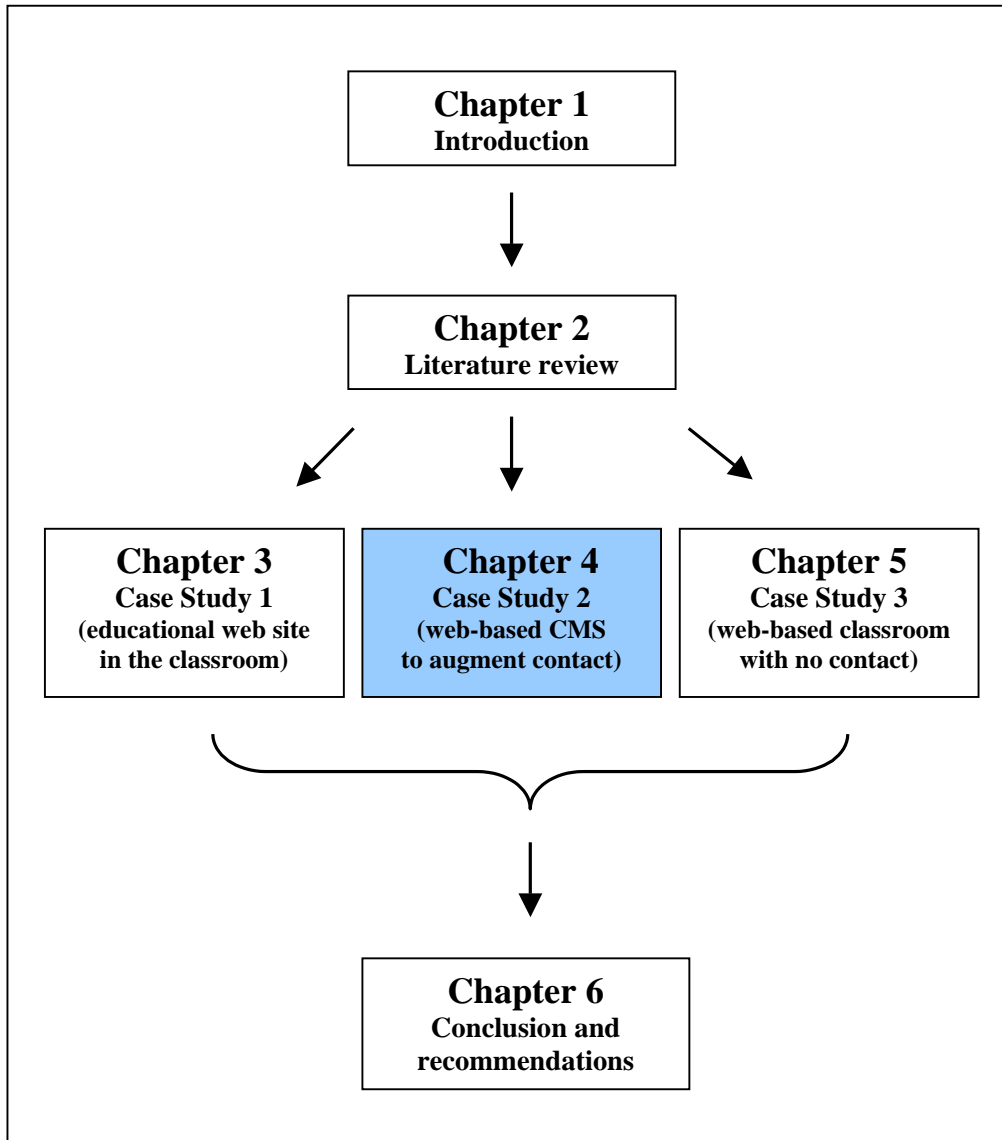


Chapter 4

Case Study 2: Investigation of a web-based CMS delivered by *WebCT*



4.1 Introduction

This chapter reports on the second case study, namely, a web-based course management system (hereafter referred to as web-based CMS) called *WebCT*, for undergraduate and postgraduate learners alike. A web-based CMS refers to tools that support the design, delivery, and management of online courses (Firdiyewek, 1999). Besides *WebCT*, other Internet course management tools include Blackboard, LearningSpace, TopClass, Web course in a Box, and First Class (Huang, 2000). *As it is the web-based CMS that is under investigation in this study, the focus will not be on the course per se.*

WebCT was designed with a view to supporting enriched interactive educational communication on the Web, and to offer enhanced support to instructors and learners as they use the Internet as a medium for learning. It is a developing product and, as a result, has had three updates since it was first used by the University of Pretoria in 1999.

This study investigates the first version of *WebCT*, namely *WebCT* version 1.3, which was implemented in 1999. The University of Pretoria is currently working on the expanded and enhanced version 3.1. The true test of a tool like *WebCT*, apart from its contribution to learning outcomes, is the satisfaction learners gain from using it, and the development of skill and method that it supports. Training programs are often assessed using Kirkpatrick's Four Levels of Evaluation, the four levels being: reactions, learning, transfer and results (Winfrey, 1999). According to this model, evaluation should always begin with level one, and then, as time and budget allow, should move sequentially through levels two, three and four (Winfrey, 1999). This research is grounded in Kirkpatrick's first level of evaluation, namely reactions, which attempts to evaluate the level of satisfaction learners gain from using it.

The research also seeks to investigate the response of two types of learners, namely undergraduate Multimedia learners and postgraduate Engineering learners, i.e. from the "soft" and "hard" sciences respectively.

The case study commences by listing the relevant research questions, followed by a literature review, and an outline of the learning context (international, national and institutional). This is followed by the research methods used to conduct the research, the results and, finally, a summary and recommendations. Instead of the chapter ending with the usual

recommendation section as given in Chapters 3 and 5, the recommendation section is followed by a discussion of the new and enhanced features of *WebCT* version 3.1.

Although a few aspects covered in this chapter are specific to *WebCT* version 3.1, most of the results should apply to web-based CMSs in general.

4.2 Research questions

Table 4.1 shows the subquestions relating to the various aspects under investigation in this case study. The researcher set out to answer these questions, and assess whether there was a difference in the responses of undergraduate and postgraduate learners to *WebCT*. These questions are asked and responses measured in respect of the four main aspects, namely: andragogical, affective/emotional, communicative and technological.

Table 4.1 Subquestions relating to aspects under investigation in Case Study 2

	Aspects	Research subquestions
Case Study 2	Andragogical	<ul style="list-style-type: none"> ▪ To what extent is <i>WebCT</i> an aid/obstacle to learners' learning? ▪ Were learners satisfied with the nature of the feedback they received from their instructors via <i>WebCT</i>? ▪ To what extent can collaborative learning be stimulated effectively on <i>WebCT</i>, using the bulletin board feature?
	Affective/emotional	<ul style="list-style-type: none"> ▪ What are learners' first impressions of <i>WebCT</i>? ▪ What emotions, likes and dislikes do learners experience when using <i>WebCT</i>?
	Communicative	<ul style="list-style-type: none"> ▪ To what extent is <i>WebCT</i> user-friendly? ▪ To what extent is <i>WebCT</i> an effective means of delivery? ▪ What method of communication (face-to face/virtual) do learners prefer? ▪ To what extent do learners value a bulletin board?
	Technological	<ul style="list-style-type: none"> ▪ What technological problems did learners/instructors encounter when using <i>WebCT</i>?

4.3 Literature review

Communicative interaction between individuals lies at the heart of most approaches to teaching in educational settings (Hewson and Hughes, 1998). It is Hewson and Hughes's (1998:329) opinion that the "constructivist approach to the design of learning and research on learners' approaches to learning, emphasise that active engagement with content and opportunities to interact with teachers and peers are essential elements for deep learning". It is apparent, however, that despite the efficiency of Internet resources such as e-mail, Hypertext Mark-up Language (HTML), File Transfer Protocol (FTP), chat rooms and bulletin boards to deliver messages, the delivery of messages, in itself, is not sufficient to ensure learning (Hewson and Hughes, 1998). Therefore, the challenge when designing flexible programs is to establish sophisticated and effective communication modes and to support a basic set of familiar techniques. In this section two types of interactivity are discussed, namely instructional/content interactivity and social interactivity.

4.3.1 Instructional/content interactivity

Classroom designs employ a range of features to support outcomes, namely: presentations, questioning, brainstorming, discussions, quizzes, debates, project work and so forth. The program *WebCT* supports such a range of features, all in one package. These features are implemented in such a way as to enhance known psychological processes that enhance learning, for example, discussions are conducted to facilitate participation and the free exchange of opinions (Hewson and Hughes, 1998:331).

Classroom designs should be as interactive as possible. They should have a high level of usability and not frustrate learners. Shneiderman (2000) gives two guidelines for user interface design. Instructional designers should strive to:

- Make design cognitively comprehensible, i.e. be consistent, predictable and make user control possible; and
- be affectively acceptable, i.e. promote mastery and satisfaction, and give users a sense of responsibility.

