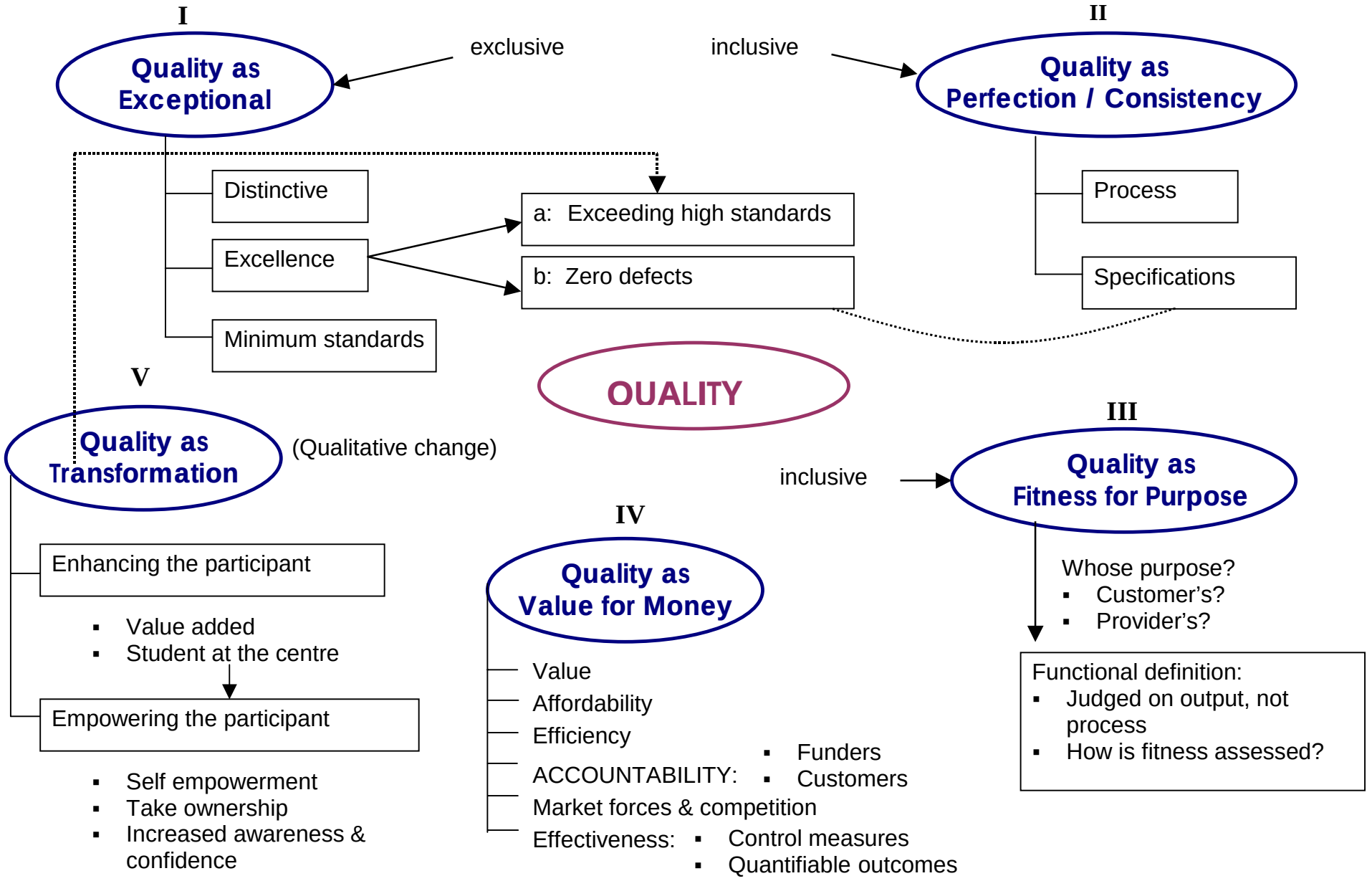
APPENDIX A

Five interpretations of the construct *quality*

(summarised from Harvey & Green, 1993)



Notions of Quality (Summarised from Harvey & Green, 1993)

APPENDIX B

Overview of established theories that support the conceptual framework for this study

B1: Quality Assurance theory

B2: Instructional Systems Design

B3: Systems theory

Appendix B1: Quality assurance theory

The literature review (chapter 2) showed that the topic of quality in higher education and in the specialised area of web-supported learning, is ill defined and can become rather overwhelming: does the concept of *quality courses* refer to quality of the subject content, the pedagogical approach, the instructional design, the assessment strategies, student support, the learning experience, or the product in the sense of satisfying the client's needs? The conceptual framework (Figure 2.5), which is based on the ISO 9001 model (Figure 2.4), reflects the application of standard quality assurance theory to the field of web-supported learning.

Standard **quality assurance theory**, one of the underlying theories of this study, was researched in depth from theoretical and global perspectives in chapter 2. Prominent writers who have engaged in the debate on applying quality assurance practice to education were reviewed in section 2.4.1. The growth of quality assurance practice and recent legislation in South African higher education were presented in section 2.4.4.

The findings chapters (chapters 4, 5 and 6) reflect the findings that emerged from attempting to diminish the gap between the *quality* discourse and the *online (web-supported) learning* discourse.

Appendix B2: Instructional systems design (ISD)

The practice of **instructional systems design (ISD)** has traditionally included phases of formative and summative evaluation (Reiser, 2002; Dick, 2002). In the 1980s, the medium / method was referred to as *computer-based education* or *computer-assisted instruction*. Today the field is more likely to be referred to as information and communication technologies (ICTs), e-learning, interactive learning systems, technology-enhanced flexible learning or asynchronous learning networks.

Over the past three decades, a well-established literature on the instructional design and evaluation of computer-based learning materials has evolved (for example, the work of Bangert-Drowns & Kozma, 1989; Caffarella, 1987; Collis & Moonen, 2001; Flagg, 1990; Gustafson & Branch, 2002; Hannafin & Peck, 1988; Jolicoeur & Berger, 1988; Reeves, 1993; Reeves & Hedberg, 2003; Reiser & Dempsey, 2002).

Evaluation is another everyday term that has different connotations in different situations (Reeves & Hedberg, 2003). Teichler (2000) agrees that the term *evaluation* is widely used and defines it broadly in the field of higher education as "any activity of assessment" (p. 34). Clark (2000), quoting Baker, defines evaluation as "the process by which we judge the worthwhileness of something in order to make decisions" (p. 6). The terms *evaluation* and *assessment* are often used interchangeably (Westerheijden, 1997); some writers prefer *evaluation* (most of the authors in Strydom, Lategan & Muller, 1997), while others appear to prefer *assessment* (Vroeijenstijn, 2001a; 2001b).

Evaluation plays a major role in quality assurance. From an institutional perspective, both internal evaluation (self-evaluation) and external evaluation (audits) are vital components in assessing the quality of academic provision (Sursock, 2001). Higher education institutions evaluate their teaching programmes, their research outputs, the competence of their lecturers and of course, the progress and achievements of their students.

Savenye and Robinson (1996) summarise the link between quality assurance and evaluation by observing that *testing, prototype evaluation* and *quality assurance* are clearly nothing but formative evaluation. Oliver (2000) also highlights this link, stating that "the real benefit of evaluation comes through links to quality enhancement" (p. 90), which clearly reflects the ethos of formative evaluation. Texas A&M University describes the evaluation phase of instructional systems design as follows: "The effectiveness of the instructional process and materials is evaluated at this

stage. This is the *quality management* [italics added] component for the program" (Texas A&M University, 2003, online reference).

The practice of evaluation within instructional systems design presents a point for reflection: instructional design is the very science (art? craft? – see Clarke & Estes, 1998) of turning learning materials into interactive, effective and enjoyable learning experiences (products), based on learning theories such as constructivism, engagement and learner-centeredness. Is quality in web-supported learning anything different to the instructional design and evaluation of computer-based education? The link is that *evaluation, quality assurance, usability testing, measurement of effectiveness* and *closing the feedback loop* may be viewed as variations on the same theme, namely continuous improvement of the learning product and its impact on student learning.

Appendix B3: Systems theory

Instructional systems design and quality management systems have links with the established theory of systems thinking. Just as with the terms quality and evaluation, the term *system* has different connotations in everyday life, for example, computer system, eco-system, water supply system, mathematical system, systems analysis and systems engineering.

Fourie (2000) defines a system as "a set of two or more interrelated elements of any kind. It is not an ultimate indivisible element but a whole that can be divided into parts" (p. 52). Peter Checkland, an expert on Soft Systems Methodology (SSM), refers to "the powerful bundle of ideas captured in the notion 'system'" (Checkland, 1999, p. A4). He applies systems thinking to 'human activity systems', which are human situations in which people are attempting to take purposeful action "to improve the situations which day-to-day life continuously creates and continually changes" (p. A4). This clearly links with quality assurance theory in the sense of continuous improvement. Peter Senge (1990) makes use of systems thinking which he describes as a "discipline for seeing wholes.

It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'" (p. 68).

Senge, Kleiner, Roberts, Ross and Smith (1994) make the perceptive link between systems thinking and the total quality movement:

> One of the most powerful discoveries for us during the past years has been seeing how closely our work on learning organizations dovetails with the 'Total Quality' movement. Again and again we have found that organizations seriously committed to quality management are uniquely prepared to study the 'learning disciplines'. (p. 10)

Fourie (2000) applies a systems approach to quality management. She proposes that quality management systems should be holistic, integrated, organic and evolutionary. Galbraith (1999) claims that a university is an example of a complex social system. "Such systems are characterised by the interaction of closed chains of causality (feedback loops) that together define the system structure and hence how the system behaves over time" (p. 143).

> The notion of the feedback loop is critical in both instructional systems design (formative and summative evaluation, which serve to review and improve the product) and quality management, where it provides measures and management information in order to inform policy and practices (Boyd, 2001b).

A system, then, is a holistic, integrated, complex set of interrelated components, all working together for a higher purpose, much like the human body (Boyd, 2001b). Each part has its own intricate and vital function, each on its own is useless and will die. This philosophy reflects the dynamic, complex and evolutionary nature of teaching and learning and the inherent difficulties in trying to systematise quality assurance practice in a meaningful way with respect to higher education.

APPENDIX C

Frameworks for quality teaching and learning with respect to e-learning

C1: Standards and Guidelines for best practices in distance education

C2: Twenty four benchmarks (Institute for Higher Education Policy,2000)

C3: Quality indicators (Barker, 1999)

C4: Seven Principles (Chickering & Ehrmann, 1996)

C5: Criteria for WebCT Exemplary Courses (Graf & Caines, 2001)

C6: Criteria for USA Office of Educational Research and Improvement (OERI)

C7: Ten Keys (Alley, 2000)

C8: Pedagogical framework (Herrington et al, 2001)

C9: Five pillars (Bourne & Moore, 2002)

C10: Taxonomy of factors to promote quality web-supported learning

C11: Overview of factors for quality web-supported learning found by other studies

Table C1

Standards and Guidelines for best practices in (technology enhanced) distance education

Institution or Author/s	Title of document	URL
Alley (2000)	**Ten keys to quality assurance and assessment in online learning.**	*http://www.worldclassstrategies.com/ papers/keys.htm*
American Council on Education (ACE)	Guiding principles for distance learning in a learning society	*http://www.acenet.edu/clll/dist_learning/dl_principlesIntro. cfm*
American Federation of Teachers	Distance Education - Guidelines for Good Practice	*http://www.aft.org/higher_ed/technology*
BENVIC Project	Benchmarking of Virtual Campuses, a project partially sponsored by the European Commission	*http://www.benvic.odl.org*
Canadian Association for Community Education (CACE)	**Quality guidelines for technology-assisted distance education** (Barker, 1999)	*http://futured.com/form/pdf/english.pdf*
Carnegie Mellon University: Learning Systems Architecture Laboratory	SCORM Best Practices Guide for Content Developers (Technical software issues for programmers – one of the goals of SCORM is to create reusable content objects)	*http://www.lsal.cmu.edu/lsal/expertise/projects/developersguide*
Chickering & Ehrmann (1996)	**Implementing the Seven Principles - Technology as lever**	*http://www.aahe.org/technology/ehrmann.htm*
Commonwealth of Learning	**Canadian Recommended E-learning Guidelines** (Based on Barker, 1999 – Updated and re-issued 2002)	*http://www.col.org/newsrelease/0206ConsumersGuide.htm*
Congressional Web-based Education Commission	United States Congressional commission to develop specific recommendations directed at maximizing Internet education possibilities.	*http://www.ed.gov/offices/AC/WBEC/FinalReport*
Council for Higher Education Accreditation (CHEA)	Quality Assurance and Distance Learning	*http://www.chea.org/Research/index.cfm#qualityassurance*
Curtin University of Technology	**Standards for Online Teaching (SOLT)**	*http://cea.curtin.edu.au/solt/*
Department of Education, South Africa	Distance Education Quality Standards Framework, 1996	*http://education.pwv.gov.za/teli2/policydocuments/*

Global Alliance for Transnational Education (GATE)	Best Practices / Quality Assurance	http://www.edugate.org/certification.html
Institute for Higher Education Policy (2000)	**Quality on the Line. Benchmarks for success in internet-based distance education**	http://www.ihep.com/PR17.html
International Association for Continuing Education and Training	Guidelines for Distance Education	http://www.iacet.org/distance/distance.htm
International Council of Distance Education (ICDE)	ICDE Standards Agency: international standards and accreditation	http://www.icde.org
Johns Hopkins University	Excellence in Distance Education: Standards for developing and delivering courses	Available in hard copy only.
Michigan Virtual University	**Standards for Quality Online Courses**	http://standards.mivu.org
North Central Association - Commission on Institutions of Higher Education	Guidelines and Principles for distance education	http://www.ncahigherlearningcommission.org/resources/distancelearning/
Open and Distance Learning Council	Standards for Open and Distance Learning	http://www.odlqc.org.uk/odlqc/standard.htm
Open University	Quality and Standards in the Open University	http://intranet.open.ac.uk/pvcsg/sqs/f-qual-and-standards/
Pennsylvania State University	Innovations in distance education: an emerging set of guiding principles and practices for the design and development of distance education.	http://www.outreach.psu.edu/DE/IDE/guiding_principles
Quality Assurance Agency for Higher Education (QAAHE)	Guidelines on the Quality Assurance of Distance Education	http://qaa.ac.uk/public/dlg/append1.htm
Southern Regional Education Board, Electronic Campus	**Principles of Good Practice**	http://www.electroniccampus.org/student/srecinfo/ publications/principles.asp
University of Illinois	**Teaching at an Internet Distance: The pedagogy of online teaching and learning**	http://www.online.uillinois.edu/old/retreat2000/tid_report.html

WebCT®	**WebCT Exemplary Course Project – Scoring rubric**	*http://www.webct.com*
Web-based Education Commission	**The Power of the Internet for Learning: moving from promise to practice**	*http://interact.hpcnet.org/webcommission/index.htm*
Western Interstate Commission for Higher Education (WICHE)	**Guide to Best Practice for Electronically Offered Degree and Certificate Programs**	*http://www.wcet.info/Article1.htm*
Western Co-operative for Educational Telecommunications (WCET)	**Balancing Quality and Access: Principles of good practice for electronically offered academic degree and certificate programs** **Best Practices for electronically offered degree and certificate programs**	*http://www.wcet.info/projects/balancing/principles.asp* *http://www.wcet.info/resources/accreditation*

Table C2

Twenty-four Benchmarks for Internet-based Distance Education

(Synthesized from the Institute for Higher Education Policy, 2000)

Category	**Benchmarks**
Institutional support	1. A documented technology plan. 2. Reliability of the technology delivery system. 3. A centralised system to maintain the distance education infrastructure.
Course development	4. Guidelines regarding minimum standards and learning outcomes determine the delivery system used. 5. Instructional materials are reviewed periodically. 6. Course design requires students to engage in analysis, synthesis and evaluation.
Teaching/learning	7. Student interaction with faculty and other students. 8. Feedback to student assignments and questions is constructive and provided in a timely manner. 9. Students learn research methodology.
Course structure	10. Student self-motivation and access to technology are assessed. 11. Supplemental course and organizational information is provided. 12. Students have access to sufficient library resources, traditional and online. 13. Agreement is reached between students and faculty on completion and submission of student assignments.
Student support	14. Students receive information about the study program and all its requirements. 15. Students are provided with hands-on training in accessing resources. 16. Students have access to technical assistance. 17. A structured and efficient system is in place to address student queries and complaints.
Faculty support	18. Technical assistance in course development is available. 19. Faculty members are supported in the transition from traditional teaching to online teaching. 20. Instructor training and assistance, including peer mentoring, is available throughout the progression of the online course. 21. Faculty members are provided with written resource material to support them in facilitating online learning.
Course evaluation	22. The program's educational effectiveness is evaluated. 23. Data on enrollment, costs and successful / innovative uses of technology are used to evaluate program effectiveness. 24. Intended learning outcomes are reviewed regularly to ensure clarity, utility and appropriateness.

