# The Applicability of Quality Management to the Field of Web-Enhanced Learning in Higher Education Institutions

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Signed: Date:

## Dedication

To my parents, late father Hassan, who believed in education and encouraged me to set my goals and work hard to achieve them. To my mother, I am sure you are proud of me. Thanks for your praying for me and encouraging me to push on when I felt like giving up.

## Acknowledgement

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## Glossary

| | |
|---|---|
| AASTMT | Arab Academy For Science & Technology And Maritime Transport |
| ADDIE | Analyze – Design – Develop – Implement – Evaluate |
| AUC | American University In Cairo |
| BLA | British Learning Association |
| CACE | Canadian Association For Community Education |
| CDPD | Course Design And Production Department |
| CHEA | Council For Higher Education Accreditation |
| CSF | Critical Success Factors |
| DRM | Design Research Methodology |
| EFMD | Foundation For Management Development |
| EFQM | European Foundation For Quality Management |
| ELCP | E-learning Core Procedure |
| ELIP | E-learning ISO Procedure |
| ELSP | E-learning Support Procedure |
| ENQAAA | Egyptian National Quality Assurance And Accreditation Agency |
| EQA | External Quality Assurance |
| EQO | European Quality Observatory |
| ESCSF | Education Support Critical Success Factors |
| GUA | Global University Alliance |
| HE | Higher Education |
| HEI's | Higher Education Institutions |
| ICCTA | International Conference On Computer Theory And Applications |
| ICT | Information And Communication Technology |
| IHEP | Institute For Higher Education Policy |
| ILO's | Intended Learning Outcomes |
| IT | Information Technology |
| LICSF | Learning Interaction Critical Success Factors |
| LMS | Learning Management System |
| LQIP | Learning Quality Improvement Programme |
| LTSN | E-learning Guide – Learning And Teaching Support Network |
| MHE | Ministry Of Higher Education |
| MMC | Multi Media Centre |

| | |
|---|---|
| Moodle | Modular Object-Oriented Dynamic Learning Environment |
| MR | Management Representative |
| NAQAAE | National Authority For Quality Assurance And Accreditation Of Education |
| NCERD | National Centre Of Educational Research And Development Of Education |
| NEA | National Education Association |
| NQAAC | National Quality Assurance And Accreditation Committee |
| NYU | New York University |
| PCA | Principle Component Analysis |
| PDCA | Plan-Do-Check-Act |
| PQI | Productivity And Quality Institute |
| PRCSF | Personal Relevance Critical Success Factors |
| QA | Quality Assurance |
| QAA | Quality Assurance Agency For Higher Education |
| QAAP | Quality Assurance And Accreditation Project |
| QMS | Quality Management System |
| RFDQ | Reference Framework For The Description Of Quality |
| RMIT | Royal Melbourne Institute Of Technology |
| SCIL | Stanford Centre For Innovations In Learning |
| STARS | Students Thriving, Achieving And Recognizing Success |
| TAM | Technology Acceptance Model |
| TQM | Total Quality Management |
| TSCSF | Technical Support Critical Success Factors |
| TTCSF | Technology Tools Critical Success Factors |
| UCSF | Universal Critical Success Factors |
| UKQAA | United Kingdom Quality Assurance Agency |
| UNESCO | United Nations Educational, Scientific And Cultural Organization |
| WBL | Web-Based Learning |
| WCET | Western Cooperative For Educational Telecommunications |
| WEL | Web-Enhanced Learning |

## Abstract

Quality assurance in higher education and E-learning are current and topical, yet seldom overlap (Arbaugh, J. B., 2004).

Higher education institutions are facing pressure to become more focused on the needs and expectations of clients and to compete in the global environment, especially given the growing and enhanced information and communication technology.

According to Allen & Seaman, (2007) calls for quality promotion, evaluation, client satisfaction and value for money are driving the pedagogical revolution that cannot be neglected.

Quality management in higher education and web-enhanced learning provide the context of this study. The research in this study is concerned with applying a quality management system to web-enhanced learning in higher education and seeks to answer the following questions:

- What are the critical success factors for quality web-enhanced learning?
- How could a quality management system be used effectively in the design process of Web–Enhanced Learning?
- What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning?

The research methodology is case study based; exploring the need for a possible implementation of an effective quality management system in web-enhanced learning in an electronic learning environment at the Arab Academy for Science, Technology and Maritime Transport.

The conceptual framework of this study (Figure 4.5) is based on quality management systems theory and instructional system design.

The field of web-enhanced learning is still suffering from the different gaps presented in the benchmarking and best practice as presented in the calls for improving the quality of e-learning which triggering the rationale of this research (see section 1.3).

The process-based quality management system in this case study and the artifacts it produced, is a contribution to quality management practice and criteria that will

assist the Higher Education Institutions in evaluating academic support units, with particular reference to web-enhanced learning.

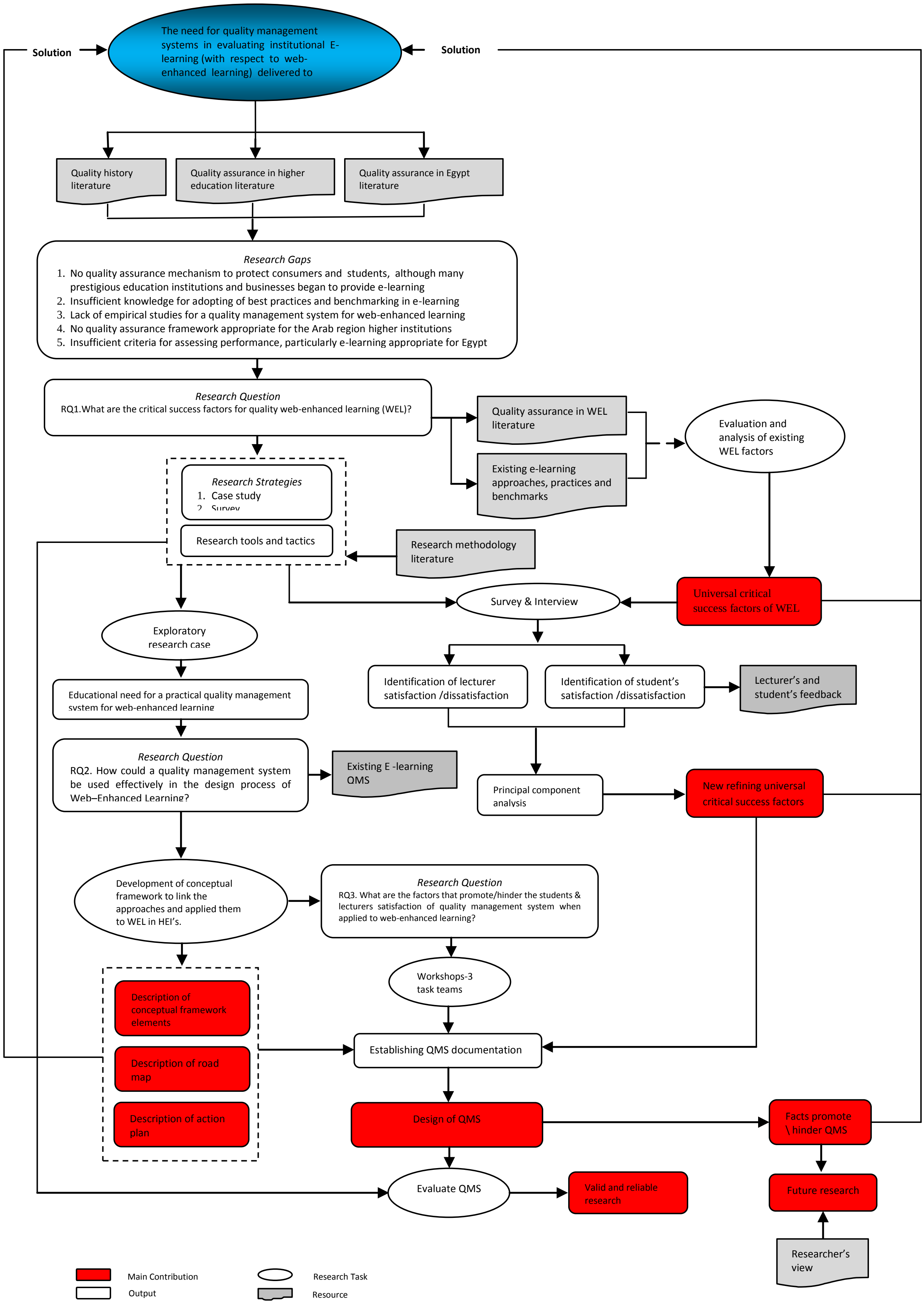
These artifacts are summarized below and could be generalized to other e-learning support units in other higher institutions.

- The associated capture and analysis of the critical success factors (CSF) using students and lecturer's satisfaction/dissatisfaction measures is a repeatable approach and as such is a contribution to the theory of quality web-enhanced learning and does not rest on the case study alone.
- The technique used in combining the existing ISO standards upon which to base the WEL QMS procedural instance is repeatable and a methodological contribution. Procedures can be adopted and customized for similar higher education institutions
- The process of a proposed Quality Management System (QMS) approach in this case study and the results in terms of the methods, approach and detailed analysis it produced, are contributions to the theory of quality management system.

The figure below represents a summary of the research process clarifying the relation and interactions of the research questions and the related research findings.

During the journey of the thesis work and regardless the Quality Management Systems debate, it was found that taking the approach of Quality Assurance with respect to continuous improvement, such principles and methods may be modified and successfully applied to e-learning Higher Education Iinstitutions. Obviously the service quality of client satisfaction should be addressed and researched in order to continually improve the products or the services offered. As such ccomprehensive evaluation of web-enhanced learning by lecturers and students needs to be enabled on regular basis.

For of lecturers, the qualitative approach yielded more valuable and meaningful data than a wide e-mail questionnaire would have done. Lecturers are keen and willing to share their sincere experiences and needs. The human element in terms of both lecturer buy-in and student use of web-supported learning determines the vital success of using technology to enhance teaching and learning.




Summary of research process

# CHAPTER 1

# THEME ANALYSIS AND FORMULATION OF THE PROBLEM

## 1.1 GENERAL ORIENTATION TO THE RESEARCH

E-learning is a force to be reckoned within education, where lifelong learning is taking on a significant presence now. (Britain S., 2004). As with all educational institutions, higher educational institutions need to consider adapting and implementing E-learning with greater success and efficiency to compete in the marketplace.

The need for quality assurance in E-learning has arisen in international and national educational policy discussions as well as in quality surveys and questionnaires targeted at university students and teachers. E-learning has established itself as part of everyday operations in universities. (Institute for Higher Education Policy, 2000).

Although quality assurance has recently become one of the most debated issues in the education and training area, both nationally and internationally, literature on research that has been conducted in quality assurance in e-learning, with special reference to web-enhanced learning, is unclear. In a study of the quality assurance audit manuals of 12 different countries, only two references were found to quality criteria for distance education and no references to such criteria for e-learning (Schwarz, S., & Westerheijden, D. F. (Eds.). (2004b)). Thus there is a need for a study on how to systematically improve the quality of E-learning opportunities.

Understanding quality assurance has become an important issue to the success of institutions as well as companies. One of the problems in E-learning is that the quality terminology is still vague. People are using the terminology ambiguously, without defining the exact term. Thus, quality terminologies have to be clarified before the quality process can continue. The terminologies of quality, quality assurance and quality management are vague, ambiguous and difficult to define. (Harvey & Green, 1993). Section 1.8.2 explains these terminologies, as well as in the literature review in chapter 2.

In this study, quality management is seen as creating quality systems; quality assurance is applied to processes. Quality management procedures are the practical steps in enhancing the quality systems inside institution operations. There is still uncertainty and doubt among many as to what actually constitutes a quality E-learning approach. Although more and more institutions seek to use E-learning as a mode of delivery for their units and courses, and more and more they are being held accountable for the quality of the services they provide, the need grows for accepted standards and benchmarks against which performance can be judged. (Parri J. 2006).

One main instrument for quality management enhancement is evaluation. As noted by Reeves & Hedberg, (2003):'Decisions informed by sound evaluation are better than those on habit, ignorance, intuition, prejudice, or guesswork….far too often people make poor decisions about the implementation of interactive learning systems because they lack pertinent information'.

The evaluation process is linked directly with improving the quality of learning services and products. The conceptual framework in chapter 4 presents the evaluation process with the quality management system. The study shows how evaluation can be used as a participatory tool for quality enhancement within the implementation of E-learning programs by using questionnaires and interviews with practitioners. The purpose of this chapter is, therefore, to outline the research problem as well as the circumstances that triggered this research. The aims and objectives that informed and guided this research are captured in this chapter, and at the same time, the research methodology, the definition and clarification of terms as they are used in this research and the plan of the whole research project are discussed.

## 1.2 MOTIVATION FOR DOING THE RESEARCH IN THE FIELD OF QUALITY IN HIGHER EDUCATION

In Egypt, prior to 1990, the higher education sector was fragmented, and uncoordinated. Higher education system comprises universities and higher education institutions, besides governmental and private universities.

There were 12 public universities, 37 public technical institutes and only 4 private universities, within different authorities of educational administration of public sector and private sector at the Ministry of Higher (NCERD, 2004).

These various types of universities and institutions demonstrated vast quality differentials in terms of resourcing, academic provision, research outputs and student access (Ministry of higher education, 2000).

In the mid of 1990's, significant attention was given to re-engineering and revitalising the education system in general and higher education in particular. Part of these transformation initiatives was a greater need for and attention to quality assurance in the higher education sector. Other transformation initiatives involve the university degree standards and levels should follow such pattern which will improve performance quality levels. (NCERD, 2004).

Although the attention of national and international quality agencies has focused on quality assurance in higher education (see chapter 2), the quality argument and the E-learning argument have had little to do with each other, for the following reasons (Reid, 2003; Oliver, 2001; Herrington et al, 2001):

- quality related to online teaching are relatively new concepts in higher education;
- the quality argument operates mostly at national quality agencies level, while the online argument operates at institutional level;
- responsibility for quality assurance of web-enhanced learning rests within different parts of the university.

These reasons highlight the objective which drives this study, explicitly the call to enhance E-learning (in terms of web-enhanced learning) provided to students by the use of a suitable quality management approach in higher education.

## 1.3 RATIONALE THAT TRIGGERED THIS RESEARCH

While working in the field of education and quality assurance, I became interested in the evaluation of E-learning interventions from the perspective of standard quality management system. I discovered that much has been written on quality management systems in higher education in general, but little done for application of quality management system to E-learning or web-enhance learning. Hence I tried to explore the debate of applying a suitable quality management approach in education in general and to E-learning in particular. I needed to work towards an understanding of what quality means in E-learning and how E-learning users may move towards the task totally, considering the needs and input of all role players.

My investigation into current literature revealed five motivating issues and gaps needing to be explored in the research (in the paragraphs that follow, the terms E-learning, support-hyper learning and online learning are used depending on the given context and the terminology used by the respective authors). These issues and gaps are presented as follows:

1- **Implementing E-learning quality:** UNESCO mentioned the importance of assuring quality of E-learning to achieve their objectives (UNESCO, 1998).

(Baker, R. and Papp, R., 2004) stating that there was no quality assurance mechanism to protect consumers and students, although many prestigious education institutions and businesses began to provide e-learning. ((Oliver, R. and Herrington, J. (2003)) indicates that the need grows for accepted standards and benchmarks against which performance universities seek to use E-learning as a mode of delivery for their units and courses to be judged. Furthermore a study by the European Quality Observatory (EQO) indicates that quality is seen as very important, but is seldom implemented in practice.

2- **Adopting of best practices and benchmarking**: Numerous sets of principles, standards and checklists have been published (Milne & White 2005) and many governments and organizations in various countries are developing ways of measuring and producing best practices and benchmarking for learning quality in higher education but little is for support-hyper learning in higher education. A study by the European Quality of E-learning (Quality E-learning handbook, 2004) arose out of the need to establish the usage and state-of-the-art of quality in European e-learning.

3- **Appropriate quality assurance framework for the Arab region**: Alsunbul A. (2002) pointed out that 'the issue of quality assurance in the Arab countries stems from the fact that universities which adopt the on-line education model have undertaken no effort to establish national standards to assure the academic quality of all processes conducted by universities, particularly with regard to the course materials and their relevance to the Arab world context.

4- **Appropriate for Egypt:** Said (2001) highlights that there are no quality assurance mechanisms in place to evaluate E-learning teaching (formative or summative). There are insufficient criteria for assessing performance, particularly e-learning. El-Shenawi (2005) outlines that there is limited expertise for developing strong standards for performance, and no generally available data that could readily be used as indicators of E-learning educational quality.

5- **Quality management system for web-enhanced learning at the Arab Academy for Science and Technology (AASTMT):** One of the main strategic orientations of the AASTMT is quality, as stressed by the president in recognizing the importance of quality education, The Arab Academy for Science and Technology (AASTMT) shaped the Productivity and Quality Institute (PQI) and supported it with resources so as to become the focal point of the transmission of quality services. PQI maintains professional, highly qualified and competent staff with an overriding role of using the state-of-art tools available to bring the most effective ideas and approaches to develop and create workplaces and a quality environment in Egypt and the Arab region. Quality must become such a differentiating factor for the AASTMT - quality of academic research, quality of student life, client service, and quality of the people who become as graduates.(AASTMT achievement report, www.AASTMT.org)

Regarding that mentioned above, it is obvious that there is a need for quality management systems in evaluating institutional E-learning (with respect to web-enhanced learning) delivered to students.

**1.4 STATEMENT OF THE PROBLEM AND RELATED QUESTIONS**

The background and aim of this research is the perceived need to apply quality management system procedures/guidelines to web-enhanced learning in higher education institutions. Such application inevitably means searching for factors and practices which can be used to improve the quality of web-enhanced learning (WEL). In view of the circumstances presented above, the power of this study will give rise to the following questions:

- What are the critical success factors for quality web-enhanced learning?
- How could a quality management system be used effectively in the design process of Web–Enhanced Learning?
- What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning?

It should be emphasised at this point that the focus of this research is the investigation into the construction of a WEL quality management system (QMS) rather than investigating the WEL process itself. The emphasis is thus on the WEL process' inputs and resultant outputs keeping the WEL process methodological framework constant. In this way the resultant QMS should be generic.

## 1.5 OBJECTIVES OF THE RESEARCH

This research sought to achieve the following objectives:

- To explore the most critical success factors involved in the instructional design process of web-enhanced learning (WEL)
- To explore a way for the systematic development of a quality management system approach for a web-enhanced learning environment.
- To formulate and evaluate quality assurance practice in the form of a formal quality management system (QMS), for web-enhanced learning. This would imply the formation of a QMS conceptual model and system prototype.

## 1.6 RESEARCH METHODOLOGY

The research methodology refers to the overall approaches and perspectives to the research process as a whole, the choices made and the strategies that were used to answer the research questions (Neville C., 2005). The theoretical thinking of this research has grown from the positivist epistemology towards a more interpretive epistemology. This can be clarified by trying to understand the fact of quality in web-enhanced learning and being in the same time personally involved in the research project investigating the quality approaches, systems and evaluation. Also having a concern for individuals involved (clients and E-learning users), at last having a practical interest in the case study, in order continuously to improve quality practices in education.

Blessing & Chakrabarti et al**.,** approach presented in figure (1.1) explains the researcher theoretical thinking, where it is concerned with the four main stages regarding Design Research Methodology (DRM).

The DRM emphasizes:

- to identify the aim that the research is expected to fulfil and the focus of the research project;
- to focus Descriptive Study I on finding the factors that contribute to or prohibit success;
- to focus the Prescriptive Study on developing support that addresses those factors that are likely to have most influence;
- to enable evaluation of the developed support (Descriptive Study II).

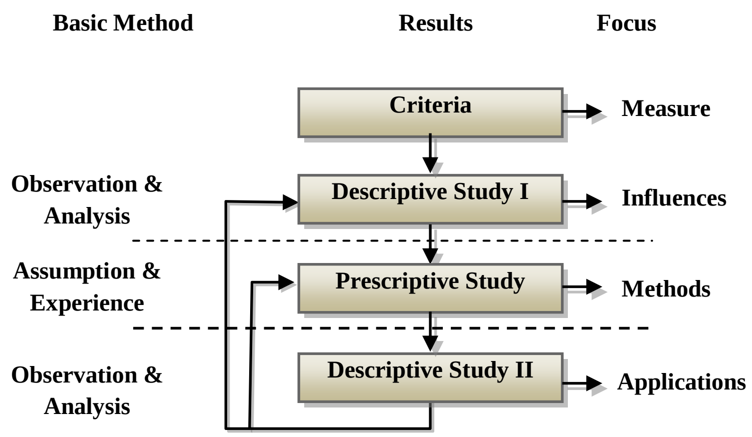



**Figure 1.1 DRM Framework (Blessing & Chakrabarti et al., 2009)**

There are two factors in the state-of-the-art context. The first being the quality assurance/ management and the second is the WEL development, this is demonstrated in the DRM by identifying the relation between quality and web-enhanced learning as a particular phenomenon by establishing a QMS to enhance the WEL courses.

The second is the literature review searching for universally-accepted critical success factors (CSF); this became the basis for the research work having a descriptive study to identify the universal critical factors which influence the quality of instructional design in WEL. The universal CSF (UCSF) were then refined and expanded. This was done by establishing a case study in which students and lecturers were counselled through interviews and questionnaires, having a prescriptive study using a case study with individuals (lecturers & students) involved in the process of WEL and formation (refined and expanded) critical success factors. Their feedback was analyzed with respect to finding the principal components, the output of which was used to supplement and augment the universal CSF in order to tailor these better towards the specific E-learning sub domains of web-enhanced learning, evaluating the outcomes of the case study by descriptive study II in the form of establishing a QMS prototype. The formation of specific CSF web-enhanced learning enabled the compilation of a limited quality prototype system (QMS). Table 1.1 describes in detail the relation between the DRM framework and the thesis research design. This study was both quantitative and qualitative. An attempt was, as quoted by DeVaus, D. A. (1995) to differentiate the two approaches by stating that:

- Qualitative research methods deal with data that are mainly verbal.
- Quantitative research methodologies deal with data that are mainly numerical.

The detailed research approach and methodology are described in chapter 5.

**Table 1.1 Research 'situation' related to the DRM.**

| Result | Process | Focus | Outcome |
|---|---|---|---|
| **Criteria** | Problem Definition<br>Problem Questions | - Implementing e-learning quality – Adopting of best practices and benchmarks – Appropriate quality assurance framework – Appropriate framework for Egypt – Adopt QMS for e-learning in AASTMT | Five key issues triggered this research |
| **Descriptive Study I** | Search, analyse and comment on the literature<br>Search to build the categorization set of the most general critical success factors which help in building the student questionnaire and lecturers' interviews | - Quality in higher education institutes<br>- Quality in e-learning<br>- Universal critical success factors of WEL<br>- Lecturers' category – Students' category<br>- Institutional category - Pedagogical category<br>- Technology category<br>- Evaluation and Assessment category<br>- Instructional Design category | Literature debate of quality in higher education in general and in E-learning in particular + WEL literature for universal critical success factors |
| **Prescriptive Study** | Based on the analysis of the student questionnaire and lecturers interviews using PCA analysis, refined critical success factors introduced + combining ISO9001&ISO19796 | 1) web facility ease of use, (2) infrastructure reliability and effectiveness, (3) student perception of LMS effectiveness, (4) student interactive collaboration capabilities, (5) Course assessment, (6) Course planning and development, (7) instructor attitude and control, (8) sufficiency and adequacy of university support activities. | Proposed Approach to QMS development |
| **Descriptive Study II** | Build up QMS with regard to refined CSF<br>Proposed QMS approach<br>Focus groups validation using two focus groups of students and lecturers | Action plan – Roadmap and Limited prototype QMS<br>QMS validation | Validated QMS development approach |

Table 1.2 below illustrate the philosophy describing the two research methodologies (positivistic and phenomenological) is in line with Collis & Hussey (2003) practical mixed methods approach, in which there is a concern with applications and solutions to problems.

This philosophy reflects on the study by focusing on trying to understand the phenomenon of quality in web-enhanced learning, also investigating the concern for lecturers and students involved in web-enhanced learning. A case study, observation and reviews-related studies and data were the practical interests in order, continuously, to improve real-world practice.

This study uses qualitative methods, such as, structured interviews with lecturers (Yin, 2003a) and focus groups with lecturers and students. Chapter 5 section 5.4

gives details of the research approach and strategy involved for these data-collection methods. Quantitative methods are also applied in the form of statistical analysis of student surveys (see chapter 5 section 5.6.1). In keeping with the exploratory nature of this study and the mixed-methods approach, a combination of data were gathered from interviews, observation, surveys and focus groups.

Table 1.2 summarizes the research methodology and data-collection techniques used in the research. Each technique is associated with one or more primary methods (i.e. qualitative or quantitative), the kind of information obtained, and the form of the resulting data.

**Table 1.2 Research methodologies and data collection technique summary**

| Research Methodology | Primary Method | Technique | Information Obtained | Forms of Data | Analysis |
|---|---|---|---|---|---|
| Literature Review | Literature Review | Qualitative | Analysis in the context of the quality – Quality in Education Quality in HE and finally quality in e-learning | Narrative text | Content analysis |
| Survey **(Positivistic)** | Questionnaire | Quantitative | Quantifiable assessments of WEL critical success factors and students' satisfaction /dissatisfaction. | Numeric data | Descriptive statistics |
| | Interview | Quantitative | Quantifiable assessments of lecturer satisfaction with WEL courses | Numeric data | Descriptive statistics |
| Case study & Ethnography **(Phenomenological)** | Participant as Observer | Qualitative | Variables affecting students' and lecturers' satisfaction viewpoints to prototype a QMS procedures/documents of WEL courses with respect to instructional design process | Narrative text | Content analysis |
| | Focus Groups | Qualitative | Clients (students & lecturers)specific perspective on Prototype QMS | Narrative text | Content analysis |

## 1.7 POSSIBLE SIGNIFICANCE AND BENEFICIARIES OF THE RESEARCH

The significance and beneficiaries of this study is underlying to the following:

- Provide an understanding of various factors, practices and frameworks to enhance the quality of web-enhanced learning in higher education.
- Assist in promoting and enhancing quality in on-line learning in higher education, including web-enhanced learning.
- Provide quality concepts and quality assurance experience from other domains.

- The significance of this research may be demonstrated by exploring how a quality management systems' approach can promote continuous improvement to web-enhanced learning using client feedback and evaluation processes.
- Guide and enable the researcher and the higher institutional instructional designers to collaborate with lecturers and students (clients) in designing courses, and setting strategies that instructional designers can use as they work with lecturers in the design process.
- The AASTMT, which will be able to offer a case study on the application of quality management system to web-enhanced learning;
- Other higher education institutions, in which support units will be able to apply the factors identified to improve the quality of web-enhanced learning;
- The National Quality Assurance and Accreditation Committee (NQAAC) in EGYPT, which will be able to draw on the refined critical factors identified to use as criteria for the quality assurance of web-supported learning;
- The academic community in the field of quality management of web-enhanced learning in higher education.