Interactive web environments should be designed according to general web principles, as given by Lynch and Horton (1997) in Table 4.2.

Table 4.2 General web principles

Design principle	Design Implication
Navigation	Provide a rich set of graphic navigation, and interactive links within web pages, to draw learners' attention to content.
Provide the reader with a context.	Provide the reader with a context, so they can see their place within an organisation of information.
Give users direct access.	Strive to provide learners with the information they want in the fewest possible steps and in the shortest time.
Bandwidth and interaction	Avoid features that will keep the learner waiting.
Simplicity and consistency	Use metaphors that are simple, familiar, and logical to the audience.
Design stability	Keep interactive features of the web site working reliably.
Feedback and dialogue	<ul style="list-style-type: none"> ▪ Offer constant visual and functional confirmation of the user's whereabouts and options. ▪ Respond to learners' inquiries and comments. ▪ Make direct links available to instructors.
Design for the disabled	Build in "alternate" messages ("ALT" tags in HTML) so that learners without graphics capabilities can still understand the function of graphics on pages.
Use button bars.	Allow learners to navigate through the information in a site in the intended sequence, by building in button bars such as "Next Page" and "Previous Page".

(summarised from Lynch and Horton, 1997)

4.3.2 Social interactivity

Email, news groups and bulletin boards are known as the standard Internet communication tools available to support asynchronous communicative interaction. These communication tools are flexible, efficient, widely accessible (using standard desktop computers and phone lines) and are capable of supporting enhanced interactivity. They have improved communication drastically in comparison to traditional distance education. The rapid deployment of the Internet also means that these tools can support educational programs on a global scale, a possibility only dreamed of a decade ago. In response to these possibilities for enrichment, teachers and instructors worldwide have worked to harness this potential for educational purposes. The designers of *WebCT* have also worked to harness this potential, including in their package e-mail, a bulletin board, a whiteboard and chat rooms.

However, despite the relative enthusiasm of standard Internet tools - the richness of communicative interactivity is actually very poor when compared to that of the average physical classroom (Hiltz and Wellman, 1997). The restriction to text, while bringing some advantages, removes from the communication many of the linguistic and extra-linguistic features of face-to-face communication. Simply stated, there is no intonation, no body

language, no facial expressions, no accent, no speech rhythm and no proxemics. It is Hewson and Hughes's (1998:331) opinion that attempts at incorporating some of these features, in the form of "emoticons", for example, :-), :-), are usually inadequate and clumsy, although the attempt itself speaks of the common view that the medium is slightly impoverished. In fact, none of the immediacy and subtlety upon which most established classroom conventions are built can be approached by this medium (Hewson and Hughes, 1998). See Chapter 2, Section 2.2.3.2(c) for further limitations of CMC.

4.4 Context

In this section the international, national and institutional context will be discussed, and a description of the target population will be given.

4.4.1 International

A paradigm shift is currently taking place, moving from an industrial-based society to a knowledge-based society (Marchionini, 1999; Trilling and Hood, 1999). The shift to a knowledge-based society has had a major impact on tertiary education worldwide, specifically as regards the shift from traditional learning towards open learning. The aim of open learning is to provide unhindered access to learning resources so that technologically supported freedom of information may be turned into freedom of education for individuals pursuing their own learning needs, that is, a flexible learning system catering for diverse learning situations (Virtual Campus, 1998b). The use of the Internet and World Wide Web in open learning has increased greatly in the past few years, as vehicles have proliferated to deliver course materials and to create active and collaborative learning experiences. There is a need to investigate such courses to determine whether their benefits and limitations are what the literature claims them to be.

4.4.2 National context

The South African National Qualifications Framework supports the rationale for restructuring South African education through the South African Qualifications Authority (SAQA). The objectives of this framework are to facilitate access to, and mobility and progression within, education, training and career paths (Fregona *et al*, 1999). SAQA recognises that open learning lends itself to Outcomes-Based Education (OBE) in both style and philosophy (Fregona *et al*, 1999). OBE is an approach that requires learners and lecturers to focus their attention on the desired end results of learning, and the teaching and learning processes that will guide the learners to these end results (Geyser, 1999). The focus is less on the teacher as instructor, and more on the *teacher as facilitator*, with the emphasis on *active learner-involvement*, and the learner as the *creator/producer of knowledge*. This supports the notion of open learning, which suggests a learner-centred philosophy.

According to Gultig (1997), the main principles underlying OBE are:

- Lifelong learning;
- flexible education and training structures;
- the integration and transfer of learning; and
- the need to teach towards critical, cross-field and specific outcomes.

Critical, cross-field outcomes would promote the development of basic skills such as communication, critical thinking, problem-solving, and team working skills, necessary for functioning in a changing, modern society, while specific outcomes are context-specific and describe the competence learners should demonstrate in particular areas of learning at certain levels (Virtual Campus, 1998a).

4.4.3 Institutional context and target population

A flexible learning system encompasses a range of distance and face-to-face delivery mechanisms and support systems, using appropriate, cost-effective combinations of technologies. At the University of Pretoria, a great deal of attention has turned towards the vision of a Virtual Campus. The Virtual Campus of the University of Pretoria is an electronic extension of current contact teaching facilities, products and services. It provides an Internet-based platform that enables residential and remote learners and staff to access an

integrated educational environment from anywhere in the world (Virtual Campus, 1998b). The aim of the Virtual Campus is to improve the quality of educational processes and products, and to extend existing administration and teaching/learning functions through the application of various technologies. It expands the market of the University of Pretoria by allowing access to remote learners worldwide. Through the Virtual Campus, the university hopes to transform gradually so as to offer increased flexibility to their clients. The idea is to offer fewer contact sessions – mainly for examination, practical work and problem solving - complemented by Internet-based teaching and learning environments (Virtual Campus, 1998b).

The Virtual Campus uses *WebCT* to bring part of this vision to fulfilment. *WebCT* is being used by instructors and learners from a wide range of disciplines at the University of Pretoria. Two of the disciplines in which *WebCT* has been implemented are the Information Science Department in the then “Faculty of Arts”, as well as the Department of Engineering and Technological Management in the then “Faculty of Engineering” (the Information Science Department and Faculty of Engineering have subsequently been integrated into the new “Faculty of the Built Environment”).

The researcher chose to examine one course in each of these departments to see whether learners’ response to *WebCT* differed between two different age groups, i.e., undergraduates and postgraduates, from the “soft” sciences and the “hard” sciences respectively. This provides a more varied perspective on the learners’ perceptions of *WebCT*, since to date no such course had been evaluated. A further reason is that any indication of potential problems that could arise in the development and implementation of web-based CMSs would be valuable in maximising the benefits of such a process and counteracting its limitations.

The two courses will now be discussed in more detail.

4.4.3.1 Systems Development course

In 1999, the Information Science Department had eleven courses on *WebCT*, the majority of which were still in their development phase. A course on Systems Development was selected for investigation, since it was the only course in which *WebCT* was used properly in the Information Science Department, although not optimally, as evidenced in the findings. The class was also a good target because the learners were in their second year of studying BA Multimedia and therefore had advanced Internet knowledge, experience and expertise. It was also easy to evaluate this group, because the resources were at the researcher's disposal, due to her studies being based in the department.

The intended outcomes of the Systems Development course are to equip learners with the following skills:

- Knowledge about: database construction, project planning, project management, user needs analysis, system specifications, introduction to interface development, and HCI;
- The ability to plan and manage a multimedia project;
- The ability to design a database;
- Capacity to understand the factors involved with the design of user interfaces;
- Capacity to understand designing from a human user perspective; and
- The ability to apply the theory of HCI to practical user interfaces.

4.4.3.2 Maintenance Management course

The Department of Engineering and Technology Management had four masters-level courses on *WebCT* in 1999. These were also in their development phase. A course on Maintenance Management was selected for investigation, in which *WebCT* was used as a support, in addition to two weeks contact teaching a year.

The desired outcome of the Maintenance Management course is for learners to obtain an introductory knowledge of maintenance management, with an emphasis on the necessary tools to manage the maintenance function within the enterprise.

In this course learners learn how to:

- Specify a maintenance objective;
- formulate a maintenance strategy; and
- structure a maintenance organisation so as to achieve its own objectives.

4.5 Method

This research falls under both a non-experimental survey design, as well as a qualitative ethnographic design. The research is primarily a qualitative study, but quantitative measures were taken to triangulate the data. A questionnaire was completed by the learners (shown in [Appendix C](#)). Qualitative measures were used in the questionnaire (where open-ended questions were used), and for interviews with the instructors of both groups of learners. Quantitative measures were taken in the questionnaire sent to learners after completing the course (where Likert scaling was used), as well as in an analysis of the Multimedia learners' communication (i.e. the messages they posted to the bulletin board). Multiple methodologies were used to validate the results generated from the questionnaire, i.e. triangulation was applied.