Table C3

Quality indicators for technology-assisted distance education (Summarised from Barker, 1999)

Quality inputs and resources	Quality processes and practices	Quality outputs and outcomes
Learning outcomes are: • clearly defined • demonstrable • measurable • achievable • useful • appropriate	Student management systems include: • registration • orientation • intake and placement • pre-entry counseling • recognition of prior learning • accurate management of student records • learner involvement in decision making • assistance with technologies used	Acquired content, skills and knowledge are: • relevant • transferable • purpose-specific • blended
Curriculum content is: • accurate • relevant • scholarly • up-to-date • consistently updated • appropriate to learning objectives • culturally sensitive	Learning management processes include: • quality teaching practices • quality learning approaches • quality assessment practices • appropriate use of communications facilities • effective human resource management practices • accountable programme management	Necessary learning skills acquired for: • successful course completion • lifelong learning • self-directed learning management
Teaching / learning materials are: • well designed • well organised • free of errors • readily available • user friendly • affordable • free of cultural, racial, class or gender bias • accessible to learners with disabilities • easy to use • free of technical hitches	Appropriate use of technologies to: • make students feel comfortable • accommodate and promote individualization • create opportunities for meaningful work • increase information processing skills • promote problem solving abilities • nurture artistic expression • enable active engagement in the construction of knowledge • provide drill and practice where necessary	Completion credits or credentials are: • recognised by professional, national bodies • recognised by other educational institutions • of same value with respect to on-site or distance learning • transferable nationally and internationally

Quality inputs and resources	Quality processes and practices	Quality outputs and outcomes
Complete learning package includes: • course description • course objectives • information about the instructor • learning notes • additional learning resources • activities and assignments • assessment opportunities	Communication facilities are able to: • encourage contact between students and faculty • provide opportunities for interaction and problem-solving • develop reciprocity and cooperation among students • enable students to interact with experts	Return on investment with regard to: • accessibility • objective benefits and utility • effectiveness • efficiency • customer satisfaction
Learning technologies are appropriate to: • field of study • learning outcomes • target population • cost and benefit to the learner • enable instructor support	Human resources management includes: • recruitment and selection of appropriate personnel • requirement for ongoing professional development • technical skills development and support • regular evaluation of competence	
Sound technical design that is: • navigable • updated • complemented by graphics • available in text-only format • includes links to other relevant resources • reliable • complete	Program management is accountable for: • student management, learning management, planning, evaluation, research, continuous improvement, financial viability and continuity	
Appropriate and necessary personnel are available: • teachers, managers, subject matter experts, library staff, tutors, mentors, technical support, learning skills support, career planning, employment counselling etc.		

Quality inputs and resources	Quality processes and practices	Quality outputs and outcomes
Learning resources are: • varied • easily accessible • copyright approved • flexible for different learning styes		
Program plans and budget include: • written policies • adequate budget • financial and administrative commitment to a programme • a technology plan • security of systems		
Routine review and evaluation of: • course content and objectives • learning materials • instructional design • instructors • learning and student achievement • policies and management practices • operational procedures • customer satisfaction		
Product / service information is provided		
Advertising, recruiting and admissions information is provided		
Course package is: • appealing • user-friendly • extensible • inclusive of all administrative services • personalised • coherent and complete • reviewed and evaluated routinely		

Table C4

Seven principles applied to technology-enhanced learning

(Adapted from Chickering & Ehrmann, 1996)

Seven Principles	Applied to technology-enhanced learning
1. Encourage contact between students and faculty.	E-mail, computer conferencing, the internet and learning management environments facilitate online communication. Both synchronous and asynchronous forms of communication promote contact between faculty and students, between experts and students and between students themselves. Total communication increases, with students who would normally be too shy or inhibited in a face-to-face situation, opening up and participating more freely (Chickering & Ehrmann, 1996).
2. Develop reciprocity and cooperation among students.	Co-operative learning, team work and group assignments are enhanced in an online environment. Learning is a social activity (Fullan, 2002) and online learning enables the establishment of vibrant learning communities.
3. Use active learning techniques.	Besides the use of synchronous and asynchronous communication tools, e-learning enables many other activities, such as simulations, online debates and the creation of developmental electronic portfolios. The use of technology as a tool itself can support apprentice-like activities, for example, using statistical software or using the Internet to gather information.
4. Give prompt feedback.	E-mail supports person-to-person feedback, student presentation tools facilitate the submission and sharing of student work and international experts can be involved in responding to discussion questions.
5. Emphasize time on task.	Time efficiency increases when interactions between teacher and students, and among students, fits busy work and home schedules. Students and faculty can save time and effort by accessing online resources without having to physically go to a library or to travel to classes. Computers can record student participation and interaction and help document time spent on learning tasks.

6. Communicate high expectations.	'Significant real-life problems, conflicting perspectives, or paradoxical data sets can set powerful learning challenges that drive students to not only acquire information, but to sharpen their cognitive skills of analysis, synthesis, application and evaluation' (Chickering & Ehrmann, 1996). Knowing that their work will be available for public scrutiny also encourages students to produce their best.
7. Respect diverse talents and ways of learning.	Learning technologies offer a variety of learning experiences, which appeal to different learning styles, for example, visual, audio, text, group and individual activities. They can encourage self-reflection, self-evaluation, problem-based and real-life learning. Constraints of time and place disappear and anywhere, anytime learning becomes a reality.

Table C5

Criteria for WebCT® Exemplary Courses

Academic Rigour	Content Robustness
1. Course objectives are written at a higher level and clearly revealed to students.	1. The quality requirements of assignments (both web-based and non web-based).
2. Course assignments promote critical thinking strategies.	2. The degree to which course content is made available within WebCT.
3. Course requirements include clearly stated expectations defining minimal levels of student participation	3. The degree to which the course content is made available in manageable segments.
4. Course makes **appropriate** use of inherent WebCT technologies.	4. The degree to which students interact with each other and the instructor to communicate about the course.
5. Course makes **exceptional** use of inherent WebCT technologies.	5. The extent to which the course makes appropriate use of digitised images and graphics.
6. Course assignments cause students to apply knowledge and skills in realistic and relevant ways.	6. They type and quality of student assessments included in the course.
7. Course assignments require students to make appropriate and effective use of external resources, including print, library, web-based and other electronic resources.	
8. Course assignments and content facilitate a high level of collaborative activities.	
9. Instructor makes appropriate ancillary resources available.	
10. The course content and requirements are as demanding as a face-to-face course with similar content.	

Table C6

Criteria for USA Office of Educational Research and Improvement (OERI)

(adapted from Confrey, Sabelli & Sheingold, 2002)

	Level 1: Little or no demonstration of the criterion.	**Level 2:** Insufficient or incomplete demonstration of the criterion.	**Level 3:** Adequate demonstration of the criterion.	**Level 4:** Clear and convincing demonstration of the criterion.	**Level 5:** Compelling demonstration of the criterion.
Criterion 1 The program addresses an important educational issue or issues and articulates its goals and design clearly.	Vague, incomplete, incoherent, unclear	Too general, or goals not significant.	Goals adequately significant and design adequately thoughtful and coherent.	Significant, thoughtful, coherent, clear and complete. Description may be only adequate in its clarity and completeness.	Goals, design and description are convincing or compelling and supported by research.
Criterion 2 The program develops complex learning and thinking skills.	Unclear what is being learnt from learning activities.	Unclear how activities contribute to the criterion.	Sufficient description of activities contributing to learning.	Clear description of activities and contribution to learning.	Makes a case through argument and examples of how activities contribute to learning.
Criterion 3 The program contributes to educational excellence *for all.*	Not clear who has access or is served by the program. No evidence of outreach or collaboration.	Does not convey high or clear expectations. No evidence of outreach or collaboration.	Set high expectations and serve diverse groups of learners. Closing gaps in participation of under-served learners.	High expectations for all learners, meet needs of diverse and under-served learners. Active outreach and collaborative partnerships.	Increased both participation and performance of under-served groups of learners.
Criterion 4 The program promotes coherent organizational change.	Vague or no demonstration of vision, goals, involvement of constituencies, enhancement of human capacity or changes in policy.	May claim a vision, but vision is not clear. May establish partnerships, but not clear how they contribute to organizational change.	Promotes some organizational change. Change is not yet comprehensive or fully coherent.	Promotes coherent organizational change.	All indicators are addressed: vision, goals, involvement of constituencies, enhancement of human capacity and changes in policy.

	Level 1: Little or no demonstration of the criterion.	Level 2: Insufficient or incomplete demonstration of the criterion.	Level 3: Adequate demonstration of the criterion.	Level 4: Clear and convincing demonstration of the criterion.	Level 5: Compelling demonstration of the criterion.
Criterion 5 The program has rigorous, measurable evidence of its achievements of one or more among Criteria 2, 3 and 4 (learning, equity and organizational change).	If evidence is presented, it is not clearly related to program goals and claims. Often too early to have collected valid evidence.	Considerable amounts of data may be presented, but data do not constitute credible evidence of effectiveness. May be limited in the type of data collected or sample size.	Evidence clearly related to program goals and to claims of effectiveness. The research design meets adequate standards of quality. Evidence sufficiently well documented and analysed.	Evidence clearly related to program goals and to claims of effectiveness. The research design meets adequate standards of quality. Evidence well documented, carefully analysed and complete.	Evidence clearly related to program goals and to claims of effectiveness. The research design is driven by these goals and claims. Clear and appropriate evidence is provided, presenting a compelling case.
Criterion 6 The program is adaptable for use in multiple contexts. It is sustainable and scaleable.	Program may be too new to be able to show adaptability. Program description may be vague or unfocused so that replication or sustainability is not clear.	Program may be locally sustainable, but not scalable or adaptable to a range of settings. May provide no guidelines for implementation.	Adequately available technology, cost-effective, demonstrates some scalability or adaptability.	Convincing demonstration that the program is adaptable for use in multiple contexts.	Programs address all of the indicators and show that they can be widely used in multiple settings.

Table C7

Ten Keys to Quality Assurance in Online Learning (Synthesized from Alley, 2000)

10 KEYS	APPLICATION
1. Allow the student to exert himself by constructing his own knowledge. The Internet is an ideal medium for problem-based learning activities.	• Have the student develop an applicable webliography. • Have the student develop a problem-based research paper.
2. Allow the student to take responsibility for his or her own learning journey. The web environment is ideal for offering a student richness of information and resources.	• Articulate a 'course structure map' in which the target competencies (learning outcomes) for the course are precisely outlined. • Include assessment of prior learning and the • concrete knowledge, skill or behaviour to be demonstrated.
3. Minimize frustration and maximize positive tensions that the student experiences.	• Have a campus portal offering resources for student support and assistance. • Find out what training, guidance and counselling resources are available and provide direct links to these. • Provide a cyber café area or an open forum discussion area (student lounge). • Build very strong feedback mechanisms. • Make use of student groups / teams. • Acquire monitoring and mentoring skills. • Provide reassurance and encouragement. • Have a time-to-completion chart showing the average time required to complete each task in the course.
4. Provide time for students' self-reflection. Design in some mechanism for appreciating and recognizing the reflection they do. Share the results of your reflections on some aspect of the class or student work. On the web, the student can control the flow of information to suit his individual needs or preferences.	• Use the chat tool to prompt reflection. • Provide a topic for a debate via online synchronous chat. • Ask students to perform some closing work on the discussion board, such as revisiting all postings in a thread and to post a synthesis or summary. • Prompt students to analyse and justify what they have asserted and to synthesize and evaluate ideas. • Ask students to reflect upon themselves as members of a group by having them analyse their own collaborative styles. • Use the survey tool to survey students about their progress • Have students do a self-audit of work completed and work still to be done.

5. Accommodate various learning styles. Offer the same content in textual, visual and/or audio formats. Allow student to publish content in a variety of media.	• Help learners to understand, exploit and/or compensate for their preferred learning styles. • Have learners complete a learning style inventory - see http://www.indstate.edu/ctl/styles/tstyle.html • Use asynchronous communication tools to accommodate your students' preferences for the pace and order of learning. • Use your learning-style profile of the class in designing learning activities and assigning roles in group work.
6. Promote active learning. (see Gagne's (1985) conditions of learning)	• Motivate the student to gain a new competency. • Encourage the students to learn by doing. • Use action verbs that will cause the learner to demonstrate the new competency. • Make use of formative assessments so that the learner derives added benefit through feedback.
7. Design action oriented learning activities that compel the learners to discover phenomena and seek out new knowledge to explain them.	• Dispatch the learners (possibly in teams) on loosely defined or open-ended discovery adventures. • Have students post poems on the course site anonymously and then all students can exchange anonymous reviews. • Have students interview experts, research a topic, perform a task, or construct a model.
8. Enhance critical thinking and higher order reasoning.	• Use question and answer sessions. • Facilitate critical discussions. • Design learning activities that are genuinely collaborative. • Assign students roles within the group that make results of their individual learning essential to the success of the group. • Design learning activities the enable both private and social modes of learning.

9. Provide for a non-threatening exploration of typical misconceptions that may lurk among prior learning and may conflict with new knowledge. The web environment is ideal for the presentation of self-assessments and curiosity-evoking questions in a non-threatening manner.	• Provide a survey of common misconceptions in the form of a “fun facts” item. • Post tantalizing questions or riddles and provide links to information that explains the riddle or perplexity. • Post an assertion and have students defend or criticise the view. • Ask students to pose observations to substantiate or defend their own respective viewpoints. • Follow up in some way by posting a public reply, answer or summary of student comments.
10. Offer multiple learning paths to encourage students to learn recursively. Content placed online does not need to exhibit the same pre-determined structure as a text book does.	• Present your course content in unsequenced areas or clusters. • Design simple learning activities accompanied by self-assessment within each content cluster.

Table C8

Quality Guidelines for online courses (synthesized from Herrington et al, 2001)

	Quality of Pedagogy	Quality of Resources	Quality of Delivery Strategies
1.	**Authentic tasks:** The learning activities involve tasks that are applicable in real-life settings.	**Accessibility:** Resources are easily located and accessed.	**Reliable and robust interface:** Learning materials are accurate, usable and error free.
2.	**Opportunities for collaboration:** Collaborative learning is used to create outcomes that could not have been achieved individually.	**Currency:** Resources are current, up-to-date and applicable to the subject matter.	**Communication channels:** Dialogue between students and between lecturers and students is encouraged.
3.	**Learner-centered environments:** There is a focus on how and what students have learned.	**Richness:** A rich variety of resources, views and perspectives are available.	**Appropriate bandwidth and download demands:** Learning materials are accessible and downloadable within a reasonable time span.
4.	**Engaging:** Learners are challenged and motivated by learning experiences.	**Purposeful use of media:** Media and resources are used optimally and appropriately.	**Equity and accessibility:** Learning materials and activities are accessible and available to all students, including the disabled.
5.	**Meaningful assessment:** Authentic and integrated assessment is used, rather than separate assignments and examinations.	**Inclusivity:** Learning materials demonstrate social, cultural and gender sensitivity.	**Appropriate corporate style:** Layout and presentation should be consistent with the corporate identity, to ensure quality of presentation.