## 1.8 RESEARCH CONTEXT

The context of the research problem is described in this section. The unit of analysis for this case study is the Course Design and Production Department (CDPD) at Multi Media Centre (MMC) at the Arab Academy for Science & Technology and Maritime Transport (AASTMT), Egypt. The local context regarding AASTMT is presented here, followed by major contextual concepts is used in this research: *quality, web enhanced learning and higher education*. Hence, they warrant clarification.

### *1.8.1 AASTMT context*

The Arab Academy for Science and Technology& Maritime Transport (AASTMT) is of the largest non-governmental higher education institution in Egypt, with approximately 15000 students and 2500 academic staff members (AASTMT achievement report, www.AASTMT.org). The Academy set the grounds for Quality and Productivity studies, research and services, Computer literacy, Multi-modal Transportation and Logistics, participation in training on Crisis and Disaster management, in addition to implementing the latest techniques in using Multimedia to serve educational, training and research processes(www.AASTMT.org).

The AASTMT nature contributes to the in progress mission for quality improvement, particularly in e-learning. Since the introduction of E-learning at AASTMT in 1995, MMC was responsible to deliver flexible learning through a variety of media and enhanced by technology. CDPD at MMC is the case on which this study is based.
CDPD provides support to members of staff, who desire to improve education, multimedia, E-learning and multimedia courseware, Intranets and CD-ROM discs. CD/online hybrids are also produced to make use of the strengths of both environments; speed of multimedia on CD-ROM and online updating and dynamic performance of the Internet. Consultations for educational matters are offered, especially for instructional design of learning materials. Also training is offered for lecturers providing web-enhanced learning in the use of the learning management system, Moodle. Technical support is available to lecturers and students as well. Quality assurance theory refers to inputs, process, products and clients (ISO 9001:2004 standard). Process, products and clients in the context of this study are shown in figure 1.2.

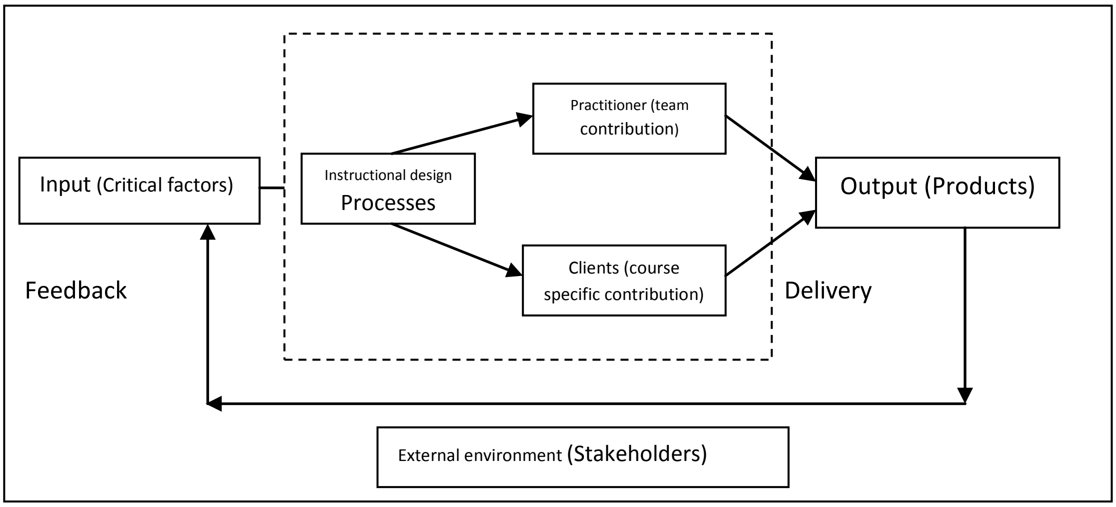



**Figure 1.2 Web-enhanced learning role players**

Clients of web-enhanced learning are the lecturers who deliver education in the form of enhanced technology and facilitation of learning materials. The other clients are the students who taking web-enhanced courses that have been developed and implemented by CDPD. Management of the Academy who interest in the quality of web-enhanced learning, quality agencies such as NAQAA, parents and employers are the stakeholders.

The web-enhanced learning product considered all processes, materials, expertise and skills required to develop a web-enhanced learning course.

The instructional design process is generally based on the team work (Gustafson & Branch, 2002). Teams within the CDPD in this case typically consist of the practitioners (project managers, instructional designers, educational consultants, graphics specialist programmes) indicated in figure 1.2.

Inter-dependencies between all role players showed the contributions to the instructional design process of the web-enhanced learning.

### *1.8.2 Major contextual concepts context*

The study compromise three domains describing the context, each is discussed briefly in term of national or international issues, as applicable.

#### *1.8.2.1 Quality*

Quality control checks whether the produced product or offered service meets the set standards. Quality is sometimes checked at the end of the production process and somebody from outside the institution administers it. (Harvey, 2002). In web-enhanced learning, quality control is used to ensure that all process elements (technical, institutional, pedagogical…etc.) are functioning with a minimum of errors. Quality control takes corrective action after the faults have occurred.

Quality assurance is often presented as a technical issue that involves terminologies and procedures from handbooks. According to Harvey (1999) quality assurance is based on three main principles: control, accountability and improvement. Quality assurance is considered a preventive action before faults occur. The research study has emphasized quality assurance in the area of web-enhanced learning material (product).

Harvey indicates two main issues in his definition for quality assurance, which are accountability and improvement. The control of accountability and improvement of the process in the organization is called the quality debate, chapter 2, section 2.5.1 explore this in detail.

A quality management system (QMS) is" ……collective policies, plans, practices, and controls by which an organization aims to reduce and eliminate non-conformance to standards, specifications and customer expectations…..". It is formal because it consists of a system of controlled documented procedures for different processes which affect quality. (Parker, N.K. 2004).

The definition of quality within the context of this study explicitly, means continuous improvement in the search for excellence, where the quality management is seen as creating quality systems and refer to initiatives (either internal or external to an organisation), which are undertaken in the quest to assure and manage quality; quality assurance is applied to processes and criteria. Quality management procedures are the practical steps in enhancing the systems inside the organisational operations.

CDPD in AASTMT has used quality principles (control, assurance and management) to create a customized quality management system, which improve the quality of web-enhanced learning courses delivered to students in particular and lectures in general and put time frames to continuous improvement of the processes and functions.

### *1.8.2.2 E-learning*

Through increasing power and application of ICT, it is now practicable to integrate multimedia technology into teaching and learning processes. This penetration of ICT into the educational sector is currently transforming higher education institutions, resulting in a change in teaching and learning environments.

Thus the term E-learning includes a variety of electronic delivery media, such as, multimedia, virtual classrooms, video conference, etc. Other terms are used to refer to the use of the internet to enhance learning, for example on-line learning, technology–enhanced learning, blended web-based learning or internet-based distance learning, computer-mediated learning (American Federation of Teachers, 2000). Another term is asynchronous learning network. Mayadas, F. (1997) Web-enhanced learning is a subset of E-learning as shown in figure 1.3.

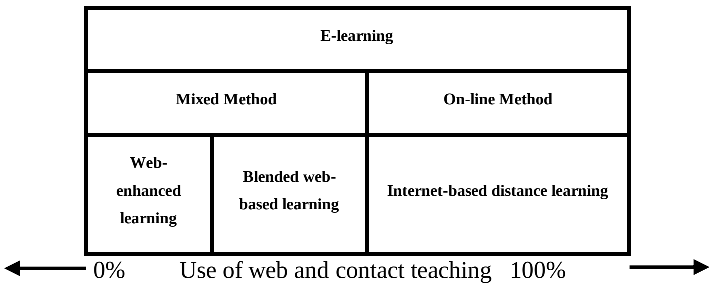



**Figure 1.3 E-learning methods**

In this research, the terminology of web-enhanced learning is used where students are expected to access on-line material and resources besides face to face learning. Web access is provided to a limited extent, but is optional for learners for a minor part of the course. The Web enhanced courses are face-to-face courses that make pedagogically significant use of the web through a course management system but do not reduce seat time, while blended courses that combine face-to-face and online instruction with reduced seat time. The internet-based distance learning is where the content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. (Tavangarian, et al, 2004).

A review of the various university web sites revealed that most universities internationally and in Egypt are implementing E-learning and try to use the advantages of web-enhanced learning. Egypt universities currently concerned in E-learning include at least, Cairo University, Ain Shams University, American University in Cairo (AUC) and AASTMT. This can be presented from papers presented at annual international conferences held by the AUC for E-learning applications and the annually International Conference on Computer Theory and Applications (ICCTA) held by ASSTMT.

However, E-learning now gives great support to higher education, still there is little about how to provide a range of web-enhanced learning tools to defined, high quality standards (El-Shenawi, 2005) as can be seen from issues made for research on the quality of E-learning(see section 1.3 rationale that triggered this research). This study attempts to apply standard quality management system to the filed of web-enhance learning in higher education, in the context of the AASTMT, which claims quality as one of its strategic drivers.

#### *1.8.2.3 Higher education*

The higher education sector context implies the university-type educational institutions, both private and public.

**Emergence of markets and students**

Higher education is no longer the preserve of small numbers of privileged students. There is an increased interest in and demand for higher education qualifications, which leads to increasing student numbers.

Therefore, the Higher Education Ministry in Egypt, is in favour of reforming the education system to increase competition and equip graduates with the tools needed to face the increasing demands of the employment market and has proposed setting up an independent body to set education standards and ensure that universities and higher institutions of learning adhere to these standards through a system of quality control.

**Rise of information and communication technology**

Information and communications technologies have grown quite rapidly. For higher education, it is hoped that this will make access easier to promote equity and improvement in the quality of education. It is argued that the aim of using technology is to enhance access and flexibility, while reducing costs and promoting quality (Kishun, 1998).

Many elements have seen significant evolution and improvement, including interface design, approaches to interaction and methods of delivery and integration. There is a fast-growing range of E-learning content and software products, more than simply the availability of technology in higher education; people in general are becoming more comfortable with the use of the internet in everyday life and its logical extension to the learning environment (Collis & Moonen, 2001).

**Globalization and transnational education**

Economic globalization has increased the role played by market mechanisms in the provision, steering and organization of higher education. Educational organizations worldwide are faced with increased competition due to globalization and have attempted to gain competitive advantage by positioning themselves as “excellent”.

**Client satisfaction**

Students of Higher Education perceive themselves to be external clients of a service. Hence, the staff and administrative members are internal clients. Therefore, clients’ satisfaction is possibly one of the crucial challenges facing both private and public Egyptian higher educational organizations.

Both the students and staff experiences have become an important dimension in the measurement of quality of education; this will require an intensive focus on clients, and successful identification of internal and external clients.

## 1.9 OUTLINE OF CHAPTERS

The structure and content of this thesis is described below. An overview of the structure of the thesis is given in table 1.3.

**Table: 1.3 thesis structure**

| No. | Chapter Title | Chapter Description | Method |
|---|---|---|---|
| 1 | Theme analysis and formulation of the problem | Initial Problem Definition | |
| 2 | The dynamics of quality movement and their influence on higher education | Quality History; Quality assurance in Higher Education; Quality assurance in Egypt | Search the literature review |
| 3 | Quality assurance practices and their relevance to web-enhanced learning | Quality assurance in WEL; WEL universal critical success 7 factors | Complete literature. Analyze and comment |
| 4 | Research concept framework | Select appropriate quality assurance standards | ISO9001&ISO19796 |
| 5 | Research methodology | Overall approaches & perspectives to the research | Case study – Surveys – Observation |
| 6 | Presentation and analysis of collected data | Refining the universal critical success factors in eight factors → Measure students' and lecturers' satisfaction | Student Questionnaire, Lecturers' Interview and principal component analysis |
| 7 | The quality management system | Evaluation ← Prototype QMS Development | Participant observation & Focus group |
| 8 | Summary of findings and recommendations | Findings & recommendations | |

**Chapter 1: Theme analysis and formulation of the problem**

In Chapter 1, the theme of the study, statement of the problem, the aims and the significance of the study have been constructed. Chapter 1 seeks to provide a comprehensive background, context for the research, motivation for the research and the problem to be investigated, including the research methodology and methods to be employed to collect data. This is meant to provide a clear picture of the research.

**Chapter 2: The dynamics of quality movement and their influence on higher education**

In Chapter 2, the dynamics of quality movement and its influence on higher education are discussed. The purpose of this chapter is to show how the quality assurance application can influence contemporary thinking of higher education regarding insight into the concept of quality and the promotion and enhancement of the culture of quality. It further seeks to illustrate how best quality practices can be adapted to higher education in Egypt.

**Chapter 3: Quality assurance practices and their relevance to web-enhanced learning**

In Chapter 3, the quality assurance practices in particular to the field of E-learning. The purpose of this chapter is to show what the universal critical factors are which affect the quality in E-learning in the context of Web-Enhanced Learning (WEL).It further seeks to illustrate the clients' satisfaction (students/lecturers) from the concepts of evaluation and continual improvement.

**Chapter 4: Research concept model**

Chapter 4 presents the concept definition of a web-enhanced learning quality management system as a three-layered hierarchical model, based on classical quality theory, quality standards and critical success factors. A conceptual framework was identified in order to present the research study work relevant to the hierarchical model.

**Chapter 5: Research methodology**

In Chapter 5, a detailed discussion of the qualitative and quantitative research design is outlined. This chapter seeks to provide the research design, which is the plan for doing the research. In addition, it presents a detailed discussion of the methods to be employed in this research for the collection of data.

**Chapter 6: Presentation and analysis of collected data**

In Chapter 6, analysis and interpretation of the collected data is undertaken. This chapter seeks to analyze the collected data regarding the research problem and interpret it.

**Chapter 7: The quality management system**

In Chapter 7, the development of a QMS approach used to assure the quality of WEL evaluated by an established prototype quality management system. This chapter outlines steps taken to establish the required QMS and it further seeks to validate the established QMS.

**Chapter 8: Summary of findings and recommendations**

In Chapter 8, a summary of the findings and recommendations is presented. The purpose of this chapter is therefore to make recommendations based on the findings and to provide some themes related to this research that warrants research.

## 1.10 CONCLUSION

Quality and quality assurance have become key issues for higher education internationally in the 1990s (Kells 1995; Kells and Van Vught 1989; and Harman, G. 1998). In many countries, managers of higher education systems and institutions are concerned about quality and how to put in place appropriate quality assurance mechanisms.

As presented above, higher education institutions are under pressure to be involved in quality assurance practices and institutions have to be involved in E-learning sooner or later, it is just a matter of time. However, this will not succeed unless it is combined with quality management systems. The relevance to the Arab environment and the definitions of used terms, the context of the research study are presented in this chapter. Three main domains construct the body of the research, where each domain is considered important for national and international higher education institutions delivering web-enhanced learning programs. Although, E-learning is now broadening access to higher education, it still requires the quality as seen from the calls made for quality in e-learning. This research seeks to respond to calls for quality assurance in the provision of web-enhanced learning, and investigates the most critical success factors to enhance the implementation of material delivered. The main output from this chapter is the set of research questions which will be used as the focus for the study, and for which answers will be sought through the development and evaluation of a WEL specific Quality Management System (QMS).

# CHAPTER 2

# THE DYNAMICS OF QUALITY MOVEMENT AND THEIR INFLUENCE ON HIGHER EDUCATION

## 2.1 INTRODUCTION

The philosophy of quality management helps both industrial and services organizations in different countries to compete globally. This philosophy includes principles that could be translated and applied to improve educational institutions and the system of education delivery (Holt, 1993; Blankstein, 1996; Weller & McElwee, 1997). Hence much has been written about quality, quality assurance in general and its application in higher education.

It is therefore the purpose of this literature chapter to illustrate how quality assurance influences the management of higher education internationally and nationally with reference to higher education in Egypt. It also reviews the literature in terms of the common understanding of quality and its associated philosophies. The critical contribution made by this quality movement is in the principles that are at present used in management systems in relation to customer satisfaction, and education has prompted its selection. It is important to understand the history and philosophy of quality so as to be able to inform and influence the effective management of quality assurance practices in higher education.

## 2.2 LITERATURE REVIEW SOURCES

Chapter 2 and chapter 3 will review the literature related to this study. As such a wide literature search was undertaken. The sources include books, electronic and paper journals, conference proceedings and international universities, quality assurance agencies' websites. The bibliographies of journal articles provide a rich source for further investigation.

One study was found close to my research problem, titled "Quality practices in web-supported learning in higher education: an exploratory study" Jill W Fresen. His study attempted to explores such guidance in the form of factors to promote quality web-supported learning in higher education institutions. Fresen (2005) built up a comprehensive taxonomy of universal critical success factors for web-supported learning, considered as a contribution to the theory of quality web-supported learning. The approach he used in design and development of QMS was based on ISO9001 and he concluded that it was difficult to build the QMS with regard to existed quality practices and guidelines.

My study explores such guidance in the form of refining the Fresen universal critical factors and practices such as ISO19796 and ISO9001 for developing a quality for web-enhanced learning in higher education institutions.

Fresen did not measure how effective is the taxonomy of factors in promoting the quality of web-supported learning courses, where this study indicate the most critical factors in the form of refining his universal factors. Also Fresen did not measure the feedback of clients regarding the established QMS in order to translate the feedback into specific improvements in client satisfaction measures, where my study go deeper and measure the feedback of clients in form of focus groups.

## 2.3 BRIEF HISTORICAL OVERVIEW OF QUALITY

It is important to realize that quality has been a priority issue, especially in the industrial environment around the world. Moreover, it has been at the top of educational policy makers' list of priorities, and improving quality is probably the most important task educational institutions are faced with today (Sallis, 1997). It is important to understand the history and philosophy of quality so as to be able to notify and influence effective management on education.

After the Second World War, the western world continued to focus on increasing production due to the rise in market demand. With increasing economic success, companies always had a market for their products; hence they were not inclined to concentrate on quality. In addition, customers' expectations of product durability and reliability were relatively low compared with today, as was the technology of both the products and manufacturing process (Beckford, 1998).

Today, organizations exist in an active global village, which is technologically advanced, competitive and quality oriented. For survival, organizations have no alternative but deliver high quality products and services, which is similar to delivering learning by a competent staff member with a quality education and training background. This is, therefore a clear indication that for long term success of business, the ability to deliver quality services and products depends on efficient human resources development. In the education sector, management researchers have written in depth about the effective and suitable methods of enhancing quality in a teaching and learning environment. This was accompanied by growing state interest in quality, dependent on establishing local or national quality agencies. By the end of the 1990s, concern for quality and standards was worldwide. (Throw, 1994).

## 2.4 THE NOTION OF QUALITY

The history of quality alone does not help much in providing the meaning of the quality concept. So it is important to explore the concept from different perspectives, so as to gain insight into it by discussing the nature of the concept and by looking for the notions of quality.

### *2.4.1 The nature of quality concept*

The concept of quality is very controversial globally. The main cause of this argument is that it means different things to different individuals; indeed, the same persons may adopt different conceptions at different moments (Harvey & Green, 1993).The concept is also perceived by Harvey & Green (1993) as being relative to the stakeholders. It is relative to the user of the term and the circumstances in which it is involved. This view therefore triggers the following question: Whose quality? For example, to an education establishment, a high-quality training programme may be one that turns out staff members with experience, flexible minds, readily able to acquire skills and adapt to new methods and needs, whereas to government it may be one that produces well-trained educators. The argument of quality is at the top of the agendas of educational policy makers and improving quality is probably the most important. According to Nightingale and O'Neil (1999), 'quality' is not a word people seem to find difficult, except when they are asked to define what they mean by it. Badley (1993) views the concept as one of those empty concepts that are confusing when people want to pick out a set of defining characteristics. He compares it to a chimera, because of its complicated nature. A chimera is an imaginary animal composed of the parts of different animals (Oxford School Dictionary, 2001).

Badley's article, titled "Quality Debate in Higher Education", that quality is an essentially contested concept. Its contentedness comes from its being descriptively or cognitively weak and at the same time, emotively powerful. Its status is high, its prestige is great, its trouble-making and mystifying character is immense and yet its meaning is elusive and vague (Badley, 1993). Tam and Maureen (1999), point views that although the concept of quality may seem to have an excellent image, it remains meaningless because of its ambiguity and abstraction; hence, there are opposing and conflicting views about it. Sallis, (1999) has summarized the contested nature by providing the following contradictions:

- Quality is both a strategic and an operational concept.
- Quality is both a visionary and a practical idea.
- Quality is both an absolute and a relative concept. It can mean both 'high quality' and 'fitness for purpose'.
- Quality is about both people and systems.
- Quality has to be defined both by the institution and its customers. The views of each may be very different.
- Quality can be allied to both 'hard' and measurable standards as well as to 'soft' and more intangible standards about care, courtesy, concern and comparison.
- Quality cannot stand still. The definition is never static. Today's high quality may be tomorrow's poor quality.

The different definitions attached to the global concept demonstrate its idea and controversial status. The following are commonly used definitions of 'quality':

- Conforms to specifications: A product or service that meets the design specifications is a quality product or service (Crosby, 1996).
- Fit for use: A product or service that satisfies the customer's expectations is a quality product or service (Gaither, G.H. 1998).
- Achievement of mission and goals (Green, 1994).
- Continuous improvement: An organization or programme that creates a climate for constant improvement is a quality organization or programme (Deming, 1994).
- Multifactor concept: Quality is a multifactor concept involving not only fitness for use, but also reliability, durability, aesthetics, etc (Garvin, 1988).

From above it is obvious that definition does not inform precisely what quality is. Some of it tells of the customer perception of quality of services and products. This confirms the vagueness of the concept. The concept of quality is viewed from different paradigms, hence different definitions. A paradigm, according to Babbie

(2001) is the fundamental model or frame of reference one uses to organize observations and reasoning.

### *2.4.2 Quality movement*

The quality movement has its origins in industry and commerce in the UK and the United States in the early part of the twentieth century. Industrial organizations committed to national standardization began in the UK and by 1932 had spread to twenty-five countries (Lewis & Smith, 1994). The factory system and the first assembly lines were attempts to increase productivity and reduce costs. The founding fathers of the quality movement (Taylor, Shewhart and Deming) set out to find ways to eliminate wastage and increase production. Taylor was particularly interested in applying scientific management techniques to improve productivity in factories.

However, his emphasis on the assembly line and the division of labour meant that management held the monopoly on knowledge and skilled workers were not appreciated for their craft (Whaymand, 2004). Taylor's defenders claim that his work was twisted and misapplied, yet today the term "Taylorism" has the connotation of machine over man and productivity at all costs (Gabor, 1990). Perhaps the most well known expert in Quality is W. Edwards Deming, who devised a business philosophy known as Total Quality Management (TQM), which has been embraced worldwide This philosophy helped to lift Japanese industry to achieve world-class standards of quality (Tirupathi R. Chandrupatla, 2009). TQM is based on the beliefs that change for the better occurs through dedication to continuous improvement and shares a constancy of purpose by everyone in the organization (Tirupathi R. Chandrupatla, 2009). Deming believes that the quality of the process influences the quality of a product or service. It must be noted that the initiation and facilitation of the quality process is a management responsibility. This could therefore suggest that poor management of the quality process results in a poor-quality product or service and vice versa. Deming's 'fourteen principles' are still quoted in the field today and some educators have attempted to apply them in the field of education (Lewis & Smith, 1994), with varying degrees of success and acceptance.

Three beliefs can be derived from Deming's approach, the first being that management plays an important role in the quality process. It either leads to the realization of a quality product or service or causes quality problems through poor management. The second is that quality improvement should be a continuous exercise. Finally, quality management should be systematically planned and must not be done on an ad hoc basis, as in many quality initiatives.

The term quality control was stated firstly by Armand Feigenbaum, who wrote a famous book on the subject in 1951 (Feigenbaum. 2005). He views quality control as: “An effective method for coordinating the quality maintenance and quality improvement efforts of the various groups in an organization so as to enable production at the most economical levels which allow for full customer satisfaction” (Beckford, 1998). Feigenbaum defines quality as ‘best for customer use’. He believes that the fundamental aspect in quality improvement in the organization is the involvement of all functions in the process and that quality should be built into the product or service. Feigenbaum might be suggesting that quality problems could be avoided if quality issues could be attended to long before the product or service is delivered. All the functions in the organization should be involved in the process of assuring quality and taking corrective action where necessary. This collective process of assuring quality should be conducted from the beginning to the end when the product or service is delivered. Logothetis (1992) and Gilbert (1992) see Feigenbaum’s approach as a simple way of managing a business organization and an important force leading to organizational success and growth. Feigenbaum advocated a special group of quality engineers, as opposed to the collaborative approach of the Japanese.

Another American quality expert, Philip Crosby maintained that “quality is free” (Macdonald, 1998). Crosby believes that “It is always cheaper to do it right first time”. This notion cautions against the inspection of a product or service and the cost involved.

Since inspection is a costly exercise, Crosby advises that quality needs to be built into a product or service from the onset. This is an attempt to prevent errors and to avoid spending a lot of money on trying to rectify them (Crosby, 1996). In other words, if you do not allow any bad components on your production line, you do not need to spend money on expensive inspections, rejections and rework. This has become known as the concept of zero defects.

Juran views quality in terms of fitness for purpose (Bank, 1992). Bank suggests that this is a more useful definition than 'conformance to specification', in the sense that an unhealthy product or service could conform to all specifications but still be unsuitable for use.

- Identification of goals and policies for quality
- Implementation of plans to meet the goals
- Provision of resources to evaluate progress
- Ensuring appropriate motivation

All these aspects reveal that the emphasis of Juran's work on quality is on planning and organizational issues. All these are managerial functions. Juran's approach is perhaps better interpreted by Logothetis (1992), who states that quality does not happen by accident, it has to be planned. It is clear that Juran, just like Deming, believes that top management must lead the organization with regard to quality enhancement (Downey, et al., 1994). While Juran's approach stresses the managerial functions of planning, control and improvement as essential for the enhancement of quality, he has a nine step 'quality road map' that could serve as a valuable guide to achieving quality (Bendell, 1989).

The above historical overview illustrates that the quality movement has a long history in industry. Various pioneers in the quality field have put unchanged principles, elements, steps and critical success factors in achieving quality and increasing productivity. These perspectives of the pioneers' approaches fit into the need of applying quality assurance in higher education and that management should take a lead in the initiation, facilitation and enhancement of quality assurance mechanisms. At the same time, it should empower those playing a role (i.e. managers, lecturers, instructional designers, quality representatives and students) and involve them in the quality assurance process. Quality assurance in higher education should not be the responsibility of one individual, but should involve all stakeholders.

At the same time, AASTMT can benefit from incorporating this theory, where applicable, into our own practice of quality management. The CDPD in the AASTMT used the quality principles in the form of a quality policy using the terms of fitness for purpose, client satisfaction and continuous improvement of processes and function (See appendix 7).

## 2.5 QUALITY ASSURANCE IN HIGHER EDUCATION

According to Wahlen (1998) quality assurance in higher education is the activity that aims at maintaining and raising quality, e.g. research, analysis, assessing acceptability, recruitment, appointment procedures and different mechanisms and systems. The aim of quality assurance in higher education is to guarantee the improvement of standards and quality in higher education in order to make higher education meet the needs of students, employers and financiers (Lomas, 2002).