Data was collected by means of a questionnaire distributed to the entire population of Multimedia learners after they completed the course. Twenty-four questionnaires were given out, and twenty were returned. In the case of the Engineering learners, a random sample of six learners was drawn, and they completed the questionnaire by means of a structured telephonic interview. In addition to the questionnaire, both course instructors were interviewed to obtain their insights and in-depth understanding of their use of *WebCT*, in their respective departments. An analysis of the messages Multimedia learners posted to the bulletin board was undertaken to examine whether or not the bulletin board supported collaborative learning, and what undergraduates used it for. The communication of the Engineering learners was not available to the researcher, and hence was not analysed.

4.6 Specifics of *WebCT*

WebCT is a tool that supports the design, delivery and management of sophisticated web-based learning environments (Firdyiwek, 1999). It supports course designers or instructors in creating sophisticated web-based learning environments, including the instructor's administration, course design, learner evaluation and so forth.

WebCT is the world's leading provider of integrated e-learning systems (Baird, 2001). Over the last three years it has become widely deployed at tertiary education institutions worldwide. According to Baird (2001), over 148 000 faculty members at 1 578 colleges and universities are using *WebCT's* products and services to transform the educational experience for more than 5.9 million learners. It has been made the university standard in many institutions, including the University of Pretoria.

In 1999, features of *WebCT* included: a bulletin board, private e-mail, chat room, course content, online study guides, access to grades, online quizzes, a calendar, a tracking and student administration tool and a student presentations tool (*WebCT* Faculty Lounge, 2000; Virtual Campus, 1998b). *WebCT* offers these various facilities to encourage learners to take ownership of their learning and to support collaborative learning - a constructivist paradigm as discussed in Chapter 2, Section 2.2.1.2.

This case study reports on an investigation conducted in June 1999, and as such all data and screen captures pertain to that year. Figures 4.1, 4.2, and 4.3 give an indication of what the web-based CMS looked like, giving screen captures of the static section, namely the introductory screen (see Figure 4.1) and the course content (see Figure 4.2); and one of the dynamic section, namely the bulletin board (see Figure 4.3).

Figure 4.1 Opening screen of WebCT



Figure 4.2 Screen capture of course content

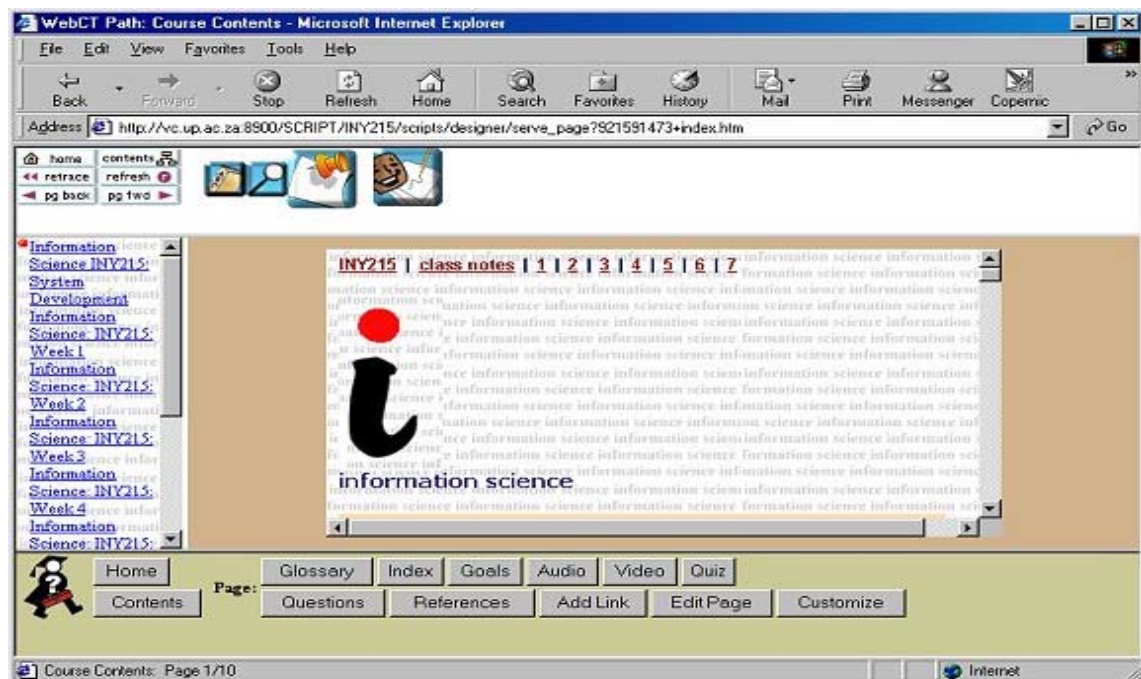
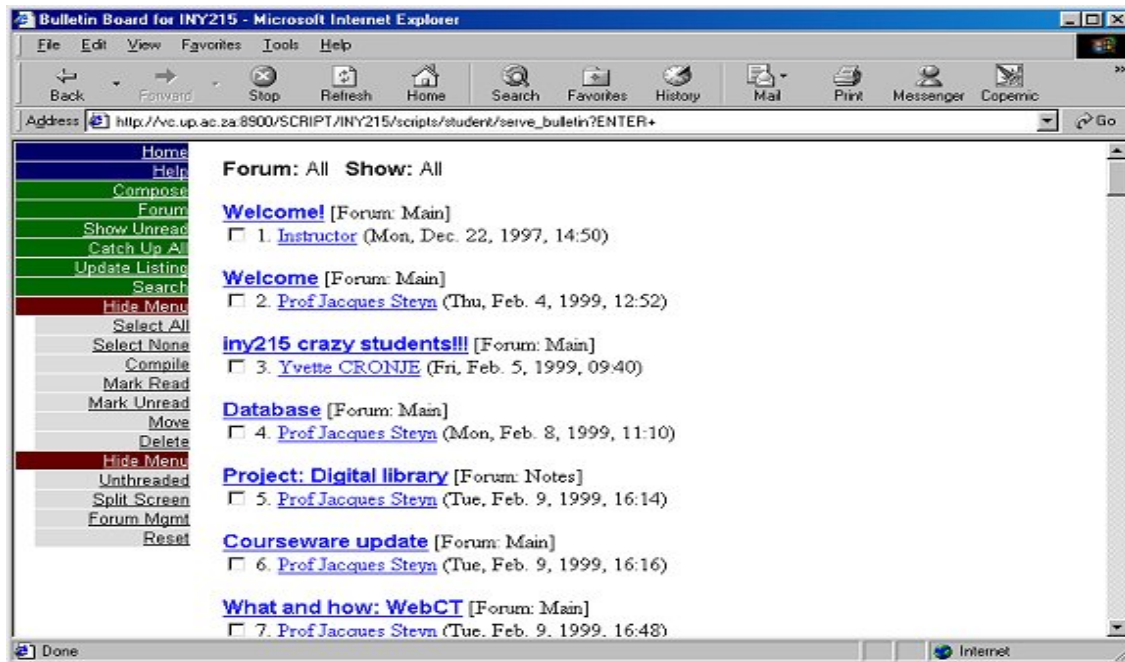


Figure 4.3 Screen capture of bulletin board



The purpose behind using a **bulletin board** in both courses was to facilitate debate, collaboration and dialogue among learners and their instructor for the duration of the course. The **mail tool**, similar to e-mail, was used for private communication within the courses. The learners doing the Systems Development course made use of the **presentation tool** in *WebCT*, in which learners are able to present their findings, by uploading their projects into the *WebCT* course. Each learner can access any of the presentation topics/projects that other learners/groups of learners have uploaded, and can then share the information (Eiffel-Corp, 2000).

4.7 Results

Twenty of the twenty-four Multimedia learners taking the Systems Development course (almost the complete population) participated in the investigation of *WebCT* by means of a questionnaire survey, forming the primary respondents. A sample of six of the forty learners taking the Maintenance Management course took part in a telephonic structured interview, forming the secondary respondents. In short, the primary respondents were the undergraduate Multimedia learners and the secondary respondents were the postgraduate Engineering learners. The difference in sample size is not important, since it is *WebCT* that is under investigation, rather than the learners. However, any results that may be derived from this study are tentative.

The characteristics of the learners who participated in the survey are given in Table 4.3.

Table 4.3 Description of learners using the web-based CMS

Characteristics		Undergraduate Multimedia learners	Postgraduate Engineering learners
Gender	Male	10	5
	Female	10	1
Employment status		Full-time learners	Full-time employed; part-time learners
Age range		From eighteen to mid-twenty	Three in their mid-twenties Three between thirty and thirty-nine
Internet use	Daily basis	19	4
	Weekly basis	1	2
Location of learners		In close proximity Have traditional face-to-face instruction, four times a week.	Highly dispersed Have two weeks contact-teaching a year.

From Table 4.3, it can be seen that both groups of learners use the Internet on a frequent basis. The main differences between the two groups is their employment status, age, as well as the distance between learners.