Table C9

Five pillars of the Sloan-C Consortium (from Bourne & Moore, 2002)

GOAL	PROCESS/PRACTICE	METRIC	PROGRESS INDICES
LEARNING EFFECTIVENESS			
Quality of learning online is demonstrated as at least as good as the quality the institution provides in traditional programs	Academic integrity and control reside with faculty in the same way as for traditional programs at that institution	Faculty perception surveys or sampled interviews compare learning effectiveness in delivery modes Learner/graduate/employer focus groups or interviews measure learning gains	Faculty report online learning is equivalent or better Direct assessment of student learning is equivalent or better
COST EFFECTIVENESS			
Institutional business practices generate and support stable, high quality educational programs and expansion to meet needs	The institution demonstrates financial and technical commitment to its online programs Tuition rates provide a fair return to the institution and best value to learners at the same time Tuition rates are equivalent or less than on-campus tuition	Institutional stakeholders show support for participation in online education Effective practices identified	The institution sustains the program, expands and scales upward as desired, strengthens and disseminates its mission and core values through online education
ACCESS			
All learners who are qualified and motivated are enabled to succeed and complete a course/degree/program through online access to learning in any discipline (continually enlarging the pool of learners)	Program entry processes inform learners of opportunities, and ensure that qualified, motivated learners have reliable access Integrated support services are available online to learners	Administrative and technical infrastructure provides access to all prospective and enrolled learners Quality metrics measure information dissemination; learning resources delivery; and tutoring services	Qualitative indicators show continuous improvement in growth and effectiveness rates
FACULTY SATISFACTION			
Sustain and increase faculty participation in online teaching Expand and deepen faculty awareness of and satisfaction with online teaching Integrate faculty online and face-to-face with online purposes and practices	Process to ensure faculty participation in matters particular to online education (e.g. governance, intellectual property, royalty sharing etc.) Process to ensure adequate support for faculty in course preparation and course delivery	Repeat teaching of online courses by individual faculty indicates approval Addition of new faculty shows growing endorsement	Data from post-course surveys show continuous improvement: At least 90% of faculty believe the overall online teaching/learning experience is positive Willingness/desire to teach additional courses in the program: 80% positive

STUDENT SATISFACTION			
Every learner who completes a course is satisfied with the: Level of interaction with faculty and other students Learning outcomes matching the course description Adequacy and appropriateness of technology and support	Faculty / learner interaction is provided timely and substantive Adequate and fair systems assess course learning objectives; results are used for improving learning	Metrics show growing satisfaction: Surveys (see above) and/or interviews Alumni surveys, referrals, testimonials Outcomes measures Focus groups Faculty / Mentor / Advisor perceptions	Satisfaction measures show continuously increasing improvement Institutional surveys, interviews, or other metrics show satisfaction levels are equivalent to or better than those of other delivery modes for the institution

Table C10

Taxonomy of factors to promote quality web-supported learning

Category	Factor Study:	1	2	3	4	5	Sum
Institutional Factors	Technology plan	0	1	1	0	0	2
	Infrastructure / Adequate resources for online learning	0	1	1	0	0	2
	Student advice and consultation	0	1	1	0	0	2
	Institutional evaluation of programme effectiveness	0	1	0	0	1	2
	Promotes coherent organisational change	0	0	0	0	1	1
Technology Factors	Appropriate use of technology	1	0	1	0	1	3
	Reliability / robustness	0	1	1	0	0	2
	Accessibility / 24/7 availability	0	1	1	0	0	2
	Technological support available for lecturers & students	0	1	1	0	0	2
	System training available for lecturers & students	0	1	1	0	0	2
	Accurate management of student records / data	0	0	1	0	0	1
Lecturer Factors	Interaction with students / facilitation of online learning	1	1	1	1	0	4
	Frequent and constructive feedback to students	0	1	1	1	0	3
	Professional training in education - profess develmt	0	1	1	0	0	2
	Regular evaluation of lecturer competence	0	1	1	0	0	2
	Academic background / qualifications	0	0	1	0	0	1
Student Factors	Communication with fellow students	1	1	1	1	0	4
	Time management / time on task	0	0	1	1	0	2
	Learner control over time, place, pace of learning	0	0	1	1	0	2
	Expect efficiency and effectiveness	0	1	1	0	0	2
	Employ critical thinking strategies	1	0	0	0	0	1
	Motivation / commitment / self esteem	0	1	0	0	0	1
	Improve students' problem solving abilities	0	0	1	0	0	1
	Return on investment - customer satis. - cost/benefit	0	0	1	0	0	1

Category	Factor Study:	1	2	3	4	5	Sum
Instructional Design Factors	Co-operative / group learning / team work / reciprocity	1	0	1	1	1	4
	Student engagement in higher cognitive levels / knowledge construction / challenges	0	1	1	1	1	4
	Rich learning resources / Sound learning materials	1	1	1	0	0	3
	Interactivity / Active learning / learning activities	0	0	1	1	1	3
	Design standards / guidelines / minimum requirements	0	1	1	0	0	2
	Routine review and evaluation of courses / products	0	1	1	0	0	2
	Inclusivity/equity: social, cultural, gender, disabilities	0	0	1	0	1	2
	Enhanced student motivation / responsibility for own learning	0	0	1	0	0	1
	Manageable segments / modular / chunking	1	0	0	0	0	1
	Purposeful use of learning media	0	0	1	0	0	1
	Appropriate use of images, graphics	1	0	0	0	0	1
	Offer a complete learning package	0	0	1	0	0	1
Pedagogical Factors	Learning outcomes / objectives are clearly stated	1	1	1	0	1	4
	Communicate high expectations	0	0	1	1	1	3
	Optimal assessment strategies / authentic tasks	1	0	1	0	1	3
	Respect diverse talents and learning styles	0	0	1	1	0	2
	Clearly stated expectations re: min levels of participation, assignment completion	1	1	0	0	0	2
	Provide time for students' self reflection	0	0	0	1	0	1
	Provide a non-threatening, comfortable environment	0	0	1	0	0	1
	Students instructed in proper research methodology	0	1	0	0	0	1
	Relevance and accuracy of content	0	0	1	0	0	1
	Research and continuous improvement	0	0	1	0	0	1
	Educationally significant goals	0	0	0	0	1	1
	Programme is adaptable, sustainable and scaleable	0	0	0	0	1	1

APPENDIX C

Table C11:

Overview of factors for quality web-supported learning found by other studies

Reference	Context	Factors for quality WSL
Alley (2000) (See Appendix C, Table C7)	Summarises the results of a nationwide empirical study in the USA to systematically identify the factors that determine the quality of online learning. Ten key elements for effective online learning were identified.	1. Encourage knowledge construction 2. Encourage students to take responsibility for their own learning 3. Minimize frustration and maximize positive experiences 4. Provide time for students' self reflection 5. Accommodate various learning styles 6. Promote active learning 7. Design action oriented learning activities 8. Enhance critical thinking, higher order reasoning and collaborative projects 9. Provide non-threatening opportunities for exploration 10. Offer multiple learning paths.
Applebee, Dearn, Donnan & Kiley (2003)	Consider the effectiveness of traditional evaluations of teaching in flexible learning environments. Traditional teacher evaluation tools include student feedback on teaching and courses, staff promotion criteria and criteria for teaching awards.	Role of online teacher, e.g. moderation, interaction Teaching with technology IT support Course content Student support Learning activities Authentic assessment Feedback
Arbaugh (2000)	Investigates the effectiveness of Internet-based courses in an MBA programme in terms of perceived usefulness and perceived ease of use of the course software. He provides recommendations for researchers, management educators and business schools.	Instructor characteristics: • Instructor immediacy • Effective interaction • Attitudes towards the course • Attitudes towards the technology • Experience and skill with the medium Student characteristics: • Experience and skill with the medium

Table C11 (continued):

Overview of factors for quality web-supported learning found by other studies

Reference	Context	Factors for quality WSL
Downey (2000)	Considers the application of quality models from the business world (e.g.Deming's quality cycle) to education in general and claims that best practice in teaching and learning technologies should be promoted and refined through continuous quality improvement (CQI).	Self-paced learning Standardisation Any time / any place learning Reduced operational costs, after the initial investment Promoting virtual group or virtual team skills in students[1].
Forman, Nyatanga & Lovemore (2002)*	Presents standards that e-learning should adhere to.	Adequate learner support Interactivity User-friendly navigation Media and technical quality Students require: • Learning-to-learn skills • Independence • Self-management skills
Lee & Dzuiban (2002)*	Discuss quality assurance strategies in university distance education programmes, with particular emphasis on the role of ongoing formative and summative evaluation of learning programmes.	Administrative leadership and support Ongoing programme concerns Web-course development Student concerns and needs Faculty concerns and needs
Oliver (2001)	Addresses the major issues confronting the successful adoption and sustained use of online learning in higher education in the Australian context. Strategies to support and sustain quality online learning programmes are described.	Teacher expertise in online teaching: • teaching online; • technology skills; • technology currency; • teacher training. Student readiness to move online: • technology skills; • access to technology; • technology literacy; • self-regulated learning. Technology infrastructure: • courseware delivery systems • hardware and software • service provision. Provision of content and learning resources: • reusable learning objects. Instructional design: • reusable learning designs.

[1] In Downey (2000), this is the only factor that relates to the Fresen taxonomy (promoting co-operative group learning, team work and reciprocity) – the other items appear to be advantages of online learning.

Table C11 (continued):

Overview of factors for quality web-supported learning found by other studies

Reference	Context	Factors for quality WSL
Oliver (2003)	Develops descriptors and standards for institutional quality audits. While the resulting framework did not specifically target online teaching and learning, some descriptors having an impact on online teaching and learning were identified.	Course materials and resources Teacher qualifications and currency Facilities and resources for teaching and learning Provision of appropriate learning experiences Work, community and professional engagement Assessment procedures Continuous improvement in teaching processes Student selection and entry into courses Student support
Richardson (2003)	Uses the Course Experience Questionnaire (CEQ) and the Revised Approaches to Studying Inventory (RASI) to measure students' perceptions of academic quality in a short web-based course.	Appropriate assessment Appropriate workload Clear goals and standards Generic skills Good materials Good tutoring Student choice
Scott (2001)	Investigates more powerful uses of information and communication technology (ICT), such as interactive learning, production of creative works, online debates and active experimentation and problem solving. He concludes that wasted time and disappointment can be avoided if all proposed applications of ICT are checked against learning quality tests identified in the literature, which are listed in the adjacent column.	Relevance Responsive learning designs Appropriate use of wide range of learning strategies and resources Clear expectations Prompt and detailed feedback on learning More flexible pathways for learning Convenient and flexible access to learning times, locations and resources Responsive administration, support services and infrastructure.
Waddel & Byrne (2003)	Concentrate on the facilitation of online learning after an online course has been implemented. They provide pointers for lecturers to promote the quality of their interaction with and encouragement offered to students.	• Interaction • Community • Engagement • Communication • Respect • Empathy • Attentiveness • Motivation

APPENDIX D

Student survey:

D1: WebCT Experience Questionnaire

Key:

F=Frustration

S=Satisfaction

TA = Technical Adequacy

ES = Educational Support

CT = Communication Tools

AD = Affective Domain

PL = Perceived Learning

D2: Data format, coding and transformation

D3: Coding frame for open questions

D4: Coding of open questions

D5: Items contributing to the Technical Adequacy (TA) Index

D6: Items contributing to the Educational Support (ES) Index

D7: Items contributing to the Affective Domain (AD) Index

D8: Items contributing to the Communication Tools (CT) Index

D9: Items contributing to the Perceived Learning (PL) Index

WebCT Experience Survey

Dear Student
We are evaluating the quality of the WebCT courses at the University of Pretoria. Please take 3 minutes of your valuable time to complete this WebCT Experience survey. We need to know if you had technical or access problems and how you experienced online learning in general.

Question 1 (You may mark more than one option) How do you gain access to a computer? ❑ My own computer at home ❑ My own computer in the residence ❑ My computer at work ❑ IT computer labs ❑ Informatorium computer labs ❑ Other computer labs on campus	OC 0 1	**V1** **V2** **V3** **V4** **V5** **V6**	**TA**	**F**
Question 2 When you need to access a computer on campus, can you find one available? • Yes, I always find a computer. • I find it difficult to find an available computer. • No there is never a computer available.		**V7** 1 2 3	**TA**	**F**
Question 3 Do you make use of computer facilities on campus for your other University work (e.g. assignments, WebCT), apart from practical computer classes? • Yes • No		**V8** 1 0	**info**	
Question 4 If so, for what purpose do you make use of campus computer facilities, besides for practical computer classes? (You may mark more than one option) ❑ To read my email ❑ To access my WebCT course/s ❑ To browse the Internet ❑ To complete assignments ❑ To compile my own notes ❑ Not applicable		**V9** **V10** **V11** **V12** **V13** **V14**	**info**	
Question 5 Do you experience a sincere need for printing facilities on campus? • Yes • No		**V15** 1 0	**TA**	**F**
Question 6 If so, do you find it easy to find a printing facility on campus when you need one? • Yes, a printing facility is always available. • I find it difficult to find a printing facility. • No, I can never find a printing facility. • Not applicable.		**V16** 1 2 3 4	**TA**	**F**
Question 7 What is your gender? • Male • Female		**V17** 1 2	**info**	
Question 8 What is your age group? • Younger than 21 • 21-25 • 26-39 • 40 +		**V18** 1 2 3 4	**info**	

Question 9 Approximately how many times per week did you log on to your web-supported course? • Less than once per week (e.g. 3 times per semester) • 1 to 5 times per week • 6 to 10 times per week • More than 10 times per week	**V19** 1 2 3 4	**info**	
Question 10 What was the approximate duration of your online sessions? • 1 to 30 minutes • 31 to 60 minutes • 1 to 2 hours • More than 2 hours	**V20** 1 2 3 4	**info**	
Question 11 What Browser do you usually use? • Netscape 3.0 or less • Netscape 4.0 or later • Internet Explorer 3.0 or less • Internet Explorer 4.0 or later • Konqueror (Unix) • Mozilla (Unix) • Other Browser	**V21** 1 2 3 4 5 6 7	**info**	
Question 12 What type of technical difficulties did you experience? (You may mark more than one option) ❑ None ❑ Slow Internet access ❑ UP network/server being down ❑ My Internet service provider being down ❑ Logon/registration problems ❑ Too much material to download ❑ Attempted downloads were incomplete/aborted ❑ Lack of technical support ❑ Some links in the course did not work ❑ Other	TD 0 1 **V22** **V23** **V24** **V25** **V26** **V27** **V28** **V29** **V30** **V31**	**TA**	**F**
Question 13 How often did you experience technical difficulties of any sort? • Less than once per week (e.g. 3 times per semester) • 1 to 5 times per week • 6 to 10 times per week • More than 10 times per week	**V32** 1 2 3 4	**TA**	**F**
Question 14 How long did it take for technical problems to be solved? • Half a day • 24 hours • 2 - 6 days • 1 week or longer • Never solved	**V33** 1 2 3 4 5	**TA**	**F**
Question 15 To whom did you go to with your technical difficulties? (You may mark more than one option) ❑ My lecturer ❑ The Telematic Learning and Education Innovation personnel ❑ Support at Student Online Services ❑ My fellow students ❑ Client Service Centre	**V34** **V35** **V36** **V37** **V38**	**info**	

Question 16 If you received the standard Welcome Student CD-Rom, what is your opinion of it? • It's great. • It's reasonable, but needs improvement. • It's poor. • Not applicable.	**V39** 1 2 3 4	**ES**	**F**
Question 17 Consider the student orientation / training session for WebCT. (You may mark more than one block) ❑ The session equipped me sufficiently to participate in my web-based course. **TS 0** ❑ I could not logon during the session. ❑ I was still confused after the session. ❑ I feel my basic computer skills are inadequate. **1** ❑ I think more student orientation is required. ❑ I did not attend the session. ❑ There was no orientation session for my WebCT course.	**V40** **V41** **V42** **V43** **V44** **V45** **V46**	**ES**	**F**
Question 18 I felt comfortable communicating via online communication tools. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V47** 1 2 3 4 5	**CT**	**S**
Question 19 Web-supported communication helped me to express myself more than I would have in a traditional classroom. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V48** 1 2 3 4 5	**CT**	**S**
Question 20 The lack of people's faces, voices and/or body language makes the learning experience impersonal. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V49** 1 2 3 4 5	**AD**	**F**
Question 21 I became frustrated because my classmates were slow to respond to my e-mail and/or discussion messages. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V50** 1 2 3 4 5	**AD**	**F**
Question 22 I learnt from the contributions made by other students. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V51** 1 2 3 4 5	**PL**	**S**