### 2.5.1 Quality assurance as a debate and as an issue in higher education

In a higher-education environment, the quality of education has been taken for granted for many decades; the educational institutions were far away from the market forces, whereas the academics were the sole controllers (Harvey, 1995). Nowadays, institutions of higher education (HE) have started to examine the applicability of utilizing quality-focused initiatives towards improving educational quality. There is a long-standing debate about quality in education; therefore, we must explore the concept of quality in education. Based on management and industry quality literature reviews, we can argue that the concept of quality is considered a complex one, covering different concepts and elements; “There are widely different conceptualizations of quality in education (Harvey, 1995). Figure 2.1 represent the quality approaches needed in educational organization with respect to quality standards, quality management systems and quality assurance practices for learning and education content.


**Figure 2.1 Quality in education**

Peters and Waterman, (1982), and ,Cheng, Y and Tam, W (1997) defined education quality as follows: “Education quality is the character of the set of elements in the input, process, and output of the education system that provide services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations.” Obviously, the assessment of the quality of education must meet the same general and specific requirements that we demand from education itself if it is to earn the characteristic of quality. Consequently, understanding and conceptualizing quality in education from different perspectives and facilitating development of management strategies for achieving it. Total quality management in educational institutions has been strongly emphasized many years ago (Bradley, 1993; Greenwood and Gaunt, 1994; Murgatroyd and Morgan, 1993). Ehlers, 2002 quoted different meanings of quality, different quality perspectives and different levels of the educational process to which quality can apply as shown in figure 2.2.

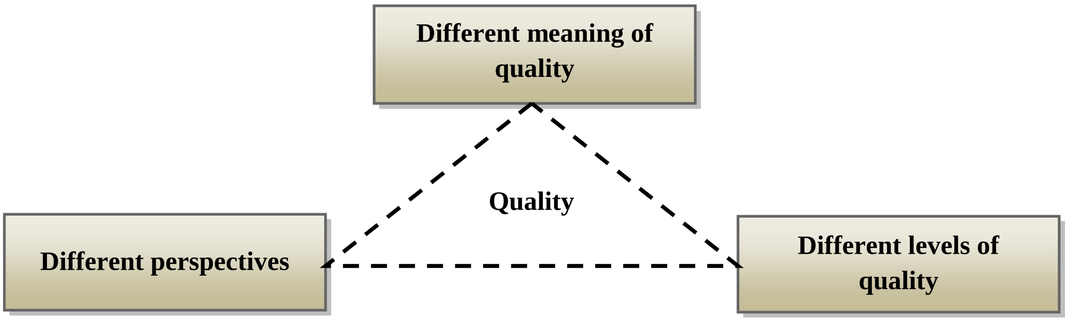



**Figure 2.2 Multiple dimension of quality concept in learning (Ehlers, 2004)**

According to the concepts of total quality management, quality in education can be totally ensured if an educational institution can involve and empower all its members in functioning, carrying out continuous improvement in different aspects of internal process, and satisfying the requirements, needs, and expectations of its external and internal stakeholders. Cheng and Tam,(1997) illustrated seven models of education quality: “goal and specification model; resource-input model; process model; satisfaction model; legitimacy model; absence of problems model; organizational learning” Cheng’s and Tam’s seven models are interrelated and their relationship reflects the different emphasis on different aspects of an education institution pursuing quality and aiming to understand different conceptions of quality in education institutions, as well as develop a comprehensive approach in managing education quality, which is considered important in long-term planning for achieving total education quality. It can be argued that higher education institutions' competitiveness and survivability in the market is directly interrelated with the quality of the educational services offered as perceived by their potential stakeholders.

Universities are currently facing the challenges of reorienting their approaches to be more customer-focused and conducting their activities in a more business-like manner. “It is not possible to deal with quality as a unitary concept, and the best that can be achieved is to define clearly the criteria that each stakeholder uses when judging quality and to take into account the competing views when assessment of quality is undertaken.” (Sahney, Banwet, Karunes, 2004b).

Watty K. (2000) illustrates in figure 2.3 how quality can be deconstructed into various dimensions as it may be applied to the education sector.

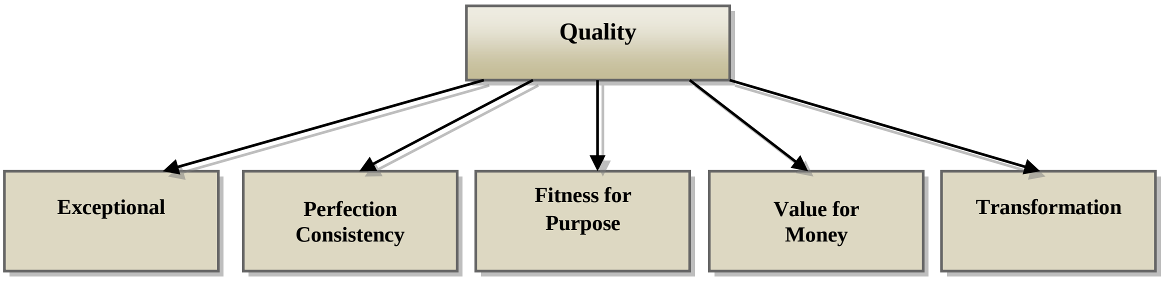



**Figure 2.3 Watty quality dimensions (Watty, 2000)**

Education is an energetic method and people are considering the centred activity, with complex relationships between different players, such as education institutions, customers and quality assurance agencies. While reading the literature, important issues were directed and address my viewpoint on the following questions:

- Can instructors implement quality assurance practice, as it has started firstly in the industrial sector?
- Is it possible to construct and effectively apply a quality management system for educational application in a systematic way?
- How can education managers set the role of self-evaluation practice inside their organizations in order to adapt to external environment accountability?

With respect to the first question, there are various suggestions on both sides of the argument. I review first, some of those who do not believe, followed by the views of some of those who do believe that quality assurance practice may be applied in the field of education. Mizikaci, F. (2006) expresses his objection to the implementation of quality assurance in the form of performance indicators in higher education with regard to universities. He states that accountability and quality are often vague and lack substance. Also he states that total quality management and quality assurance have the potential to disrupt university traditions and culture. Srikanthan and Dalrymple (2002) specifically note the unvalued implementation of TQM models to the service function within HEIs. They advise that these models are inappropriate for what they term "academic functions" (2002).

Becket and Brookes (2008) identifies and defines the different models that have been applied internationally in HEIs.

- **TQM:** A comprehensive management approach which requires contribution from all participants in the organisation to work towards long-term benefits for those involved and society as a whole.
- **EFQM excellence model:** Non-prescriptive framework that establishes nine criteria (divided between enablers and results), suitable for any organisation to use to assess progress towards excellence.
- **Balanced scorecard:** Performance/strategic management system which utilises four measurement perspectives: financial; customer; internal process; and learning and growth.
- **Malcolm Baldridge award:** Based on a framework of performance excellence which can be used by organisations to improve performance. Seven categories of criteria: leadership; strategic planning; customer and market focus; measurement, analysis, and knowledge management; human resource focus; process management; and results.
- **ISO 9000 series:** International standard for generic quality assurance systems. Concerned with continuous improvement through preventative action. Elements are customer quality and regulatory requirements, and efforts made to enhance customer satisfaction and achieve continuous improvement.

- **Business process re-engineering:** System to enable redesign of business processes, systems and structures to achieve improved performance. It is concerned with change in five components: strategy; processes; technology; organisation; and culture.
- **SERVQUAL**: Instrument designed to measure consumer perceptions and expectations regarding quality of service in five dimensions: reliability; tangibles; responsiveness; assurance and empathy; and to identify where gaps exist.

They also highlight that the student is a customer when it comes to using administrative services but a participant within the teaching and learning process, and TQM models do not recognize this distinction. Srikanthan and Dalrymple (2003) therefore advise that HEIs should move on from these industrial approaches and develop a more holistic model that would serve to manage academic functions better. Many higher education institutions (HEIs) appear to rely heavily on industrial quality models, either adopted directly or adapted for use within HEIs. While these models have proved beneficial in addressing both quality assurance and enhancement initiatives in HE, the benefits gained have been predominantly in administrative and service functions (Aly and Akpovi, 2001).

On the other hand, McAdam and Welsh (2000) reviewed the literature on the European Foundation for Quality Management (EFQM) and concluded that the EFQM provides an integrated map of management issues that is valued by the majority of 17 further education colleges in Northern Ireland. Another viewpoint in higher education, which addresses the issue of mechanisms adopted by internal stakeholders, is likely to include self-evaluation practices and student feedback. As students are viewed as an integral part of the learning process (Wiklund et al., 2003), this type of evaluation tends to be more formative in nature and therefore more likely to lead to continual quality improvement efforts. Furthermore, the involvement of internal stakeholders often results in a culture of quality management being embedded within programs. He maintains that universities need to establish a quality culture and quality assurance systems in all processes. Stevens (1996) maintains that there should be no problem in applying business theory and strategies in the field of education, as long as one does not lose track of the human and personal approach.

(Roffe, 1998; Osseo-Asare Jr and Longbottom, 2002; Cruickshank, 2003; Mizikaci, 2006) believe that to achieve the benefits of all quality models, a number of critical requirements must be met in the implementation of these models in higher education.

The issue revealed on the first question is that undemocratic management practices will surely not gain favour with university communities. It is believed to agree with the concept of establishing a quality culture and identifying the benefits will result in a successful implementation of quality assurance practice in the field of higher education. All role-players in the process of higher education should be involved in the quality culture, in the interests of continuous improvement in web-enhanced learning. As I am a quality practitioner, I have to consider the social and personal needs of students and lecturers, due to the complex nature of quality in education.

The other issue evolved from my experience as a quality consultant in the field of education in AASTMT, working to control the level of conformance to standards is the commitment to improvement raised from those who offer the service of learning.

Milliken, J. and Colohan, G. (2004) have reported that there has been a shift from focusing on practices, control and regulation toward self-evaluation and continual improvement. This was obvious and clear in the field of quality assurance in higher education.

The above observation leads to the second question of the debate, namely the improvement and accountability problem. Stensaker (2003) as Brown (2000) argue that internal improvement and accountability are not mutually exclusive opposites but are both imperative, in relative proportions, for a successful institutional quality assurance system.

Brennan and Shah (2000) point out that, traditionally, universities have emphasized self and collegial accountability and self-improvement, and Harris (1994) is of the opinion that managers in higher education are mediators of extraneous, market-orientated values, which compete with the collegial values in universities.

Quality assurance could be divided into internal and external quality assurance according to the customers of education and their opportunities.

**External quality assurance (External Accountability/ Summative Approach):** External quality assurance monitoring is a broad concept that includes several quality-related assessments provided by different bodies or individuals outside the higher education institutions. The aim is to achieve accountability. The government institutions usually decide upon the systems of external quality assurance of higher education institutions. (Middlehurst and Woodhouse, 1995). External quality assurance is necessary in order to prove to the public that the goals set by the institution will be achieved.

Higher education institutions bear responsibility to assure their supporters, state and society in general, that they are committed to the fulfilment of their mission, uses the resources honestly and responsibility and those they meet the legal expectations (El-Khawas, 1998).

**Internal or institutional quality assurance (Internal self Evaluation/ Formative Approach):** Internal or institutional quality assurance aims at institutional development and assessment of internal accountability. Institutional quality assurance incorporates every institutional activity that focuses on quality assurance and development in all fields of activity of the institution (European Dimension of Institutional Quality Management, 2000). Internal quality assurance concentrates mainly on academic issues and lies in collecting evidence and information about mission fulfilment, efficiency of activity and ways of ensuring quality within the institution (El-Khawas, 1998). The debate of internal improvement and external accountability is found in different literature (Vroeijenstijn,1995, Bazargan, A.2000, Randall, 2002;) which shows that there are not necessarily opposing views at either end of the field, but rather an awareness of the extremes and the need to balance both sides of the scales.

As the involvers in the process of education, they should continually ask some questions regarding self-evaluation, using what, why, where and when. Such as: what to achieve? What is the right way of doing it? And why we do it? Whether the context chosen is right or not? When do we say that it is effective? Is this the best possible way of doing it? (Bazargan, A.2000).

Such an awareness of the need for self-evaluation and the practice thereof will enable education providers to be in an everlasting state of readiness to demonstrate accountability to external agencies when required to do so. This approach will prevent the reality of spending months preparing for external audits and then, after the departure of the audit panel, reverting to the usual ways of doing things.

To me, quality assurance for improvement purposes implies a formative approach: the focus is not on control but on improving quality. The commitment to self-evaluation is the most important issue of quality assurance practice in education. It assures and believes all five of Harvey and Green's (1993) quality philosophies, namely quality as exceptional, perfection or consistency, fitness for purpose, value for money and transformation.

### *2.5.2 Quality assurance in higher education in different countries*

After a discussion of the contexts of quality assurance activities in higher education in general, the following highlights quality assurance bodies that have been proposed for monitoring the delivery of online instruction in four pioneer countries. Some universities implement academic standards and values to reflect the image of their reputable name. Harvey and Knight (1996) indicate that universities can no longer retreat into an autonomous collegialism. As such, sometimes quality assurance agencies are viewed with suspicion and met with resistance (Kalsen, R. & Stensaker, B., 1995). Both national and international higher education institutions rely on quality approaches to ensure the quality of education provision. These approaches mostly review and monitor comments, external reviews of examination questions and answers, attention to quality on an individual basis, external review by professional agencies and finally external review on master and doctoral degrees (CHE, 2000).

Many countries nowadays are expressing increased calls for quality accountability, which are changing the higher education learning and education assessments (Ratcliff, J. L. and associates 1995). Harvey, L. (1995) highlights the reasons for the increased outline of quality in higher education. Section 1.8.2.3 mentions audit and assessment as one of the issues.

The notions of benchmarks, standards and reputation imply that higher education institutions seek to compare the quality of their academic provision with other such institutions on the global stage (Phipps, R. A., & Merisotis, J. P. 2000). This has resulted in a global need for higher education institutions to review their quality assurance mechanisms and protocols (Brennan, J., & Shah, T. (2000). Many developing countries are in the process of applying quality standards and benchmarks in education in general and in higher insinuations in particular. Egypt is one of those countries which are looking to improve its learning quality. Most developed countries have progressed in different ways in forming guidelines, benchmarks and standards in implementing quality assurance practices in their higher education institutions.

Some of these developed countries which have reputable standards and benchmarks are:

***United Kingdom***

The Quality Assurance Framework in the United Kingdom is not just comprehensive; it is “the most complex anywhere in the world” (Brown, 2000). The Quality Assurance Agency for Higher Education (QAA) was incorporated in 1997, with the aim of reducing some of the reporting burdens created by a combination of external assessments by funding agencies, and quality assurance processes driven by peer review. Its mission is to “promote public confidence that the quality of provision and standards of awards in higher education are being safeguarded and enhanced” (QAA, 2000). The QAA has developed codes of practice for ten areas: postgraduate research programs; collaborative provision; students with disabilities; external examining; assessment of students; program approval, monitoring and review; career education, information and guidance; placement learning; recruitment; and admissions (QAA, N.d.a). Further regulation has developed in the form of benchmark information for different subject areas, linked to the national frameworks for higher education qualifications. These are the explicit learning outcomes meant to communicate to the public and to potential employers the attainments to be expected from program graduates. The examples of quality assurance frameworks from the United Kingdom are all centred on open and distance learning, with E-learning issues being acknowledged variables within a spectrum of delivery mechanisms. They publish a comprehensive set of distance E-learning guidelines on their website. The Committee of vice chancellors et al. (2000), reports that mystification and globalization were the major factors in shaping the quality assurance system designed by the UK QAA. These reasons are forming the same need of developing countries.

***Australia***

Australia has a national instrument, in the form of its Qualifications Framework, for protecting the quality of its educational and training programs. Even the use of the term “university” is restricted by State or Territorial legislation, and universities must demonstrate that they have appropriate quality assurance procedures in place. Within this framework, “universities are expected to engage in a pro-active, rigorous and ongoing process of planning and self-assessment which will enable them to ensure the quality outcomes expected by their students and the wider community” (Department of Education, Training and Youth Affairs, 2000). The Australian government policy framework has been presented as a marketing tool to address the advantages that global competitors enjoy by having “centralized, separate, and highly visible” bodies responsible for quality assurance (Vidovich, 2001).

The rationale for the development of the national system was explicitly framed in terms of competitive challenges, domestic and international, and of policies that have encouraged the universities to “align themselves more closely with industry needs” (DETYA, 2000). Under the revised regime, creditable quality assurance systems, providing evidence of the quality of service and skills of graduates, were explicitly intended to make the universities more attractive to business investors. The systems include national qualification schemes that communicate expected standards for each level of post-secondary achievement.

***Canada***

In Canada, the responsibility for education rests at the provincial, not the national, level. Each province has its own quality assurance framework or approach to determining whether post-secondary programs are eligible for student funding or to receive public money. The degree to which a province might regulate or even provide subsidies to private or for-profit educational institutions varies widely. It is fitting, then, that the Canadian example of quality guidelines originates with a private corporation sponsored by community and government-funded agencies (Barker, 2002a). The Canadian Recommended E-learning Guidelines list themselves as “consumer-oriented, consensus-based, comprehensive, futuristic, distinctively Canadian, adaptable, and flexible.”

***United States of America (USA)***

According to Woodhouse (2000a), “the earliest instance of the phenomenon of external quality assurance (EQA) is provided by the USA, where higher education became a big operation at an early stage”. The Council for Higher Education Accreditation (CHEA) is a non-profit organization established in 1996, which co-ordinates and promotes quality and public accountability in institutions and programmes through voluntary, non-governmental self-regulation. Most states in the USA also have regional accrediting associations to determine the quality of programmes and curricula (Ratcliff, 1997). Universities and regional associations have developed their own guidelines for best practices in distance education, which are available on the Internet (Cravener Educational Consultants, 2000). The American Federation of Teachers has published Guidelines for Good Practice in Distance Education (American Federation of Teachers, 2000).

Although all the above-mentioned countries have well-structured regulations in higher education initiative, still traditionally there has been less regulation across pioneers and there is certainly less still in horizon (Barker, K. 2002b). Egypt uses these pioneer countries' guidelines and best practices to construct its own quality assurance guide in order to ensure higher education quality learning delivery as shown in next section.

## 2.6 QUALITY ASSURANCE IN HIGHER EDUCATION IN EGYPT

The Egypt framework is presented in this section with particular reference to higher education. The Ministry of Higher Education in Egypt has developed special criteria to assure quality in higher education institutions. The Egyptian higher education strategic reform plan was developed, and endorsed nationally by all concerned stakeholders in February 2000. A National Quality Assurance and Accreditation Committee (NQAAC) was formed to look into establishing a national system through which the quality of the Egyptian higher education system can improve, and produce quality graduates that Egypt needs to meet the challenges of the twenty first century. A comprehensive study to establish Egyptian National Quality Assurance and Accreditation Agency (ENQAAA) was finalized in 2002. The Ministry of Higher Education, being responsible for the overall education system in Egypt as stipulated in the constitution, took the initiative to develop an overall strategic plan for quality assurance and accreditation to assist Egyptian Higher Education Institutions to improve the quality of their academic programs and that of their graduates. The Quality Assurance and Accreditation Project (QAAP) is one of the corresponding projects under the Higher Education Reform Strategy directed to improve quality, efficiency and relevance of Higher Education in Egypt. The QAAP is governed by a National Committee (NQAAC) nominated by the Minister of Higher Education and

State for Scientific Research. The mission of NQAAC is to ensure quality, continuous development and efficient performance of Egyptian education institutions and to gain the confidence of the community, in their graduates, based on an internationally recognized evaluation mechanism.

The strategic objective of the QAAP is to prepare Higher Education Institutions for qualification to apply for accreditation.

The main objectives of QAAP are to:

- Develop a National Quality Assurance and Accreditation system in Higher Education Institutions (HEIs)
- Develop an Internal Quality Assurance System in HEIs
- Gain the confidence of the community in the Egyptian graduates
- Raise the awareness among HEIs and the community about the culture of quality in education
- Ensure the quality of the graduate to compete nationally, regionally and internationally
- Establishment of National Academic Reference Standards and Benchmarks
- Participation in the establishment of a National Quality Assurance and Accreditation Agency (NAQAAE)

The relevant act to the field of higher education in general and quality assurance in particular, is law No. 82 for the Year 2006 regarding the establishment of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE). The authority established by virtue of this law:

- Educational Institutions
- Educational Program
- Curriculum
- Evaluation
- Quality Assurance
- Accreditation
- Benchmarks
- Approved Standards

The purpose of the act 82 of 2006 is to involve the quality and accreditation standards for educational institutions as well as the quality and accreditation standards for educational programs. Hence, one of the objectives of the higher education act of 82 is to provide for quality assurance and quality promotion in higher education. Accordingly, it made provision for the establishment of a committee and a statutory accreditation body to advise the Ministry of Higher Education in Egypt on all matters pertaining to higher education.

To address the need for help and direction, the responsibility for quality assurance at universities was assigned to a higher education quality committee, which is concerned with strategic and conceptual issues regarding quality in higher education and is also responsible for programs' accreditation and auditing. The Higher Education Quality Committee's approach is one of capacity building and encouraging excellence. They make use of the well-known four-stage model currently used in Europe. This model consists of two phases, pre-accreditation phase and accreditation phase (See http://en.naqaae.org.eg).

For the first phase there are three main stages as follows:

- Gap analysis, procedures and methods required By NAQAAE
- Self-study report
- Improvement plan
- Mock assessment before accreditation

And as for the accreditation phase itself, it consists of one main stage "accreditation" in which it has:

- Reviewers' visit
- Initiation of final report, including assessment outcomes

From the above, quality assurance practice in higher education in Egypt is yet in its early stages; only one university has been awarded the conformance to the guidelines of good practices in quality assurance introduced by NAQAAE (See www.naqaae.gov.eg).

## 2.7 CONCLUSION

This chapter reviewed the literature with respect to quality assurance, in general, from its controversial nature, also quality assurance in higher education, both internationally and nationally. The relevant debate and issues, which have contributed to the recent high profile of quality assurance, were presented in order to draw a framework for this study. Against this framework, my case study focuses on the quality of web-enhanced learning in higher education, with particular emphasis on self-evaluation initiatives of the Course Design and Production Department (CDPD) in the Arab Academy of Science, Technology and Maritime Transport.

The construct quality includes the perspectives of quality as exceptional, perfection or consistency, fitness for purpose innovation with emphasis on client satisfaction.

The debate for quality was discussed as two main concerns, namely introducing quality assurance practices into higher education and the second is the quality internal improvement and external accountability debate. It concluded that self improvement is possible for implementation in the higher education domain, but taking into consideration the needs and commitment of users due to the complex nature of the education environment. An overview of international practices from the developed countries and the pioneers in the field of e-learning, such as UK, USA, Australia and Canada were introduced as they are famous in the field. These famous standards with well-established national standards can improve the principles of quality assurance in education. National initiatives and legislative framework of Egyptian quality assurance in higher education was presented. It was shown that the quality assurance system in higher education Egypt is quite immature since it started in 2006, but with the good will of the higher Education Quality Committee, the project of implementing quality assurance in higher education will succeed. The AASTMT was the first university in Egypt, practising the concept of quality assurance in education, which was done by implementing ISO9001 in the education process for undergraduate studies in three colleges. This practice will help in, and contribute to, the practice of institutional audits and to the specification of relevant criteria introduced by the law act 82/2006.

Chapter 3 will therefore examine quality assurance practices and their relevance to web-enhanced learning. This exercise is important to explore universal factors which affect the instructional design process of WEL. This is the process of analyzing the information that enables reference points to be enhanced, which can be used to promote change in the direction that is most likely lead to improvement in the WEL instructional design process (Jackson, 2000).

# CHAPTER 3

# QUALITY ASSURANCE PRACTICES AND THEIR RELEVANCE TO WEB-ENHANCED LEARNING

## 3.1 INTRODUCTION

The increasing number of E-learning providers and challenges presented while implementing e-learning, results in a need for international and national benchmarking and standards in addition to the traditional ones. Khan (2000) states, that in the current environment, it is obligatory in organizations to demonstrate the quality of their services in ways that are intelligible to potential students and their employers, faculty and staff, regulators, and government agencies. This implies that we should use best quality assurance practices that could be modified and incorporated into the higher education system and make it more effective.

The purpose of this chapter is to:

- highlight the critical factors that should be incorporated into the instructional design of web-enhanced learning while implementing a quality assurance system
- reviews reported studies on role-players' (student and lecturer ) satisfaction with on-line learning with respect to – technology-enhanced learning with reference to various resources and
- focus on the relevance of quality management systems to E-learning that were found in the literature.

This chapter also seeks to investigate the collections of practices (principles, guidelines, benchmarks, indicators and standards) available through different resources such as internet, published papers and studies to explore these practices which improve the quality of web-enhanced learning.

## 3-2 QUALITY AND E-LEARNING

Great expectations have emerged for E-learning advances to meet society's demands in new ways. Many universities and private corporations are investing significant capital in E-learning systems (Levy, 2006). A variety of these higher education institutions are driven by a vast increase in the global demand for higher education, which provides new opportunities to contribute to the educational process. However, as Oliver (2001) and other researchers Guardian (2004) and Garrett (2004) pointed out, many projects such as the UK e-University, New York University (NYU) Online, Scottish Knowledge, Universities 21 and Global University Alliance (GUA), which all developed around E-learning applications, have failed to realize their aims and goals, leading many to question the quality and capabilities of this form of education.

One of the problems facing people seeking to describe quality in E-learning is to understand precisely what constitutes e-learning. E-learning occurs in a wide range of teaching activities where technology of one form or another is involved. Technology necessarily underpins the administrative functions of most universities and higher education institutions and, for many, the lines between the administration, and the conduct, of teaching can be unclear.

The term “E-learning” as described may have several synonyms such as “distance” “distributed” flexible” or “virtual” learning and these often hide real differences in learning experience, forms of delivery and formal status. E-learning can be thought of as any learning that is done utilizing an internet or intranet connection. Delivery can be asynchronous (allowing learners to go through learning materials at their own pace within broad time constraints) or synchronous (participants attend the on-line learning session at a scheduled time, allowing for live interaction with the instructor and other students) (Frazee, 2003).

The term E-learning comprises all forms of electronic delivery media supported learning and teaching, where content is delivered via a variety of electronic delivery media, for example web-enhanced , streaming video and audio, image, virtual classrooms, video conferencing, etc.

This research focuses on web-enhanced learning as part of e-learning. The term E-learning is the broader field, while the term web-enhanced learning (WEL) is used to indicate that students are expected to access on-line material and resources, the traditional use of internet media. The researcher uses the term web-enhanced learning (WEL) instead of the term web-based learning (WBL), as the AASTMT is using web enhanced courses (face-to-face courses that make pedagogically significant use of the web through a course management system but do not reduce seat time).see figure 1.2.

By reviewing the literature in the field of E-learning and quality, a gap is appear between the use of technology and the education (Khan 1997; Willis 2000). Researchers have written about the need for quality standards to ensure the educational integrity of E-learning programs (Benson, 2003; Carstens and Worsfold, 2000; Speck, 2000).