4.7.1 Andragogical aspects

This section discusses whether or not *WebCT* was an aid or obstacle to the learning of undergraduates and postgraduates, whether or not learners were satisfied with the nature of feedback they received from their instructor via *WebCT*, and the extent to which collaborative learning is effectively stimulated on *WebCT*, using the bulletin board feature.

The term “andragogy” is used to distinguish the teaching and learning of adults from “pedagogy”, the teaching and learning of children, as discussed in Chapter 2, Section 2.3.3(b). Hence the descriptor “andragogical” is used, and not “pedagogical”. “Andragogical” in this context includes both undergraduate and postgraduate learners.

4.7.1.1 To what extent is *WebCT* an aid/obstacle to learners’ learning?

Figure 4.4 depicts learners’ views on whether *WebCT* was an aid or obstacle to their learning.

Figure 4.4 *WebCT* - aid or obstacle?

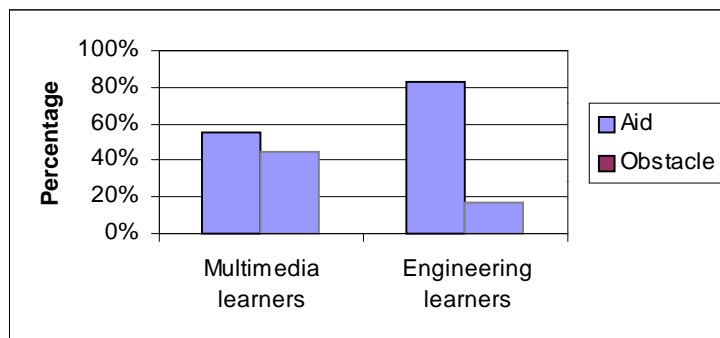


Figure 4.4 indicates that among the undergraduate Multimedia learners, there was no real clarity as to whether *WebCT* was an aid or obstacle to their learning. Fifty-five per cent of the undergraduate Multimedia learners felt that it aided learning, while 45% experienced it as an obstacle. The majority of the postgraduate Engineering learners, in contrast, experienced *WebCT* as an aid to their learning (five of six - 83%), the sixth one feeling frustrated by it at times. These results indicate that web-based CMSs are potentially more valuable for postgraduates who study by means of distance learning, than for undergraduates who study by means of contact teaching. Table 4.4 shows possible factors accounting for the difference in learners’ response.

Table 4.4 Possible factors accounting for the difference in learners' response

Factor	Reason	Design implication
Age, maturity and work experience	The groups differed in terms of their age difference, maturity and work experience.	Match learners' tasks with their age, maturity and work experience.
Prior knowledge	The Multimedia learners, at the time of the investigation, were second-level learners, with a traditional school background, used to contact teaching, and were now suddenly exposed to learning virtually, a concept which could have been foreign to their mindsets and contrary to their educational expectations.	Give learners adequate training on <i>WebCT</i> and the type of development it supports.
Motivation	The material incorporated no metaphor that drew on their existing skill and knowledge, and was not visually sufficiently stimulating or captivating. Bear in mind that these are Generation X learners - used to being entertained, and if material does not interest them, they move on (see Chapter 2, Table 2.13 for the characteristics of Xers).	Use a metaphor with which learners are familiar.

4.7.1.2 Were learners satisfied with the nature of the feedback they received from their instructors via *WebCT*?

Learners were generally satisfied with the nature and quantity of the feedback they received from their instructors (undergraduate Multimedia learners: 63%; postgraduate Engineering learners: five of the six - 83%). Nevertheless, some of the undergraduate Multimedia learners did not like the fact that certain instructions were only given on *WebCT* and that messages from their instructor were brief. This indicates, however, that the instructor took on a constructivist stance, in that he considered the character traits of this group of learners to be independence and self-reliance, and therefore did not give the answers away, but rather encouraged them to think for themselves.

Table 4.5 gives comments from the undergraduate Multimedia learners regarding the feedback they received via *WebCT*. Their comments relate to both the instructor's method and to *WebCT's* performance.

Table 4.5 Undergraduates’ comments regarding feedback

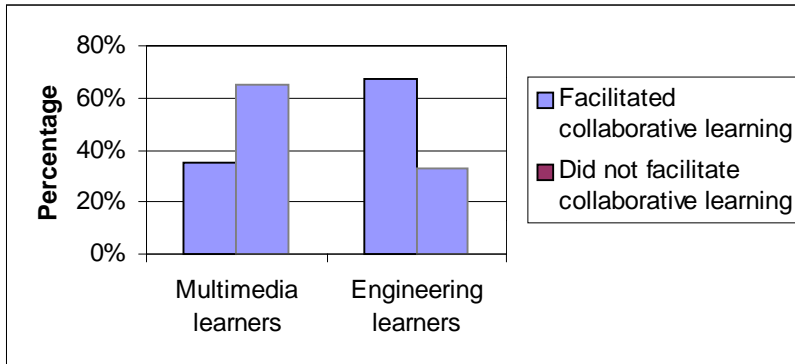
Positive comments	Negative comments	
<ul style="list-style-type: none"> ▪ <i>Feedback was always in a positive light and of good quality.</i> ▪ <i>We were always told what to do.</i> ▪ <i>It was exact.</i> 	Feedback on instructor’s method	<ul style="list-style-type: none"> ▪ <i>He kept stereotyped. I had to get my answer out of what he sent.</i> ▪ <i>He had the right idea, but the wrong methods.</i> ▪ <i>Instructions were given at “bad” times, and important information given only on WebCT.</i> ▪ <i>Face-to-face feedback is better - you can express yourself better than on e-mail. His messages were short and not in detail.</i>
	Feedback on WebCT	<ul style="list-style-type: none"> ▪ <i>Very often valuable comments were missed because one doesn’t always have the time to look at WebCT every day.</i> ▪ <i>There is always a timespan before messages could be retrieved.</i>

The Engineering learners were disappointed with two of their instructors who did not use the bulletin board at all. Two Engineering learners felt that the success of a bulletin board depends on the enthusiasm of the instructors and their interaction on the bulletin board. Nevertheless, all the learners experienced it as a valuable means of communication.

4.7.1.3 To what extent can collaborative learning be stimulated effectively on WebCT, using the bulletin board feature?

Constructivism emphasizes the importance of collaborative learning. Figure 4.5 depicts learners’ view on whether the online discussion facilitated collaborative learning.

Figure 4.5 Learners' view on whether the online discussion facilitated collaborative learning

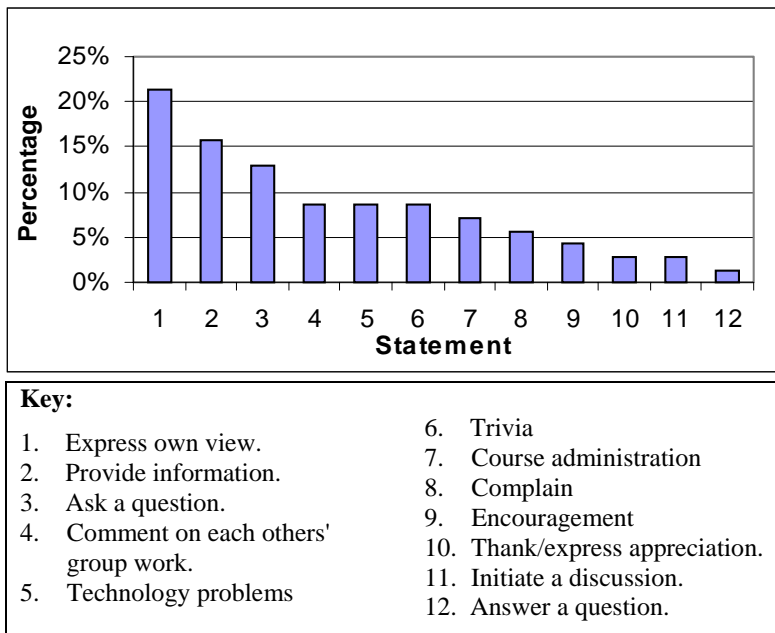


Two thirds (65%) of the undergraduate Multimedia learners were unconvinced about *WebCT's* ability to facilitate collaborative learning, while two-thirds (67%) of the postgraduate Engineering learners felt it did. Considering these results, it does not appear that collaborative learning was supported among the Multimedia learners. However, one must remember that these learners were in close proximity, having traditional face-to-face instruction four times a week.

These results could indicate the following:

- Collaborative learning can be effectively stimulated when learners study by means of distance learning and have a need to communicate. The Multimedia learners had less of a need to communicate because they had traditional face-to-face contact.
- The Engineering learners could choose voluntarily whether or not to participate in the bulletin board. The Multimedia learners, by contrast, were told that their interaction on the bulletin board contributed towards semester marks, which meant that if they wanted good marks, they had to participate regardless of whether they had useful information to communicate.

The messages Multimedia learners posted to the bulletin board were classified into certain categories to determine whether or not these messages supported collaborative learning and for what purposes undergraduates used this feature. The classification was based on the identified areas of similarity. A classification of their communication is given in Figure 4.6.