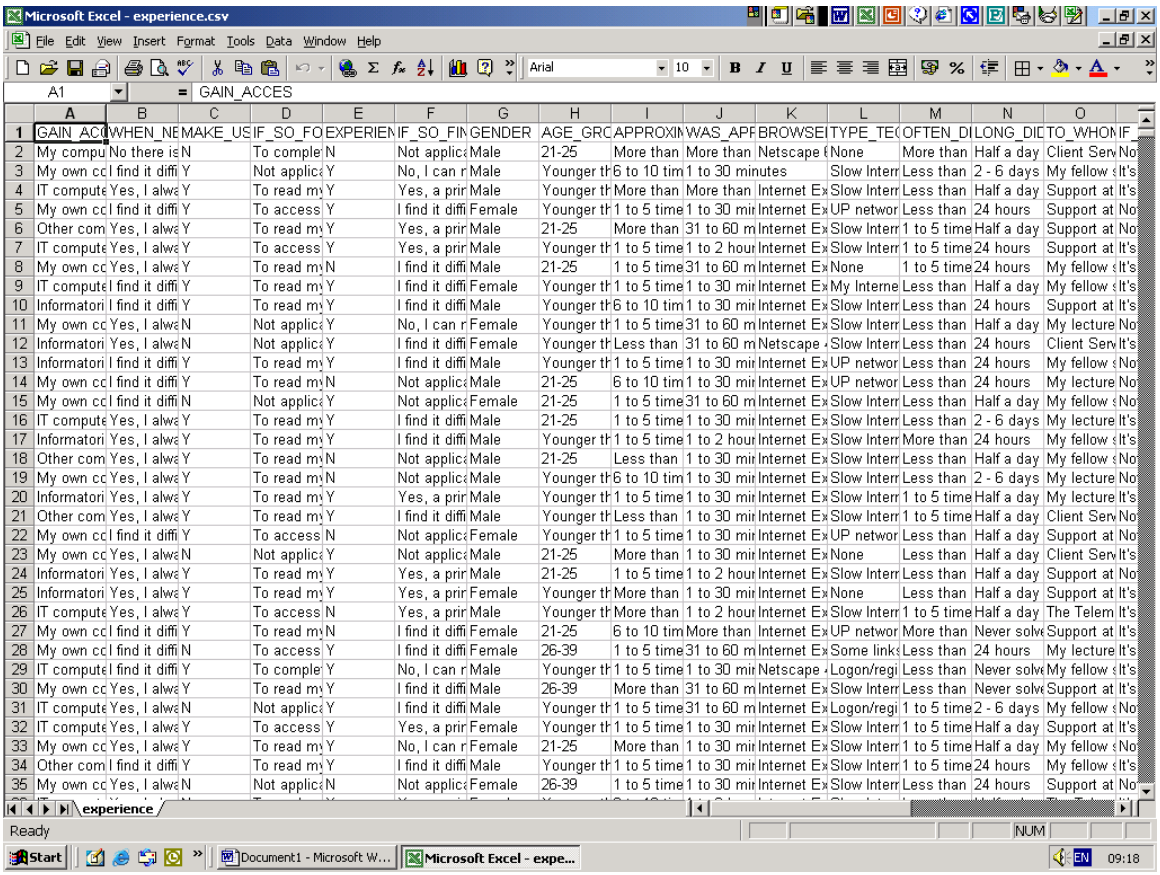
Question 23 Web-supported learning helped me to develop my ability to work as a team/group member. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V52** 1 2 3 4 5	**PL**	**S**
Question 24 Web-supported learning helped me to develop my ability to plan my own work. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V53** 1 2 3 4 5	**PL**	**S**
Question 25 I found the web-supported course to be an enriching learning experience. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V54** 1 2 3 4 5	**PL**	**S**
Question 26 I experienced feelings of annoyance and/or stress during this learning experience. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V55** 1 2 3 4 5	**AD**	**F**
Question 27 *(*transformed)* I found the opportunities for 'anywhere; anytime' learning convenient. • Strongly disagree • Disagree • Agree • Strongly agree • I don't know / Not applicable	**V56** 1 2 3 4 5	**AD**	**F**
Question 28 What were the positive aspects you experienced during your web-supported courses? (Please answer in point form and limit your response to a maximum of 4 points.) …… …… …… ……	**V57** **V58** **V59** **V60**		
Question 29 What were the negative aspects you experienced during your web-supported courses? (Please answer in point form and limit your response to a maximum of 4 points.) …… …… …… ……	**V61** **V62** **V63** **V64**		
Question 30 What suggestions can you make to improve your web-supported courses? (Please answer in point form and limit your response to a maximum of 4 points.) …… …… …… ……	**V65** **V66** **V67** **V68**		

Appendix D2: Data format, coding and transformation

Data format

Table D1 shows a sample of the raw Excel data in alphanumeric format, that was obtained from the student WebCT Experience questionnaire. The first step was to code the data numerically, as described below.

Table D1: *Raw data in Excel*



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	GAIN_ACC	WHEN_NE	MAKE_USE	IF_SO_FO	EXPERIEN	IF_SO_FIN	GENDER	AGE_GRC	APPROXIN	WAS_APF	BROWSEI	TYPE_TE(	OFTEN_DI	LONG_DIE	TO_WHON
2	My compu	No there is	N	To comple	N	Not applic	Male	21-25	More than	More than	Netscape	None	More than	Half a day	Client Serv
3	My own cc	I find it diffi	Y	Not applic	Y	No, I can r	Male	Younger th	6 to 10 tim	1 to 30 minutes		Slow Interr	Less than	2 - 6 days	My fellow s
4	IT compute	Yes, I alwa	Y	To read m	Y	Yes, a prir	Male	Younger th	More than	More than	Internet Ex	Slow Interr	Less than	Half a day	Support at
5	My own cc	I find it diffi	Y	To access	Y	I find it diffi	Female	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	UP networ	Less than	24 hours	Support at
6	Other com	Yes, I alwa	Y	To read m	Y	Yes, a prir	Male	21-25	More than	31 to 60 m	Internet Ex	Slow Interr	1 to 5 time	Half a day	Support at
7	IT compute	Yes, I alwa	Y	To access	Y	Yes, a prir	Male	Younger th	1 to 5 time	1 to 2 hour	Internet Ex	Slow Interr	1 to 5 time	24 hours	Support at
8	My own cc	Yes, I alwa	Y	To read m	N	I find it diffi	Male	21-25	1 to 5 time	31 to 60 m	Internet Ex	None	1 to 5 time	24 hours	My fellow s
9	IT compute	I find it diffi	Y	To read m	Y	I find it diffi	Female	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	My Interne	Less than	Half a day	My fellow s
10	Informatori	I find it diffi	Y	To read m	Y	I find it diffi	Male	Younger th	6 to 10 tim	1 to 30 mir	Internet Ex	Slow Interr	Less than	24 hours	Support at
11	My own cc	Yes, I alwa	N	Not applic	Y	No, I can r	Female	Younger th	1 to 5 time	31 to 60 m	Internet Ex	Slow Interr	Less than	Half a day	My lecture
12	Informatori	Yes, I alwa	N	Not applic	Y	I find it diffi	Female	Younger th	Less than	31 to 60 m	Netscape	Slow Interr	Less than	24 hours	Client Serv
13	Informatori	I find it diffi	Y	To read m	Y	I find it diffi	Male	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	UP networ	Less than	24 hours	My fellow s
14	My own cc	I find it diffi	Y	To read m	N	Not applic	Male	21-25	6 to 10 tim	1 to 30 mir	Internet Ex	UP networ	Less than	24 hours	My lecture
15	My own cc	I find it diffi	N	Not applic	Y	Not applic	Female	21-25	1 to 5 time	31 to 60 m	Internet Ex	Slow Interr	Less than	Half a day	My fellow s
16	IT compute	Yes, I alwa	Y	To read m	Y	I find it diffi	Male	21-25	1 to 5 time	1 to 30 mir	Internet Ex	Slow Interr	Less than	2 - 6 days	My lecture
17	Informatori	Yes, I alwa	Y	To read m	Y	I find it diffi	Male	Younger th	1 to 5 time	1 to 2 hour	Internet Ex	Slow Interr	More than	24 hours	My fellow s
18	Other com	Yes, I alwa	Y	To read m	N	Not applic	Male	21-25	Less than	1 to 30 mir	Internet Ex	Slow Interr	Less than	Half a day	My fellow s
19	My own cc	Yes, I alwa	Y	To read m	N	Not applic	Male	Younger th	6 to 10 tim	1 to 30 mir	Internet Ex	Slow Interr	Less than	2 - 6 days	My lecture
20	Informatori	Yes, I alwa	Y	To read m	Y	Yes, a prir	Male	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	Slow Interr	1 to 5 time	Half a day	My lecture
21	Other com	Yes, I alwa	Y	To read m	Y	I find it diffi	Male	Younger th	Less than	1 to 30 mir	Internet Ex	Slow Interr	1 to 5 time	Half a day	Client Serv
22	My own cc	I find it diffi	Y	To access	N	Not applic	Female	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	UP networ	Less than	Half a day	Support at
23	My own cc	Yes, I alwa	N	Not applic	Y	Not applic	Male	21-25	More than	1 to 30 mir	Internet Ex	None	Less than	Half a day	Client Serv
24	Informatori	Yes, I alwa	Y	To read m	Y	Yes, a prir	Male	21-25	1 to 5 time	1 to 2 hour	Internet Ex	Slow Interr	Less than	Half a day	Support at
25	Informatori	Yes, I alwa	Y	To read m	Y	Yes, a prir	Female	Younger th	More than	1 to 30 mir	Internet Ex	None	Less than	Half a day	Support at
26	IT compute	Yes, I alwa	Y	To access	N	Yes, a prir	Male	Younger th	More than	1 to 2 hour	Internet Ex	Slow Interr	1 to 5 time	Half a day	The Telem
27	My own cc	I find it diffi	Y	To read m	N	I find it diffi	Female	21-25	6 to 10 tim	More than	Internet Ex	UP networ	More than	Never solv	Support at
28	My own cc	I find it diffi	N	To access	Y	I find it diffi	Female	26-39	1 to 5 time	31 to 60 m	Internet Ex	Some links	Less than	24 hours	My lecture
29	IT compute	I find it diffi	Y	To comple	Y	No, I can r	Male	Younger th	1 to 5 time	1 to 30 mir	Netscape	Logon/regi	Less than	Never solv	My fellow s
30	My own cc	Yes, I alwa	Y	To read m	Y	I find it diffi	Male	26-39	More than	31 to 60 m	Internet Ex	Slow Interr	Less than	Never solv	Support at
31	IT compute	Yes, I alwa	N	Not applic	Y	I find it diffi	Male	Younger th	1 to 5 time	31 to 60 m	Internet Ex	Logon/regi	1 to 5 time	2 - 6 days	My fellow s
32	IT compute	Yes, I alwa	Y	To access	Y	Yes, a prir	Female	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	Slow Interr	1 to 5 time	Half a day	Support at
33	My own cc	Yes, I alwa	Y	To read m	Y	No, I can r	Female	21-25	More than	1 to 30 mir	Internet Ex	Slow Interr	1 to 5 time	Half a day	My fellow s
34	Other com	I find it diffi	Y	To read m	Y	I find it diffi	Male	Younger th	1 to 5 time	1 to 30 mir	Internet Ex	Slow Interr	1 to 5 time	24 hours	My fellow s
35	My own cc	Yes, I alwa	N	Not applic	N	Not applic	Female	26-39	1 to 5 time	1 to 30 mir	Internet Ex	Slow Interr	Less than	24 hours	Support at

Step 1: Data coding

In the Excel file, each row represents a respondent (from 1 to 4 650). Each column in the file is a variable (V1 to V68). For multiple choice items where only one response was allowed, it was easy to use the Excel Search and Replace function, for example:

> "Replace N with 0 and Y with 1."

In the case of multiple response items, i.e. where the respondent could mark more than one option, a programming statement was required to identify and replace particular alphabetic strings with the following:

- 0 if not marked or
- 1 if selected by a respondent.

Table D2: *Example of Excel programming statements to convert a multiple response item from alphabetic to numeric data*

```
Question 1: (You may mark more than one option)
How do you gain access to a computer?
      ❑ My own computer at home                    V1
      ❑ My own computer in the residence           V2
      ❑ My computer at work                        V3
      ❑ IT computer labs                           V4
      ❑ Informatorium computer labs                V5
      ❑ Other computer labs on campus.             V6
V1 = IF(ISERROR(SEARCH("My own computer at home",A2)),0,1)
V2 = IF(ISERROR(SEARCH("My own computer in the residence",
A2)),0,1)
V3 = IF(ISERROR(SEARCH("My computer at work",A2)),0,1)
V4 = IF(ISERROR(SEARCH("IT computer labs",A2)),0,1)
V5 = IF(ISERROR(SEARCH("Informatorium computer labs",A2)),0,1)
V6 = IF(ISERROR(SEARCH("Other computer labs on campus",A2)),0,1)
```

A sample of the coded data from the questionnaire is shown in Table D3, with the data in numeric format, with the exception of the text-based responses to the three open questions (V57 to V68):

Table D3: *Example of coded data*

1	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
2	0	0	1	0	0	0	3	0	0	0
3	1	0	0	0	0	0	2	1	0	0
4	0	0	0	1	1	0	1	1	1	1
5	1	0	0	0	0	1	2	1	0	1
6	0	0	0	0	0	1	1	1	1	1
7	0	0	0	1	1	0	1	1	0	1
8	1	0	0	0	0	0	1	1	1	0
9	0	0	0	1	0	0	2	1	1	1
10	0	0	0	0	1	1	2	1	1	1
11	1	0	0	0	0	0	1	0	0	0
12	0	0	0	0	1	0	1	0	0	0

Step 2: Data transformation

The questionnaire contained several *multiple response* items, i.e. items to which respondents could select more than one response (for example, questions 1, 12 and 17). Such items generated multiple variables, in one case as many as ten separate variables per item (see question 12). In order for each questionnaire item to produce only one variable[2], it was necessary to transform the data from multiple response items into secondary data. That is, a single new variable was created for each multiple response item such that:

- 0 indicates low frustration;
- 1 indicates higher frustration.

Table D4 shows the example of transforming the six variables generated by question 1, into one binary variable, *Own Computer* (OC). The example is explained below the table.

Table D4: *Transformation of a multiple response item (six variables) into one binary variable*

Question 1: (You may mark more than one option)		OC
How do you gain access to a computer?		
❑ My own computer at home	**V1**	**0**
❑ My own computer in the residence	**V2**	
❑ My computer at work	**V3**	
❑ IT computer labs	**V4**	**1**
❑ Informatorium computer labs	**V5**	
❑ Other computer labs on campus.	**V6**	

OC = IF (COUNTIF(A4:C4, "=1") >=1, 0, 1)

The initial coding for this item allocated 1 or 0 to *each* of the variables V1 to V6, depending on whether the student had respectively selected the option or not (see Table D2). In considering the entire item, selection of any of the first three options implies that the student has access to their own computer in *at least* one location (this

[2] This ensured that each item was weighted equally in its contribution to the frustration or satisfaction indices.

would imply a lower degree of frustration with respect to computer access). The last three options imply that the student does not have access to their own computer (this would imply a higher degree of frustration with respect to computer access).

Variables V1 to V3 (in cells A4, B4 and C4[3] for the first individual) were searched to find at least one '1'. If this was true, then the new variable *Own Computer* (OC) was set to 0 (low frustration). If no '1' was found amongst variables V1, V2 and V3, then it implies that the student does not have access to their own computer in any location. In this case, OC was set to 1 (high frustration). The same function was then copied to all rows (respondents) in the data file.

Similar transformations to secondary data were carried out for the other multiple response items:

- **Question 12:** Type of technical difficulties experienced.
  New variable 'Technical Difficulties' (TD):
  TD = 0 (low frustration) or TD = 1 (high frustration).
- **Question 17:** Student training session in WebCT.
  New variable 'Training session' (TS):
  TS = 0 (low frustration) or TS = 1 (high frustration).

[3] See the Excel programming statement given in Table D4.

Step 3: Data categorisation

Since the intention was to calculate a Frustration Index **(FI)** and a Satisfaction Index **(SI)**, questionnaire items were categorised as contributing to either student frustration or student satisfaction. Intermediate indices were calculated, in each of the questionnaire categories (the categories and indices are shown on the instrument: Appendix D1).

Table D5: *Categories contributing to the Frustration or Satisfaction indices*

Questionnaire category	Intermediate index	
• technical adequacy and technical support (**TA)**	Technical Adequacy Index **(TAI)**	**FI**
• educational support (supportive resources and training) **(ES)**	Educational Support Index **(ESI)**	
• affective domain (feelings and emotions of students) **(AD)**	Affective Domain Index **(ADI)**	
• interactivity (use of the communication tools in WebCT) **(CT)**	Communication Tools Index **(CTI)**	**SI**
• perceived learning (**PL)**	Perceived Learning Index **(PLI)**	

Frustration Index:	FI = TAI + ESI + ADI
Satisfaction Index:	SI = CTI + PLI

After coding and transformation, the Excel data file contained the variables and indices shown in the following tables. Table D6 shows the variables contributing to the Frustration Index and Table D7 shows the variables contributing to the Satisfaction Index. A legend giving details of the variables, is given below each table.