Regarding that mentioned above, evaluating and assuring quality in E-learning programs has become a critical issue since defining quality standards can be challenging.

Quality has been defined in terms of the design of the E-learning experience, the experience of learners, and evidence of learning outcomes (Carr and Carr, 2000; Jung 2000; Salmon, 2000). The quality and design of E-learning courses, however, are sometimes compromised in a ". . . effort to simply get something up and running" in response to pressing consumer demands (Dick, 1996: 59). Masoumi, D. (2007) quoted that educators and researchers have voiced concern over the lack of rigorous evaluation studies of E-learning programs (e.g., Arbaugh, 2000; Howell, Saba, Lindsay, and Williams, 2004; Lockyer, Patterson, and Harper, 1999; Robinson, 2001). McGorry (2003) adds, "Although the number of courses being delivered via the internet is increasing rapidly, our knowledge of what makes these courses effective learning experiences is limited".

Often the E-learning quality is linked in terms of content or resources, while quality is eventually dependent on the decisions and behaviours of learning and teaching practitioners and participants. The quality of E-learning resources needs to be guided within a frame of quality understanding of learning activity. However, one point is clear that the same principles apply when qualifying E-learning programs as traditional learning and teaching. Although there are some special characteristics in e-learning, that need to be specified.

## 3-3 CRITICAL FACTORS TO IMPROVE QUALITY OF WEL

A broad range of factors that can influence the success of web-enhanced learning environments has been mentioned in the literature. There are many internet sites that offer guidelines or best practices for distance learning, which have been developed by individual institutions, or a group of them, or national quality assurance agencies. Some of the guidelines are of pure distance education and others are for technologies which improve distance education. A selection of the most important guides and criteria sites is listed in Appendix 1.

Although practical guidelines and standards for technology-enhanced online learning education exist, no systematic work is found on characterizing a collective set of vital factors for implementing successful web-enhanced learning environments.

A new set of factors will emphasise the important issues that should be dealt with in designing and implementing web-enhanced learning. In terms of selected international studies which investigated the quality of E-learning programmes in the context of web-enhanced learning reviewed below, it was noticed that almost all related studies were researched in Europe, USA and Australia as shown before in chapter 2 section 2.5.2.

### *3-3-1 Benchmarks derived critical factors*

The unexpected growth of IT technology has promoted quality agencies and educational institutes into delivering E-learning in Higher Education (HE) to develop guidelines, or benchmarks to ensure quality E-learning education. The quality assurance benchmarks created by these quality agencies and institutes are designed to apply to a wide variety of institutional contexts and consist of various quality statements. Nearly all strategies include topics such as faculty training, course development, learning resources, student services, outcomes assessment and infrastructure. These benchmarks were initially developed to suit all distance learning forms. Therefore they tend to be of a wider and generic nature, providing general guidance. Based on an important study of “quality of the line” by the Institute for Higher Education Policy in (2000), Phipps and Merisotis surveyed the literature in the context of on-line education to compile a list of 45 possible benchmarks. They then determined whether those benchmarks were recognized at various institutions delivering online courses, and examined the importance of each benchmark to administrators, staff, faculty, and students at those institutions. The result was a list of 24 benchmarks that should be considered “essential to ensure the quality in distance education”. The 24 benchmarks are given in detail in (Table 3.1).

**Table 3.1: equality in Internet based distance education benchmarks (The Institute for Higher Education Policy, 2000)**

| Category | Benchmark |
|---|---|
| Institutional support | A documented technology plan. |
| | Reliability of the technology delivery system. |
| | A centralized system to maintain the distance education infrastructure. |
| Course development | Guidelines regarding minimum standards and learning outcomes determine the delivery system used. |
| | Instructional materials are reviewed periodically. |
| | Course design requires students to engage in analysis, synthesis and evaluation. |
| Teaching/ learning | Student interaction with faculty and other students. |
| | Feedback to student assignments and questions is constructive and provided in a timely manner. |
| | Students learn research methodology. |

| Category | Benchmark |
|---|---|
| Course structure | Student self-motivation and access to technology are assessed.<br>Supplemental course and organizational information is provided.<br>Students have access to sufficient library resources, traditional and online.<br>Agreement is reached between students and faculty on completion and submission of student assignments. |
| Student support | Students receive information about the study program and all its requirements.<br>Students are provided with hands-on training in accessing resources.<br>Students have access to technical assistance.<br>A structured and efficient system is in place to address student queries and complaints. |
| Faculty support | Technical assistance in course development is available.<br>Faculty members are supported in the transition from traditional teaching to online teaching.<br>Instructor training and assistance, including peer mentoring, is available throughout the progression of the online course.<br>Faculty members are provided with written resource material to support them in facilitating online learning. |
| Course evaluation | The program's educational effectiveness is evaluated.<br>Data on enrolment, costs and successful / innovative uses of technology are used to evaluate program effectiveness.<br>Intended learning outcomes are reviewed regularly to ensure clarity, utility & appropriateness. |

The institute report states'' in addition to the internet's profound influence on distance education, it is important to point out that a growing number of faculties are using the internet to complement traditional classroom based courses'' (Institute for Higher Education Policy, 2000). Therefore the 24 benchmarks can be applied to what has become known as E-learning which refers to the mixing of different learning environments. E-learning has many specific meanings based upon the context in which it is used; such a learning model is in use at The Arab Academy for Science and Technology where faculties are using the internet web to complement traditional classroom-based courses. (See section 1.8.2.2).

Oliver (2001) addresses, in his intensive study, "Assuring the Quality of Online Learning in Australian Higher Education", the major successful implementing factors in Australian higher education which support and sustain quality in web-enhanced learning. The factors were as follows:

- Teacher expertise
- Student readiness
- Technology infrastructure
- Provision of content and learning resources
- Instructional design

Oliver (2003) also stated that frameworks for quality in E-learning distinguish four discrete elements:

- **The curriculum**, that which is to be learned. A strong curriculum has relevance to the student and the workplace. It has currency and reflects best practice.
- **The learning design**, the planned learning environment. An effective learning design provides the forms of learner engagement required to assist the learner to interact with that which has to be learned in meaningful ways.
- **The learning resources**, the course content. Strong course content is accessible and current. It provides multiple perspectives and conceptual underpinning.
- **The delivery processes** supports and scaffolds for learning. A strong delivery process supports the learners, provides contexts for communication and collaboration.

The outcome of the framework set guidelines for quality indicators for technology-enhanced distance learning, which are divided into the following categories:

1. Quality **input** elements and attributes which describe pre-conditions for successful teaching and learning **in** online assisted distance learning.
2. Quality **process** elements and attributes which describe ongoing-conditions for successful teaching and learning **in** online assisted distance learning.
3. Quality **outputs** elements and attributes which describe post-conditions for successful teaching and learning **in** online assisted distance learning.

Although the above categories incorporate the previously defined factors, but still did not indicate how to evaluate the overall learning quality cycle in the form of evaluation and continual improvement as result the evaluation factors should be considered. Full details of these factors within the categories are given in the following table 3.2.

**Table 3.2 a framework describing quality teaching and learning (Oliver et al, 2003)**

| Inputs | Teaching | Learning |
|---|---|---|
| Elements and attributes which describe pre-conditions for successful teaching and learning | • course establishment and course review<br>• curriculum specifications<br>• course materials and resources | • student selection and entry into courses<br>• students' progression through courses |

| Inputs | Teaching | Learning |
|---|---|---|
| | • teacher qualification and currency<br>• strategic plan for teaching and learning<br>• facilities and resources for teaching and learning | |
| ***Process***<br>Elements and attributes which describe on-going conditions for successful teaching and learning | • provision or appropriate learning experiences<br>• work, community and professional engagement<br>• assessment procedures<br>• student support | |
| ***Outputs***<br>Elements and attributes which describe post conditions for successful teaching and learning | • continuous improvement in teaching processes<br>• reflective practice and ongoing commitment to continuous improvement processes | • graduate are employable in various ways<br>• graduates can demonstrate outcomes<br>• course satisfaction and attitudes |

Govindasamy (2002) provides a pedagogical basis for successful E-learning implementation described in seven E-learning critical factors, explicitly:

- institutional support,
- course development,
- teaching and learning,
- course structure,
- student support,
- faculty support, and
- evaluation and assessment.

While Papp's study (2000) entitled "E-learning critical success factors" stated eight factors which contribute to enhance online learning and teaching, including:

- intellectual property,
- suitability of the course for E-learning environment,
- building the E-learning course,
- course content,
- course maintenance,
- platform, and
- measuring success of an E-learning course.

Papp (2000) suggested studying each one of these imperative factors in isolation and as a composite to determine which factor(s) influence and affect E-learning success.

An observed study by Thierry Volery (2000) conducted in different universities suggested a framework for the critical factors in online learning, focusing on three aspects in e-learning:

- **technology** aspect : ease of access and navigation, interface design and level of interaction);
- **instructor** aspect: (attitudes towards students, instructor technical competence and classroom interaction); and
- **previous use of technology** aspects: from a student's perspective or student's previous computer knowledge.

Soong, Chan, Chua, and Loh (2001) using a multiple case study, verified that the E-learning critical factors are:

- human factors,
- technical competency of both instructor and student,
- E-learning mindset of both instructor and student,
- level of collaboration, and
- a perceived information technology infrastructure.

They recommended that all these factors should be considered in a holistic fashion by E-learning adopters. Also in an attempt to provide a pedagogical foundation as a prerequisite for successful E-learning implementation, Govindasamy (2002) discussed seven E-learning critical factors namely:

- institutional support,
- course development,
- teaching and learning,
- course structure,
- student support,
- faculty (lecturer) support, and
- evaluation and assessment.

According to studies conducted by Selim (2005), seven factors affect the success of E-learning environment. The specified E-learning CSF categories were based on students' perceptions and included:

- **instructor characteristics** (technology and teaching),
- **student characteristics** (computer competency, collaboration, and content design), technology (infrastructure), and
- **support**

Fresen (2005) in an inclusive study highlighted six critical factors in his thesis “Critical success factors for quality web-supported learning.” He suggested the following categories in his research.

- Institutional factors
- Technology factors
- Student factors
- Lecturer factors
- Instructional design factors
- Pedagogical factors

He also analyzed and categorized each of these factors to sub factors (around fifty sub factors) which specifically explain the feature of respected factors. (Fresen, 2005).

Khan (2005) in an E-learning “QUICK Checklist” identified various critical factors for successful e-learning. He clustered critical success factors in seven categories:

- **Institutional factors** like need assessment, financial readiness, infrastructure readiness such as internet connections.., cultural readiness and content readiness
- **Management factors** including management team, managing the content development process, and managing delivery and maintenance
- **Technological factors** cover infrastructure planning, hardware, and software
- **Pedagogical factors** include content analysis, audience analysis, goal analysis, medium analysis, design approach, organization, learning strategies
- **Ethical factors** comprise social and political influence, cultural, diversity, bias, geographical diversity, learner diversity, digital divide, etiquette, legal issues
- **Interface design factors** embrace page and site design, content design navigation, accessibility, usability testing, resource support, online support, online resources, offline resources,

- **Evaluation factors** include evaluation of the E-learning content development process, evaluation of the E-learning environment, evaluation of E-learning at the program and institutional levels, assessment of learners

He claims that these factors are logically comprehensive and empirically the most useful dimensions for open, flexible and distributed learning environments. Another often cited study is Barker (1999), who published the results of a community project commissioned by the Canadian Association for Community Education (CACE), conducted by a consulting company by the name of FuturEd. FuturEd undertook an extensive international literature search for complete sets of guidelines and individual quality indicators for distance learning. The report summarizes many resources (mainly online) to inform developers about quality education practices and the use of educational technologies.

FuturEd defines technology-assisted distance learning as the learning situation where "the learner is in one location and the 'provider' of the learning is in another and technology is used to make the link" (Barker, 1999). The outcome of FuturEd is a set of guidelines for quality indicators for technology-enhanced distance learning, which are divided into the following categories:

1- Quality **inputs and resources** for technology-assisted distance learning.
2- Quality **processes and practices** in technology-assisted distance learning.
3- Quality **outputs and outcomes** from technology-assisted distance learning.

An overview of each of these categories is given below. Full details of factors within the categories are given in table 3.3.

**Table 3.3 quality indicators for assisted distance education (Barker, 1999)**

| **QUALITY INPUTS AND RESOURCES** | | | |
|---|---|---|---|
| **Complete learning package includes:**<br>• course description<br>• course objectives<br>• information about the instructor<br>• learning notes<br>• additional learning resources<br>• activities and assignments<br>• assessment opportunities | **Learning outcomes are:**<br>• clearly defined<br>• demonstrable<br>• measurable<br>• achievable<br>• useful<br>• appropriate | **Curriculum is:**<br>• accurate<br>• relevant<br>• scholarly<br>• up-to-date<br>• consistently updated<br>• appropriate to learning objectives<br>• culturally sensitive content | **Teaching / learning materials are:**<br>• well designed<br>• well organized<br>• free of errors<br>• readily available<br>• user friendly<br>• affordable<br>• free of cultural, racial, class or gender bias<br>• accessible to learners with disabilities<br>• easy to use<br>• free of technical hitches |
| **Learning technologies are appropriate to:** | **Appropriate and necessary personnel are** | **Program plans and budget include:** | **Product / service information is provided** |

| | | | |
|---|---|---|---|
| • field of study<br>• learning outcomes<br>• target population<br>• cost and benefit to the learner<br>• enable instructor support | **available:**<br>• teachers, managers, subject matter experts, library staff, tutors, mentors, technical support, learning skills support, career planning, employment counseling etc. | • written policies<br>• adequate budget<br>• financial and administrative commitment to a programme<br>• a technology plan<br>• security of systems | **Advertising, recruiting and admissions information is provided** |
| **Sound technical design that is:**<br>• navigable<br>• updated<br>• complemented by graphics<br>• available in text-only format<br>• includes links to other relevant resources<br>• reliable<br>• complete | **Learning resources are:**<br>• varied<br>• easily accessible<br>• copyright approved<br>• flexible for different learning styles | **Routine review and evaluation of:**<br>• course content and objectives<br>• learning materials<br>• instructional design<br>• instructors<br>• learning and student achievement<br>• policies and management practices<br>• operational procedures<br>• customer satisfaction | **Course package is:**<br>• appealing<br>• user-friendly<br>• extensible<br>• inclusive of all administrative services<br>• personalised<br>• coherent and complete<br>• reviewed and evaluated routinely |
| **QUALITY PROCESSES AND PRACTICES** | | | |
| **Student management systems include:**<br>• registration<br>• orientation<br>• intake and placement<br>• pre-entry counseling<br>• recognition of prior learning<br>• accurate management of student records<br>• learner involvement in decision making<br>• assistance with technologies used | **Learning management processes include:**<br>• quality teaching practices<br>• quality learning approaches<br>• quality assessment practices<br>• appropriate use of communications facilities<br>• effective human resource management practices<br>• accountable programme management | **Appropriate use of technologies to:**<br>• make students feel comfortable<br>• accommodate and promote individualization<br>• create opportunities for meaningful work<br>• increase information processing skills<br>• promote problem solving abilities<br>• nurture artistic expression<br>• enable active engagement in the construction of knowledge<br>• provide drill and practice where necessary | **Communication facilities are able to:**<br>• encourage contact between students and faculty<br>• provide opportunities for interaction and problem-solving<br>• develop reciprocity and cooperation among students<br>• enable students to interact with experts |
| **Human resources management includes:**<br>• recruitment and selection of appropriate personnel<br>• requirement for ongoing professional development<br>• technical skills development and support<br>• regular evaluation of competence | | **Program management is accountable for:**<br>• student management, learning management, planning, evaluation, research, continuous improvement, financial viability and continuity | |
| **QUALITY OUTPUTS AND OUTCOMES** | | | |
| **Acquired content, skills and knowledge are:**<br>• relevant<br>• transferable<br>• purpose-specific<br>• blended | **Necessary learning skills acquired for:**<br>• successful course completion<br>• lifelong learning<br>• self-directed learning management | **Completion credits or credentials are:**<br>• recognized by professional, national bodies<br>• recognized by other educational institutions<br>• of same value with respect to on-site or distance learning<br>• transferable nationally and internationally | **Return on investment with regard to:**<br>• accessibility<br>• objective benefits and utility<br>• effectiveness<br>• efficiency<br>• customer satisfaction |

1. Quality of **inputs and resources** is applicable to the teaching and learning model. It includes guidelines for learning outcomes, curriculum content, learning materials, learning technologies, instructional design and the provision of support personnel.

2. Quality of **processes and practices** includes institutional factors such as the management of students, programmes and human resources, as well as the use of quality technology to nurture active engagement and communication.
3. Quality of **outputs and outcomes** concentrates on the skills and knowledge of the student emerging from the learning process, as well as recognition and transferability of the qualification.

This category also considers return on investment with regard to effectiveness, efficiency and client satisfaction. The guidelines are intended to assist consumers in making choices and in ensuring the best return on their investment (by considering categories 2 and 3 above). This client orientation to educational products and services is intended to assist providers of technology-assisted distance learning to develop, evaluate and continuously improve their products and services. In 1987 Chickering and Gamson developed their now well-known "Seven Principles of Effective Instruction", which emphasize student feedback and communication. The seven principles (Chickering & Gamson, 1987) are based on extensive research on teaching and learning and characterise good practice in undergraduate education. Since the seven principles were proposed in 1987, new technologies have changed the face of education. Chickering and Ehrmann (1996) applied the seven principles to online learning environments.

Table 3.4 lists Chickering and Gamson's (1987) seven principles in the left column and Chickering and Ehrmann's (1996) application thereof using educational technologies, in the right column.

**Table 3.4 seven principles of Chickering and Gamson (1987) applied by Chickering and Ehrmann (1996) to online environments**

| Seven Principles | Application of technology |
|---|---|
| • Encourage contact between students and faculty | The Internet, e-mail and learning management systems. |
| • Develop reciprocity and cooperation among students | Co-operative learning online. |
| • Use active learning techniques | Communication tools, online activities, electronic portfolios |
| • Give prompt feedback | E-mail, online discussion forum. |
| • Emphasize time on task | Asynchronous access and computer record keeping of time spend |
| • Communicate high expectations | Real life problems and scenarios, public scrutiny of work submitted. |
| • Respect diverse talents and ways of learning. | Variety of learning experiences, anywhere, anytime learning. |

Chickering and Gamson's (1987) strategies have been permanently strong and widely accepted as measures for judging the effectiveness of distance learning as well as traditional classroom teaching (John Hopkins University, 2002; Herrington et al., 2001). A summary of Chickering & Ehrmann (1996) is given by Wilkinson, Wilkinson & Nel (2001). Ehrmann claims that although much has changed since 1996, much has remained the same (Chickering & Ehrmann, 1996). He states that "these same seven principles, and these seven kinds of technology use, seem equally important for all kinds of learners (and faculty) in all kinds of situations".

### 3.3.2 Universal categorization and success factors

The web-enhanced learning critical success factors (CSF) categorization is a mixture of different perspectives as seen from the above literature.

It is obvious that different categories of critical success factors (CSF) in an E-learning environment have been mentioned by different studies. Despite this, categories could be grouped in a number of universal categorizations such as organizational, technical, pedagogical, evaluation, and student & lecturers.

Therefore to decide on the categories for the classification, table 3.5 shows the categories used by some existing best practices and guidelines.

**Table 3.5 international guideline and practices categorization**

| No. | Reference | Categories |
|---|---|---|
| 1 | The E-University Compendium- Cases, Issues and Themes in Higher Education Distance E-Learning- August 2004 | • Pedagogies & technologies<br>• Course design and development<br>• Organizational support<br>• Supporting staff and students<br>• Evaluation and quality assurance |
| 2 | Institute for Higher Education Policy- (2002) | • Institutional support<br>• Course development<br>• Teaching and learning<br>• Course structure<br>• Student support<br>• Faculty support<br>• Course evaluation |
| 3 | E-learning Guide – Learning and Teaching Support Network (LTSN), August 2003 | • Institutional support<br>• Curriculum development<br>• Staff development<br>• Student support<br>• Collaboration & communication<br>• Learning & Teaching |
| 4 | Western Cooperative for Educational Telecommunications (WCET) -2002 | • Institutional context and commitment<br>• Curriculum & instruction<br>• Faculty support<br>• Student support<br>• Evaluation & assessment |

| | | |
|---|---|---|
| 5 | North Central Association Commission on Institutes of Higher Education - 2006 | • Curriculum and Instruction<br>• Evaluation & Assessment<br>• Library & Learning Resources<br>• Student services<br>• Facilities and Finance |
| 6 | National Education Association (NEA)- 2000 | • Institutional support<br>• Course development<br>• Student development<br>• Faculty support<br>• Evaluation & assessment |

Many of the above-mentioned categories in table 3.5 are shown to be similar in nature. Table 3.6 explain how these different categories could be grouped in one basic category.

**Table 3.6 categorisation integration**

| Reference | Categories | | | | | | |
|---|---|---|---|---|---|---|---|
| **The E-University Compendium- Cases, Issues and Themes in Higher Education Distance E-Learning** | 1-Pedagogies<br>7 - technologies | 2-Course design and development | 3-Organizational support | 5-Supporting staff<br>6-students | 4-Evaluation and quality assurance | | |
| **Institute for Higher Education Policy** | 3-Institutional support | 2-Course development | 1-Teaching and learning | 2-Course structure | 6-Student support | 5-Faculty support | 4-Course evaluation |
| **E-learning Guide – Learning and Teaching Support Network (LTSN)** | 3-Institutional support | 2-Curriculum development | 5-Staff development | 6-Student support | 7-Collaboration & communication | 1-Learning & Teaching | |
| **Western Cooperative for Educational Telecommunications (WCET)** | 3-Institutional context and commitment | 2-Curriculum & instruction | 5-Faculty support | 6-Student support | 4-Evaluation & assessment | | |
| **North Central Association Commission on Institutes of Higher Education** | 2-Curriculum and Instruction | 4-Evaluation & Assessment | 7-Library & Learning Resources | 6-Student services | 7-Facilities and Finance | | |
| **National Education Association (NEA** | 3-Institutional support | 2-Course development | 6-Student development | 5-Faculty support | 4-Evaluation & assessment | | |
| **LINK KEY used between factor categories** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Summary Category** | **Pedagogical** | **Instructional design** | **institutional** | **Evaluation** | **Lecturer** | **student** | **Technical** |

For example student development and student support grouped in student category; others which could be grouped in one category are curriculum and instruction or curriculum development as both could be considered instructional design, and also collaboration & communication and facilities and finance could both be considered technical category.

Therefore a reasonable combination of the type of categories shown in table 3.6 seems to be as follows:

1. Pedagogical category

2. Instructional design category
3. Institutional category
4. Evaluation category
5. Lecturer category
6. Student category
7. Technical category

Additional studies (guides and criteria sites) considered important, were found for the categories which affect the web-enhanced learning. Their findings corroborate in the search for the categories are listed in Appendix 1.

Each category is containing a list of universal critical factors (elements) which affect the web-enhanced learning. The factors for WEL mentioned in some studies are reported in table (3.7) beside a selection of best practices and guidelines listed in Appendix 1.

**Table 3.7 studies of critical success factors in WEL**

| **Factors for quality WEL** | **Reference** |
|---|---|
| - Interaction- Community- Engagement- Communication- Respect- Empathy- Attentiveness-Motivation | Waddel & Byrne (2003) |
| Relevance - Responsive learning designs- Appropriate use of a 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. | Scott (2001) |
| Appropriate assessment- Appropriate workload- Clear goals and standards-Generic skills-Good materials- Good tutoring- Student choice | Richardson (2003) |
| 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 | Oliver (2003) |
| Administrative leadership and support- Ongoing programme concerns- Web-course development-Student concerns and needs- Faculty concerns and needs | Lee & Dzuiban (2002) |
| Adequate learner support- Interactivity- User-friendly navigation-Media and technical quality- Learning-to-learn skills- Independence-Self-management skills | Foreman, Nyatanga & Lovemore (2002) |
| 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 | Downey (2000) |
| Instructor characteristics: Instructor immediacy-Effective interaction-Attitudes towards the course- Attitudes towards the technology-Experience and skill with the medium<br>Student characteristics: Experience and skill with the medium | Arbaugh (2000) |
| Role of online teaching, e.g. moderation, interaction- Teaching with technology- IT support-Course content- Student support- Learning | Applebee, Dearn, Donnan & Kiley |

| Factors for quality WEL | Reference |
|---|---|
| activities -Authentic assessment -Feedback | (2003) |
| Encourage knowledge construction-Encourage students to take responsibility for their own learning-Minimize frustration and maximize positive experiences-Provide time for students' self reflection-Accommodate various learning styles-Promote active learning- Design action oriented learning activities- Enhance critical thinking, higher order reasoning and collaborative projects- Provide non-threatening opportunities for exploration- Offer multiple learning paths. | Alley (2000) |

The critical factors from the studies reviewed in appendix 1 and from studies mentioned in table 3.7 can be grouped into classification groups. Investigating the literature for universal critical success factors in e-learning, it was clear that few appear to present a holistic approach to quality in web-enhanced learning because a single factor category cannot ensure overall quality as a QMS is not a simple cause-effect mechanism but tries to 'control' a typical multi-variate situation which exhibit chaotic behaviour. The dimensionality of the multi-variate situation is likely to be unknown in most cases. As a result the exhaustive set of CSF is likely to be unknown, all one may hope for is to be able to select/define the most important at any point in time.

The work by Fresen, (2005) was chosen as a suitable base because his taxonomy provides a holistic approach. He categorizes factors from different resources and presents an overall taxonomy. Fresen's categories and factors were synthesized based on the frequency with which the factors were mentioned in the original works while other studies didn't. Table 3.8 represents Fresen's taxonomy of factors promotes the quality of e-learning.

**Table 3.8 Fresen's classification of factors to promote the quality of e-learning**

| Category | Factor |
|---|---|
| Institutional | • Technology plan<br>• Infrastructure / Adequate resources for online learning<br>• Student advice and consultation<br>• Change management<br>• Promotes coherent organizational change<br>• Standardization of information design |
| Technology | • Appropriate use of technology<br>• Reliability<br>• Availability<br>• Appropriate download and band width<br>• IT support available for clients<br>• System training available for clients<br>• Accurate management of student records / data |
| Lecturer | • Interaction with students / facilitation of online learning<br>• Frequent and constructive feedback to students |

| Category | Factor |
|---|---|
| | • Professional training in education - professional development<br>• Academic background / qualifications<br>• Regular evaluation of lecturer competence |
| Student | • Communication with fellow students<br>• Time management / time on task<br>• Learner control over time, place, pace of learning<br>• Expect efficiency and effectiveness<br>• Employ critical thinking strategies<br>• Measuring and evaluate student satisfaction<br>• Motivation / commitment / self esteem<br>• Improve students' problem solving abilities<br>• Return on investment - cost/benefit |
| Instructional Design | • Co-operative / group learning / team work / reciprocity / collaboration<br>• Student engagement in higher cognitive levels / knowledge construction /challenges / complex thinking skills<br>• Rich learning resources / Sound learning materials<br>• Interactivity / Active learning / learning activities<br>• Design standards / guidelines / minimum requirements<br>• Routine review and evaluation of courses / products<br>• Enhanced student motivation / responsibility for own learning<br>• Manageable segments / modular / chunking<br>• Inclusivity: social, cultural, gender, disabilities<br>• Purposeful use of learning media<br>• Appropriate use of images, graphics<br>• Offer a complete learning package |
| Pedagogical | • Learning outcomes / objectives are clearly stated<br>• Communicate high expectations<br>• Respect diverse talents and learning styles / equity for all<br>• Optimal assessment strategies / authentic tasks<br>• Clearly stated expectations re: level of participation, assignments etc.<br>• Provide time for students' self reflection<br>• Provide a non-threatening, comfortable environment<br>• Students instructed in proper research methodology<br>• Relevance and accuracy of content<br>• Research and continuous improvement<br>• Educationally significant goals<br>• Programme is adaptable, sustainable and scaleable |

Although Fresen comprises and spreads the evaluation factors within two categories in his taxonomy (student and lecturer), still he missed some issues regarding overall evaluation. Therefore it was considered important to modify his factors to include all evaluation factors in a separate category taking out the two evaluation factors from student and lecturer categories and put both of them into the separate evaluation category with the added new factors, table 3.9 represent the modified classification of factors based on Fresen's taxonomy.