Figure 4.6 Classification of learners' communication on the bulletin board

A hundred and thirteen messages were sent to the bulletin board, of which 62% were sent by learners, and 38% by the instructor. Although the largest number of postings were learners expressing their own view, this only occurred after the instructor had expressed his concern that only eight learners had used the bulletin board up to that date. He then told learners to debate whether “Project Management is a waste of time”. The percentage given in Figure 4.6 is misleading, as only fifteen out of a total of 24 learners expressed their own view, and their views were generally only a paragraph each. Thus the instructor was correct in saying, “no serious theoretical issues were discussed”. However, it must also be realised that these learners did not have the necessary prior knowledge in place to make a worthwhile contribution. The instructor should have taught the learners this knowledge immediately, instead of assuming that they themselves would attempt to seek it. In this way, the Multimedia learners would have something to communicate, and would have received the necessary guidance from their instructor.

In this specific study, considering that only 35% commented that the discussions facilitated collaborative learning, and the small number of learners who expressed their view, it can be said that the discussions did not really facilitate participation and the free exchange of opinions, as suggested by Hewson and Hughes (1998:331).

Multimedia learners used the bulletin board predominantly for providing information, asking questions, commenting on each others' group work, mentioning problems with technology and plain trivia (meaningless comments) (see Figure 4.6). It is interesting to note that one specific learner provided most information and that learners, in general, did not answer each others' questions, except once. The instructor thus intervened and answered the questions. When two learners initiated a dialogue, no others contributed.

The results indicate that although the onus is on learners to take control of their learning environment and available resources, the undergraduate Multimedia learners were not necessarily accustomed to becoming the owners of their own learning. It seems that sharing control of the classroom learning with learners using discussion software, is an uncomfortable situation for some learners. It appears that this group of learners need to adjust to this style of learning, before they can reap its full benefits. Nevertheless, the experience did have value for some learners, and although it was not a socially fulfilling experience, they received useful knowledge nevertheless. Learners were at least introduced to it, and should harness its potential as they become more familiar with it. The bulletin board was therefore not used to its full functionality, and did not support collaborative learning nor facilitate peer problem-solving as it could have, had it been more effectively utilised by both learners and the instructor.

4.7.2 Affective/emotional aspects

In this section the following is discussed: learners' first impressions of *WebCT* and learners' emotions, likes and dislikes with regard to *WebCT*.

4.7.2.1 What are learners' first impressions of *WebCT*?

Figure 4.7 depicts learners' first impressions of *WebCT*. Figure 4.7 indicates a range of emotions from positive first impressions, to mixed emotions, through to negative impressions.

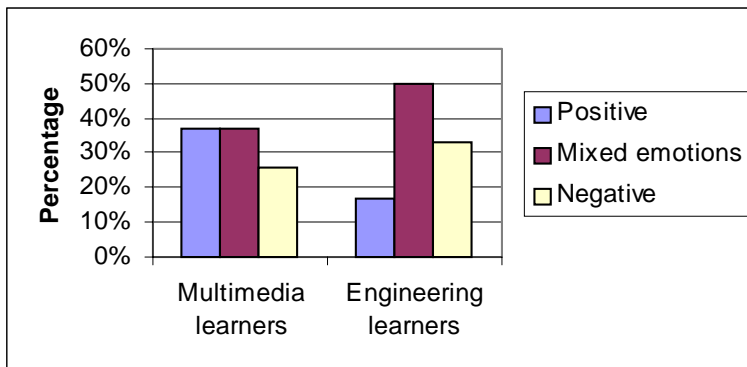
Figure 4.7 Learners' first impressions of *WebCT*

Figure 4.7 gives no clarification as to any predominant impression formed by learners. However, it appears that the undergraduate Multimedia learners had a more positive first impression than that of the postgraduate Engineering learners who predominantly experienced mixed and negative impressions. The Multimedia learners, however, expressed disappointment with *WebCT* as the course progressed, with one learner stating “I liked it, then was desperately disappointed by it”.

Table 4.6 gives comments relating to learners' first impressions of *WebCT*, divided into the aspects under investigation in this study. Comments are divided into these aspects for the purpose of clarity.

Table 4.6 Learners' comments regarding their first impressions

Group	Aspect	Positive comments	Mixed emotions	Negative comments
Multimedia learners	Affective/emotional	<ul style="list-style-type: none"> ▪ <i>WebCT is a good system and is convenient.</i> ▪ <i>The Virtual Campus has done a good job.</i> ▪ <i>Good idea, accessible from home as well</i> ▪ <i>I was very impressed.</i> ▪ <i>Very good supporting learning system</i> 	<ul style="list-style-type: none"> ▪ <i>O.K, not impressive though</i> ▪ <i>Not much of an impression (neither good nor bad)</i> 	<ul style="list-style-type: none"> ▪ <i>I liked it, then was desperately disappointed by it.</i>
	Communicative	<ul style="list-style-type: none"> ▪ <i>Makes interaction between learner and information easier.</i> ▪ <i>Smart, very handy, well-structured.... kind of cool</i> ▪ <i>Interactive and easy to use. I will definitely recommend it.</i> 	<ul style="list-style-type: none"> ▪ <i>Looks good, not exciting, but you can easily find needed information.</i> 	<ul style="list-style-type: none"> ▪ <i>It is hard to get to the relevant information.</i> ▪ <i>The information is poorly presented.</i> ▪ <i>Terrible user interface</i>
	Technological		<ul style="list-style-type: none"> ▪ <i>A help when it worked</i> 	<ul style="list-style-type: none"> ▪ <i>Somewhat unreliable</i> ▪ <i>Slow and unreliable</i> ▪ <i>Not good, it did not function correctly or logically.</i>
Engineering learners	Affective/emotional	<ul style="list-style-type: none"> ▪ <i>Quite impressed, could work well.</i> 	<ul style="list-style-type: none"> ▪ <i>Useful, but takes time to get used to.</i> ▪ <i>Nice idea, but doesn't work. Interaction is limited.</i> 	
	Communicative			<ul style="list-style-type: none"> ▪ <i>Difficult to get into, and not easy to access information.</i> ▪ <i>Unwieldy</i>

Some of the Multimedia learners were quite impressed with *WebCT*, highlighting its convenience - "interactive and easy to use" and found it valuable - "very good supporting learning system", while other learners had mixed emotions to it. Some learners felt negative about *WebCT* and commented that the interface was badly designed, the information was

poorly presented, and that it did not function correctly or logically. In contrast, only two of the Engineering learners found it not user-friendly, commenting that it is “difficult to get into, and not easy to access information” and is “unwieldy”.

4.7.2.2 What emotions, likes and dislikes do learners experience when using *WebCT*?

In this section the emotions learners experienced when using *WebCT* are reported, as well as what they liked and disliked about *WebCT*. Table 4.7 depicts their relevant criticisms and comments regarding *WebCT*.

The most common emotion among both groups of learners was frustration, for reasons given in Table 4.7. Seventy per cent of the undergraduate Multimedia learners and 67% of the postgraduate Engineering learners experienced frustration. Emotions experienced to a lesser degree among the undergraduate Multimedia learners were helplessness, alienation, anger and fear. Positive emotions experienced among this group of learners were a sense of achievement, motivation, satisfaction and a feeling of success, once they had mastered *WebCT* as a medium for learning. The two positive emotions experienced by the postgraduate Engineering learners were a sense of achievement and satisfaction.

Table 4.7 Learners' comments regarding their feelings about WebCT

Group	Aspect	Likes	Dislikes
Multimedia learners	Affective/emotional	<ul style="list-style-type: none"> ▪ <i>If you are behind in your studies you can catch up with WebCT.</i> ▪ <i>You can go and get clarity for several times and check dates, etc. One can check it from outside UP.</i> ▪ <i>While working at home, it is possible to upload work and then use it again at University.</i> ▪ <i>One feels good when you can see your work on the Web.</i> 	<ul style="list-style-type: none"> ▪ <i>I feel it's an effective idea that isn't being utilised as intensely as it could be.</i> ▪ <i>It is slow and totally uncool.</i> ▪ <i>I feel negative towards this program, especially seeing that it comprised 90% class time - don't overkill.</i> ▪ <i>The product was a bad buy.</i> ▪ <i>Boredom</i>
	Communicative	<ul style="list-style-type: none"> ▪ <i>Having access to the course material at all times, and therefore not having to make photocopies that are bound to get lost.</i> 	<ul style="list-style-type: none"> ▪ <i>Having to communicate in a certain way.</i> ▪ <i>Not up-to-date</i> ▪ <i>Navigation difficult and design unpleasant</i> ▪ <i>I guess I have a little cyberphobia left somewhere. The bulletin board boggles me, and no one chats in the chat room anyway.</i>
	Technological	<ul style="list-style-type: none"> ▪ <i>It feels good when something (any projects) worked.</i> ▪ <i>It is nice that any member of the group has access to the presentations and that others cannot sabotage your work.</i> ▪ <i>When it worked, it was a help.</i> 	<ul style="list-style-type: none"> ▪ <i>It's not reliable! One day it works, the next day it doesn't.</i> ▪ <i>At certain times one was not able to log on at all.</i> ▪ <i>We were unable to change data quickly and easily.</i> ▪ <i>Uploading files is a slow process, since you have to upload one thing at a time.</i>
Engineering learners	Affective/emotional	<ul style="list-style-type: none"> ▪ <i>Good system</i> ▪ <i>Happy with service</i> ▪ <i>WebCT is good.</i> 	
	Communicative		<ul style="list-style-type: none"> ▪ <i>Elaborate, superfluous, graphics</i>
	Technological		<ul style="list-style-type: none"> ▪ <i>Frustrated with access</i> ▪ <i>I did not get very far after using the system for one and a half hours.</i>

The Multimedia learners found the flexible arrangement of the course content useful and convenient. They liked the fact that it could be accessed at any time, and found it useful for getting clarity, checking dates and for catching up on work if they were behind. One learner also liked having access to the presentations of other groups' work. However, other learners were negative, commenting that it was unreliable, a bad buy, and one learner was bored by it. Another learner commented that the bulletin board "boggles me", indicating that he did not really understand the concept behind a bulletin board.