Table D6: *Categories contributing to the Frustration Index (FI)*

TA **OC**	TA **V7**	TA **V15**	TA **V16**	TA **TD**	TA **V32**	TA **V33**	**TAI**	ES **V39**	ES **TS**	**ESI**	AD **V49**	AD **V50**	AD **V55**	AD **V56**	**ADI**	**FI**
0	3	0	0	0	4	1	**8**	0	1	**1**	0	1	1	4	**6**	**15**
0	2	1	3	1	1	3	**11**	2	1	**3**	1	0	0	2	**3**	**17**
1	1	1	1	1	1	1	**7**	1	1	**2**	2	3	3	2	**10**	**19**
0	2	1	2	1	1	2	**9**	0	1	**1**	3	0	2	2	**7**	**17**
1	1	1	1	1	2	1	**8**	0	1	**1**	2	2	3	1	**8**	**17**
1	1	1	1	1	2	2	**9**	1	0	**1**	2	1	1	2	**6**	**16**
0	1	0	2	0	2	2	**7**	1	1	**2**	3	3	3	2	**11**	**20**
1	2	1	2	1	1	1	**9**	1	0	**1**	3	3	3	3	**12**	**22**
1	2	1	2	1	1	2	**10**	2	0	**2**	2	2	2	2	**8**	**20**
0	1	1	3	1	1	1	**8**	0	1	**1**	0	0	3	2	**5**	**14**
1	1	1	2	1	1	2	**9**	1	0	**1**	0	1	1	2	**4**	**14**
1	2	1	2	1	1	2	**10**	0	1	**1**	0	0	0	4	**4**	**15**
0	2	0	0	1	1	2	**6**	0	1	**1**	2	2	2	2	**8**	**15**

Legend:

TA = Technical Adequacy

TAI = Technical Adequacy Index

ES = Educational Support

ESI = Educational Support Index

AD = Affective Domain

ADI = Affective Domain Index

FI = Frustration Index (FI = TAI + ESI + ADI)

OC = Own Computer: binary data from multiple response Question 1:

- 0=low frustration, i.e. has own computer in at least one location
- 1=high frustration, i.e. does not have own computer at all

TD = Technical Difficulties: binary data from multiple response Question 12:

- 0=low frustration, i.e. no technical difficulties experienced
- 1=high frustration, i.e. technical difficulties of various types were experienced

TS = Training Session: binary data from multiple response Question 17:

- 0=low frustration, i.e. the student felt sufficiently equipped
- 1=high frustration, i.e. the student did not feel sufficiently equipped

Table D7: *Categories contributing to the Satisfaction Index (SI)*

CT V47	CT V48	CTI	PL V51	PL V52	PL V53	PL V54	PLI	SI
1	4	**5**	3	4	0	0	**7**	**12**
3	0	**3**	0	0	0	0	**0**	**3**
4	2	**6**	2	2	3	3	**10**	**16**
3	2	**5**	0	2	0	0	**2**	**7**
4	3	**7**	3	3	4	4	**14**	**21**
3	3	**6**	3	3	4	4	**14**	**20**
3	3	**6**	3	3	3	3	**12**	**18**
3	3	**6**	3	3	3	3	**12**	**18**
3	2	**5**	3	2	3	3	**11**	**16**
0	0	**0**	0	0	3	3	**6**	**6**
3	4	**7**	4	4	3	3	**14**	**21**
0	0	**0**	3	0	0	0	**3**	**3**
3	3	**6**	3	3	3	3	**12**	**18**

Legend:

CT = Communication Tools

CTI = Communication Tools Index

PL = Perceived Learning

PLI = Perceived Learning Index

SI = Satisfaction Index (SI = CTI + PLI)

The frequency distributions and grouped frequency distributions were computed and plotted using S-PLUS. The findings are given in chapter 4.

Step 4: Scale transformation

In some cases, when an item was expressed positively in the Frustration category, the data for that item was transformed so that the responses were consistently ordered from low to high levels of frustration. For example, three of the four affective domain (AD) items were clearly phrased in a way that implied frustration ("I became frustrated because my classmates were slow to respond to my e-mail and/or discussion messages"). The scale ranged from low frustration (Strongly disagree = 1) to high frustration (Strongly agree = 4), as shown in Table D8.

Table D8: *Scale for negatively expressed items in the Frustration category*

Frustration level:

Low → **High**

1	2	3	4	5
Strongly disagree	Disagree	Agree	Strongly Agree	I don't know/ Not applicable

However, one of the affective domain items was phrased positively ("I found the opportunities for anywhere, anytime learning convenient"). The data for this item was therefore transformed, so that 'strongly disagree' became 4 implying high frustration and 'strongly agree' became 1, implying low frustration. This transformation is shown in Table D9.

Table D9: *Data transformation for positively expressed item in the Frustration category*

Original data:

1	2	3	4	5
Strongly disagree	Disagree	Agree	Strongly Agree	I don't know/ Not applicable

Transformed data:

1	2	3	4	5
Strongly disagree	Disagree	Agree	Strongly Agree	0

Frustration level:

Low → **High**

Most of the items included an option 'I don't know / Not applicable' at the higher end of the scale (=5). Since such a response should not contribute to the calculation of either a Frustration or Satisfaction index, these scores were transformed to zero. Where appropriate, the 'I don't know / Not applicable' option was labeled as 'Uncertain'. The neutral option should appear logically in the centre of the scale rather than at the higher end of the scale, since the scale represents a monotonically increasing (or decreasing) level of agreement with the given statements. The graphs in chapter 4 therefore present the 'Uncertain' option in the centre of the distribution.

Appendix D3: Coding frame for open questions

V57: Positive aspects

1.	Convenience / ease of access / flexibility / ease of communication / anytime, anyplace, any pace / userfriendly
2.	Information clear and accessible / can review, repeat information / online if hard copy lost
3.	WebCT – good tools / easy to learn / efficient learning method
4.	Reference material – availability of library material / interesting articles / resources
5.	Good organization of syllabus / study guide / content / class notes
6.	Learnt from classmates / collaborative learning / team approach / group interaction
7.	Good facilitation of online sessions / feedback, encouragement from lecturer
8.	Electronic submission of assignments
9.	Electronic feedback (texts / assignments / results / marks / solutions)
10.	Self esteem / self confidence rose / independence / full potential / self discipline / time management
11.	Improved technical skills / computer literacy / searching information, internet
12.	Fast downloads / fast access / speed
13.	Challenging, exciting, enriching, new learning experience
14.	Other

V61: Negative aspects

1.	Technical problems / slow internet / slow network / slow downloads / downtimes of system / server problems / problems uploading
2.	Malfunctions / errors / illegible acrobat files / links not working / difficulties with attachments
3.	Inadequate response or feedback from lecturer / poor or infrequent online facilitation / inadequate (or no) interaction from lecturer
4.	Lecturer not informed / not prepared / outdated lectures / too little academic support from lecturer
5.	Slow updates / changes to web course e.g. marks, calendar, deadlines
6.	No exam papers / model answers available
7.	Expectations / explanations / instructions not clear
8.	Web facilities not used to full advantage
9.	Inadequate / incomplete course material / class notes not available / not on time / confusing / vague
10.	Too impersonal / face-to-face is better
11.	Difficulties with group dynamics – frustrating, members not pulling their weight, slow response from classmates
12.	AIS page problems / sources, references not available / not accessible
13.	Felt uncomfortable / frustrated
14.	Lack of knowledge / training / support for students
15.	Lack of access to computers and / or printers on campus
16.	Other

V65: Suggestions

1.	More powerful server / faster network
2.	More courses / lecturers should use WebCT
3.	Get lecturers to use it better / motivate lecturers / more interaction, feedback from lecturers / buy-in from lecturers / more encouragement / steering / guiding from lecturers
4.	More interaction from students
5.	Make better use of the tools / discussions / calendar
6.	Better technology skills for lecturers / students / more training in WebCT
7.	More assessment / quizzes / assignments / tasks / tests online
8.	After hours support / IT support / prompt solution of problems
9.	More frequent updating of marks / content / dates / groups
10.	Improve navigation / user friendliness
11.	Other

Appendix D4: Coding of open questions

Table D10: *Sample of coded responses to open questions*

Number	Student	V57	V58	V59	V60	V61	V62	V63	V64	V65	V66	V67	V68
1	2344	14	0	0	0	16	0	0	0	11	0	0	0
2	1808	3	4	14	0	16	0	0	0	11	0	0	0
3	2101	1	1	0	0	1	0	0	0	1	0	0	0
4	1255	2	2	4	0	16	0	0	0	11	0	0	0
5	237	1	0	0	0	16	0	0	0	11	0	0	0
6	4186	10	11	0	0	16	0	0	0	3	0	0	0
7	2330	2	13	10	0	8	8	5	0	5	5	0	0
8	293	1	0	0	0	1	5	2	16	11	11	0	0
9	4174	13	0	0	0	11	0	0	0	11	0	0	0
10	218	1	0	0	0	1	2	0	0	11	0	0	0

Legend:

V57: Positive aspects

V58-V60: More positive aspects[4]

V61: Negative aspects

V62-V64: More negative aspects

V65: Suggestions for improvements

V66-V68: More suggestions

Table D10 shows a sample of 10 coded responses to the three open questions. The respondents were invited to enter up to a maximum of four points per item. Since few respondents entered as many as four points per item, there was a high frequency of blank responses (coded as zero). These entries were excluded from the data analysis.

Before frequencies were calculated, the positive response variables (V57 to V60), the negative responses variables (V61 to V64) and the suggestions variables (V65 to V68) were respectively concatenated, thus producing three consolidated variables, each containing 400 responses.

[4] Space was allowed for a maximum of four points, each of which became a separate variable.

Appendix D5:

Items contributing to the Technical Adequacy (TA) Index

The Frustration Index (FI) was based on the contributing indices Technical Adequacy (TA), Education Support (ES) and Affective Domain (AD). This Appendix presents bar charts of the variables which contributed to the *Technical Adequacy* Index.

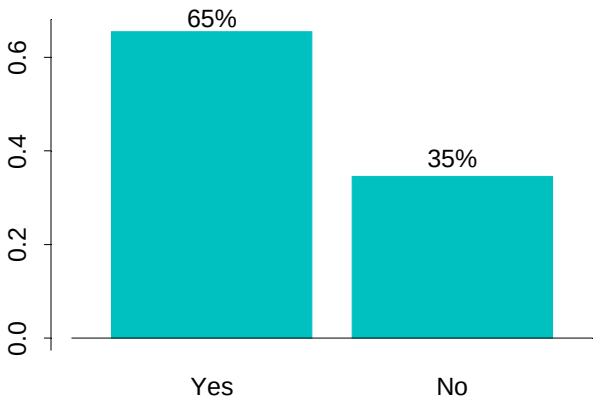
Evidence	Interpretation
	A fairly high proportion (65%) of respondents have their own computer, either at home, in the residence or at their place of work. The graph is approaching a reverse 'J' shape, but 35% of students experience frustration at not having their own computers.

Figure D1: Distribution of the 'Own Computer' variable (OC) (Question 1)

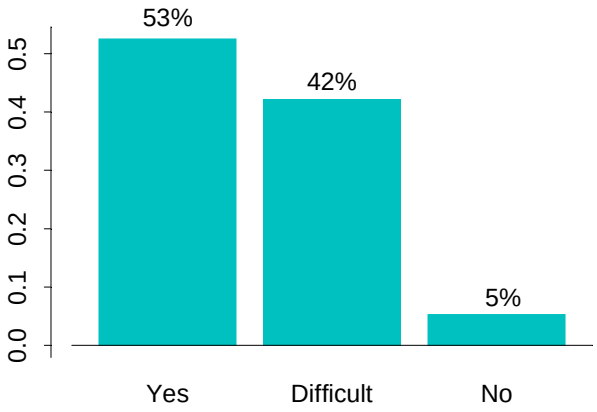
Evidence	Interpretation
	Approximately half the students (47%) experience moderate to high frustration due to the lack of access to computers on campus. Although only 5% experience high frustration (a good sign), the magnitude of the middle bar (moderate frustration) is to high.

Figure D2: Availability of computers on campus (Question 2)

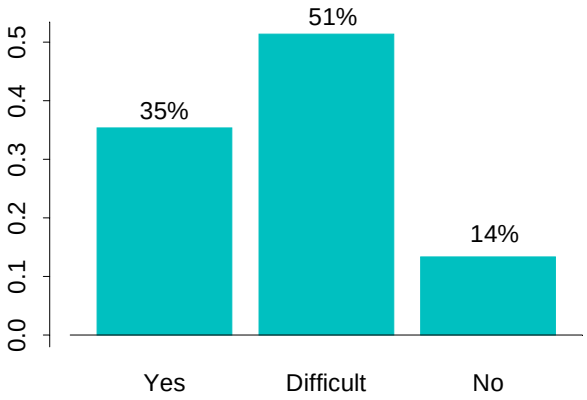
Evidence	Interpretation
	The graph shows that 65% of students who need to use printers on campus find difficulty or are not able to access a printer when they need one.

Figure D3: Availability of printers on campus (Question 6)

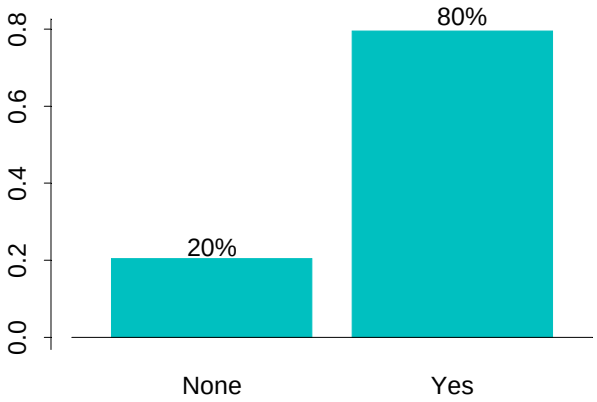
Evidence	Interpretation
	The graph shows that 80% of respondents are frustrated by experiencing technical difficulties of some sort[5]. This extent of technical difficulties is unacceptably high.

Figure D4: Technical difficulties experienced (Question 12)

[5] Question 12 list options for the type of technical difficulties experienced.

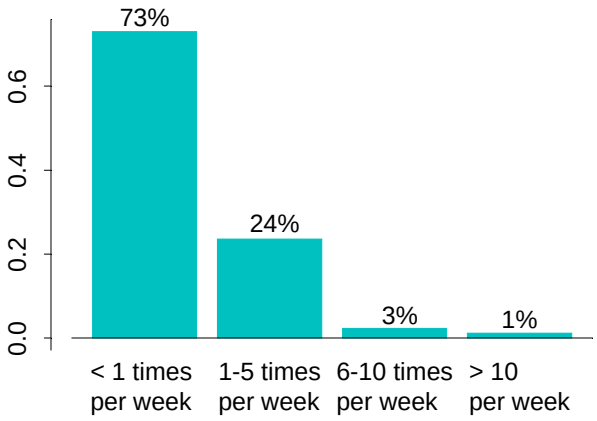
Evidence	Interpretation
	This graph exhibits the desired reverse 'J' shape. It is encouraging to note that 73% of respondents experienced technical difficulties less than once per week.

Figure D5: Frequency of technical difficulties (Question 13)

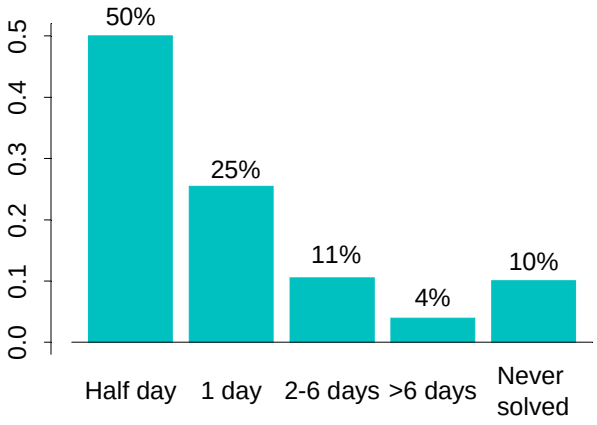
Evidence	Interpretation
	This graphs exhibits the desired shape, with the exception of the category 'Never solved'. The fact that 10% of technical difficulties are never solved is a cause for concern. This may indicate unsolvable system problems, problems beyond the skills of the technicians, or

Figure D6: Time taken to solve technical difficulties (Question 14)

Appendix D6:

Items contributing to the Educational Support (ES) Index

The Frustration Index (FI) was based on the contributing indices Technical Adequacy (TA), Education Support (ES) and Affective Domain (AD). This Appendix presents bar charts of the variables which contributed to the *Educational Support* Index.

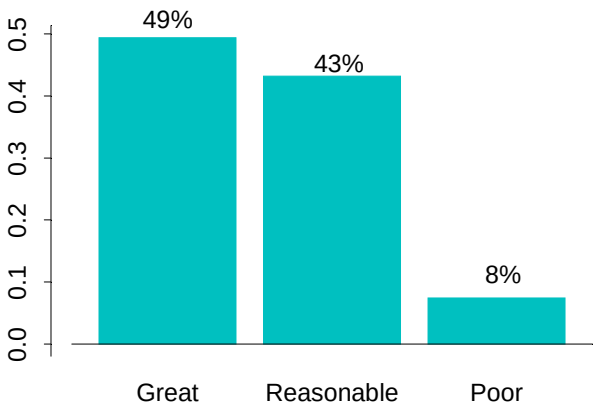
Evidence	Interpretation
	Of the respondents who received the student support CD-Rom, only 49% think it's great. The support CD-Rom should ideally satisfy more than half the students using it.