**Table 3.9 modified classification of factors**

| Category | Factor |
|---|---|
| Institutional | • Technology plan<br>• Infrastructure / Adequate resources for online learning<br>• Student advice and consultation<br>• Change management<br>• Promotes coherent organizational change<br>• Standardization of information design |
| Technology | • Appropriate use of technology<br>• Reliability<br>• Availability<br>• Appropriate download and band width<br>• IT support available for clients<br>• System training available for clients<br>• Accurate management of student records / data |
| Lecturer | • Interaction with students / facilitation of online learning<br>• Frequent and constructive feedback to students<br>• Professional training in education - professional development<br>• Academic background / qualifications |
| Student | • Communication with fellow students<br>• Time management / time on task<br>• Learner control over time, place, pace of learning<br>• Expect efficiency and effectiveness<br>• Employ critical thinking strategies<br>• Motivation / commitment / self esteem<br>• Improve students' problem solving abilities<br>• Return on investment - cost/benefit |
| Instructional Design | • Co-operative / group learning / team work / reciprocity / collaboration<br>• Student engagement in higher cognitive levels / knowledge construction /challenges / complex thinking skills<br>• Rich learning resources / Sound learning materials<br>• Interactivity / Active learning / learning activities<br>• Design standards / guidelines / minimum requirements<br>• Routine review and evaluation of courses / products<br>• Enhanced student motivation / responsibility for own learning<br>• Manageable segments / modular / chunking<br>• Inclusivity: social, cultural, gender, disabilities<br>• Purposeful use of learning media<br>• Appropriate use of images, graphics<br>• Offer a complete learning package |
| Pedagogical | • Learning outcomes / objectives are clearly stated<br>• Communicate high expectations<br>• Respect diverse talents and learning styles / equity for all<br>• Optimal assessment strategies / authentic tasks<br>• Clearly stated expectations re: level of participation, assignments etc.<br>• Provide time for students' self reflection<br>• Provide a non-threatening, comfortable environment<br>• Students instructed in proper research methodology<br>• Relevance and accuracy of content<br>• Research and continuous improvement<br>• Educationally significant goals<br>• Programme is adaptable, sustainable and scalable |
| Evaluation | • Institutional evaluation of program effectiveness<br>• Regular evaluation of lecturer competence<br>• Measuring and evaluate student satisfaction<br>• Evaluate content development process<br>• Evaluate assessment methods of student learning |

From the literature, the researcher found that no category would be sufficient to assure quality in the E-learning environment, since many of these factors are systemically interrelated and interdependent, depending on the learning environment.

The classification given in Table 3.9 is a classification of universally important factors and practices which together promote the quality of web-enhanced learning experiences. In isolation, no category would be sufficient to guarantee quality web-enhanced teaching and learning. For example, Carrol (Mayes, 2007) describes the misconception of the 'Nurnberg Funnel': the assumption that the delivery of high quality learning materials is sufficient for learning to occur. Focus on good instructional design and good pedagogy, emphasizes Clarks insistence on the benefits of sound course design, instead of the impact of delivery medium in promoting learning (Clark, 1994). Oliver (2003) asserts that "the principles that underpin the quality of a successful education and online learning are exactly the same as those that underpin successful face to face teaching".

## 3-4 EVALUATION OF THE TEACHING/LEARNING PROCESS

In relation to quality, evaluation is often used synonymously with quality assurance and monitoring processes (Ehlers et al, 2004). However, evaluation has other purposes, such as for development and knowledge (Chelimsky & Shadish, 1997).

When defining quality criteria for teaching and learning, different phases in teaching, i.e. prerequisites of teaching, planning, implementation and evaluation, must be taken into consideration. One main instrument for quality enhancement is evaluation. Deepwell (2007) shows how evaluation can be used as a participatory tool for quality enhancement within the implementation of E-learning programs.

Part of evaluating the effectiveness of quality of any teaching and learning intervention is to obtain ongoing feedback from users and monitor their use (Lowe&Hall, 1999). Wallace (1999) and Smulders (2003) saw the learner in E-learning as both a learner and a user, and then quality standards need to be defined in practical terms on both pedagogical and operational levels. One of the common problems identified in quality E-learning was the absence of performance signposts and measurements. Thus, students are unmotivated and frustrated (O'Regan, 2003). Implementing quality assurance systems in the organization can protect the learner as a "customer" able to acquire the maximum benefit of E-learning by:

- focus on pedagogical values such as individualistic or collaborative learning;
- identification, control, and elimination of inherent problems; and
- dynamic real-time evaluation

Pond (2002) stated “If we are to have viability and credibility in whatever quality assurance measures we adopt in the 21st century, we must open ourselves and the process to other stakeholders: the community, employers, professional organizations, peer institutions, and especially the students themselves”.

In order to ensure quality education without empirical and systematic assessment, Pond (2002) provided a set of universal criteria. He referred to the most widely used definitions of quality, quality assurance, and accreditation, with the learner at the centre of the evaluation process.

Nesbit and Leacock (2004) also use evaluation as an instrument to assure the quality of learning resources. Their framework focuses on different aspects of quality, such as content, motivation, accessibility, and interoperability. All the studies reviewed above evaluated student perceptions and satisfaction with web-enhanced learning. On the other hand few studies were found to survey the level of satisfaction of lecturers.

***3-4-1 Students’ satisfaction***

Randall (2002) highlights the growing concerns of students, as paying customers, about the quality of the educational provision offered to them and emphasizes that delivery systems, and the quality assurance thereof, need to meet the needs and expectations of users.

Janne Parri (2006) indicates that the concept of the learner as a customer is becoming more prevalent. Abitt (2005) proposes five factors that he calls ‘the pillars of quality’ of a web-based course-management system. These include learning effectiveness, student satisfaction, faculty satisfaction, cost effectiveness, and access.

Sariola, Evälä, Ritvanen and Tervonen (2005), in a study aimed at evaluating Finnish quality management in web-based learning, targeted at university students and teachers, specify that organizations must ensure adequate understanding of the needs and expectations of the students and should gather students’ feedback, including satisfaction with the services provided as well as with the web-based learning course. Also they emphasize that quality management and criteria should shift from teaching and planning the courses onto learning results and more student- oriented quality management. Leckey and Neill (2001) claim that it is “evident that student evaluation, whether of courses, teaching quality or the overall student experience, is extremely important and has a significant role to play in the quality assurance process” (p. 19).

According to Boud. D. & Prosser, M. (2002), developments in higher education likely to lead to increased evaluation of teaching and courses through the use of learner evaluation. This means that international quality organizations and national quality agencies will require evidence from an institution about its knowledge of the student experience and the ways in which it has taken student views into account in course design, production and facilitation. Student evaluation is an important part of assessment for quality in university education. However, it should not be the only assessment tool for development. Universities and local authorities must work together in creating self assessment, auditing and national qualifications schemes to establish quality in web-based learning. Segrave, S. & Holt, D.M. (2003) stated that effective E-learning environments require some form of interaction and collaboration among students, several researchers recognized the importance of student interaction to improve performance and satisfaction.

In an empirical study to investigate the critical factors influencing learner satisfaction conducted by Sun et al (2008), a set of measures was investigated showing how institutions can improve learner satisfaction and further strengthen their E-learning implementation.

An integrated framework proposed by the study, describes the critical factors to learner satisfaction. Consequently, in the E-learning evaluation area, there has been a tendency to adopt measures that are widely accepted in the general field of training and education, based on evaluation models such as Kirkpatrick’s four-level model (1998).

This model particularly has the following four levels:

1- **reaction** to measure the customer satisfaction;
2- **learning** to measure the degree of change of participants knowledge, attitudes and skills;
3- **behaviour** to measure the degree of participants behaviour changes as a result of training;

4- **results** measure the achievements of objectives and impact on the organisation.

Kirkpatrick’s model indicates that the four levels should be implemented sequentially in order to achieve success in the evaluation process. But it is not easy to measure levels 3 and 4 in higher education institution, without further research involving graduates in the this work. Another evaluation measure similar to Kirkpatrick’s, is Clark (2000) which has two levels, participant reactions and achievement of learning or programme objectives. The first is similar to Kirkpatrick’s level 1 and the other similar to Kirkpatrick’s levels 2 and 4. Clark (2000) describes two advantages of reaction evaluation: it can uncover informal participant impressions and reveal unanticipated benefits and problems with the course. This is clearly useful in the sense of formative evaluation and continuous improvement and is the level of student and lecturer evaluation that is applied in this study.

The research study will examine the first level of Kirkpatrick’s model as it is simpler to implement in the AASTMT web-enhanced environment, rather than to go deeper into the other three levels which seems to be difficult as the research focuses on improving the web-enhanced learning experience (formative evaluation) of the student in order to sustain continuously improving web-enhanced learning environment, for which the definition of the most critical success factor is necessary. This study does not intend to measure Kirkpatrick’s higher levels, such as the degree of actual learning that took place. These are distant outcomes. (See conceptual framework: figure 4.5).

Strachota, E. (2006) conducts a survey research to measure student satisfaction in on-line courses. She used student on-line surveys to research constructs that are critical to a satisfying on-line learning experience. The findings of Strachota, E. (2006) showed that learner-content interaction and learner-instructor interaction were found to be the most important variables for a satisfying online experience. Consequently this indicates the importance of designing quality products (Web-enhanced course) and the importance of lecturer feedback and training practice needs when conducting a web-enhanced learning program. As a result the research is focusing on client satisfaction of both students and lecturers.

Teng et al (2004) conducted a study to explore critical implementation issues through two similar evaluation criteria and systems for synchronous systems (i.e. web-enhanced learning or web-based learning) that are used by a university in China and another in USA. A framework describing the quality characteristics of web-enhanced learning was evaluated for various constituencies. The framework consisted of four main quality characteristics (Content design, instructional design, interface design and technology design). Each of these characteristics includes critical factors. The consumers' perceptions are one of the important factors of web-enhanced learning debate in the study, whether these perceptions factors were mandatory or optional for the assessment purposes. The study sought to establish the ways in which consumers are using the web-enhanced learning and what processes enhance their learning, so that improvements in interactive E-learning teaching and learning may be initiated and continued. The study results were used to improve course design as a formative evaluation, also improve student support mechanisms and enable staff and organizations to improve their pedagogical strategies.

The above authors stated that learners' accent is given to the human dimension, (i.e. pedagogical approach) of the online environment and also said that E-learning requires skills like critical thinking, self-study and learning skills. Catterson (2004) carried out an educational evaluation of Moodle at Neosho County Community College faculty in the Business and Technology Department, USA, to offer a more in-depth approach to the course management system Moodle.

The case study was a group of college staff, faculty, board members and the student ambassador group "Students Thriving, Achieving and Recognizing Success (STARS) who participated in this research experience using Moodle – almost the same sample as the sample in this study (200 students – see chapter 5). Catterson (2004) formed six surveys with rating form to obtain customer feedback on the use of Moodle's various tools by which he measures the level of interactivity amongst students and teachers. "Uses may include the provision of student access to learning resources, the facilitation of communication and collaborative working among and between students and academic staff, the assessment of individual students or groups of students, and the provision of administrative and student support.

It is an interesting study; the results were satisfactory in that usefulness percentages for many Moodle courseware tools and management were high. Hermans, et al (2007) conducted a study examining the relationship among attitudinal variables contributing to student satisfaction in web-enhanced courses (Moodle) in a state university.

He builds the theoretical hypothesis on technology acceptance model (TAM). He found that Moodle is quickly changing the way of learning as such students' and staff members' teaching and learning approach is changed and that, in general, students perceive the web-enhanced courses to be efficient and exciting. He recommended that ongoing studies should be required, in order to adopt and integrate Information Technology by lecturers. Kakasevski, et al (2008) seeks to evaluate Moodle usability as one of the leading open-source learning management systems. They look for student feedback on the valuable use of Moodle tools at University of Skopje, Macedonia. Four courses were evaluated; involving eighty four undergraduate students participating in the study.

The findings of Kakasevski , et al(2008) showed that the main reasons students used the Moodle course tools were ease of accessibility to course materials, the ease of communicating with the lecturers and other students, time saving, students' satisfaction with learning materials and that they like participating in components of Moodle tools. The student questionnaire (chapter 5 section 5.6.1) was constructed based on the literature discussed above in order to elicit student feedback on web-enhanced learning courses (Moodle courses), also to examine the universal factors and refine it to produce new critical success factors.

### *3-4-2 Lecturer satisfaction*

Few studies were found which surveyed the other role-players of on-line learning, regarding lecturers' satisfaction, with web enhanced learning.

Lee, J. (2002) surveyed faculty members and administrators at the university to investigate motivating and inhibiting factors for lecturers participating in technology-enhanced distance education. His findings list the top five motivating factors and the top five inhibiting factors for faculty members, as shown in Table 3.10.

**Table 3.10 motivating and inhibiting factors for faculty members to participate in technology-enhanced distance education (Lee, J. 2002)**

| Top five motivating factors | Top five inhibiting factors |
| --- | --- |
| Monetary support for participation | Faculty development |
| Personal motivation to use technology | Release time from academic duties |
| Opportunity to improve my teaching | Faculty development |
| Opportunity to diversify program offerings | Lack of institutional support |
| Greater course flexibility for students credits toward tenure and promotion | Concern about quality of courses |

Lee, J. (2002) concludes that "while teaching at a distance requires new technical skills for the new teaching and learning environment, what becomes very important is how to teach concepts within this environment, i.e. pedagogy". Yuen, et al (2008) conducted a survey in order to explore the motivators and inhibitors of the knowledge-sharing process involved at the University of Hong Kong. The survey results give a quantitative view to the measurement of the determinants of the perceptions formed which affect the individual attitude to the E-learning platform and hence to the involvement of the individual to the whole knowledge-sharing process.

The authors found two inhibitors regarding:

- human interaction and sharing is crucial in e-learning
- the design of E-learning systems to provide authentic learning experiences for people to address various training needs and to foster knowledge sharing in a learning community.
- where the motivation found in participants were experienced teachers with reasonable computer competence with positive perceptions towards technology acceptance.

This finding in Lee, J. (2002) supports the philosophy of pedagogy before technology while Yuen, et al (2004) shows the importance of lecturers accepting technology in order to share learning knowledge with other users (i.e., students). Sorebo, A etal. (2008) conducted a study to test the influence of confirmed expectations, perceived usefulness, perceived competence and satisfaction on E-learning among university lecturers.

A questionnaire was completed by 125 university lecturers from 12 different universities in Norway. The obtained results suggest lecturers' confirmation of expectations, perceived usefulness and competence are important in explaining their satisfaction with an-E-learning tool. The result indicated that lecturers' perception of how useful an E-learning tool is, together with their confirmation of initial expectations, constitute the most important factors in explaining their satisfaction level. This study was used by the researcher to build up the interview survey with lecturers in AASTMT.

The lecturer interview method was used to obtain the qualitative lecturer feedback on using the E-learning component (Moodle). Interviews were used to elicit qualitative lecturer feedback on the use of web-supported learning and the services rendered by the support team. The interview schedule is the lecturer questionnaire where the questionnaire is measuring the lecturers' experience and satisfaction.

Although the various studies reviewed in section 3.4.1 acknowledged and investigated student feedback with respect to online learning, few of them specifically emphasized the theme of customer satisfaction in the light of quality assurance.

Only a few studies were found which investigate lecturer satisfaction with technology-enhanced distance learning (section 3.4.2). Research questions 2 and 3 in this study are, therefore, motivated by the need to build a view of quality assurance of web-enhanced learning from the point of view of client (student and lecturer) satisfaction.

As result of this conclusion, the second and third questions of the research were formulated in order to build the view of quality assurance of WEL from the point view of students and lecturers.

- How could a quality management system be used effectively in the design process of Web–Enhanced Learning (WEL)?
- What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning?

## 3.5 CONCLUSION

International studies were reported, analysed and presented from frequently cited literature for classic benchmarks, principles or indicators and technology–enhanced courses papers. Details of the finding of all these studies are given in appendix 1.

Critical success factors (CSF) relevant to WEL have been determined and are defined above. Regarding the CSF it was found that the work by Fresen provided the most suitable basis for the set of WEL specific CSF. This was because of his holistic approach to the teaching/ learning process. Modification was made on Fresen taxonomy to add new category ‘’Evaluation‘’ in order to make taxonomy more appropriate when use by practitioners. The ‘Fresen set’ of CSF was thus used for refinement and further use in the WEL QMS.

Student and lecturer (client) satisfaction in e-learning, considered very important measure in quality assurance.

Several precise studies were found on student feedback regarding course material and activities, but not on wide institutional basis, except for two cases that investigates the motivating and inhibiting factors for faculty members who work on technology-enhanced learning.

Many quality assurance systems were found concentrating on pedagogical and effectiveness of E-learning or on institutionally quality assurance measures to improve learning in general. As such there is lack of guidance in the literature for E-learning practitioners or governmental quality assurance agencies tying to document critical success factors to standardize and improve the quality of web-enhanced learning, from both process and product perspectives.

In terms of quality management concepts the importance of output evaluation was, expectedly, emphasized and thus would influence strongly the expected use of classical ‘Plan, Do, Check and Act’ quality concepts,. This in turn leads to the identification and further investigation to an appropriate template basis for the WEL QMS concept from standards and guidelines that provides the basis for a systematic approach to the creation of a specific, focussed approach to the construction of a quality management system for WEL.

# CHAPTER 4

# WEL QMS CONCEPTUAL FRAMEWORK

## 4.1 INTRODUCTION

The above chapters have presented the investigated issues concerning quality concepts and critical success factors with respect to teaching and learning processes. It was identified from the literature review in chapter 2 and chapter 3 that both management and individuals are aware of the importance of quality but there are no approaches and adoption procedures identified to be implemented in higher education institutions. Such issues must inevitably be addressed before any attempt to define a quality management system (QMS) is made. This chapter presents the concept definition of web–enhanced learning QMS as a three- layered hierarchical model (figure 4.6) which is based upon classical quality-system theory, modified quality standards and critical success factors which are concluded to be relevant for web-enhanced learning. This triggered the second question of the research of how could a quality management system be used effectively in the design process of Web–Enhanced Learning (WEL)?

## 4.2 EXISTING ON-LINE QUALITY MANAGEMENT SYSTEM

Few formal reports were found on the QMS's for E-learning in the literature. From an institutional perspective, many universities have quality assurance or quality promotion units which work with national quality assurance agencies putting systems in place to assure the quality of the academic programs they offer. Such systems are generally referred to as quality assurance systems and focus on institutional self-evaluation followed by external audit, based on the four- step model described by Jeliazkova and Westerheijden (2002) and Mizikaci, F. (2006). Some institutions and universities implement an internal audit system to ensure the quality of the management system. For example the AASTMT in Egypt has a well documented quality assurance system for undergraduate programmes, not particularly for e-learning, in which staff members can easily use it in many forms such as documented procedures or via the intranet. With regard to electronic learning, Lowe and Hall (1999) distinguish between the process and the product in hypermedia applications. The process model in an E-learning support unit can be equated with the instructional design model (for example, the ADDIE model: Analyze – Design – Develop – Implement – Evaluate .see figure 4.1).

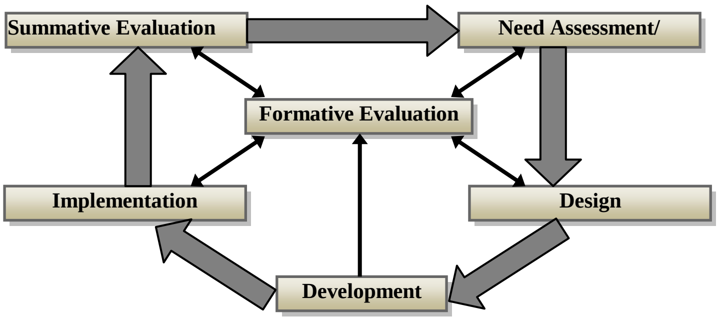



**Fig 4.1 ADDIE model, source :( webqq.csc.noaa.gov)**

Another well-known instructional design model is the Dick and Carey, 1978 systems approach. Carey made a significant contribution to the instructional design. The model as shown in figure 4.2 addresses instructions as an entire system, focusing on the interrelationships between context, content, learning and instruction. The model components interact with each other and work together to bring about the desired learning outcomes for the students.

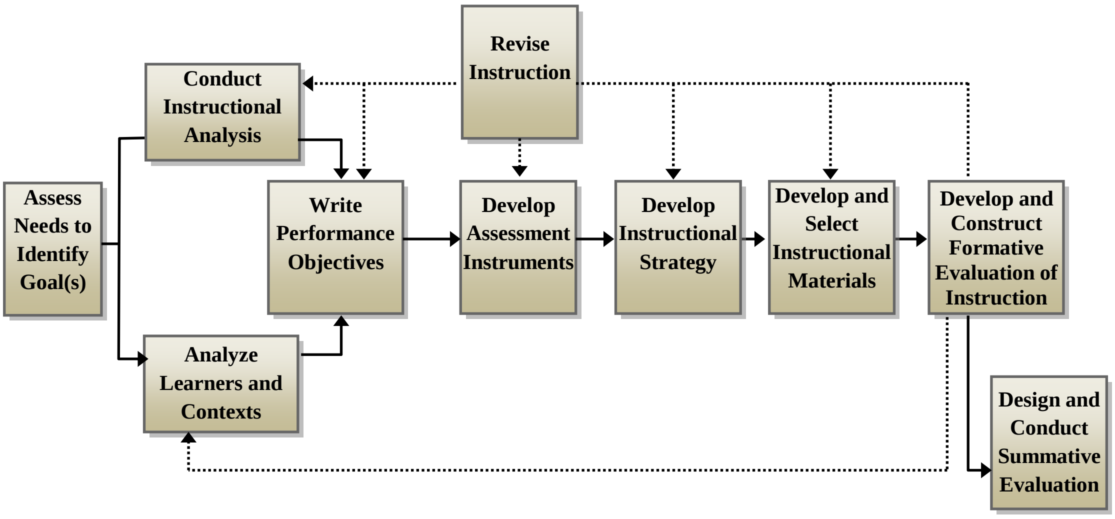



**Fig 4.2 Dick and Carey model, Dick& Carey, 1978**

The quality management system is focusing on the process of designing, developing, delivering and implementing web-enhanced learning.

Only four formal quality management systems (QMSs) have been found which focus on web-enhanced learning. These four examples are discussed below. Even if the titles of papers are enticing, the depth or emphasis of the research projects is often misleading or focused in a different direction. For example, enhancing the quality of online higher education through measurement (Zhao, 2003) – this paper makes various suggestions as to what may be done, but does not report on any actual research done or systems implemented. Many papers present models, tools, or frameworks to enhance the quality of online learning (the product), usually referring to pedagogical effectiveness.

Distance Education Centre at the University of Southern Queensland received the quality accreditation from several accredited professional bodies (University of Southern Queensland, 2008). Their certification includes various institutional and operational aspects, such as organizational management, network design and maintenance, student support systems, multimedia development, telecommunications support, examinations preparation and production, courseware design and development and project management. Although the web site of the university indicates that quality reference approach is exist including the evaluation, quality records and quality measures, but there is no evidence that a formal documented QMS is exist.

A two years project at FH JOANNEUM, based at the University of Applied Sciences is reported by Pauschenwein and Schinnerl (2005).

They mention that the aim of quality management in E-learning at the University is to ensure the development of quality and quality assurance of E-learning concepts and E-learning content and its adaptation to all target groups.

Pauschenwein et al. (2005) quality assurance system consists of evaluation tools, guidance procedures and a training kit. As such, it focuses on evaluating existing computer-based learning materials, or using the procedures in designing new materials. For producers or developers of instructional materials, it can be viewed as an 'instructional design toolkit'. For students, it is a mechanism for them to select and evaluate learning materials in a given programme. Pauschenwein et al (2005) conclude that their system focuses on pedagogical quality, that is, the quality of learning materials and the potential of ICT resources.

Pauschenwein et al (2005) system does not, in fact, address the internal processes and procedures of an E-learning support unit, in the sense of a formal quality management system.

The Swiss Centre for Innovations in Learning (SCIL) is based at the Universidad St. Gallen in Switzerland. The Stanford Centre for Innovations in learning (also SCIL) collaborates with the Swiss SCIL on various teaching and learning projects.

The Swiss Centre promotes and supports quality improvement of E-learning in higher education, through a variety of activities, such as the development of quality standards, evaluation of E-learning projects and analysis of best practices. They have developed a quality management system and certification process in collaboration with the European Foundation for Management Development (EFMD) in Brussels and as part of the E-learning Quality Improvement Programme (ELIP).

The EFMD includes an accreditation institute, for the accreditation of programmes at universities and corporate universities (Seufert, 2004). The same author mentions that self-assessment and external evaluation are part of ELIP and that, from a customer perspective, the intention is to promote improved quality of e-learning. The SCIL appears to use a TQM approach in that they consider the inputs, processes and outputs of quality management. They equate a quality management system with evaluation: formative and summative, which does not imply evaluation of products and, not necessarily, quality management of processes.

The Royal Melbourne Institute of Technology (RMIT) in Australia has developed a university-wide quality assurance system with respect to the instructional design of online courses (McNaught, 2001). The vast majority of their courses involve mixed mode designs, that is, a combination of face-to-face teaching and online learning offered through a distributed learning system.

The quality assurance policy at RMIT has three primary components: educational (instructional) design, peer review and formal evaluation. All courses with an online component need to supply clear evidence of educational design and planning (which includes curriculum coherence, administrative information, planned activities and assessment opportunities).

Formal peer review sessions are held in order to evaluate online courses. This provides feedback to the course designers, as well as academic development for other participants who experience strategies that they may apply in their own courses. Summative evaluation of courses after implementation directs efforts at ongoing quality improvement. This is managed by means of a formal evaluation plan, which includes a student feedback plan.