The undergraduate Multimedia learners gave the following comments about *WebCT*, in the form of suggestions:

- *Could be more user-friendly.*
- *Should be way more interactive.*
- *Good idea, but needs to be more functional.*
- *A great concept, but needs to have all the bugs fixed up.*
- *WebCT needs constant attention and management to work - this stage still has to occur.*

Two postgraduate Engineering learners gave brief, yet positive comments about *WebCT*, stating that they were happy with the service. The results generally indicate that learners are in favour of the open learning approach. They did, however, experience the following frustrations:

- The slow speed between screen transitions. This, however, was due to large graphics, and the limited bandwidth available in South Africa.
- Instructors who did not update the content of their sites when information changed, or left their sites incomplete.
- Two of their instructors did not communicate electronically at all. They found this very frustrating, especially seeing that these were their Information Management and Information Technology instructors.

Two of the Engineering learners preferred using conventional e-mail and found it to support collaborative learning more effectively than a bulletin board. Although the e-mail facility on *WebCT* was well-used, it was considered ineffective by these two learners because it was less responsive than other e-mail packages. These learners found communicating and collaborating with their study group more effective through conventional e-mail, which they

experienced as effective, efficient, flexible and trustworthy. For this specific group of learners, classroom discussions via a discussion list may have been more convenient and beneficial than an online bulletin board. The e-mail facility on *WebCT* was valuable, however, for learners studying on campus, who did not have the Internet at home or access to a sophisticated e-mail program.

The instructors of the two groups of learners also experienced different emotions. The instructor of the Multimedia learners felt disappointed and disillusioned by their use of *WebCT*, in contrast to the instructor of the Engineering learners, who was very positive. The Multimedia instructor felt this way, due to both teaching inadequacies and tremendous problems with technology (discussed further in Section 4.7.4).

Teaching inadequacies

The Multimedia instructor felt that the learners did not use the bulletin board for real problem-solving and to discuss real theoretical issues. It was discovered only much later that learners did not understand certain concepts and did not attempt to get clarification on these concepts, either from their peers face-to-face or on the bulletin board. The instructor should have clarified these concepts with the learners, realising that they did not have the necessary prior knowledge in place.

Technology difficulties

The Multimedia instructor commented that there was also no help facility for course developers, nor a help facility for learners about entering courses on *WebCT*. As a result, he could not help learners with their technology problems, because of being in a different position to them. He solved the problem by creating a phantom learner (i.e. by appearing himself as an additional learner on the course). Despite this problem being solved, it is imperative that support in this regard be improved.

Further frustrations experienced by this instructor were:

- Outsiders were unable to access the course due to the password control; and
- the Virtual Campus could not accommodate the structure required by the Information Science Department and, as a result, the instructor had to fit the course into the “mould” provided.

The instructor of the Engineering learners, in contrast, was very positive about their use of *WebCT*, although they also had their share of technological problems. He found *WebCT* very useful, and a major improvement on the previous running of their Masters course.

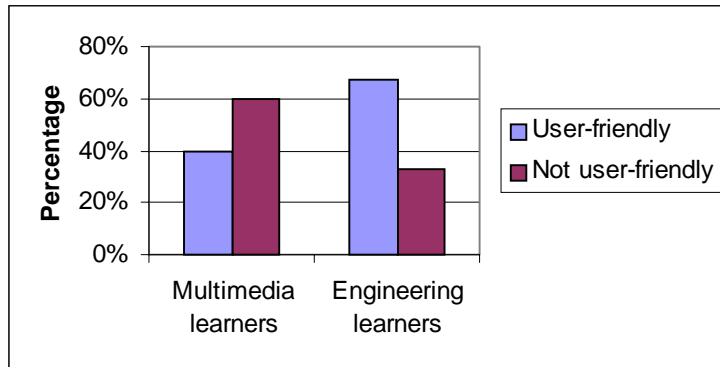
Communication which in the past had been by conventional mail, was now instant. The instructor also commented that his contact with learners improved significantly, in that he had continuous communication with them. His learners felt more comfortable in saying certain things and were bold in giving their opinions. He also received better feedback from them since using *WebCT*, and found they were more in control of their learning environment than in the past. He also found that *WebCT* saved considerable time in terms of administration.

4.7.3 Communicative aspects

In this section the following is discussed: the extent to which *WebCT* is user-friendly and an effective means of delivery, the methods of communication learners prefer and the extent to which learners value bulletin boards.

4.7.3.1 To what extent is *WebCT* user-friendly?

Figure 4.8 depicts the extent to which learners experienced *WebCT* as user-friendly.

Figure 4.8 User-friendliness of *WebCT*

Sixty per cent of the undergraduate Multimedia learners experienced *WebCT* as not user-friendly (see Figure 4.8). On the other hand, four of the six postgraduate Engineering learners (67%) felt that it was user-friendly. Their conflicting responses could be due to the Multimedia learners applying prior knowledge and experience from a previous first-level course including criteria for good web design. The Engineering learners lacked this prior knowledge.

Certain learners in both groups found the design of *WebCT* problematic. This is indicated by learners' comments in Tables 4.6 and 4.7, where they mention things like information being poorly presented, unpleasant design, etc.

The Engineering learners made the following valuable suggestions with regard to the user-friendliness of *WebCT*:

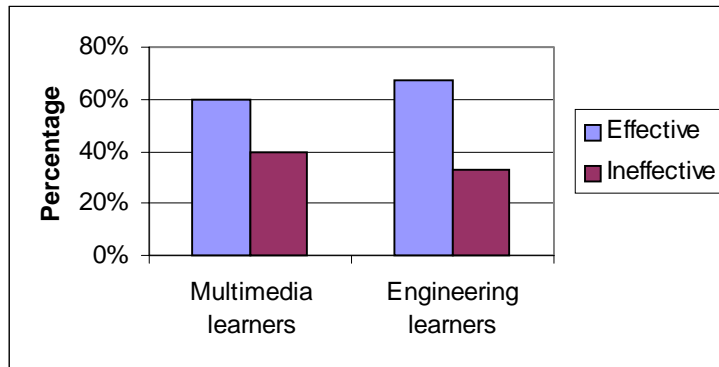
- *A link to your conventional e-mail program would be good. Speed should be improved and it should be made more user-friendly.*
- *Peel off front layers, making it easier to go to straight to where you want to go. All bits and pieces should be on one site.*

The instructor of the Multimedia learners also found the shell approach restrictive, in that it provided a rigid structure.

4.7.3.2 To what extent is *WebCT* an effective means of delivery?

Learners' response to the effectiveness of *WebCT* as a means of delivery were similar, as depicted in Figure 4.9 (undergraduate Multimedia learners: 60%; postgraduate Engineering learners: four of the six - 67%).

Figure 4.9 The effectiveness of *WebCT* as a means of delivery



This indicates the value some learners perceive in web-based CMSs. Two Multimedia learners made the following comments with regard to *WebCT* as a means of delivery.

- *Very good concept, supports learning.*
- *Don't take it away, it saves my life when I need it.*

Some of the Multimedia learners felt, however, that *WebCT* should not be a replacement for lectures, but should merely function as a support for learning. Some of them felt that their instructors placed too much emphasis on *WebCT*, as indicated by the following comments:

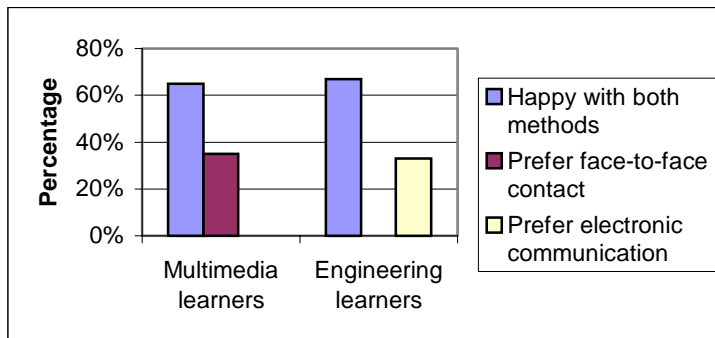
- *WebCT should be a support for the instructor and not a total reference alone.*
- *WebCT is not a replacement for lectures and instructors. We need classes in which our work is explained and discussed, we still need to be fed by a spoon, I guess.*

The latter comment indicates that not all learners have the characteristic of being self-directed, as Laidlaw (1998) suggests (see Chapter 2, Table 2.13). It also appears that for a large number of learners, the basic elements of fun, discovery and self-motivated mastery were absent.