Figure D7: Opinions of the student support CD-Rom (Question 16)

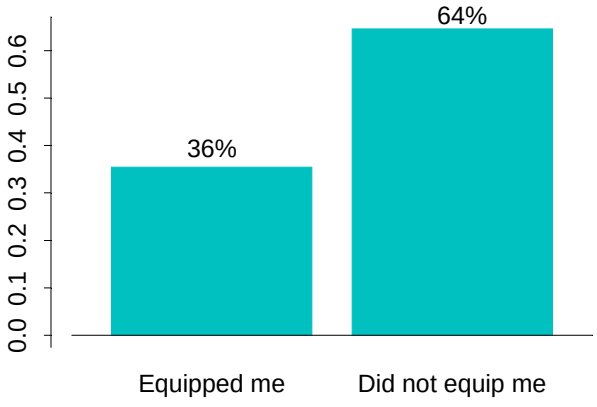
Evidence	Interpretation
	It is a cause of concern that 64% of students who attended the WebCT training session were of the opinion that for various reasons[6], they were not equipped to participate in their web-supported course.

Figure D8: Opinions of the WebCT student training session (Question 17)

[6] Question 17 lists the type of problems experienced.

Appendix D7:

Items contributing to the Affective Domain Index (ADI)

The Frustration Index (FI) was based on the contributing indices Technical Adequacy (TA), Education Support (ES) and Affective Domain (AD). This Appendix presents bar charts of the variables which contributed to the *Affective Domain* Index.

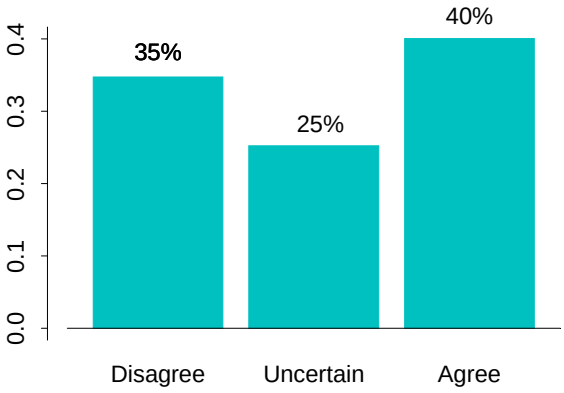
Evidence	Interpretation
	This graph shows that although a fair number of respondents disagreed that the web-supported learning experience is impersonal, there are still too many (40%) who agree with the statement.

Figure D9: The learning experience is impersonal (Question 20)

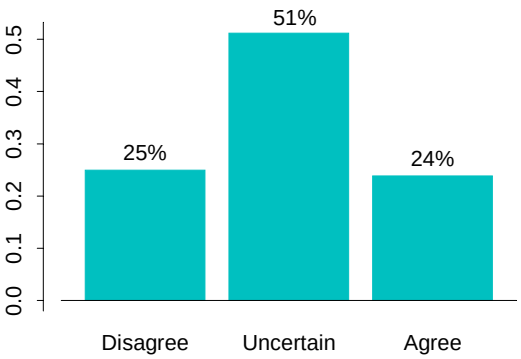
Evidence	Interpretation
	This graph reflects an equivalent number of respondents disagreeing as agreeing with the statement and too many in the 'Uncertain' category.

Figure D10: Slow response from my classmates (Question 21)

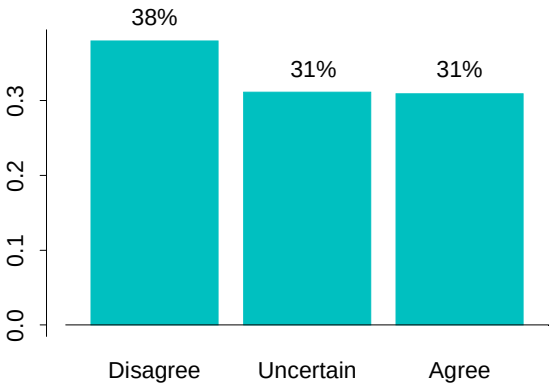
Evidence	Interpretation
	This graph is beginning to reflect a reverse 'J' shape; however there are still too many respondents (31%) agreeing with the negative statement, thus contributing to their frustration in the online environment.

Figure D11: Feelings of annoyance and/or stress (Question 26)

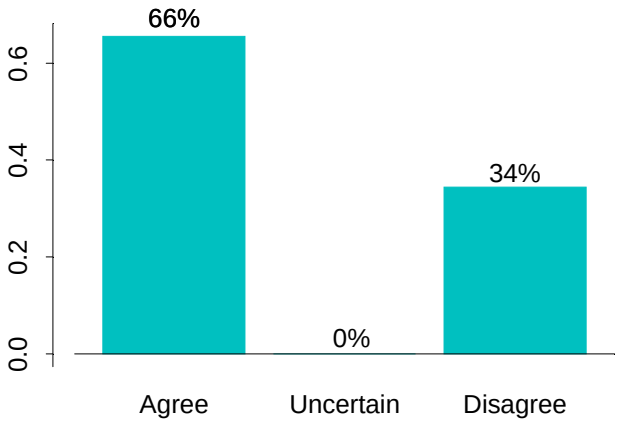
Evidence	Interpretation
	This statement is positively phrased, for which the scale on the horizontal axis has been transformed. Therefore we still expect a reverse 'J' shape, which is apparent in this graph. The number of respondents agreeing with the positive statement is reasonably high (only 66%).

Figure D12: Anywhere, anytime learning is convenient (Question 27)

Appendix D8:

Items contributing to the CommunicationTools Index (CTI)

The Satisfaction Index (SI) was based on the contributing indices Communication Tools (CT) and Perceived Learning (PL). This Appendix presents bar charts of the variables which contributed to the C*ommunication Tools* Index.

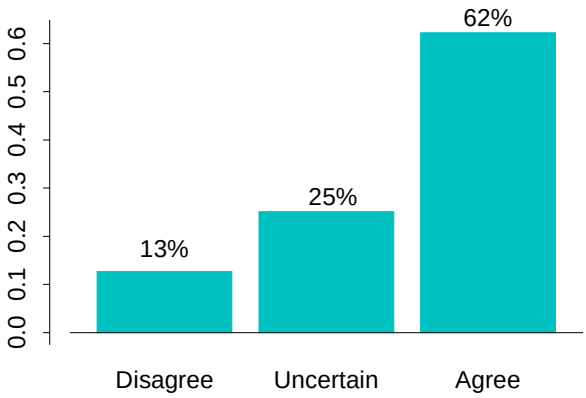
Evidence	Interpretation
	This graph exhibits a very nice 'J' shape, i.e. a small proportion of respondents (13%) disagreed with the positive statement and a large proportion of respondents (62%) agreed with it.

Figure D13: I felt comfortable communicating online (Question 18)

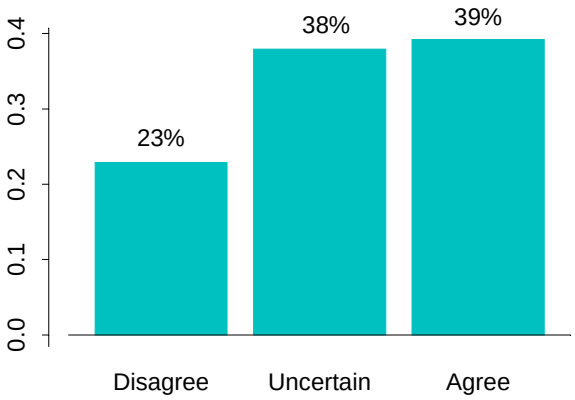
Evidence	Interpretation
	This graph exhibits an approximate 'J' shape, although the middle bar, i.e. the number of respondents who were uncertain, is rather high and the number of respondents who agree with the statement should be preferably be higher.

Figure D14: More self expression than in the traditional classroom (Question 19)

Appendix D9:

Items contributing to the Perceived Learning (PL) Index

The Satisfaction Index (SI) was based on the contributing indices Communication Tools (CT) and Perceived Learning (PL). This Appendix presents bar charts of the variables which contributed to the *Perceived Learning* Index.

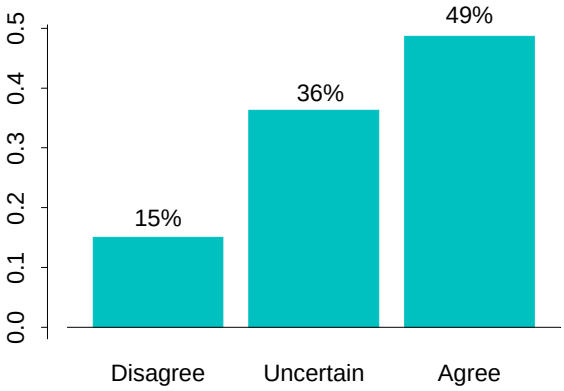
Evidence	Interpretation
	This graph exhibits a good 'J' shape, i.e. a small proportion of respondents (15%) disagreed with the positive statement and a larger proportion of respondents (49%) agreed with it.

Figure D15: I learnt from the contributions of other students (Question 22)

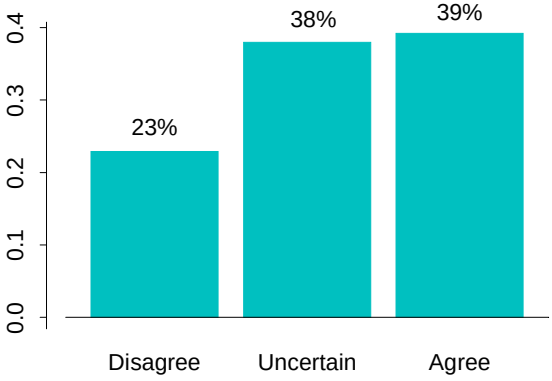
Evidence	Interpretation
	This graph also reflects a positive finding with respect to team work, although the 'Agree' category should preferably be higher. The central bar ('Uncertain') is rather too high.

Figure D16: Developed my ability to work as a team/group member (Question 23)

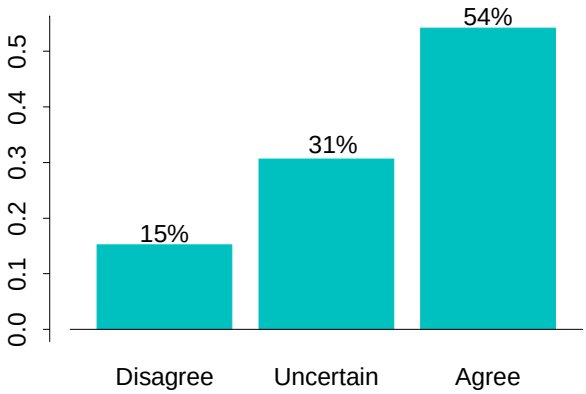
Evidence	Interpretation
	This graph exhibits an acceptable 'J' shape, with a good proportion of respondents (54%) agreeing with the positive statement.

Figure D17: Developed my ability to plan my own work (Question 24)

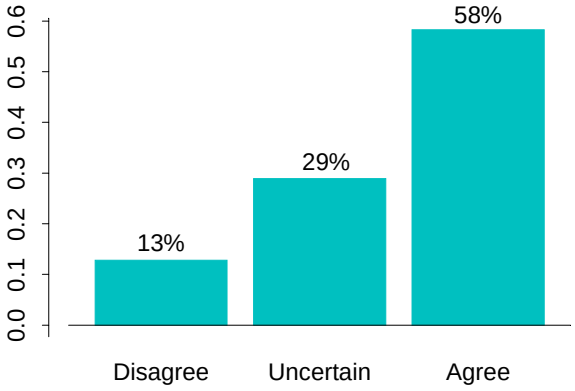
Evidence	Interpretation
	This graph also exhibits an acceptable 'J' shape, with 58% of respondents agreeing with the positive statement.

Figure D18: Web-supported learning is an enriching learning experience (Question 25)

APPENDIX E

Lecturer interviews:

E1: Lecturer Experience and Satisfaction interview schedule

E2: Samples of data from open questions

APPENDIX E

Lecturer Experience and Satisfaction Questionnaire

Using electronic media in teaching is a different process and experience from conventional face-to-face teaching in terms of changes to pedagogy and the adoption of ICTs. The commitment and willingness of academic staff to adopt e-learning enables the University to respond to growing demands from students for electronic access and to maintain and improve the quality of learning effectiveness.

Important factors contributing to the satisfaction of lecturers involved in e-learning are opportunities for effective online interaction with students with diverse backgrounds and interests, as well as opportunities for leadership, research, publications, recognition, collegiality and professional development (Lorenzo & Moore, 2002). Ongoing staff training and development are essential to ensure staff readiness for online teaching and ICT developments (Oliver, 2002).

Please contribute to our research by completing this survey to establish the extent of lecturer involvement and satisfaction with e-learning and the associated support services at the University of Pretoria.

Department:	
Programme:	
Delivery medium:	WebCT Multimedia
Project Leader:	
Date:	

Overall effectiveness of the WebCT course or Multimedia programme ("e-learning component")

	Strongly disagree	**Disagree**	**Neutral N/A**	**Agree**	**Strongly agree**
In my opinion, the e-learning component adds value to the learning experience for students.					
The e-learning component promotes active learning / problem-based learning / learner-centered activities.					
I used the e-learning component to support me in my administrative tasks.					
I found that the e-learning component supported me in the facilitation of learning.					

Rank these online tools according to:	**Discussion**	**e-mail**	**Chat**	**Calendar**
• Frequency of **your** use of the tool: **0=never; 1=seldom, 2=monthly; 3=weekly; 4=daily**				
• Your opinion of the tool's usefulness: **0=useless; 1=supportive; 2=indispensible**				

My overall evaluation of the **worth** of this e-learning component in enhancing the teaching and learning experience:	**A Excellent**	**B Very Good**	**C Good**	**D Poor**	**E Unaccept -able**

What do you perceive as the **worth or value** of the e-learning component?

	High Impact	Intermediate	Web Page Design	WebCT Designer	Facilita-tion of e-learning
Which WebCT or Facilitation training course/s did you attend?					
Did you attend each training course before, during or after you presented your module? (b=before; d=during; a=after)					

Learning outcomes					
	Strongly disagree	**Disagree**	**Neutral N/A**	**Agree**	**Strongly agree**
The e-learning component contributed to the achievement of subject specific learning outcomes.					
In what way?					
The e-learning component provided meaningful assessment opportunities.					
In what way?					
The e-learning component enhanced the learning experience due to instructional design features, e.g. activities, chunking, resources, interaction.					
In what way?					

Problems experienced
What problems did you as a lecturer experience in the **design and development** of this e-learning component?

What problems did you as a lecturer experience in the **facilitation / presentation** of this e-learning component?
Benefits experienced
What benefits did you as a lecturer experience in the **design and development** of this e-learning component?
What benefits did you as a lecturer experience in the **facilitation / presentation** of this e-learning component?
Overall evaluation
Might there be lessons learnt from this implementation that could be shared for future use?
What effect or impact has this e-learning component had on teaching and learning in your department?

Quality of service from Department of Telematic Learning and Education Innovation and AIS						
In the interests of continuous improvement, please rate the service you received from the following units:						
Project Management	**A Excellent**	**B Good**	**C Satisfactory**	**D Poor**	**E Not applicable**	**F Unaware of service**
Education Consultancy	**A Excellent**	**B Good**	**C Satisfactory**	**D Poor**	**E Not applicable**	**F Unaware of service**
Instructional Design	**A Excellent**	**B Good**	**C Satisfactory**	**D Poor**	**E Not applicable**	**F Unaware of service**
Graphics	**A Excellent**	**B Good**	**C Satisfactory**	**D Poor**	**E Not applicable**	**F Unaware of service**
Information Service (AIS)	**A Excellent**	**B Good**	**C Satisfactory**	**D Poor**	**E Not applicable**	**F Unaware of service**
Other comments related to service and support provided for e-learning:						

Thank you.
We appreciate your time and commitment to the promotion of e-learning and associated services at the University of Pretoria.

Appendix E2: Sample of data from open questions

Although open-endedness presents problems in analyzing the data, “an open-ended question can catch the authenticity, richness, depth of response, honesty and candour which are the hallmarks of qualitative data” (Cohen et al. p.255). This small scale pilot study invited honest and personal responses from participants in an attempt to probe the real experiences of lecturers participating in online teaching.