Four formal quality management (or quality assurance) systems for web-enhanced learning were reviewed above. Two are at universities in Australia, one at a university in Germany and one at a European corporation with links to a university in the USA. Of those which provided details of their systems, or published papers, the RMIT example appears to be a true process-based quality management system for online learning, in that it documents policy and processes with the intention of continuous improvement.

From above argument conceptual framework for this study is established to link the approaches and applied them to the field of web-enhanced learning in higher education.

**4.3 QUALITY APPROACHES AND STANDARDS FOR E-LEARNING**

Two approaches shape the important development of the conceptual framework and lead to formulate the intended quality management approach for this work:

- Quality assurance and guidelines: the knowledge on quality assurance ISO 9001 and quality guidelines ISO19796.
- Instructional systems design: the knowledge that promotes the design and development of electronic learning environments to enhance learning (Kruse, 2004).

The two approaches were selected because of two main issues. The first is that the two approaches are issued from the same international organization which is the ISO. The second reason is that ISO9001 is a famous generic quality management system and widely adopted in industrial and service organizations, in addition to the long experience of the researcher in developing QMS's in universities.

ISO 19796 was the first ISO standard published to help e-learning educational organizations to develop quality systems and to improve the quality of their processes, products, and services.

The common link between the two theories is evaluation. Formative evaluation research and systems theory investigate human activities dedicated to continual improvement (Bereiter, 2002; Checkland, 1999). In this case study, the term evaluation is interpreted in three areas:

- Quality assurance continuously improving processes and procedures
- Instructional design formatively evaluating learning products
- Quality systems improve the human technical systems function and interaction

The ISO 9001 international standard on the requirements for quality management systems promotes a process approach (ISO/TC 19796), in conjunction with the Plan-Do-Control-Act quality improvement cycle first promoted by Deming (Gabor, 1990). The ISO 9001 model (Figure 4.3) was used as part of the basics for the conceptual framework for this study.

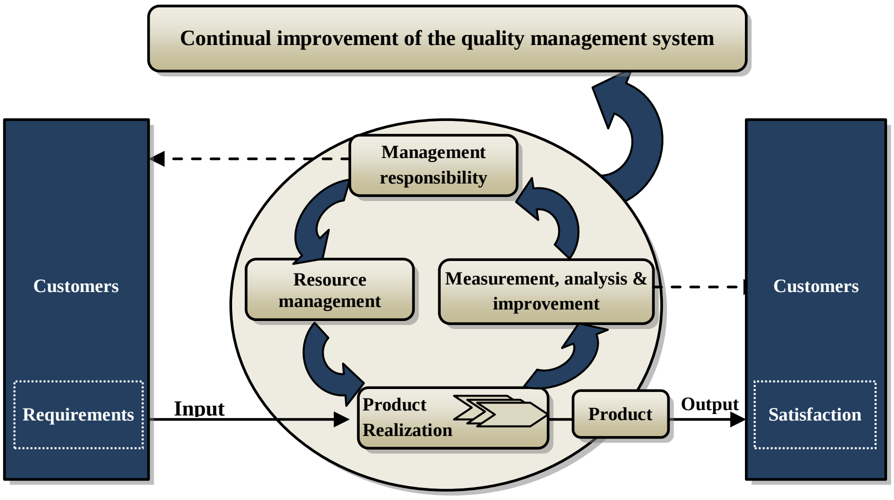



**Fig (4.3) ISO 9001 model of a process-based quality management system (SABS, 2000)**

Figure 4.3 illustrates the combination of a quality-improvement cycle, with the process-based approach, in which inputs are converted by the process to outputs. During this process, products are designed and produced. The products are outputs of the process: the level of their quality contributes to the level of customer satisfaction.

In 2005, the new quality standard for learning, education, and training, ISO/IEC 19796-1, was published. Its purpose is to help educational organizations to develop quality systems and to improve the quality of their processes, products, and services. Generally, quality is an issue of increasing importance in educational organizations (Ehlers et al., 2005).

Pawlowski (2007) stated that "however, there are currently no commonly accepted approaches (Kefalas et al., 2003) therefore; many obstacles to implement and achieve quality can be found in practice. He appointed these obstacles in the difficulty the organization can face due to the variety of existing approaches that meet their needs and requirements and secondly successful implementation depends on overcoming typical barriers (Masters, 1996).

The new quality standard ISO/IEC 19796-1 was developed to overcome those problems. However, implementing a standard in an educational organization is a complex task requiring competencies, commitment, and resources. *In an E-learning environment there is no generally recognized quality management approach but generic ones such as EFQM or ISO9000:2000 are applied to the field of learning (Cruickshank, 2003).* Generic concepts need to be extended regarding educational processes. *The conclusion Cruickshank ended with is that a new quality mark should harmonize existing approaches to provide a common base for quality management in educational organizations and this solution is provided in the process model framework of ISO/IEC 19796-1 Standard (ISO/IEC, 2005) as shown in table (4.1).*

**Table 4.1: reference framework for the description of quality (RFDQ) process model**

| ID Category Sub | Processes | ID Category Sub |
|---|---|---|
| NA | Need analysis | classification |
| FA | Framework analysis | classification |
| CD | Conception/Design | classification |
| DP | Development/Production | classification |
| IM | Implementation | classification |
| LP | Learning focus | classification |
| EO | Evaluation / Optimization | classification |

Pawlowski (2007) provides a quality adaptation model in the form of a guideline on how to adapt the generic standard ISO/IEC 19796-, however he did not define procedures to be adapted in the educational organisations on a broad base. Pawlowski (2007) also stated *''since the model is very generic, more research is necessary — especially to find specific solutions for different fields of usage''*.

Nothing was found which related to case studies or practices to adopt ISO 19796 in the process of instructional design of web-enhanced learning in higher institutions or in universities. As mentioned above the main objective of adopting quality approaches is to assure that an organization manages the quality of its processes. There should be awareness of what quality means for each process. This means that all staff members should be aware of their roles in the quality management process. This is done by preparing precise descriptions of all instructional design processes of the web-enhanced learning in the organization. From the identification of educational demand, the conceptual design and rollout to the final optimization, all processes should be transparently described. For web-enhanced learning, specific processes should be taken into account. A useful instrument to take specific E-learning processes into account is the descriptive process model of ISO/IEC19796:2005.

The descriptive model shows the classification and documentation scheme for quality processes as shown in table 4.2. The description model serves only as certain kind of information base to provide a harmonized scheme to describe quality approaches.

**Table 4.2: descriptive process model of ISO/IEC19796-1:2005**

| Attribute | Description | Example |
|---|---|---|
| ID | Unique Identifier | ID1234 |
| Category | Main Process | Course development |
| Process Name | Process name | Method selection |
| Description | Description of the process | Within this process the didactic concept and methods are evaluated and selected |
| Relations | Relation to other processes | Before the method selection a target group analysis must be performed; FA.6 |
| Sub-processes / sub-aspects | Sub-processes / sub-aspects / tasks | Method identification, method alternatives, method prioritization |
| Objective | Objective of a Process | Adequate selection of one or more didactic concepts |
| Method | Methodology for this process Reference to guideline / documents | • Method selection shall be based on the target group.<br>• Methods are selected based on the teachers' experience.<br>• See Method Guidelines Handbook |
| Result | Expected result of a process | Method specification Documents |
| Actors | Responsible/participating actors | Team Didactical Design |
| Metrics / Criteria | Evaluation/and Metrics for this process | Criteria catalogue 3.2.2-3.2.6 |
| Standards | Standards used | DIN EN ISO 9241, IEEE 1484.12.1:2003 Learning Object Metadata |
| Annotation / Example | Further Information, Examples of usage | |

This process model is a guide to the different processes for developing learning scenarios. It includes the relevant processes within the life cycle of information and communication technology systems for learning, education, and training. The process model is divided into seven parts. Sub-processes are also included referencing to a classification of processes. Table 4.3 reflects the seven parts of the process.

**Table 4.3: process model of ISO/IEC 19796-1**

| ID | Category | Description |
|---|---|---|
| 1 | **Needs Analysis** | **Identification and description of requirements, demands, and constraints of an education project**<br>1.1 Initiation<br>1.2 Stakeholder identification<br>1.3 Definition of objectives<br>1.4 Demand analysis |
| 2 | **Framework Analysis** | **Identification of the framework and the context of an educational process**<br>2.1 Analysis of the external context<br>2.2 Analysis of staff resources<br>2.3 Analysis of target groups<br>2.4 Analysis of the institutional and organizational context<br>2.5 time and budget planning<br>2.6 Environment analysis |
| 3 | **Conception/ Design** | **Conception and Design of an educational process**<br>3.1 Learning objectives<br>3.2 Concept for contents<br>3.3 Didactical concept/methods<br>3.4 Roles and objectives<br>3.5 Organizational concept<br>3.6 Technical concept<br>3.7 Concept for media and interaction design<br>3.8 Media concept<br>3.9 Communication concept<br>3.10 Concept for tests and evaluation<br>3.11 Concept for maintenance |
| 4 | **Development / Production** | **Realization of concepts**<br>4.1 Content realization<br>4.2 Design realization<br>4.3 Media realization<br>4.4 Technical realization<br>4.5 Maintenance |
| 5 | **Implementation** | **Description of the implementation of technological components**<br>5.1 Testing of learning resources<br>5.2 Adaptation of learning resources<br>5.3 Activation of learning resources<br>5.4 Organization of use<br>5.5 Technical infrastructure |
| 6 | **Learning process** | **Realization and use of the learning process**<br>6.1 Administration<br>6.2 Activities<br>6.3 Review of competency levels |
| 7 | **Evaluation / optimization** | **Description of the evaluation methods, principles, and procedures**<br>7.1 Planning<br>7.2 Realization<br>7.3 Analysis<br>7.4 Optimization/ Improvement |

Tables 4.1 and 4.2, ISO 19796 contain a list of reference criteria for the assessment of the quality of E-learning products. The standard contains functional as well as media and learning psychology-related reference criteria.

## 4.4 RELEVANT ISO FRAMEWORKS FOR THE FOUNDATION OF THE WEL SPECIFIC QMS

In short the relevance of these two standards may be viewed as in fig 4.4. Consequently, the ISO19796 standard is a basic model or roadmap for educational institutes and has to be adapted to each institute's specific context.

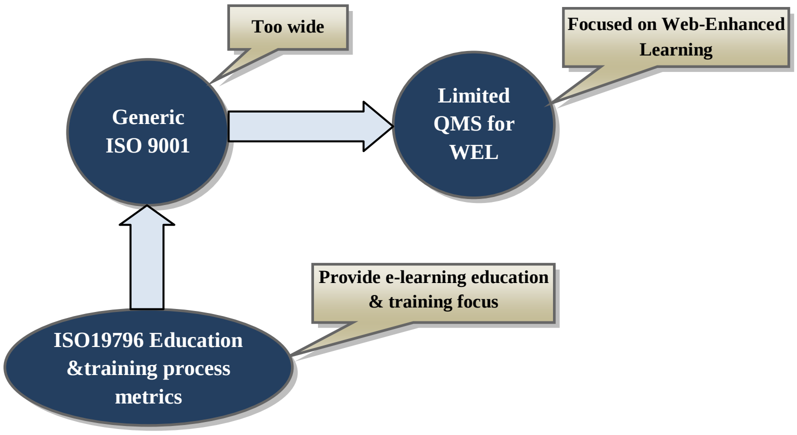



**Figure 4.4 Quality management standards integration**

ISO 9001 is generic approach (International Organization for Standardization, 2000). It is widely used and well accepted in the field of quality management. However, the effort to adapt this approach is very high. In practical, organisation has no specific domain guideline to provide description for the education process. Even though this difficult, examples of succession shows that it is possible to use this standard in the context of learning and education(e.g., Cruickshank, 2003; SRI, 2003) but that adapting this standard still requires a great deal of effort.

In order to avoid the great adaption effort, specific approaches for the field of learning (some of these mentioned in chapter 3) have been developed such as the following:

- BLA Quality Mark (British Learning Association, 2005)
- QAA Framework (Consortium for Excellence in Higher Education, 2001)
- Quality on the Line Benchmarks (Institute for Higher Education Policy, 2000)
- ASTD Quality Criteria, American Society for Training & Development (2001)
- Learning Object Metadata IEEE Learning Technology Standards Committee (2002)
- Data Quality (Pipino et al., 2002; Pierce, 2004)

These approaches differ in scope and methodology, extended from developing course content criteria and guidelines to quality management system for education.

Moreover, none of these approaches has a wide acceptance in Europe (Ehlers et al., 2005).

In spite of the fact that all quality approaches are considered helpful for educational organisation, several weaknesses exist. (Pawlowski, 2007);

- most standards and approaches are not comparable; only expert users are informed on scope and applicability for a certain context;
- the adaptation efforts for generic standards are, in many cases, too high;
- specific standards are usually not widely used and not well known in the community.

*From above it is obviously that these standards and approaches are theoretically fine but practically it is difficult to be adopted specifically for educational organizations.*

As a result of this the ISO 19796 was published in-order to overcome these shortcomings. The ISO19796 supports the development of quality profiles (generic standard is tailored to the needs and requirements of an organization) for educational organizations. It is a framework to *guide actors through the process of quality development* in the field of e-learning.

Although the ISO 19796 provides a harmonized approach to manage, assure and assess quality, harmonization has been done on theoretical level also, same as for those of specific approaches mentioned above, with no recommendation or guidelines for quality management.

Pawlowski (2007) stated the weaknesses found in the ISO19796:

- Harmonization: the processes are specific to the domain; however, not all specific scenarios are covered.
- Completeness: there are no pre-defined relations sequencing the processes
- Methodology: It is not clear from the document itself whether or not the standard needs to be extended and adapted.
- Support of stakeholders: the standard does not contain detailed guidelines for how to use the model.
- Flexibility: the standard does not contain a conformance statement, each extension would relate to the harmonization aspect.
- Consistency with other standards: The model includes the main aspects that are covered in other process-oriented standards (see first section).

For these reasons and specially the last one, ISO19796 can be used as guideline that can then be used in a generic standard, such as ISO9001, and a quality management system then can be developed with respect to web enhanced- learning using the two standards. The quality conceptual frame work for the WEL QMS is developed and presented in chapter 7 figure 7.4 detail the formation of the quality management system.

*I included the ISO 9001 as part of the process-based quality management model in connection with ISO 19796 to produce a combined conceptual framework for the quality management of web-enhanced learning (Figure 4.5).*

Figure 4.5 reflects elements of quality assurance theory (Plan-Do-Control-Act cycle, feedback loop, inputs, processes and outputs, client satisfaction), as a complex holistic system, made up of basic parts, It responds to the request that "a complete solution must recognize the importance of processes, and for adequate checking of quality, we must take a balanced account of inputs, processes, outputs and outcomes (Woodhouse, 2000b, p. 107).

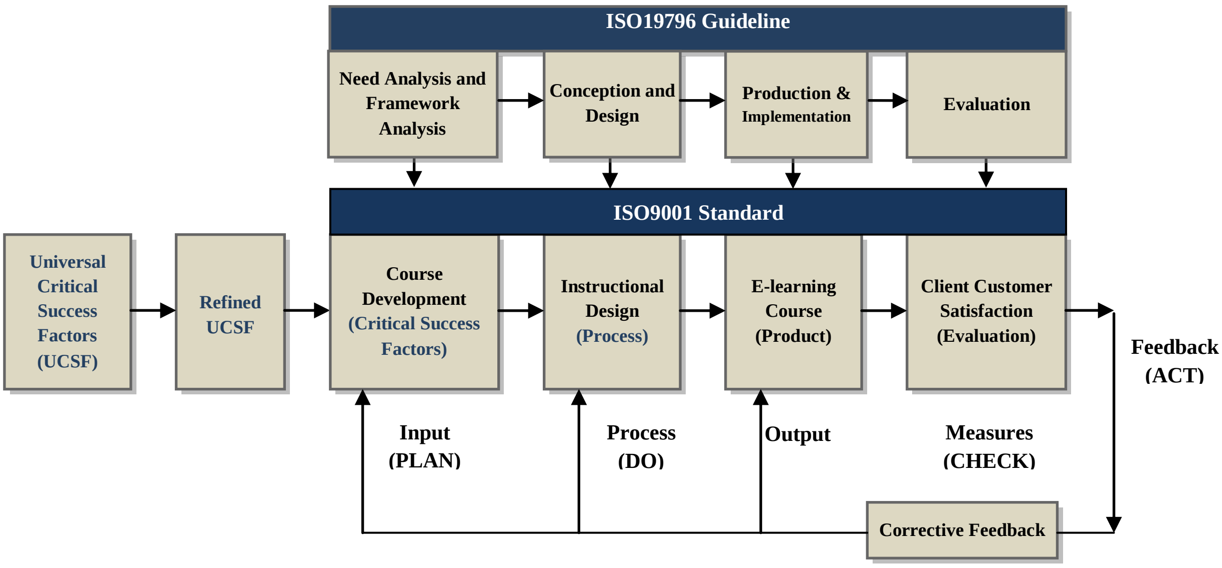



**Figure 4.5 Conceptual framework**

The combination of the two standards in this study means that the conceptual framework can serve as a guideline for future similar WEL specific QMS development. Additionally, the conceptual framework suggests combination procedures and steps to implement such QMS for WEL (see procedures in Appendix 6 and table 7.1 roadmap & action plan in chapter 7).

The two standards (ISO9001&ISO19796) were combined so that when considering the ISO9001 ‘’plan’’ requirements, the course development should have at first a need analysis and framework analysis to have the necessarily critical success factors for course development, subsequently the ISO9001 ‘’do’’ requirements is using the instructional design process based on the guidance’s of ISO19796 conception and design category. The ‘’check’’ output of ISO9001 requirement is the course (product) in which it should be aligned with the ISO19796 production & implementation category. The last is the ‘’Act’’ phase in which the product is changed through the client feedback guided by the evaluation category of ISO19796.

The research questions are directly addressed by this conceptual framework. It is emphasises the need and the expectations of the clients (students and lecturers). The refined critical success factors identify and focus on the quality of WEL course *outputs* (products). The WEL course is then evaluated in the course of usual instructional design practice. Customer satisfaction is the summative evaluation of the WEL courses (products) that uses the CSF to produce measures to effect continual improvement through a classical feedback loop.

The research questions in this study are linked in a straight line with the conceptual framework:

1- The research question (What are the critical success factors for quality web-enhanced learning) is reflected in the input part of the framework which through the instructional design process, affect the quality of WEL courses in the output part of the framework.
2- The research question (How could a quality management system be used effectively in the design process of Web–Enhanced Learning) is reflected in the process of part of the framework and in the client satisfaction and evaluation.
3- The research question (What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning?) is reflected by customer satisfaction measure of the framework.

All parts of the conceptual framework (fig.4.5) reflect the nature of quality management system for the web-enhanced learning that has resulted from this case study.

Decisions for improvement need to be based on measurements that lead to information that continuously improve the quality cycle. The measurement realizations in this study are the students and lecturer's satisfaction, according to Kirkpatrick's participant's reaction (level1). The feedback measures need to be acted upon summative evaluation procedures with the aim of improving the on going process and product (see figure 4.7).

Figure 4.5 illustrates the combination of a quality-improvement cycle, with the process-based approaches of ISO9001 and ISO19796, in which inputs are converted by the process to outputs. During this process, products are designed and produced. The products are outputs of the process: the level of their quality contributes to the level of customer satisfaction.

The eight categories of critical success factors identified from the literature review are considered the input for the quality management system in order to promote the quality of web-enhanced learning.

Certain factors were considered within the eight categories (pedagogical-instructional-institutional-evaluation-lecturer-student-and technical). Regarding the pedagogical and instructional categories, factors are inclined to promote the learning practice. With respect to institutional factors top management are committed to give the material and financial resources, also the same with the CDPD at MMC.

Evaluation factors are most important, in which it is measuring the effectiveness and the continual improvement of the QMS. The factors tend to be universal, for example regular evaluations of lecturer competence, assessment methods of student learning and Measuring and evaluate student satisfaction. What is new here with regards to CDPD is the evaluation of the content development process as this process should be approved by Ministry of Higher Education annually; hence the CDPD could not improve the WEL course content on semester basis.

In relation to technical factors that have straight influence on WEL and client satisfaction in the same time, CDPD include all the support needed for maintenance of technology and technical staff availability in the campus and computer laboratories to help students and lecturers.

Some of the lecturer and student factors in this case study tend to be universal rather than unique; for example, varied backgrounds, learning styles, levels of commitment and motivation for web-supported learning. What is unique is the needs of students with disabilities are now being recognised, both nationally and internationally.

The WEL quality management system is seem conceptually as presented in figure 4.6:

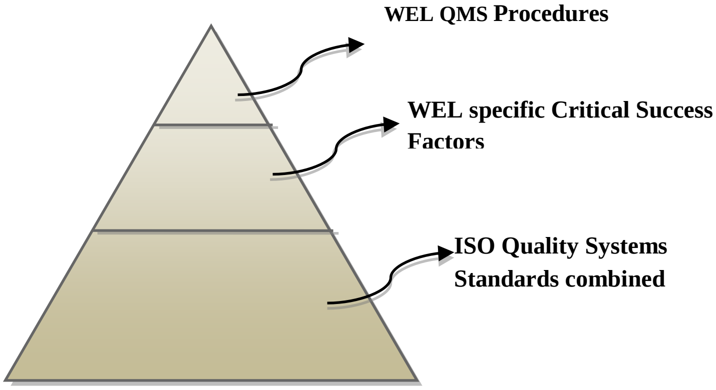



**Figure 4.6 Three layer QMS hierarchy**

Chapters 2 and 3 discuss and show that the nature of WEL presents domain- specific quality management issues with respect to:

- quality concepts
- critical success factors
- system concepts and procedural guidelines

The WEL QMS conceptual 3-layered model should facilitate a QMS which satisfies the plan, do, check and act of classical quality control theory, using WEL-focused CSF to effect the required success evaluation and corrective feedback according to fig 4.5. In classical process control terminology, the system concept is represented diagrammatically in figure 4.7 as below:

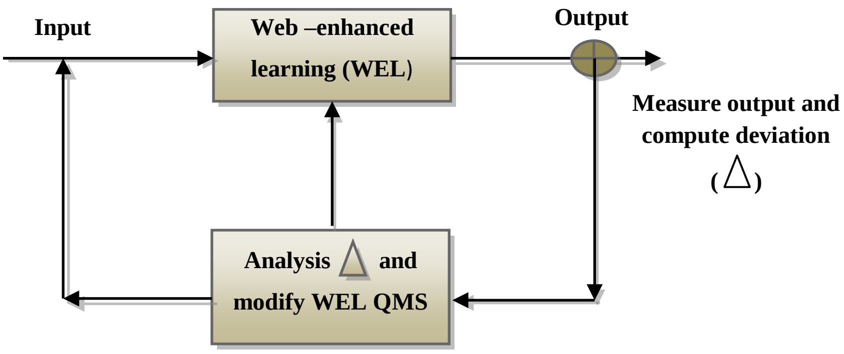



**Figure 4.7 Classical process terminology**

The WEL process is the overall process including the 4 WEL phases in figure 4.5, namely, course development, instructional design, the actual E-learning course product, and the client customer evaluation. Central to both the output deviation measurement and its analysis and subsequent corrective actions, lays the CSF.

The CSF provides the control methodological focus for the required QMS concept. The third conceptual model layer represents the QMS actions, patterns and procedures which facilitate the effective implementation of the WEL QMS. The 3-layer concept implies a degree of modularity in as much as changes in one layer will only affect layer(s) directly based upon it. This is, however, not taken further in any detail.

## 4.5 CONCLUSION

The WEL QMS concept reflects a number of state-of-the-art systems and quality concepts, as well as critical success factors which have been well defined for different teaching and learning situations. Thus the WEL QMS presents the details a new QMS approach and instance for WEL. In this concept it is the top layers 2 and 3 of the layered system concept (fig.4.6) which introduce increasing degrees of instancing specific details. It is expected that the critical success factors may need prioritizing and refining and that the QMS procedures may require consequential amendments. Such issues may be seen as detailed implementation issues, not concept issues, since critical success factors cannot be assured constant in time and across domains and that varying implementation domains may require different procedures as a function of such variables as culture, pedagogical development subject matter etc.

# CHAPTER 5

# RESEARCH METHODS

## 5.1 INTRODUCTION

The purpose of this chapter is to present a research methodology overview and to discuss the research 'situation' and the associated research programme with the required research methods for each step and phase of the programme. Its focal points include the research design employed and the sampling procedure used to investigate the applicability of quality assurance to the field of web-enhanced learning in Egyptian higher education, which will be studied in the pilot study, as well as the construction and administration of the instruments used in the research. This will be an exercise meant to complement the literature review and not to duplicate the knowledge already presented in the previous chapters on quality assurance in an E-learning environment with respect to web-enhanced learning. This approach is based on the idea that "until you have learned what others have done in your area, you cannot develop a research project that will contribute to furthering knowledge in your field" (Johnson, 1994).

This chapter presents a methodological overview in section 5.3. The chapter describes the methodological framework of this study.

## 5.2 RESEARCH METHODOLOGICAL OVERVIEW

### *5.2.1 Paradigms of research*

The research philosophy, or paradigm, impacts on the methodology adopted for the research project. The term methodology refers to the overall approaches and perspectives to the research process, as a whole, and is concerned with the following main issues:

- Why certain data is collected
- What data is collected
- Where it is collected
- How it is collected
- How it is analysed

A research method refers only to the various specific tools or ways data can be collected and analysed, e.g. a questionnaire; interview checklist; data analysis software etc. There are essentially two main research philosophies (or positions) although there can be overlap between the two – and both positions may be identifiable in any research project. Positivistic: can also be referred to 'Quantitative', ‘Objectivist’, ‘Scientific’, ‘Experimentalist’ or ‘Traditionalist’. With regard to the characteristics of the positivistic paradigm based on ontological, epistemological and methodological components, it can be said that the positivistic ontology is that reality can be apprehended. The investigator and the investigated ‘object’ are assumed to be independent entities, and the investigator is capable of studying the object without influencing it or being influenced by it. The positivistic epistemology is based on objectivity, a possibility to find universal facts. Questions and/or hypotheses are stated in prepositional form and subjected to empirical tests to verify them. (Guba and Lincoln, 1994). Positivistic approaches to research are based on research methodologies commonly used in science. They are characterised by a detached approach to research that seeks out the facts or causes of any social phenomena in a systematic way. “Positivistic approaches are founded on a belief that the study of human behaviour should be conducted in the same way as studies conducted in the natural sciences” (Collis & Hussey, 2003). Positivistic approaches seek to identify measure and evaluate any phenomena and to provide rational explanation for it.

This explanation will attempt to establish causal links and relationships between the different elements (or variables) of the subject and relate them to a particular theory or practice. There is a belief that people do respond to stimulus or forces, rules (norms) external to themselves and that these can be discovered, identified and described using rational, systematic and deductive processes. Phenomenological: (can also be referred to as ‘Qualitative’, ‘Subjectivist’, ‘Humanistic’ or ‘Interpretative’). Phenomenological approaches however, approach research from the perspective that human behaviour is not as easily measured as phenomena in the natural sciences. Human motivation is shaped by factors that are not always observable, e.g. inner thought processes, so that it can become hard to generalise on, for example, motivation from observation of behaviour alone. Furthermore, people place their own meanings on events; meanings that do not always coincide with the way others have interpreted them.