4.7.3.3 What method of communication do learners prefer?

Figure 4.10 portrays the methods of communication preferred by learners.

Figure 4.10 Method of communication learners prefer



The majority of learners in both groups preferred face-to-face contact as well as virtual communication on a bulletin board. A third of the Multimedia learners, however, preferred only face-to-face contact with fellow learners and instructors. This demonstrates that some learners are still in favour of the traditional approach to learning, where class work is explained and discussed, and that the trend towards virtual learning is a concept foreign to some learners' mindsets and contrary to their educational expectations.

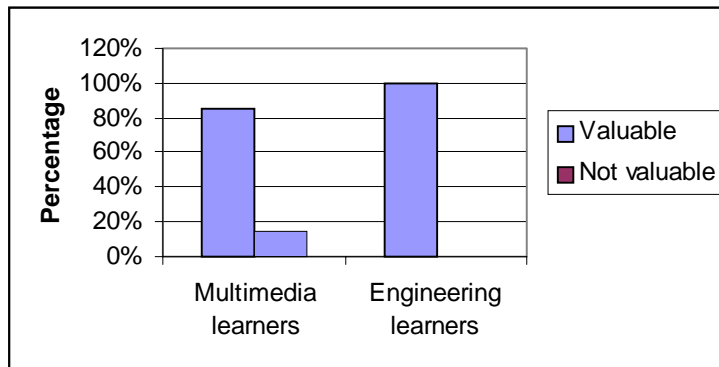
Among the postgraduate Engineering learners, two of the six (33%) preferred electronic communication, while four of the six (67%) were happy with both methods. None of these learners indicated that they preferred face-to-face contact on its own, indicating that lectures alone will not meet the needs of postgraduates. It is nevertheless quite evident that both groups of learners favour the open learning approach and the principles of flexible learning.

4.7.3.4 To what extent do learners value a bulletin board?

Learners were instructed to use the bulletin board feature on *WebCT* to communicate with fellow learners and their instructor, this being their primary method of communication.

Figure 4.11 depicts the value learners attach to a bulletin board.

Figure 4.11 Value attached by learners to a bulletin board



Eighty-five per cent of the undergraduate Multimedia learners considered it a valuable method of communication, in contrast to all the postgraduate Engineering learners who felt that bulletin boards were valuable. The Multimedia learners who disagreed commented that they preferred gaining knowledge, insight and assistance from their peers face-to-face. Although the Multimedia learners felt that bulletin boards were valuable, they only started using this feature to its full functionality when they heard that their class participation contributed towards semester marks, which meant that if they wanted good marks, they had to participate. This gave some undergraduates a negative perception of *WebCT*, as indicated by the following comment:

Hi, look at me! I'm writing, that means I'm participating, that means I get better marks! Now ain't that cool. Please don't just write stuff, it's boring. No use just talking if you have nothing to say (like me now). So don't participate ... he he he

The instructor responded to this learner, stating that, “You’ll be amazed to find out that hitting the log does not create marks, only valuable participation does”. Instructors and educators can nevertheless learn from an experience like this that as far as possible, discussions should be designed in such a way that they are goal-oriented, grab the attention of learners, offer challenges and hand control over to them (Clarke, 1998).

The characteristics of Xers, such as “used to being entertained”, and “if something does not interest me I move on”, should be taken seriously.

Table 4.8 indicates in more detail how learners felt about the bulletin board and whether or not they found it to be of value.

Table 4.8 Value learners attached to the bulletin board

Group	Positive comments	Negative comments
Multimedia learners	<ul style="list-style-type: none"> ▪ <i>You can share ideas, offer help, and hear others' opinions.</i> ▪ <i>The interaction with fellow learners was very good.</i> 	<ul style="list-style-type: none"> ▪ <i>Easier to talk to fellow learners face-to-face.</i> ▪ <i>I prefer face-to-face contact.</i> ▪ <i>I had no desire to use it.</i> ▪ <i>Lots of questions/comments not answered - everyone seems to talk to themselves.</i> ▪ <i>Most of the time I am irritated by WebCT, because there are often problems. I don't spend days in front of it.</i>
Engineering learners	<ul style="list-style-type: none"> ▪ <i>Have a wide range of perspectives, which is mind broadening/useful for sharing ideas and problems.</i> ▪ <i>Learning experience was good.</i> ▪ <i>Encourage its use. Should be more user-friendly.</i> 	<ul style="list-style-type: none"> ▪ <i>Frustrated with access</i> ▪ <i>Had no need to interact.</i> ▪ <i>Minimal ideas. Our study group made use of normal e-mail.</i>

It is evident from Table 4.8 that once again, face-to-face contact was very important to the Multimedia learners and that they were generally more negative in their responses than the Engineering learners were.

To determine what value learners place on bulletin boards, they were asked whether they would use a bulletin board in similar contexts, having now been exposed to such interaction. Thirteen per cent of the Multimedia learners said “yes”, 40% said “no” and 47% percent gave a qualified “yes”, giving the following conditions for its use:

- *It must be reliable and I don't want to be forced to use it. It must be so good and interesting that I want to use it.*
- *To pass on general information, not important information.*
- *To use as an extension for learning, not as the only means.*
- *If explained properly and used in conjunction with instructors.*

- *It is good for posting general messages, but face-to-face confrontation is still better.*
- *I prefer classes rather than “virtual” classes.*
- *It should not count for marks.*

Learners who said “no”, made the following comments:

- *Because it counts for marks, learners are forced to send something just to get marks, it is a bit irrelevant some times.*
- *It is a bit too slow and plump. Feedback takes longer than just asking a question face-to-face.*
- *It is impersonal.*
- *The process is artificial.*

For both groups of learners, classroom discussions via a discussion list might have been more beneficial than an online bulletin board. For postgraduate learners it would be more convenient, while for undergraduate learners the process might seem more natural.

4.7.4 Technological aspects

In this section the technological problems instructors and learners experienced are discussed.

4.7.4.1 What technological problems did learners/instructors encounter when using WebCT?

The numerous technological failures were a significant problem. All learners experienced technological problems of some form or other. A major problem, especially for the postgraduate Engineering learners, was the download time for learners accessing their course from home. This, however, was due to large graphics and the limited bandwidth available in South Africa. Should the same study be replicated in another environment (e.g. United States or Australia), the same problems might not have been experienced.

Table 4.9 shows some of these problems, with learners’ comments and implications for design.

Table 4.9 Learners’ problems with technology

Problems	Comments	Implications
Access problems	<ul style="list-style-type: none"> ▪ <i>Access cumbersome</i> ▪ <i>My password failed twice in one month and still isn't up and running.</i> 	<ul style="list-style-type: none"> ▪ Provide direct access to course and one page with all the links learners can navigate to (i.e. a site map). ▪ Provide frontline support for both learners and instructors.
Response problems	<ul style="list-style-type: none"> ▪ <i>Response times were slow – took longer to access the WebCT course from home.</i> 	<ul style="list-style-type: none"> ▪ Increase capacity of server. ▪ Increase bandwidth.
Problems with unreliable servers	<ul style="list-style-type: none"> ▪ <i>The server had a tendency not to work – usually at crucial times.</i> 	<ul style="list-style-type: none"> ▪ Make sure the host network and remote network are stable.
Problems with uploading	<ul style="list-style-type: none"> ▪ <i>Uploading is a long and tedious process, since only one file can be downloaded/uploaded at a time.</i> ▪ <i>Sometimes newly loaded work does not show until the next day or show at all.</i> ▪ <i>Files go missing.</i> ▪ <i>Changing information is extremely difficult.</i> 	

The undergraduate Multimedia learners experienced problems with uploading their group tasks on the presentation feature of *WebCT*. Learners had been instructed to post their group tasks to this feature, yet 60% of the Multimedia learners experienced technological problems in the process.

Table 4.10 lists the problems the Multimedia instructor experienced with *WebCT*.