Samples of the data from the open questions is presented in the following categories, as per the questionnaire:

- problems experienced in design and development
- problems experienced in facilitation and presentation
- benefits experienced in design and development
- benefits experienced in facilitation and presentation
- overall evaluation and lessons learnt.

Problems experienced in design and development

Various problems in this area were reported by participants. Some of the more typical statements are listed in Table E1.

Table E1: *Problems experienced in design and development*

• The biggest problem is the human one: be up to date, motivate other lecturers, get students activated.
• Trying to keep everyone to the planned time schedule.
• Copyright problems for articles distributed on CD-Rom. Now students pay for paper-based readers – more under our control and bulk printing makes it cheaper for students.
• Problems with new platform (early 2004). Major frustration for students. Lecturer couldn’t access WebCT for a month. Study materials were available very late and students were very frustrated by this delay.
• Scanning of articles at the library and quality of scanned material.

Problems experienced in facilitation and presentation

Some of the problems mentioned by respondents are listed in Table E2. Problems mentioned by two or three respondents are indicated by 'x2' or 'x3' respectively.

Table E2: *Problems experienced in facilitation and presentation*

- Students found it difficult to understand how to work through WebCT. Had to do refresher courses. Their knowledge of basic computer skills is lacking.
- Students don't start participating in time or frequently enough. (x3)
- Lecturers frustrated with changes on WebCT interface – franticness among students and lecturers. Induces unnecessary stress and some students quit the programme. You don't develop automaticity by frequent changes to the interface.
- Lack of lab access for students. (x2)
- Students complain about printing costs, especially undergraduates. (x2)
- Lecturers do the minimum - limited online facilitation. (x2)

Benefits experienced in design and development

Various benefits in this area were reported by participants. Samples of typical statements are listed in Table E3.

Table E3: *Benefits experienced in design and development*

- It refined my thinking and enhanced my organization and forward planning.
- Personal and professional development.
- Annual updates are easy now. System is now in place for the annual re-application for copyright permission.
- Support of the instructional design team at TLEI. (We'd never do it if we had to do it ourselves.)
- Better structuring of the learning material and stronger focus on outcomes. (x3)
- Quick to update, but students still make hard copies of earlier versions.
- Lecturers have begun to think on a higher level in their own subject area.

Benefits experienced in facilitation and presentation

Lecturers who use online learning effectively are aware of the way in which the electronic environment may enhance teaching and learning. Some of the benefits mentioned by participants in facilitating their online courses are listed in Table E4.

Table E4: *Benefits experienced in facilitation and presentation*

• An enormous saving in terms of time and money.
• Communication and speed.
• Sending information to all students at same time using discussion tool. Assignment tool invaluable. Putting presentations up onto discussion board saved costs. Allowed learners to experience something new and learn a new skill.
• If used properly, electronic sources can help foster a culture of independence and self-sufficiency among students.
• Upload learning material before or after contact session.
• Accessing student marks on WebCT – for lecturers and students.
• The ability to illustrate real world 3-dimensional examples.

The last two open questions asked about the overall evaluation of the e-learning component and lessons learnt. Typical examples of the feedback are given in Table E5.

Table E5: *Overall evaluation and lessons learnt*

• Definitely facilitates large groups administratively
• You can't do it alone – it's a team effort.
• The success depends on the perspectives of the lecturers and students.
• Can be far away and still experience quality education, especially the team experience.
• Train users in computer literacy before the start of e-learning. This warrants the investment in e-learning infrastructure and facilities.
• Do not change things that work – the roll-out of the new WebCT version and the disappearance of the upload function on the lecturers' portal are two examples.
• Reliability and access must be high. One negative experience can lead to resistance from students.
• Quality of teaching and learning was enhanced.
• Concern about 'dumping' material on the web with regard to the web-enablement targets set by management.

The categorization and interpretation of the data from the open questions is presented in chapter 4, section 4.3.2, together with review and reflection on the salient features.

APPENDIX F

Artifacts in the quality management system (QMS) for web-supported-learning

F1: Project Timeline

F2: Needs Analysis Checklist

F3: Template for a procedure

F4: Example of a completed procedure

F5: Sanity Checks (Boyd, 2003)

F6: Guiding Questions (Boyd, 2003)

F7: Minimum Requirements for web-supported courses

F8: Roles and Responsibilities

F9: Service Level Agreement with lecturers

F10: Quality Pledge

F11: Master Document List

APPENDIX F1

Project Timeline

- **Version 1 (Fresen, 2001)**
- **Version 6 (Instructional Design team, 2003)**

PROJECT TIMELINE : Version 1 (Fresen, 2001)

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Exploratory Phase	Broad Needs Analysis	SHOW	Target and Content Analysis	PROJECT PROPOSAL	In-depth Analysis	PROTOTYPE	Demo of Prototype	Design	Development	Formative Evaluation	Summative Evaluation	Student Feedback	Review and Maintenance

Checklist 1

Checklist 2 QA report

Checklist 3

Student survey

ANALYSIS

DESIGN

DEVELOPMENT

IMPLEMENT

EVALUATION

PROJECT TIMELINE : Version 6 (2003)

Exploratory Phase	SHOW	Needs Analysis	PROJECT PROPOSAL	PROJECT APPROVAL and INITIATION	Academic staff training (web only)	Product Specifications	Design + Prototype Development	Prototype Demo: • to peers (shredding) • to lecturers	Development (multimedia)	Usability Testing (multimedia)	Development (web)	Formative Evaluation (web)	Student Orientation (web)	Implementation	Summative Evaluation	Review, Maintenance and Support
1.	2.	3.	4.	5.	6.	7.	8.	9.			10.	11.	12.	13.	14.	15.

Show Evaluation form

Needs Assessment Checklist

Screen Design Guidelines OR Multimedia specs

QA Report

Summative Evaluation Checklist + Student survey results (WebCT)

ANALYSE

DESIGN

DEVELOP

EVALUATE

IMPLEMENT

EVALUATE

APPENDIX F2

Department of Telematic Learning and Education Innovation

Needs Analysis Checklist: E-Education Project

Please help us to define your needs and the scope of your proposed e-learning project, in order to ensure consistency, accuracy and comprehensiveness.

Department:		Date:	
Goal analysis			
Which programme / modules do you have in mind?			
What is / are the general goals / aims of your programme / modules?			
Overall Media analysis (programme level)			
Which delivery media **do you have in mind that could be meaningfully applied in this project?** *(Please mark with an X)*	Online (web-supported) learning		
	Multimedia CD-ROM		
	Resource CD-ROM		
	Video		
	Audio		
	Video conferencing		
	TV broadcasting (DSTV)		
	Paper-based materials		
	Computer-based testing		
How would you describe your learning model, i.e. teaching and learning strategy, assessment strategy, mix of delivery media etc.			

What are your **current** method/s of teaching, e.g. lectures, tutorials, practicals, group work, etc?			
Target population analysis			
What are the approx. student numbers in these programmes / modules?		**What is the average age of the students?**	
Please characterise your students by completing the following table:			
Undergraduate	Postgraduate	Full time	Part time
Urban	Rural	Language preference:	
Computer literacy:	Novice	Average	Expert
% with access to own computers:		% with access to the Internet:	
Overall Task analysis			
What **new** knowledge and skills do your students need to acquire and how best may this be facilitated?			
What will the students be required to DO or how will they have to perform after this training intervention?			

Thank you for completing this form

Appendix F3: Template for a procedure (Boyd, 2003)

TITLE

Insert full title here, e.g. Project Approval and Initiation Procedure

OVERVIEW

Write a few lines giving an overview of the procedure, so that readers can understand what the procedure is dealing with, and how it fits in with other procedures, before they read the whole document.

OBJECTIVES

The objectives of this procedure are to ensure that:

a) Write down the required standard of operation; what must be achieved in order for this section of work to be completed efficiently and effectively.
b)
c)

PROCEDURE STEPS

1. Write down the sequential list of activities which must happen in order to achieve the objectives.

    - What documents are the inputs to this procedure?
    - What happens to them next?
    - Who does what?
    - What are the outputs of this procedure?
    - Are there any meetings held and if so what is their purpose?
    - What supporting documentation, standards or guidelines are referred to?
    - Where are all the documents filed? Are they held physically or electronically?

    When documenting procedure steps it is useful to consider Rudyard Kipling's 'six good serving men – their names are WHO, WHAT, WHERE, HOW, WHY and WHEN'. When referring to people, use the job titles rather than individual names.

RESPONSIBILITIES

	TLEI	Academic Department
1. Complete the table showing the major procedure steps and who is responsible. This table should make it clear where responsibilities lie.	Use job titles e.g. Project Manager Instructional Designer Education Consultant Graphic Designer AIS Information Specialist	Use job titles e.g. Project Leader Lecturer/s
2.		
3.		
4.		

SUPPORTING DOCUMENTS & OUTPUTS

SUPPORTING DOCUMENTS	OUTPUTS
 List the supporting documents or inputs of this procedure. These could be: • outputs which were received from a previous procedure, e.g. a signed Project Proposal • blank supporting documentation such as checklists or forms which are completed during this procedure, e.g. a letter of Approval template • guidelines or information which is not changed during the procedure, e.g. tariff lists, guidelines for project proposals	 List the outputs from this procedure, e.g. Approved Project Proposal, customised letter of approval, a completed checklist • For each item in this table, identify whether it is mandatory and must be produced (the hammer) or optional and down to individuals' discretion (the scales).

Key:

	Mandatory	Optional	

Appendix F4: Example of a completed procedure

TITLE

Design and Prototype Development Procedure

OVERVIEW

The design phase uses the output from the Product Analysis procedure and content received from the academic department, to develop a prototype that will be refined during the development phase. This prototype is used to demonstrate possible functionality, "look-and-feel" and usability of a proposed product for academic and peer approval.

OBJECTIVES

The objectives of this procedure are to ensure that:

a) The design of any product will add educational value to the learning experience.
b) The correct programming approach is selected:
   - Multimedia: to determine the strategies and coding that will be necessary in creating a multimedia,
   - WebCT: to determine which features of WebCT will be used.
c) Multimedia: A flowchart and storyboard are developed to specify the structure and sequence of the content.
   WebCT: A template is created to structure and sequence the content, and includes the correct tools to accommodate the needs specified by the academic department/s.
d) A graphic "look and feel" is developed that will suit the particular needs of the product.
e) A prototype is developed that will demonstrate the educational value added, the functionality and the proposed layout, navigation and structure of the final product. This prototype is then used as a first iteration for review by the academic department and e-education.

PROCEDURE STEPS

1. Decide on the authoring tool and programming approach to use.
2. Use the product analysis and content provided to develop a flowchart and storyboard / WebCT template for the product.
3. Use the product analysis and content provided to decide on applicable media and WebCT tools to incorporate in the prototype.
4. Contract (by email so that there is a record of the request) with the graphic division for the development of a "look and feel" for the product, if applicable.
5. Build the Prototype:
   a. Create a small shell to demonstrate navigation options and "look and feel" of the product.
   b. Demonstrate the educational value added by including an example of each envisioned element of the product, e.g. different question types available in a multimedia product, the use of the tools within WebCT, graphics, photo's and videos.

6. Complete the Multimedia Design Specifications document as far as is possible at this stage.
7. Share any new knowledge about good ways to do things with other instructional designers during the demo of the prototype ("shredding session") – see Prototype Demonstration procedure.

RESPONSIBILITIES

	TLEI	Academic Department
1) Development of flowchart and storyboard / WebCT template.	Instructional Designer Project Manager	
2) Decide on applicable media	Instructional Designer Project Manager	
3) Development of "look and feel"	Graphic Designer Instructional Designer	
4) Decide on the authoring tool and programming approach	Instructional Designer Project Manager	
5) Build the Prototype	Instructional Designer	Content specialist
6) Complete the Multimedia Design specifications document.	Instructional Designer	

SUPPORTING DOCUMENTS & OUTPUTS

SUPPORTING DOCUMENTS	OUTPUTS


• Completed Instructional Design Toolkit
• Content from client
• Multimedia specifications document
  • WebCT templates for mini-proposals
  • Minimum requirements for WebCT portals
  • Minimum requirements for WebCT modules
  • Screen Design Guidelines for WebCT
 	
 
• Design standards and principles for Multimedia
• Multimedia Evaluation Checklist
• Peer Evaluation Checklist (WebCT)
	
	• Start compiling multimedia specifications document
	• WebCT template (Full proposals)
	• Flowchart & storyboard (multimedia)
	• Prototype

Key:

	Mandatory	Optional	

Appendix F5: Sanity checks (Boyd, 2003)

QUALITY MANAGEMENT SYSTEM

SANITY CHECK FOR PROCEDURES

Why are we documenting procedures?

- To provide a defined framework for all role players to work together consistently along the entire Project Timeline
- To enable everyone, including new staff, to understand 'the way things are done around here'
- To identify together areas for improvement
- To provide an integrated and simple method to access and use supporting documentation e.g. checklists, forms, templates
- To ensure that the right tools are available to allow for comprehensive checks and to minimize errors
- To try and catch any errors as soon as possible before it's too late or too expensive to fix them
- To evaluate completed projects and help to assess their impact on teaching and learning at UP
- To learn lessons which may help to improve future projects
- To share more with each other about ways of doing things
- To demonstrate to any external stakeholders (eg auditors or UP management) that TLEI has a formal quality management system in place to control e-education projects

SANITY CHECK FOR CHECKLISTS

- What is the objective of this checklist?
- Do you use the checklist already or is it new?
- What is the feedback from using it in practice?
- Do you wish to change any of it?
- What do you do with all the completed checklists?
- Each checklist must be VALUE ADDED, ie do the people who use it thinks it adds value in practice?

Appendix F6:

Guiding questions to reflect on procedures (Boyd, 2003)

Here are some specific questions which could be raised when documenting each one of the procedures:

Procedure No 1a: Full Project Proposals (completed)

Procedure No 1b: Mini Project Proposals (completed)

Procedure No 2: Project Approval and Initiation (completed)

Procedure No 3: Academic Staff Training
How are academic staff sufficiently prepared for running effective telematic learning programmes?

Procedure No 4: Product Specifications
(used to be called 'In-depth analysis' on the Timeline diagram)
How do you create specifications for the product to ensure that requirements are accurately and comprehensively stated, according to the complexity and size of the modules or programme?

Procedure No 5: Prototype Development
How do you go about constructing a prototype? What are the objectives of a prototype? Do you need to use a Checklist to ensure that all aspects of the prototype development have been addressed? Do you wish to use or amend 'Checklist 1'?

Procedure No 6: Prototype Demonstration
How do you ensure thorough evaluation of the prototype? How do you document feedback from the client? Do you revise the product specifications if necessary?

Procedure No 7a & 7b: Multimedia and WebCT Design
Do you use a systematic way of designing the product, which is shared by everyone but adapted as required according to different situations (eg formulation and use of generic outcomes, or a WebCT template?)
Do you use other design conventions, standards or guidelines?
What are they and how do you access them?
How do you share new knowledge about good ways to do things?

Procedure No 8a & 8b: Multimedia and WebCT Development
Do you use a systematic way of developing the product, which is shared by everyone but adapted as required according to different situations?
Do you use other development conventions, standards or guidelines?
What are they and how do you access them?
How do you share new knowledge about good ways to do things?
What other standards are in place eg with regard to video, TV, photography and graphics?
Do you carry out 'peer reviews' to ensure that standards and guidelines are being correctly used?
Do academic departments or any other third parties ever supply components to be included in the final product (apart from raw content material)? If so, how do you ensure that this meets your required standards and guidelines?

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Procedure No 9: Formative Evaluation and Usability Testing
Do you use a systematic way of testing and evaluating a product prior to implementation?
What testing method do you use and how do you record the results?
Do you test the product in all its different learning environments (field testing)?
How is the product evaluated by the academic department before acceptance?
What happens to all comments and results of the evaluation; how do you ensure that these are all taken account of?

Do you wish to use or amend Checklist 2, or write a new checklist?

Procedure No 10: Student Orientation
How are students sufficiently prepared for participating in a telematic programme?

Procedure No 11: Implementation
How is the final product approved or accepted by the academic department? Should there be a formal 'signing off' of the final product?

How is the completed and accepted product made available for live use on the Virtual Campus, ie what is the 'Go-live' procedure? What other replication, installation or delivery procedures are required?

Procedure No 12: Student Feedback
How are the student surveys constructed and carried out? What happens to the information supplied by students? How are statistics generated and how are they used? Are there any other methods of obtaining student feedback other than by using surveys?

Procedure No 13: Summative Evaluation
How do you evaluate the overall effectiveness of the product in optimising the learning experience? How do you take account of lecturer feedback about the product? How do you evaluate how well the product contributed to achieving the specified learning outcomes? Whose responsibility is this? Might there be lessons learnt from this implementation that could be shared for future use?