This perspective assumes that people will often influence events and act in unpredictable ways that upset any constructed rules or identifiable norms – they are often ‘actors’ on a human stage and shape their ‘performance’ according to a wide range of variables. Phenomenological approaches are particularly concerned with understanding behaviour from the participants' own subjective frames of reference. Research methods are chosen therefore, to try and describe, translate and explain and interpret events from the perspectives of the people who are the subject of the research.

### *5.2.2 Goals of the research*

Dane (1990) claims that the immediate goals of research, exploration, description, prediction, explanation and action, provide us with a strategy for figuring out which questions to ask and which answers to seek. Robson (2002) identifies a tripartite classification, which is commonly used for the explanation of the purpose of research, distinguishing between exploratory, descriptive and explanatory purposes, which are illustrated in table 5.1 below. He states that *"a particular study may be concerned with more than one purpose, possibly all three, but often one will predominate. The purpose may also change as the study proceeds."* (Robson, 2002)

**Table 5.1: classification of the Purpose of Research; based on Robson, 2002**

| Purpose of Study | Explanation of Purpose |
|---|---|
| Exploratory | • To find out what is happening, particularly in little understood situations<br>• To seek new insights<br>• To ask questions<br>• To assess phenomena in a new light<br>• To generate ideas and hypotheses for future research<br>• Almost exclusively of flexible design |
| Descriptive | • To portray an accurate profile of persons, events or situations<br>• Requires extensive previous knowledge of the situation to be researched or described, so that you know appropriate aspects on which to gather information |
| Explanatory | • Seeks an explanation of a situation or problem, traditionally but not necessarily in the form of causal relationships<br>• To explain patterns relating to the phenomena being researched<br>• To identify relationships between aspects of the phenomenon<br>• May be of flexible and/or fixed design |

There are other classifications, such as the one below (table 5.2), where explanatory research is more or less replaced with 'analytical' and 'predictive' research.

**Table 5.2: research methodology classifications; based on Neville C., 2005**

| Exploratory | Descriptive | Analytical | Predictive |
|---|---|---|---|
| Exploratory research is undertaken when few or no previous studies exist. The aim is to look for patterns, hypotheses or ideas that can be tested and will form the basis for further research.<br>Typical research techniques would include case studies, observation and reviews of previous related studies and data. | Descriptive research can be used to identify and classify the elements or characteristics of the subject, e.g. number of days lost because of industrial action.<br>Quantitative techniques are most often used to collect, analyse and summarise data. | Analytical research often extends the Descriptive approach to suggest or explain why or how something is happening, e.g. underlying causes of industrial action. An important feature of this type of research is in locating and identifying the different factors (or variables) involved. | The aim of Predictive research is to speculate intelligently on future possibilities, based on close analysis of available evidence of cause and effect, e.g. predicting when and where future industrial action might take place. |

### *5.2.3 Research approaches*

Research can be approached in the following ways:

- Deductive/Inductive
- Quantitative/Qualitative

Any research projects combine a number of approaches, e.g. may use both quantitative and qualitative approaches

#### *5.2.3.1 Induction or Deduction*

When conducting research, one normally distinguishes between induction and deduction. Molander (1988), states that the idea of induction is the generation of general conclusions from a specific case. Deduction, on the other hand, deals with the explanation of a specific case from a general rule. The principles of inductive and deductive research are shown in Figure 5.1. Wiedersheim-Paul & Eriksson (1999) explain induction as follows: "from separate phenomenon in reality we derive general statements." On the other hand, they state that, when we perform deduction," from theory we form hypotheses, which are testable statements about reality. Through logical conclusion we derive the result." This thesis includes both deductive and inductive parts, and has many similarities to figure 5.1.

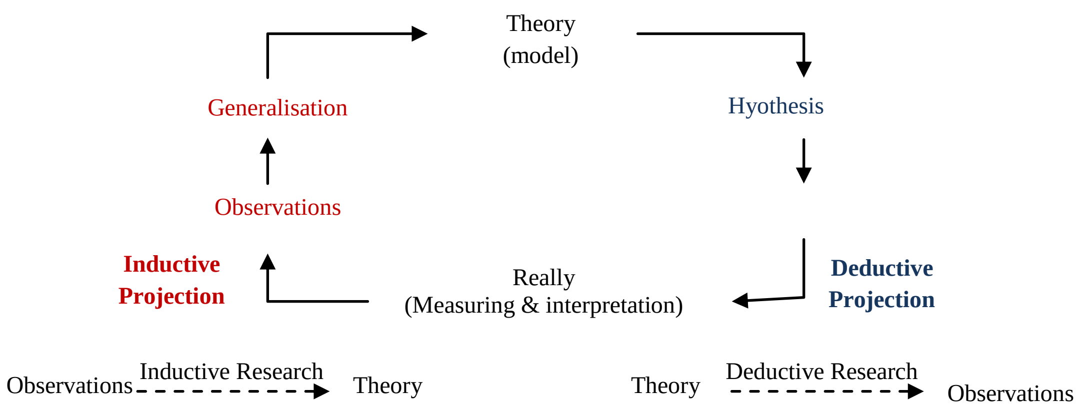



**Figure 5.1 Principles of Inductive and Deductive Research; (Wiedersbeim-Paul & Eriksson, 1999)**

#### 5.2.3.2 Qualitative and quantitative

Two major categories of research methodologies exist, namely quantitative and qualitative methods. According to Merriam (1994), the information brought by words is qualitative, while information brought by numbers is quantitative. Although there are many types of research that may be undertaken, "Qualitative research focuses on the context of a phenomenon, while quantitative research seeks to develop phenomenological generalizations that can be applied to a range of contexts."(Libarkin & Kurdziel, 2002) Whereas, qualitative research implies an emphasis on the qualities of entities, and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency. In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes (Denzin and Lincoln, 2000). These two research paradigms are widely discussed in the literature; the quantitative (or positivist) and the qualitative (or phenomenological) paradigms (Burns, 1997; Creswell, 1994; Hussey and Hussey, 1997; Leedy 1993; Remenyi et al., 1998:; Rudestam &Newton, 2001).

The quantitative paradigm has been labelled as the positivist, the experimental, objectivist, scientific, or the empirical paradigm (Creswell, 1994; Hussey and Hussey, 1997). On the other hand, the qualitative paradigm has been labelled as the constructivist or naturalistic approach (Lincoln & Guba, 1985), the interpretative approach (Smith, 1983), the humanistic approach (Hussey & Hussey, 1997), the hermeneutic paradigm (Gummersson, 2000), or post-positivist or post-modern perspective (Quantz, 1992). However, Libarkin and Kurdziel (2001) highlighted throughout a pros & cons comparison of both qualitative and quantitative studies as shown in table 5.3.

However, the notion of appropriateness must be clearly emphasized; that is, when is it appropriate to use qualitative techniques, and when are quantitative techniques more suitable to a study? This issue is a long-debated and much discussed topic in educational research, and is commonly called "the Qualitative-Quantitative Debate."

**Table 5.3: comparison of some aspects of qualitative and quantitative research**

| | **Qualitative** | | **Quantitative** | |
|---|---|---|---|---|
| **Characteristic** | **Pros** | **Cons** | **Pros** | **Cons** |
| **Methodology** | Issues can be studied in great detail. Analytical approach is unconstrained | Results may be applicable to only a narrow range of individuals or settings. often no connection to causes | Results from a variety of individuals or settings can be used to develop a single explanatory model. | Analytical approach is constrained by established standardized methods. Individuals may be artificially forced into categories |
| **Interpretation** | Interpretation is often based on manipulation of raw data and is therefore tied directly to the data source. | Individual beliefs of the researcher may shape the data interpretation. | Statistical analysis, although not perfectly free of subjectivity, is typically independent of the researcher's personal belief | By the time a quantitative work reaches the interpretation stage, the context in which the data was |

| | | | | |
|---|---|---|---|---|
| | | | system. | collected may be lost. |
| **Validity/ Reliability** | Validity and reliability are established through logical reasoning and consensus; statistics not required. | Researcher acts as the instrument; training and skill of practitioner can bias results. | Validity and reliability are highly controlled variables established statistically; limited training required. | Establishing validity and reliability is time consuming. |

Hence, Hussey and Hussey (1997) studied the main features of both qualitative and quantitative methods and illustrated it as follows; Qualitative paradigm (1) tends to produce qualitative data; (2) uses small samples; (3) is concerned with generating theories; (4) data is rich and subjective; (5) natural location; (6) reliability is low;(7) validity is high; (8) generalizes from one setting to another. Whilst, the Quantitative paradigm (1) tends to produce quantitative data; (2) uses large samples; (3) is concerned with hypothesis testing; (4) data is highly specific and precise; (5) artificial location;(6)reliability is high; (7) validity is low; (8) generalizes from sample to population. Hence, “Qualitative data can be analyzed using a number of methods and these methods bring qualitative data into the quantitative realm. Similarly, quantitative analytical techniques are used to shift raw data into the realm of statistics.” (Libarkin and Kurdziel, 2001) as shown below in figure 5.2.

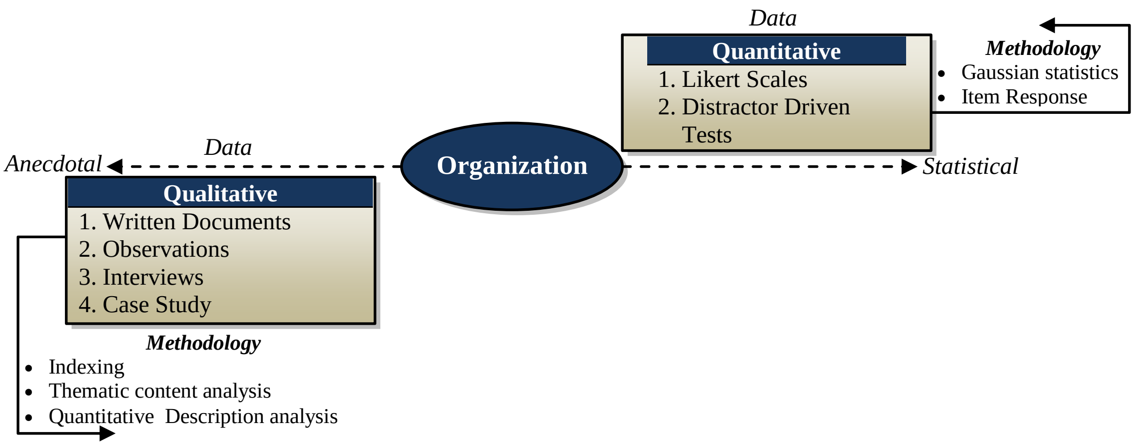



**Figure 5.2 Type for qualitative & quantitative research; Libarkin & Kurdziel, 2002**

Whilst, Kerlinger and Lee (2001) differentiate the qualitative and quantitative research throughout, identifying some key characteristics as shown in table 5.4:

**Table 5.4: qualitative and quantitative research characteristics**

| | |
|---|---|
| • Qualitative research does not rely on the use of numbers or measurements. | • Quantitative research relies on the use of numbers & measurements. |
| • Qualitative research focuses on phenomena that cannot be explained adequately with statistics | • Quantitative research focuses on phenomena that can be explained by |

| | |
|---|---|
| • Qualitative research tends to be less intrusive, and the researcher can work unobtrusively.<br>• Qualitative research has a data collection process that is semi-structured. Processes are naturalistic, participatory & interpretive in nature.<br>• Qualitative research is more flexible and changes as the data and circumstances change.<br>• Qualitative research has a phenomenological perspective. | numbers and statistics.<br>• Quantitative research requires the researcher to play a more prominent role in the data gathering process.<br>• Quantitative research structures the data collection process.<br>• Quantitative research requires a set plan for the completion of research.<br>• Quantitative research has a post-positive tradition. |

In some areas of social research, the "qualitative-quantitative" distinction has led to arguments, with the proponents of each arguing the superiority of their data over the other. The quantitative types argue that their data is "hard, rigorous, credible, and scientific". On the other hand, the qualitative proponents counter that their data is "sensitive, detailed, and contextual" in nature. However, these arguments cannot be generalized, given that both research methodologies have merit, depending upon the nature of the investigation. It should be quite clear during the research that a research methodology is selected based on its ability to provide the best forms of data to answer the research problem and purpose of the research. Table 5.5 below, further illustrates these terms.

**Table 5.5: Qualitative and quantitative mode of inquiry**

| Quantitative Method | Qualitative Method |
|---|---|
| **Assumptions** | |
| • Social facts have an objective reality Primacy of method<br>• Variables can be identified and relationships measured<br>• Outsider's point of view | • Reality is socially constructed<br>• Primacy of subject matter<br>• Variables are complex, interwoven, and difficult to measure<br>• Insider's point of view |
| **Purpose** | |
| • Generalization<br>• Prediction<br>• Causal explanations | • Contextualization<br>• Interpretation<br>• Understanding actors' perspectives |
| **Research Approach** | |
| • Begins with hypotheses and theories<br>• Manipulation and control<br>• Uses formal instruments<br>• Experimentation<br>• Deductive analysis<br>• Component analysis<br>• Seeks consensus, the norm<br>• Reduces data to numerical indices<br>• Abstract language in write-up | • Ends with hypotheses and grounded theory<br>• Emergence and portrayal<br>• Researcher as instrument<br>• Naturalistic<br>• Inductive analysis<br>• Searches for patterns<br>• Seeks pluralism, complexity<br>• Makes minor use of numerical indices<br>• Descriptive write-up |
| **Research Role** | |
| • Detachment and impartiality<br>• Objective portrayal | • Personal involvement and partiality<br>• Empathic understanding |

Both qualitative and quantitative methods can be powerful tools for understanding the complex management practices relationships in higher education institutions. It is evident that each methodology provides a unique perspective that can be important for unravelling cause and effect, regardless of its own advantages and disadvantages, as shown in table 5.6 below.

**Table 5.6: Qualitative and quantitative advantages & disadvantages**

| Qualitative Method | Quantitative Method |
|---|---|
| **Advantages** | |
| • Facilitates understanding of how and why;<br>• Enables researcher to be alive to changes which occur during the research process;<br>• Good at understanding social processes | • Economical collection of large amount of data;<br>• Clear theoretical focus for the research at the outset;<br>• Greater opportunity for researcher to retain control of research process;<br>• Easily comparable data |
| **Disadvantages** | |
| • Data collection can be time consuming<br>• Data analysis is difficult<br>• Researcher has to live with the uncertainty that clear patterns may not emerge<br>• Generally perceived as less credible by non-researchers | • Inflexible – direction often cannot be changed once data collection has started<br>• Weak at understanding social processes<br>• Often doesn't discover the meanings people attach to social phenomena |

Hence, researchers should pay particular attention to the construction of research questions before gathering data, and choose the methodology, or combination of methodologies, that is most likely to provide meaningful answers. However, Holme and Solvang (1991) argue that there are many benefits to be gained by combining qualitative and quantitative methods. Specifically, a qualitative study can be a follow up activity of a quantitative study, and can serve as a preparatory study prior to a quantitative study.

### *5.2.4 Combined methodology research*

It is not always possible to blend the two paradigms; whereas qualitative analysis provides the context lacking in quantitative research, whilst quantitative analyses broaden the implications of a purely qualitative study. Additionally, the use of multiple data sets can inform the research, yielding insight and methodological changes that improve the study and strengthen findings.

According to Preece (1994), both schools of thought can be seen as complementary, with different emphasis in different disciplines, but sharing a heritage of logical thought and empiricism. Moreover, Allwood (1999) maintains that this distinction between quantitative and qualitative methods is not appropriate, because research methods in general consist of both qualitative and quantitative elements. Hence, a research plan can incorporate both qualitative and quantitative data. Although some researchers choose one research paradigm over the other, the combination of statistical analysis, with contextual data, has been used with great success by a number of researchers. Most importantly, these dual studies are able to inform educational practice for both the local setting under study and the broader context. Libarkin and Kurdziel (2001), emphasize that qualitative and quantitative data both inform practice, the former with contextual frameworks and the latter through statistical analysis. Both types of data can be correlated within a single study, and in actuality neither data type can exist in isolation. A mixed method study would sit between the interfaces of the qualitative/quantitative realm and would inform actual practice as shown in figure 5.3 below.

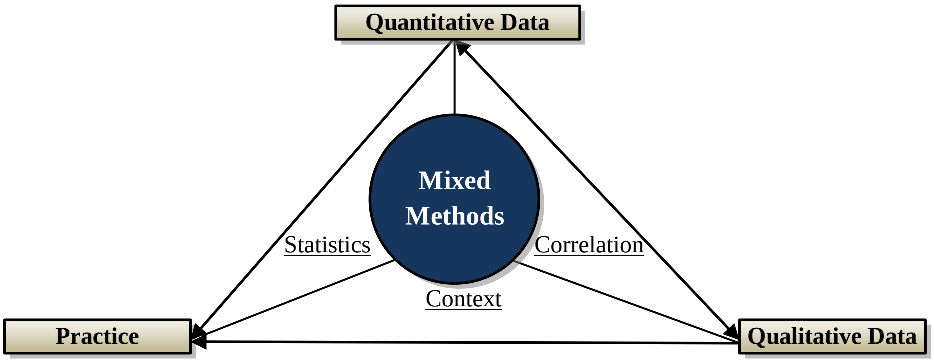



**Figure 5.3 Qualitative & quantitative data and practices ;( Libarkin & Kurdziel, 2002)**

According to Easterby-Smith et al. (2002), understanding it is particularly useful for researchers clarifying alternative designs and methods, and identifying which one is more likely to work in practice for their research. At the methodological level, however, mixing methodologies is possible for data collection (Creswell 1994; Jick 1979 and Gable 1994). Researchers must also demonstrate familiarity with controversies and positions taken within a body of knowledge (Perry 1995). It is, therefore, the author's intention to use both qualitative and quantitative elements in this thesis, without arguing that one is better than the other.

### *5.2.5 Triangulated approach*

Robson (2002) identified a range of ways in which qualitative and quantitative methods can be combined, as explained below.

Triangulation: Checking the results of a quantitative method with those of a qualitative method (or vice versa). Qualitative method used to facilitate a quantitative research design: This helps to provide information on context and participants; acts a source of hypotheses; aids scale construction. Quantitative method used to facilitate a qualitative research design: Quantitative method (survey) used to help select participants in a flexible design.

Provision of a general or more complete picture: Quantitative method used to fill a gap in a qualitative study (when the researcher cannot be present because of other research commitments); when the research questions raise issues, which cannot be addressed by purely qualitative, or purely quantitative, methods. Structure and process: Broadly speaking, quantitative design research is more effective at getting at "structural" aspects of social life, while qualitative design research is more effective in dealing with processes. Combining them allows both aspects to be covered. Researcher and participant perspectives: Quantitative designs are typically focused on the researcher's perspective. Qualitative designs can follow the participants' perspectives. A combined study can deal with both aspects.

Adding statistical generalisation: Qualitative design research rarely permits statistical generalisation. Employing an additional qualitative method may permit some generalisation. Facilitating interpretation: Quantitative designs are well adapted to establishing relationships between variables, but are typically weak in establishing the reasons for them. Qualitative methods can help in developing explanations.

Relations between macro and micro levels: Qualitative methods tend to focus on small-scale, micro, aspects of social life. Quantitative methods are often concerned with more large-scale, macro aspects. Combining the two can help to integrate both levels.

Stage of the research: Different methods may be appropriate at different stages of the research process (for example, a quantitative study may be preceded by, or followed by, the use of qualitative methods.) Robson (2002) identified also that the main advantage of employing multiple methods is commonly cited as permitting triangulation. Whereas, the classical definition of triangulation of Campbell and Fiske (1959) suggests that a successful triangulation study is such which uses different methods to come up with the same answer to a single theoretical question (Creswell, 1994). Triangulation has further been used to describe the mixing of methods, the mixing of data sources, the mixing of theories and perspectives and the mixing of quantitative and qualitative approaches within a study (Larsson, 1993; Van de Ven, 1992). The combination of quantitative and qualitative methods together could mean that the weaknesses of one approach are cancelled out by the strengths of the other.

Hence, the basic idea of a triangulated research is multi-method social research. What is meant by multiple approaches however can have more than one meaning. Denzin (1978) has identified four different ways that a research project can be triangulated as illustrated in table 5.7 below:

**Table 5.7: Methods of triangulation; Denzin, 1978**

| Triangulation Methods | Explanation |
|---|---|
| Methodological Triangulation | • Using multiple different research techniques in order to maximize the strengths of each. This can take two forms:<br>• Between method triangulation, two different research techniques, usually one "quantitative" and another "qualitative" are combined together to exploit the strength of each.<br>• Within method triangulation, only a single basic technique may be employed, but different variations of the technique are employed. |
| Investigator Triangulation | • Several investigators working together on a single research project would produce more valid and reliable results than one person alone. |
| Data Triangulation | • As well as different methods, one can have different "blocks" of data taken from different times, different locations, and different people. For example, researchers often replicate a study that was carried out before. |
| Theoretical Triangulation | • Researchers employ more than one theoretical perspective with a single research project. |

## 5.3 THE RESEARCH 'SITUATION'

The research situation is reflecting the research motivation, objectives and research questions stated in Chapter 1. The 'situation' indicates a type of research approach and this will be defined and detailed in the subsequent sections. The theoretical thinking of this research has matured towards an interpretive epistemology. This opinion complies with Blessing & Chakrabarti, et al. (1995) approach, in which there is concern with the main stages of the proposed Design Research Methodology (DRM).

The DRM emphasizes:

1. to identify the aim that the research is expected to fulfil and the focus of the research project;

2. to focus Descriptive Study I on finding the factors that contribute to or prohibit success;
3. to focus the Prescriptive Study on developing support that address those factors that are likely to have most influence;
4. to enable evaluation of the developed support (Descriptive Study II).

The DRM framework is quite clear with respect to the further emphasis on:

- Measurable criteria
- Influences
- Methods
- Applications

This is outlined in chapter 1 section 1.6. The DRM framework is reflected in the research methodology in this work as follows:

1. Research criteria were established in terms of research objectives and research questions (sections 1.4 and 1.5), thus postulating a relationship between quality and web-enhanced learning as a particular phenomenon by establishing a QMS to enhance the WEL courses. This conforms to the DRM overall criteria establishing stage.
2. The descriptive study and literature review identified the universal critical success factors (UCSF) influencing the WEL quality. This followed the second stage of the DRM, the Descriptive Study I.
3. The Prescriptive Study was affected through the execution of the case study with lecturers and students involved in the whole WEL process, and the subsequent refinement and expansion of the UCSF as well as the formation of the framework for the WEL QMS in terms of sample procedures.
4. The final DRM stage the Descriptive Study II was effected through the developed limited WEL QMS prototype and subsequent evaluation.

This can be related to the diagram represented earlier in chapter 1(table 1.1).

## 5.4 RESEARCH PROCEDURE AND STRATEGY

The researcher conducted a wide literature study on quality assurance as applied in an E-learning environment in higher education institutions. This was promoted by the fact that literature and research on quality assurance practices in E-learning with regards to web-enhanced learning was found to be unclear. A review of literature is an integral part of the research process that aims to contribute to a clearer understanding of the nature and meaning of the problem that has been identified. It provides substantially better insight into the dimensions and complexity of the problem (Neuman, 1994).

The research choice was between a single and multiple case designs. Basically, this choice involved an exchange of depth of analysis against greater generality of the findings through the use of comparative analysis. Depth of analysis via a single case design was chosen for two reasons. First, with the lack of prior research on adopting quality management system procedures and practices in e-learning, it was felt that attention should be given to increasing depth of knowledge via a reasonable length longitudinal study. Second, as a part-time research student with limited resources and needing to complete this study within a reasonable time span, it was not felt that it would be possible to do more than one organization in the required depth. Therefore, it was decided to focus effort on a minimum one year study of one organization, the Arab Academy for Science Technology and Maritime Transport in Egypt, the selection of which has already been justified in Chapter 1.

To collect data relevant to the research, journals, books and the internet have been used. Information has also been gathered from completed thesis and dissertations published on the internet. In order to complete the literature study, the researcher designed a case study for the course design and production department (CDPD) at the Arab Academy for Science and Technology in Egypt. The time period for this study was from 2009 to 2010.

The type of case study design used in this study was stated to be a single case study with embedded multiple units of analysis, using primarily qualitative data collection and analysis techniques.

What is being analysed within the case study is the instructional design process, and the web-enhanced learning opportunities are the embedded units of analysis that are designed and developed (course product) by CDPD.

The case study could be considered a typical or representative single case, to typical E-learning design and production units in other higher education institutions due to the unit of analysis and the scope of the research mentioned above (Yin, 2003).

The reason for considering this as a typical case study is that the instructional design department usually consists of a group of members working as a team serving the same clients (lecturers, students and institutional management) by using electronic communication media between lecturers, student and designers. Although the case study considered a single case it could be considered as a multiple case since the CDPD is working for different departments and faculties inside the AASTMT, where a researcher may want to compare the instructional design process in different subject areas.

Case studies are argued to be hard to replicate, provide no comparative data for single case designs or data that may be difficult to compare in multiple case designs, and that their representativeness may be unknown. These concerns are enhanced by the possibility of researcher bias, which is particularly argued to be relevant for qualitative data.

The evaluation process is obtained in the case study in two ways:

- The evaluation of the developed web-enhanced learning course if we considered the course as a product
- The evaluation of the web-enhanced learning design process during implementation of a quality management system

The feedback results from students' and lecturers' evaluation will continue to improve the unit of analysis (web-enhanced course). The criteria by which the exploration will be judged successful (Yin, 2003a) may be viewed as the programme objectives of the intervention. In this case study, the intervention is the quality management system process for web-enhanced learning, in the sense of a system (see conceptual framework figure 4.5).

The rationale of this case study is to answer all research questions through understanding the following:

- how quality assurance theory standards may be applied to the instructional design process with respect to web-enhanced learning;
- the interaction between quality of processes and quality of products;
- to understand student and lecturer satisfaction in terms of evaluation of web-enhanced courses in the search for continual improvement;

As for the first part of the rationale the conceptual framework in chapter 4 figure 4.5 shows that in this case study, regards to formal process quality management system, standard quality assurance theory may be applied in the field of WEL. It becomes clear that neither the design nor the development of the formal quality management system was the issue, but the process of combining the different quality management approaches (ISO9001&ISO19796) and the teamwork of different parties. Hence the case study contributes to national and institutional quality assurance practice with respect to web-enhanced learning, the potential for studying the impact of the study work practice and investigating appropriate measures for quality for WEL products. This understanding confirmed the evaluation side within this study: evaluating the instructional design process and contributing to best practice in a WEL support unit.

With respect to the second part of the rationale concepts were covered in the case study by formulating the three research questions. Searching for the critical factors to improve the quality of WEL (First question) focuses on the products that are the output from instructional learning designers. Research question 2 concentrates on the instructional design process, and how to apply quality assurance theory and quality standards to develop WEL QMS. This is an application of standards quality management system to the field of WEL explained by the conceptual framework. Research question 3 focuses on student and lecturers (client) satisfaction as quality measure ensure the services provided to clients by an WEL support unit, inform of design, development, consultation, training, and support.