Table 4.10 Instructor's problems with technology

Problems	Comments	Implications
Technology problems	<ul style="list-style-type: none"> ▪ <i>I experienced network, server and password problems.</i> 	Make sure the host network and remote network are stable.
	<ul style="list-style-type: none"> ▪ <i>It could not be used offline, making it expensive to use if using outside the university.</i> 	Users would have high telephone expenses on personal accounts.
User problems	<ul style="list-style-type: none"> ▪ <i>It requires training on the part of instructors, taking them away from their day-to-day work.</i> 	Reduce training to minimum possible, and provide a comprehensive manual.
	<ul style="list-style-type: none"> ▪ <i>WebCT cannot handle style sheets.</i> 	Design would be labour-intensive.
	<ul style="list-style-type: none"> ▪ <i>Learners could delete each others files.</i> 	Set rules in place with regard to what learners may or may not do.

The comments received from learners and instructors alike indicate that certain features of *WebCT* version 1.3 were unreliable and unstable.

4.8 Learners' comments matched against their characteristics

This section matches learners' comments with their characteristics as discussed in Chapter 2, Table 2.13 (characteristics of Generation X) and Table 2.14 (characteristics of adult learners). The characteristics of Xers matched against their comments are given in Table 4.11, while the characteristics of adult learners matched against their comments are given in Table 4.12.

Table 4.11 Characteristics of Xers matched against their comments

Characteristics	Comment
Independent and self-reliant	<ul style="list-style-type: none"> ▪ <i>WebCT is not a replacement for lectures and instructors. We need classes in which our work is explained and discussed, we still need to be fed by a spoon, I guess.</i> ▪ <i>Hi, look at me! I'm writing, that means I'm participating, that means I get better marks! Now ain't that cool. Please don't just write stuff, it's boring. No use just talking if you have nothing to say (like me now). So don't participate ... he he he.</i> ▪ <i>Lots of questions/comments not answered – everyone seems to talk to themselves.</i>
Technoliterate	<ul style="list-style-type: none"> ▪ <i>The server had a tendency not to work – usually at crucial times.</i> ▪ <i>Face-to-face feedback is better - you can express yourself better than on e-mail. His messages were short and not in detail.</i> ▪ <i>Looks good, not exciting, but you can easily find needed information.</i>
Expectation of instant gratification	<ul style="list-style-type: none"> ▪ <i>Should be way more interactive.</i> ▪ <i>I had no desire to use it.</i> ▪ <i>It is slow and totally uncool.</i> ▪ <i>WebCT needs constant attention and management to work - this stage still has to occur.</i> ▪ <i>Most of the time I am irritated by WebCT, because there are often problems. I don't spend days in front of it.</i>
Self-building	<ul style="list-style-type: none"> ▪ <i>You can share ideas, offer help, and hear others' opinions.</i> ▪ <i>The interaction with fellow learners was very good.</i> ▪ <i>One feels good when you can see your work on the Web.</i>

The following deductions can be made from Table 4.11:

- Learners' comments indicate that *WebCT* could not support independence and self-reliance on the part of learners.
- Though the Xers were indeed technoliterate, it appears that they also attach value to face-to-face communication and feedback.
- Xers require instant gratification; they are more aggressive – expecting things to happen quickly and immediately. *WebCT* did not meet this expectation.

Table 4.12 Characteristics of adult learners matched against their comments

Characteristics	Description
Task-centred	<ul style="list-style-type: none"> ▪ <i>Quite impressed, could work well.</i> ▪ <i>A link to your conventional e-mail program would be good. Speed should be improved and it should be made more user-friendly.</i> ▪ <i>Peel off front layers, making it easier to go to straight to where you want to go. All bits and pieces should be on one site.</i>
Value-driven	<ul style="list-style-type: none"> ▪ <i>Instructors should use it more.</i> ▪ <i>Learning experience was good.</i> ▪ <i>Encourage its use. Must be more user-friendly.</i>
Problem-centred	<ul style="list-style-type: none"> ▪ <i>Have a wide range of perspectives, which is mind broadening/useful for sharing ideas and problems.</i>

The following deductions can be made from Table 4.12:

- Adult learners' comments indicate that they are indeed task-centred and analytical – they concentrate more than the Xers on detailed features of the CMS and their purpose.
- They were less demanding and critical than the Xers, more value-driven and intent on using *WebCT* to solve the problem on hand.

4.9 Summary

Four problem areas were identified, based on the aspects under investigation, these being:

- Teaching inadequacies (andragogical aspect);
- negative attitudes (affective/emotional aspect);
- inadequate design (communicative aspect); and
- technology problems and inadequate support (technological aspect).

Each of these areas influenced the way learners experienced *WebCT*. It would also seem that the perceived usefulness of *WebCT* relates to the way individual learners or instructors experience it, as the responses of learners to the product were diverse, ranging from positive to negative.

Two main findings came out of this study, namely:

- The undergraduate Multimedia learners were typical “techno-savvy kids”. They were more aggressive and expected things to happen quickly and immediately.
- The postgraduate Engineering learners were more tolerant and saw the task behind the problem. They were less demanding and critical than the Xers, more value-driven, and intent on using *WebCT* to solve the problem on hand. They were therefore more satisfied with *WebCT* than the undergraduate Multimedia learners were.

It is the researcher’s opinion that *WebCT* is more useful for distance learners who have a need for such a product. However, it can also be of great benefit to undergraduates, if it is used as a supplement to traditional class instruction and as a support for learning. Based on the results, it should not be used as the only means of instruction.

If the University of Pretoria is to implement *WebCT* successfully, the deficiencies that have been identified must be addressed. With these problems solved, *WebCT* would have great potential and be able to support complex, linguistically rich and educationally sophisticated interactions.

Future research is needed into learners’ response to *WebCT* version 3.1 (the current version of *WebCT*). It would also be interesting to conduct the same study in ten years time, on a group of learners from the Millennial Generation – who are known as critical thinkers (Tapscott, 1999) - to determine how they respond, perceive, and use *WebCT*.

4.10 Recommendations

Recommendations are given for each of the different aspects under investigation in this study.

Andragogical aspects

- Learners must receive regular feedback.
- Learners should report on their progress or attempts/successes/failures on the tasks given them, on a weekly basis. This may keep discussions more constructive, making the instructor more aware of where learners could be experiencing problems, and learners may find that they share the same difficulties.
- Administrative technicalities should be subordinate to the instructional aspects.

Affective/emotional aspects

- Instruction should be designed for relevance and to match learners' interests.
- The interface should be re-designed and made more user-friendly. A metaphor that learners are familiar with should be employed. This metaphor should also draw upon their existing skill and knowledge.
- The basic elements of fun, discovery and self-motivated mastery should be present for learners.
- A questionnaire/s can be sent out to learners at certain times in the course. Instructors could ask learners to report on their progress, perceptions of the course and what they have learnt from the course up to that point. This could help focus the course.

Communicative aspects

- Instructors who have opted to use *WebCT* should not only keep it current, but also use it and build in adequate scaffolding. For example, the instructor should frequently post messages to the bulletin board in the beginning of the course, to familiarise learners with this feature. As the course progresses, the interaction and scaffolding on the part of the instructor should decrease and interaction between learners should increase.
- Instructors should schedule inter-learner debates on controversial, but relevant, topics. Instructors should also interact enthusiastically on the bulletin board.
- The best model is to use a combination of face-to-face contact and electronic communication. Contact sessions should be held to promote a sense of unity and belonging in a group.
- Learners should not be forced to use any of *WebCT's* communication tools, but they should be so visually stimulating and put to such good use, that learners want to use them.

Technological aspects

- The host network and the remote network must be stable.
- Design for stability, by keeping the interactive features of the site working reliably.
- Learners can be given a CD-ROM with additional course material they can use off-line, instead of having to access the Internet and wait for material to load. Course material could include video and sound clips, articles, graphics and so forth.
- Provide support for both instructors and learners.

4.11 New features

Since this study, *WebCT* has been revised and is currently in its third revision. Many of the recommendations made above have, in fact, been implemented.

Since the investigation, additional tools and features have been added, of which the following are the main features:

- A completely **different user-interface**.
- Different **administrative** and **designer functions**.
- **My WebCT**: Each user has an area known as their *my WebCT* area, which is accessed by typing in their Global ID and password. Within their *my WebCT* area, they can access any course listed in this area without having to log in to each course separately. Announcements and resource links are also found in the *my WebCT* area.
- The **WebCT Whiteboard** tool: This is a synchronous (real-time) tool. It allows learners within a course to share a common and interactive drawing board. The instructor can draw a diagram in the whiteboard that learners can modify and ask related questions about, all in real-time.
- The **Assignments** tool: This tool contains the descriptions, due dates and mark allocations for assignments that learners need to submit. The learners can submit their assignments by uploading them into the assignments tool in the course.
- The **Image Database Tool**: This database contains a database of images that learners are able to search.
- The **CD-ROM Tool**: This is a facility included in *WebCT* to avoid large multimedia files being downloaded across the Internet. Multimedia files can be cut onto CD and given to the learners, so that while browsing through their courses they can retrieve the multimedia files from a local CD rather than across the Internet.
(Eiffel-Corp, 2000).

The addition of these tools and features, together with those features already in place, make *WebCT* a useful tool, in which an open and flexible learning environment can be fostered.