekurust.htm>