Do you wish to use or amend Checklist 3, or write a new checklist?

Procedure No 14: Review and Maintenance
Do you periodically review the product with the academic department?
How do you negotiate maintenance and enhancement work with the academic department?
Do you carry out maintenance and enhancement work using the same procedures and guidelines as for new systems?
How do you control the introduction of changes into live systems?

Procedure No 15: Project Management

How do you ensure that projects are kept on time according to the agreed timescales, as far as is possible? How are academic departments informed about progress of projects? What information must be maintained in order to sufficiently monitor a project? Where is this information held and who is responsible for keeping it up to date? What statistics are produced to illustrate departmental performance on projects, satisfaction of academic departments, etc?

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APPENDIX F7

Minimum Requirements for web-supported courses:

Version 1 (TLEI team, 2001 onwards)

Minimum Requirements for Web-Supported Courses

The **study guide** must be submitted to the instructional designer both in hard copy and electronically (*.rtf or *.doc in MS Word). It may be sent either on disk or as e-mail attachment/s.

ORGANISATIONAL COMPONENT

0. Welcome

Minimum:

- Course title
- Course code
- Word of welcome / introduction
- Educational approach

Recommended:

- Description of the course
- Significance of the course within the programme
- Role of the student in self-directed learning

1. Lecturer's details

(OR Link to departmental homepage with the lecturer's information)

Minimum:

- Name of lecturer(s)
- Telephone & fax numbers
- E-mail address(es)

Recommended:

- Photo of lecturer(s)
- Subject(s) for which the lecturer(s) is/are responsible
- Consulting hours for students
- Qualifications

Optional:

- Research areas
- Titles of conference & journal papers
- Brief CV: Academic and professional experience

2. Schedule / Calendar

Minimum:

Overall course schedule (preferably per week) indicating *inter alia*

- Progress targets for students
- Dates for assignments
- Dates for contact sessions
- Dates for formal tests / examinations (if applicable)

3. Learning Resources

Minimum:

- Prescribed study material/s
- List of additional study material/s

Recommended*:*

- Links to applicable Internet sites
- *Pdf* documents (for example AIS scanned articles)
- *PowerPoint* slideshows

4. Learning Activities / Assignments

Minimum:

- List and description of all individual / group assignments
- Guidelines for structure, bibliography, layout, etc.
- Submission instructions (electronic or postal)

Recommended:

- List and description of other online learning activities, such as quizzes, self tests, student presentations, chat sessions etc.
- List and description of offline learning activities, such as practicals, tutorial sessions, interactive television etc.
- Does your instruction rate 6 stars?
  (Adapted from Dave Merrill: http://www.id2.usu.edu/5Star/Index.htm)

5. Assessment Policy

Minimum:

- Calculation of semester and year marks
- Policy on absence from tests / late submission of assignments
- Policy regarding academic dishonesty

Recommended:

- Assignment requirements: structure, technical, language, format
- Indication of grading for online participation, if applicable

6. Communication Tools

Minimum:

- List and description of communication opportunities
- Approach for using online tools (which tools and why?)
- Clarify frequency of online communication by lecturer

Recommended:

- Telephone
- WebCT e-mail or ordinary e-mail
- Discussions tool (sub-divided into topics)
- Chat rooms (optional for informal/social student exchanges?)

STUDY COMPONENT

7. Overall module specifications

Minimum:

- Purpose statement of the module
- Learning presumed to be in place
- Programme map / site map
- Critical cross field outcomes that are applicable to this module

8. Module structure

Minimum:

- Global list (or table) of themes which may be subdivided into study units
  For each Study Theme:
  - ☞ Specific learning outcomes (max 6)
  - ☞ Assessment criteria for each specific learning outcome
  - ☞ List of study units – title and appropriate study material/s
  - ☞ Self-study activities
  - ☞ Assignments for assessment

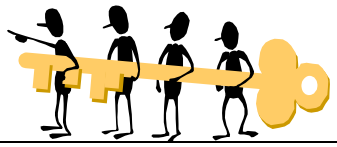
Optional: Glossary

APPENDIX F8

Roles and Responsibilities (Fresen, 2001)

Telematic Learning Projects

Roles and Responsibilities



Project Leader (Academic dept.)

The Project Leader is usually the Head of Department or other senior staff member.
His/her responsibilities include:

- compile and submit the project proposal
- manage seed funds allocated to the project on approval of the proposal
- submit annual report on the use of the seed funds
- co-ordinate the submission of content from lecturers
- ensure the quality of the content
- ensure that agreed deadlines are met
- participate in evaluating and approving the prototype
- participate in the Quality Assurance team
- authorise attendance at staff training courses
- include student web orientation session in the programme for the first contact or registration session

Project Manager (TLEI)

The Project Managers at TLEI take responsibility for different faculties.
Their responsibilities include:

- promote the adoption of web-based learning
- present "shows" to interested departments
- initiate project meetings with the academic department
- provide project status reports to the project leader
- initiate internal project meetings
- circulate minutes of project meetings
- manage the overall progress of the project
- ensure that agreed deadlines are met
- participate in evaluating the prototype
- participate in the Quality Assurance team
- analyse student feedback

Lecturer/s (Academic dept.)

The lecturer/s whose course is to be implemented on the Web has/have the following responsibilities:

- attend the Hi Impact WebCT training course
- redesign the course content and strategy in line with the minimum requirements for web-based courses
- edit all content for correct language usage
- source applicable online resources, such as online journal articles and internet sites
- submit hard copy and electronic versions of the final version of the study guide to the instructional designer
- liaise with the information specialist with respect to scanning of articles
- obtain copyright permission for the use of articles, images, photos, video clips, sound clips etc.
- liaise with the graphic artist and the instructional designer with respect to the graphics to be used and the "look and feel" of the course
- participate in evaluating the prototype
- participate in the Quality Assurance team
- be available to assist with student orientation sessions
- become a facilitator of online learning
- manage the communication, interaction and activities in the online course
- assume responsibility for entering grades, use of communication tools, posting messages and use of assignment and student management tools

Instructional Designer (TLEI) 	There are eight instructional designers at TLEI. Their responsibilities include: • consult frequently with the lecturer/s • report problems to project managers • provide guidance and suggestions about the content, strategy and structure of the web based course • design, develop and demonstrate the prototype • participate in evaluating the prototype • design and develop the course • ensure that agreed deadlines are met • follow quality assurance guidelines • carry out ongoing formative evaluation • participate in the Quality Assurance team • implement changes, edits required after evaluation • liaise with systems experts with respect to student registration, uploading course to production system • organise and present student orientation sessions • load student survey and download results • carry out ongoing maintenance of the course according to negotiated delivery times
Educational Consultant (TLEI) 	Educational consultants are based in the Education Innovation division of TLEI. Their services include: • collaborate on education philosophy and learning models (macro design) • provide assistance with the development of outcomes based curricula in compliance with SAQA requirements • guide and support the lecturer in redesigning the content and structure of courses within a flexible learning environment • advise on teaching and learning strategies • advise on the design and development of assessment strategies and learning activities • advise on the design of learning materials that optimise learner interaction and engagement therewith • advise on techniques to enhance online communication between learners and facilitator and between learners • provide relevant resources on teaching and learning theories, techniques and strategies
Information Specialist (AIS) 	Information specialists at the AIS form part of the project team. Their responsibilities include: • source applicable online resources, such as online journal articles and internet sites • scan articles required by the lecturer and provide them to the Instructional Designer in pdf format • create web pages for searching and referencing • advise on reference techniques (for example, the Harvard Method)
Graphic Artist (TLEI) 	There are four graphic artists at TLEI. Their responsibilities include: • consult with the lecturer, instructional designer and project manager • ensure that agreed deadlines are met with regard to the development of graphics • produce a concept design for the "look and feel" of the online course • produce all the necessary graphics, banners, icons for the course

APPENDIX F9

Service Level Agreement with lecturers

University of Pretoria

TELEMATIC LEARNING AND EDUCATION INNOVATION

Service Level Agreement for Web-supported Courses

Introduction	The Department of Telematic Learning and Education Innovation (TLEI) strives to provide exceptional service to its users in academic departments. In order to meet expectations, it is necessary to reach agreement on the development process and mutual commitments.
Services	In addition to web-based and multimedia course development, the E-education division of TLEI offers graphic, video and photographic services. TLEI recommends that Departments make use of these services to ensure a high standard of quality.
Projects	TLEI can only allocate internal resources to projects where the required project proposal has been approved by the Steering Committee for Telematic Learning and Education Innovation. ☞ For details about the submission of project proposals, see http://www.up.ac.za/telematic/intranet/projects/projects.htm
Ownership	The ownership of a Telematic project resides with the Academic Department and therefore the Project Leader is usually the Head of Department or appointed senior lecturer.
Management of seed funds	The seed funds allocated by the Steering Committee to a project are managed by the Project Leader in the academic department. ☞ For details see http://www.up.ac.za/telematic/intranet/projects/projects.htm#funding
Project team	For each project approved by the Steering Committee a project team is appointed consisting of the following role players: • Project Leader (Head of Academic Department) • Project Manager (TLEI) • Lecturer/s • Instructional Designer (TLEI) • Educational adviser (TLEI) • Information specialist (AIS) • Graphic artist (TLEI) • Other support services, if necessary

Web Content Development

Study guide	• The final version of the course study guide, complying with our minimum requirements, is the source document for the initial HTML development of web-based courses.
Development time	• Allow **two weeks** for the development of the prototype after the **final** study guide had been submitted to TLEI, with the exception of the peak periods November to February and June to August each year, during which **four weeks** development time is required. • This development period may need to be extended for comprehensive courses including for e.g. a large volume of course content, interactivity, intricate navigation systems and scanned articles. • If the prototype is intended as a template for further modules, allow **one week per module** after the final version of each study guide has been submitted**.** • All development and QA should be scheduled for completion at least one week before the commencement of the course.
Formats	• Do not use styles, underlined text, colours, highlights, track changes, hyperlinks and strange fonts when preparing the study guide. • Specified fonts : Arial and Times New Roman. • Do not "Save as HTML" in Word. • Hyperlinks will be added by the web developer**.**
Instructions to the web developer	• Instructions to the developer should be submitted electronically in a separate document and must not be included in the study guide.
Graphic design	• Graphic work is completed simultaneously with the development of the web pages. • Evaluation of the prototype includes evaluation of the look and feel and general graphic design.
Services for the account of the Academic Department	• The Academic Department will be invoiced for the following services: o Commercial images from an image library o Scanning o Photography o CD reproduction o Video shooting and editing o Copyright clearance for video / sound clips used by TLEI in developing a product Price lists, which are updated bi-annually, are available from TLEI and Departments are required to familiarise themselves with the current price list.

Reproduction of CD-ROMS – Art work for the inlays	• The art work for the front and back inlays of the CD-ROM is discussed at the time of the evaluation of the prototype. • The graphic design section of TLEI will submit a concept design. • Reproduction of these inlays is outsourced and takes 5 working days after final approval of the design by the project leader.
Reproduction of CD-ROMS – duplication of CD-ROMS	• The graphic design section of TLEI will reproduce a maximum of 5 CD-ROMS for demonstration purposes. • Reproduction of more than 50 CD-ROMS is outsourced, and takes 4 working days from the time of the placement of the order to final delivery to TLEI. • In-house reproduction will take 3 working days once the Project Leader and Instructional Designer are satisfied that all the content is ready for the CD-ROM.
Quality Assurance	• Departments submitting video and photographic content which they have produced themselves must ensure that they comply with the standards documents produced by TLEI. • The Project Team is responsible for quality assurance of course design and development. • All interface design for web courses developed by lecturers themselves is subject to approval by the Project team. • The Project Leader is required to participate in the QA sessions and to sign off the QA report when the web course is acceptable. • After sign-off, the web course is transferred to the Virtual Campus, for live delivery to students. • Once the course is on the Virtual Campus, the content may not be changed during the semester, with the exception of dates and/or small errors.
Maintenance	• In the event that more than 6 HTML pages require editing, a reasonable time schedule must be negotiated with the Project Manager. • Smaller changes to content must be requested electronically in the following format, referring to either the study guide or the actual web page : Example Study guide p.1 – par. 2. Replace “workshop date to be announced” with “Workshop : 15 September 2000” OR Web page Under Workshops : par 2. Replace “workshop date to be announced” with “Workshop : 15 September 2000” • Handwritten changes will not be accepted. • An annual review of the course can be negotiated with the Project Manager.

Additional content	• A reasonable delivery date should be negotiated with the Project Manager in the event that additional content needs to be added to the study guide. • It is the lecturer's responsibility to inform students of additional material/changes via the Discussions Tool.
Facilitation of learning	• It is the lecturer's responsibility to facilitate the learning process and to ensure that communication takes place, making use of the communication tools in WebCT.
Marks	• It is the responsibility of the lecturer to add and release students' marks in the WebCT course.
Staff training in WebCT	• Lecturers are requested to attend at least the WebCT High Impact training course, offered once a month. • Advanced training in WebCT is available for those lecturers who wish to acquire WebCT Designer skills. • The online registration form is at http://www.up.ac.za/telematic/intranet/training/webct/registration.htm

APPENDIX F10:

Quality Pledge

University of Pretoria

Department of Telematic Learning and Education Innovation

A VISION

To establish education excellence at the University of Pretoria.

B MISSION

TLEI leads, facilitates and participates actively in actions aimed at education innovation focussed on the establishment of flexible learning environments, to address the education needs of our clients.

C QUALITY PLEDGE

We undertake to implement our mission in a manner which takes into account the needs, knowledge, skills and attitudes of our clients, namely academic staff and students as well as external clients and stakeholders.

We commit ourselves to the delivery of services, products and systems which embrace the following principles:

1. Fitness for purpose
2. Client satisfaction
3. Cost effectiveness
4. Defined standards
5. Negotiated time frames
6. Continuous improvement of our processes and functions.

Approved and signed by all the staff of TLEI:

.....
DATE

APPENDIX F11:

Master Document List

TLEI QUALITY MANAGEMENT SYSTEM			
MASTER LIST OF PROCEDURES, FORMS AND CHECKLISTS at 7 AUG 2003			
Procedure No.	**Procedure Title**	**Current Version**	**Date**
1a	**Full Project Proposals**	Version 1	07-Aug-03
	Sample Project Proposal		
	Show Evaluation Form		
	Needs Assessment Checklist	Version 1	07-Aug-03
	Intranet - Tariff Lists		
	Intranet - Guidelines for project proposals		
	Intranet - Criteria for evaluation of proposals		
1b	**Online course registration procedure**	Version 1	07-Aug-03
	Intranet - Mini Project Proposal form		
	Letter of Approval template		
2	**Project Approval and Initiation**	Version 1	07-Aug-03
	Letter of Approval template		
	Intranet - Seed funds policy		
	Seed funds application form		
3	**Academic Staff Training (WebCT)**	Version 1	07-Aug-03
	(under control of presenters and CE@UP)		
4	**Product Analysis**	Version 1	07-Aug-03
	Instructional Design Toolkit		
	Preliminary schedule		
5	**Design and Prototype Development**	Version 1	07-Aug-03
	Multimedia Design Specifications		
	Minimum requirements for WebCT portals		
	Minimum requirements for WebCT modules		
	Screen design guidelines for WebCT		
	Design Standards and Principles		
	Multimedia Evaluation Checklist		
	Video Design Standards		
6	**Prototype Demonstration**	Version 1	07-Aug-03
	Design Standards and Principles		
	Screen design guidelines for WebCT		
	Multimedia Evaluation Checklist		
7a	**WebCT Development**	Version 1	07-Aug-03
	Screen Design Guidelines		
	Design Standards and Principles		
	Video Design Standards		
7b	**Multimedia Development**	Version 1	07-Aug-03
	Multimedia Design Specifications		
	Video Design Standards		
8a	**Formative Evaluation for WebCT**	Version 1	07-Aug-03
	QA Report		

8b	**Usability Testing for Multimedia**	Second Draft	07-Aug-03
	Consent Form		
	Online heuristic evaluation		
	Multimedia Design Specifications		
	Multimedia Evaluation Checklist		
	QA Report		
9	**Student Orientation**	Version 1	07-Aug-03
	WebCT training questionnaire		
10	**Implementation**	First Draft	23-Apr-03
	?		
11	**Summative Evaluation**	Second Draft	01-Aug-03
	WebCT Experience Survey		
	WebCT Course Specific Survey		
	Summative Evaluation Checklist		
12	**Review, Maintenance & Support**	First Draft	10-Mar-03
	?		
13	**Project Management**	First Draft	28-May-03
	Request for transfer of seed funds		