The third part of the rationale is to understand student and lecturer satisfaction in terms of evaluation of web-enhanced courses in the search for continual improvement. This rationale combines the evaluation within the instructional system design and the evaluation of quality management system. Summative evaluation procedures were written for both students and lecturers with WEL courses, beside the feedback data from student as measure for client satisfaction. All evaluations are analysed in order to improve the overall QMS implemented for WEL.

The three rationales are reflected in the study where the instructional design process is the object of analysis in the case study. It features centrally in all three research questions. The classical process terminology figure 4.7 in chapter 4 illustrates the underlying assumption, where critical success factors provide the methodological control focus of the required WEL QMS. Clients benefit from the added value resulting from the instructional design process. Then Quality Management System process can be applied to the instructional design process.

Table 5.8 shows the detailed research strategies with respect to the research questions presented in Chapter 1. Section 5.6 will present the research instruments employed in detail.

**Table 5.8: Research strategies with respect to research questions**

| | | **Question** | | |
|---|---|---|---|---|
| | | What are the critical success factors for quality web-enhanced learning instructional design? | How could the quality management system be used effectively with process design of web – enhanced learning? | What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning? |
| **Method Tools** | Literature Review | # | # | # |
| | Student Questionnaire | # | # | |
| | Lecturer Interview | # | # | |
| | Participant Observation | | # | |
| | Focus groups | | # | # |

The literature survey identified universal critical factors which improve with the quality of web-enhanced learning. The specified factors were classified in categorization according to Fresen (table 3.8 in chapter 3). These factors were used as an input into the design process of a web-enhanced course conceptual framework figure 4.5. The literature also highlights the importance of the dynamics of quality movement and their influence on higher education and looked closely into the origin, of the quality movement, the controversial nature of quality, notions of quality, philosophies of quality, quality assurance, and the influence of the quality movement on quality assurance in higher education in Egypt. All these issues depend on an understanding of the research problem as well as the whole body of research. Also the literature focuses on the importance of clients' satisfaction by obtaining their feedback of the quality of delivering web-enhanced courses in order to make continual improvement in the cycle of learning and to investigate the most critical factors affecting their receiving of WEL.

The researcher designed a questionnaire that was distributed to postgraduate students participating in web-enhanced courses in AASTMT. Literature on quality assurance was used to identify key variables for the study and these were used in the design of the instrument. Apart from the distribution of questionnaires, interviews were conducted with lecturers. Also focus groups with lecturers were followed in order to validate the proposed established QMS. It is evident that different research tools or instruments were employed in an attempt to collect reliable and valid data.

The student survey and lecturer interviews were used in order to contribute to addressing research questions 1 and 2. While focus groups were used to answer question 3. The chronology of the various activities leading to QMS is presented later in table 5.9.

Prior to implementing the main research, the research instruments or tools were first pilot tested. The purpose of this exercise was to improve the success and effectiveness of the investigation (Yin, 2002). In order to confirm Yin's statement, Tesch (1990) states that a study of specific entities implies that the researcher should expose a few cases to exactly the same procedures as planned for the main investigation, in order to modify the existing instrument. Rubin (1998) further suggests that the researcher should "try the items out with actual subjects from the target population, then rewrite and edit again all items that cause confusion, annoyance and boredom".

The piloted questionnaire for the student survey was refined and published on the internet so as to be completed twice in the year at the end of each semester. The findings from the survey in 2009 (220 respondents) are analyzed and reported in this study (section 5.6.1. 2).

With respect to interviews, a small sample of lecturers (5) and (2) of faculty Deans at the AASTMT, who participated in designing and facilitating web-enhanced courses, were surveyed in 2008, by means of personal interviews. This was a pilot experiment which enabled in-depth questioning of the participants and provided the opportunity to test and improve the interview schedule. Then actual interviews were conducted with lecturers surveyed in 2009 with a sample of 21 lecturers from two colleges and one institute inside the AASTMT.

Research question 3 is answered by the evidence contained in departmental documentation and records, the activities of team members and the artifacts they produced from a quality assurance consultant (chapter 7), followed by conducting focus group meetings with both students and lecturers to validate the documentation and record established with the QMS. This part of the case study is descriptive as well as exploratory.

## 5.5 POPULATION AND SAMPLING

The research population consisted of postgraduate students participating in web-enhanced learning drawn from different faculties in AASTMT. According to Shanks (1997) the population encompasses the total collection of members, cases or elements about which the researcher wishes to draw conclusions. Fraenkel & Wallen (1990) state that the population is the group to whom the researcher would like to generalize the results of the study. However, due to a variety of constraints that included time constraints, and the amount of assistance required for gathering and analyzing data, it became impractical to study the quality of web-enhanced courses for all students. The process of sampling, therefore, made it possible to draw valid generalizations on the basis of careful observation and analysis of variables of a relatively small proportion of the population (Keeves, 1988).

McBurney (2001) sees a sample as the totality of persons, events, organization units or case records with which the research problem is concerned. A sample is a subset of the population collected to make an estimate of the population being studied.

The researcher made sure that the sample was representative of the whole group from which it was taken. The student survey was distributed to postgraduate students at the end of second semester 2009 of a population of approximately 650 students with Moodle courses in two colleges and one institute, 220 participated in the survey, yielding a response rate of 33.8%. Lecturers for interviews were selected based on their valuable interaction and implementation with Moodle courses. Therefore 21 lecturers were participated from different departments in the two colleges and one institute.

## 5.6 RESEARCH INSTRUMENTS EMPLOYED

Questionnaires, interviews and focus groups were used to collect the relevant data. Student questionnaires and the lecturer interviews were designed for the collection of WEL process feedback. While the focus groups of lecturers and students bases for the final QMS evaluation of students and lecturers.

The instruments were:

- the student Moodle questionnaire (Appendix 2);
- the lecturer interview schedule (Appendix 3).
- observation by researcher

- 2 focus groups

Each instrument is described in further detail in the next section.

***5.6.1 Student questionnaire***

Isaac and Michael (1993) state that questionnaires describe the nature of current conditions identify problems in existing situations and assess needs or goals in order to analyze trends. They further contend that questionnaires also describe what exists in terms of particular contexts. In this research, a questionnaire based on the research objectives, as well as findings from the literature on universal critical success factors to assure the quality practices in the field of web-enhanced learning, was developed. The questionnaire is significant for this research because:

- it facilitates obtaining data and information about current conditions and practice and makes inquiries concerning attitudes and opinions;
- it is an effective way of collecting data from a large number of people, relatively cheaply and in a relatively short time by a single person;
- it allows the researcher access to samples that might be hard to reach in person or by telephone; and
- it permits time to give thoughtful answers to the questions.

In this research the questionnaire looks for feedback from students after participating in web-enhanced learning.

The use of questionnaires in this research was finally one of the appropriate ways of obtaining data about the satisfaction level obtained from the students and to explore new sub critical success factors which mainly affect the improvement of designing of courses in the frame of quality assurance management.

***5.6.1.1 Construction of the questionnaire***

The student Moodle questionnaire survey for specifying the critical success factors, within the universal categories consists of 54 closed items and 3 open items. I designed the instrument in 2009, based on the literature of Fresen's critical factors taxonomy (Fresen, 2005; see section 3.3.2) construct validity. Besides personal information, six parts were identified which reflected the issues to be investigated:

- Part 1 of the questionnaire: was structured with the aim of obtaining biographical information from the respondents. Biographical information is the information that provides an account of who the respondents are. The biographical data were used to draw conclusions and make further recommendations. This part consists of 8 questions.

- Part 2 aimed to gather data on technology tools that are in place to guarantee the smooth running of web-enhanced learning courses. This part consists of 10 questions.
- Part 3 of the questionnaire aimed to gather data on personal relevance towards using Moodle as a learning-management tool used to identify satisfaction problems which can effect improvements, and the role of the respondents in the promotion and enhancement of quality. This part consists of 14 questions.
- Part 4 of the questionnaire aimed to gather data on learning interaction with using Moodle in order to obtain learning experience gained with such a learning environment. This part consists of 11 questions.
- Part 5 of the questionnaire aimed to gather data on education support by lecturers whilst conducting the course. This part consists of 6 questions.
- Part 6 of the questionnaire aimed to gather data on technical support by the institution regarding facilities, maintenance and support. This part consists of 5 questions.

Lastly, 3 open questions about student opinion regarding the advantages and disadvantages of Moodle and their suggestions for improvement.

***5.6.1.2 The pilot study***

According to Merriam (1998), the purpose of the pilot study is to improve the success and effectiveness of the investigation. It is a small-scale study administered before conducting an actual study (Yin, 2002). As mentioned earlier on in this chapter, prior to implementing the main research, the research instruments or tools will be pilot-tested. The pilot study confirms the validity and reliability of the research instruments or tools. It is also clearly documented that it determines how the design of the main research can be improved and reveals defects in the research plan (Fraenkel & Wallen, 1990).

The pilot-testing of the research instruments or tools is advantageous in the sense that

- it may save the researcher time and financial cost on research that could yield less than expected;

- it investigates the feasibility of the proposed project and detects flaws in the measurement procedures;
- it provides the researcher with unanticipated ideas, approaches and clues unforeseen prior to the main study. As a result, it reduces the number of data-gathering problems due to unforeseen problems identified in the pilot study, which may be resolved in redesigning the main study; and
- the researcher may try out a number of alternative measures and then
- select those that yield the best results for the main study (Issac & Michael, 1993; Shanks, 1997).

The pilot study was conducted in February of 2009, on a sample of 55 postgraduate participants from different semesters at the Productivity and Quality Institute, after which the questionnaire was refined and improved in consultation with the instructional design team. The rationale behind using convenience sampling in this situation was to bring out a speedy and high response rate. A few problems regarding the wording of some questions surfaced. It was also discovered that the level of English of some of the respondents was so low that they could not understand some questions on the questionnaire or in the interview. The researcher did the translations. These problems encountered prompted the researcher to revise the questionnaire and interview schedule in order to rephrase and simplify some questions and discard others. The discarded questions were few and concerned the wider scope, wider and generic applicability and cost implications of WEL and as such did not fall completely within the research focus.

Regarding pilot-testing, Cohen & Manion (1985) remark that, “a questionnaire should be clear, unambiguous and uniformly workable”. It should engage professional interests, encourage co-operation and elicit answers as close as possible to the truth. Since 2009 the questionnaire has remained almost unchanged, in order to enable longitudinal studies comparing results between semesters or from year to year. The number of items in the questionnaire was kept to a minimum, so as not to annoy the respondents with a long questionnaire. For the closed questions, a 5-point Likert scale was used, ranging from Strongly Agree to Strongly Disagree. Open questions were kept to a minimum (three) and students were asked to give brief answers. (See chapter 6: data analysis).

### *5.6.2 Lecturer interviews*

Interviewing is the predominant mode of data collection in research (Yin, 2000), and interviews are generally used to balance questionnaires. An interview is described as an oral questionnaire, during which the interviewee provides the required information verbally face-to-face rather than writing down the responses (Bagwandeen, 1991). Structured interviews are significant for this research because they:

- determine and maintain relations with the respondents or at least determine when relations have not been established;
- permit feeling in order to obtain more complete data;
- permit greater depth; and
- supply devices for ensuring the effectiveness of the interaction between the interviewees and the interviewers.

The interviews are flexible in the sense that questions can be repeated, simplified and even rephrased, should the responses from the interviewees be ambiguous or unclear. The interviewer is also free to change the manner of questioning if the situation demands this. A first draft structured interview schedule was designed and developed for lecturers to complete. The instructional design team was invited to comment on the content and structure of the items, thus contributing to its construct validity. In order to obtain as much information as possible about lecturer satisfaction, the respondents were requested to answer both closed and open questions: (see Appendix 3)

- overall effectiveness of the Moodle course (4 items)
- top management support (3 items);
- facilitation infrastructure (2 items);
- training and education (2 items);
- community and empathy (2 items);
- feedback and evaluation (2 items);
- quality of CDPD services (5 items)

Space is provided on the interview schedule to add further comments on the above items as well as for open questions in six categories:

- overall effectiveness of the Moodle course (4 items)
- top management support (1 item);

- facilitation infrastructure (1 item);
- training and education (1 item);
- feedback and evaluation (1 item);
- overall comments (2 items)

The interviews were guided conversations (Yin, 2003a), in which the questions on the interview schedule were posed by the interviewer, who probed further when issues were identified, or when the respondent volunteered additional information. The respondents were encouraged to be honest in their responses and to report any other impressions or needs not catered for by the semi-structured interview. Responses were recorded by the researcher by hand on the interview schedule, using additional space where necessary to record the open responses. The interviews were not recorded on audio or video tape.

### *5.6.3 Observation made by the researcher (documents and records)*

The researcher becomes a working member of the group or situation to be observed. The aim is to understand the situation from the inside: from the viewpoints of the people in the situation. The researcher shares the same experiences as the subjects, and this form of research can be particularly effective in the research study of small groups/small firms. In this research the observations were made through 2 participating roles:

1. Member of the Instructional Design Team, and therefore of The QMS Committee and Task teams
2. Member of the Development and Documentations Team.

These roles allowed close observation of the capture and assessment of the WEL process output as well as its analysis and impact on the process' improvements. The observation of the students' activities during the actual WEL process was not necessary as their experiential information was captured as described above. Furthermore, it was not the objective to effect actual changes within the WEL process itself, in terms of its tools and methods, rather the creation of a suitable QMS using existing WEL process tools and methods.

The QMS documentation acts as a records instrument used in order to answer the second and third question of the research study, which was to develop a quality management system for the process of web-enhanced instructional design course.

Taking part, is a group of consultants (3, one of them is the researcher) from the Quality and Productivity Institute involved in the design and development of ISO9001 standard and ISO19796 guideline for web-enhanced learning. The consultation team plans and participates in the steering committee (see chapter 7 section 7.3.1) of the project beside instructional designers and representatives from each college (2 colleges and one institute). The consultation team consisted of 6 members, 2 project managers and 4 instructional designers. Stake, 1995, and Yin, 1994 identified sources of evidence in case studies in which it is reflected in this study by the following:

- Documents
- Archival records
- Direct observation
- Participant observation
- Physical artifacts

Four sources of data were used for the process design of the quality management system of web-enhanced learning based on Yin, 1994 and Stake, 1995, with source evidence as follows:

**Documents:** could be letters, memoranda, agendas, administrative documents, newspaper articles, or any document that is germane to the investigation. In the interest of triangulation of evidence, the documents serve to corroborate the evidence from other sources. Documents are also useful for making inferences about events. Documents can lead to false leads, in the hands of inexperienced researchers, which has been a criticism of case-study research. Documents are communications between parties in the study, with the researcher being a vicarious observer; keeping this in mind will help the investigator avoid being misled by such documents. Communications between me and the consultants, using diffident media such as face-to-face meetings, and sometimes the telephone, were used for making QMS documentation. Also notes, minutes and agenda were used, which I recorded on papers whilst in the steering committee meetings and whilst developing the QMS.

**Archival records**: can be service records, organizational records, and lists of names, survey data, and other such records. The investigator has to be careful in evaluating the accuracy of the records before using them. Even if the records are quantitative, they may still not be accurate. Different archival records used, such as departmental internal records regarding forms and guidelines, authorities and responsibilities, Moodle instructional design toolkit, action plan and E-learning policies, if available.

**Physical artifacts:** can be tools, instruments, or some other physical evidence that may be collected during the study as part of a field visit. The perspective of the researcher can be broadened as a result of the discovery. Procedures and supporting documentation generated from the development of the QMS by the team members were the prototype of the QMS. Not everything was recorded on paper at the beginning of the establishment of the QMS but later it was recorded on paper from the above data sources

**Direct observation**: occurs when a field visit is conducted during the case study. It could be as simple as casual data collection activities, or formal protocols to measure and record behaviours. This technique is useful for providing additional information about the topic being studied. The reliability is enhanced when more than one observer is involved in the task. As I am a quality consultant working for more than 13 years in the field, I was a participant observer on the work of my consultant colleagues while developing the QMS. I tried not to cause any confusion of their work but took notes on difficulties of understanding the ISO 9001 and ISO19796 standards clauses and sometimes gave advice.

Documentation procedures for the design process were established. The steering committee team was responsible for the development of QMS. The team consisted of 5 E-learning instructional designers and 3 project managers. The group consisted of 2 women and 6 men as well as the researcher as quality consultant in which all are trained in instructional design and use of web-enhanced learning and teaching activities. A master document register of procedures also was established (See chapter 7 table 7.2).

The stages used for documenting the QMS are summarized below according to four main steps and sub steps (details of QMS documentation stages presented in Chapter 7 section7.3):

a) Kick Off

   Task a-1: Quality management system sensitization

   Task a-2: Assessment and road map

b) Training

   Task b-2: Training for specific areas

   Task b-5: Steering committee meetings

c) Development

   Task c-1: Policy and manual documentation

   Task c-2: Process documentation

### *5.6.4 Focus Group*

Two focus groups were chosen as the method of validating the outcomes of this study, based on work by Morgan (1988), using one focus group of lecturers and one focus group of students whose academic background are similar in qualification and educational history and because they 'generate hypotheses that derive from the insights and data from the group' (Morgan 1988, Kreuger 1988). The focus group provided opportunities to explore shared beliefs and goals with respect to the proposed QMS. The first focus group was conducted with selected members of postgraduate lecturers. This group of lecturers composed of 7 members (3 of them were involved in QMS task teams) from different fields of study that would provide wider opportunity for discussion on the implementation of the proposed QMS.

The second focus group was selected from students who primarily were participating in the student questionnaire. Also, they were selected based on the speed of their response to the invitation to take part and subsequently on their availability for the meeting.

A total of 28 postgraduate students attended the focus group held in the evening of an ordinary working day at the productivity and quality institute.

## 5.7 RELIABILITY AND VALIDITY OF DATA

### *5.7.1 Introduction*

Gibson & Mitchell (1990) contend that 'reliability' represents the consistency with which a test will obtain the same results from the same population on different occasions. They continue to define "validity" as a degree to which an instrument measures what it claims to measure or is used to measure. In this research, the reliability and validity of data were established through the application of the following methods: triangulation, respondent validation and trail.

### *5.7.2 Triangulation*

Triangulation was achieved by carefully administering questionnaires and interviews to parties involved in web-enhanced learning in 2 colleges and one institute and institutions at different times. The questionnaire and interviews complemented the review of related literature. In order to justify the use of triangulation in this research, Erlandson & Kerlinger (1983) and Cohen & Marion (1995) state that a multi-method approach is vital when the researcher wants a holistic view on a particular subject.

### *5.7.3 Validity*

Construct validity in this study has been demonstrated by the careful analysis of the construct quality and of the element parts of a quality management system, such as processes input, products, and feedback and clients' satisfaction. These constructs were expressed in chapter (1) section 1.8, where the three knowledge domains: quality, E-learning (WEL) and higher education were presented in chapter 3 section 3.2 and in the conceptual framework in chapter 4 section 4.4. Construct validity in the student questionnaire was enhanced by basing it on validated categories and instruments from the literature (Ramsden, 1991). The lecturer interview schedule instrument was developed and part of this research effort was to validate and improve it by piloting it.  Although Yin (2003a) mentions that internal validity applies only to explanatory and not to exploratory studies, a brief reflection is given here on the naturalistic equivalent of internal validity, namely credibility (Guba & Lincoln, 1981). This study made use of a participant observer researcher, examination of data and store and retrieve data. These are techniques used to address internal validity (credibility) (Le Compte & Preissle, as cited by Cohen et al., 2000).

In this study, the observer role adopted should be noted. I consciously adopted an 'Observer as Participant' role (Junker, 1960). That is, my role as a researcher was made public from the start and was based on direct involvement in the CDPD, but not active participation. Higher involvement roles such as a complete participant were rejected on ethical, as they often require secrecy, and practical, as a part-time researcher basis. At the beginning of the study, I had an announcement placed in the CDPD, explaining the project, and throughout the study I made every effort to inform members of the situations I was observing of my background, intentions and aims for the project. I feel that the acceptance of my role was extremely high. The CDPD members with whom I came into contact were highly co-operative, open, and supportive and seemed genuinely interested in the study. It is my belief that any researcher bias from lack of acceptance by subjects or deliberate withholding of information was extremely minimal.

The student questionnaire data was manually captured and analysed by a statistician using SPSS software and where the questionnaire designed by the researcher. The statistician uses the factor analytic techniques in order to: (1) reduce the number of variables and (2) to detect structure in the relationships between variables, that is to classify variables. Therefore, factor analysis is applied as a data reduction or structure detection method. This method employed so far attempted to repackage all of the variance in the unique variables into principal components, since the researcher may wish to restrict the analysis to variance that is common among variables. The Principle Component Analysis (PCA) is, repackaging the variables' variance to redistribute variance that is unique to any one variable. Child, D. (1990).

The lecturers' interviews were manually captured and analysed by the researcher using excel sheets. External validity can be considered as equal with generalizability (Cohen et al., 2000; Yin, 2003a), in that it considers the applicability of a study's findings in a wider context (Guba & Lincoln, 1981). Yin (2003a) points out that in case study research, the idea is precisely not to attempt to generalize with other case studies, but rather to generalize with theory. That is what this case study aims to do: the themes and issues within instructional design practice and the need to merge the theory of quality assurance and web-enhanced learning are international issues experienced by many E-learning practitioners.

The use of focus groups in this study has been shown to be a sound method to validate the prototype QMS, in which the QMS was built from the student questionnaires and lecturers' interview data analysis.

Dean& Evans (1994) stated that focus groups can help organizations to understand customers in the field of total quality management. Hence, focus group is a same way of providing information for continuous improvement. Table 5.9 is indicating the chronology of the various activities leading up to the final QMS validation.

**Table 5.9: chronology of the various activities leading to QMS**

| Task | Method | Actions | 2007-2010 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Before | | | | | QMS | | | | After | |
| identifying WEL universal categories (including the critical factors) | Literature | Classification of Categories and factors | ■ | ■ | | | | | | | | | |
| Search for client (students & lecturers) satisfaction based on the universal categories and their factors. | Student questionnaire and Lecturer interviews | Feedback on most critical success factors | | ■ | ■ | ■ | | | | | | | |
| Refining universal critical success factors | Principle Component Analysis (PCA) | New refined critical success factors | | | | | ■ | | | | | | |
| Establishing QMS system based on new critical success factors | ISO9001&ISO19796 | Road map and action plan | | | | | | ■ | ■ | ■ | ■ | | |
| Implementing the QMS | ISO9001&ISO19796 | Two courses | | | | | | | | | | ■ | |
| Identify the difference before and after applying QMS | One focus group for student and one focus group for lecturers | List of comments and suggestions | | | | | | | | | | | ■ |

### *5.7.4 Reliability*

Reliability is essentially a synonym for consistency and repeat over time and/or over groups of respondents (Cohen et al., 2000). The repeat of instruments, responses and analysis was used in the research. In this research study, the different strategies used to answer the various research questions demonstrated the reliability (see chapter 1 table 1.2). The literature review, which contributed to categorization of universal critical success factors to improve the quality of web-enhanced learning, was based on reliable sources, wherever possible (see chapter 2 section 2.2).

The student questionnaire was piloted and refined for a semester, prior to its administration in 2009 (see chapter 6). It was also subjected to external evaluation by experts from AASTMT multimedia centre, which reported that both "the student and lecturer feedback instruments are well designed and the presentation of the student feedback findings in terms of advantages and disadvantages is helpful." In analyzing the data from the student questionnaire, the goal was to come up with new refined critical success factors which affect the instructional design process of the WEL. Another reason was to calculate satisfaction in term of advantages and disadvantages. Threats to the reliability of the analysis of the open answers in the student questionnaire are the risk of human error and judgment in allocating degree or number.

For lecturer interviews, due to the fact that individual perceptions of benefits and problems experienced were personal, the results are particular to the individuals interviewed at the time and are not necessarily replicable. However, the intention was to look for clients' perceptions, in order to continuously improve practice and services. With respect to the team members, I, as observer as participant, reflected on and documented their practice. The nature of the field of instructional design and web-enhanced learning is so dynamic, that it is expected that the resulting procedures will require frequent updating. The results from the focus groups have been used to increase the clarity and measurement precision of the students questionnaire results and the lecturers' interviews output, thereby increasing the instrument's validity and reliability.

## 5.8 OVERVIEW OF SELECTED RESEARCH METHODS

There are two factors in the state-of-the-art context. The first being the quality assurance/ management and the second is the WEL development. The literature review searched in the selection of universally-accepted critical success factors (CSF); this became the basis for the research work. The universal CSF were then refined and expanded. This was done by establishing a case study in which students and lecturers were counselled through interviews and questionnaires. Their feedback was analyzed with respect to finding the principal components, the output of which was used to supplement and augment the universal CSF in order to tailor these better towards the specific E-learning sub domains of web-enhanced learning.

The formation of specific CSF web-enhanced learning enabled the compilation of a limited quality prototype system (QMS). The QMS would cover the course planning and course design processes. Table 5.8 illustrates the research methodology followed in this exploratory research study. The QMS was based upon ISO9001:2008 and ISO/IEC 19796 standards. The reason for this selection being:

- The ability to establish a set of procedures that cover all key processes in the instructional design process
- Monitoring the processes to ensure they are effective
- Keeping adequate records
- Checking output for non-conformance, with appropriate corrective / preventive actions

- Facilitating continual improvement

## 5.9 CONCLUSION

This chapter presents different methodologies and resultant methods employed to gather the required data. The review of literature, questionnaires, interviews and focus groups, as presented in this chapter, assisted the researcher in the investigation of the construction of the quality WEL management. The triangulation approach sought to obtain information that enabled the researcher to make sense of quality assurance in an E-learning environment in particular, from the perspective of the students and lecturers. The next chapter will discuss the treatment of the collected data, analysis and interpretation of data.

# CHAPTER 6

## PRESENTATION AND ANALYSIS OF COLLECTED DATA

## 6.1 INTRODUCTION

The purpose of this chapter is to provide a detailed analysis of the responses to the questionnaire regarding clients' (students and lecturers) satisfaction towards the E-learning component (Moodle) and investigate new critical success factors with respect to the universal factors of instructional design for web-enhanced learning (See chapter 3 section 3.3). Analysis, as Hitchcock & Hughes, 1989 put it, is what the researcher does with the data in order to develop explanations of events so that the theories and generalization about the causes, reasons and processes of any piece of social behaviour can be formulated.

## 6.2 STUDENT QUESTIONNAIRE

The survey method was used to obtain student feedback on web-enhanced courses during the first semester in 2009 (January to June). The instrument is the Moodle experience questionnaire (Appendix 2). As mentioned in chapter 5, the student questionnaire looked for reactions from students involved in web-enhanced learning courses to specific questions relating to universal critical success factors which improve the quality web-enhanced courses.

The use of the student questionnaire in this research was one of the appropriate ways of:

- capturing data about the satisfaction level obtained from the students and
- searching for the most critical sub factors (refined critical success factors) that need to be considered while developing university curriculums and during the instructional design process when delivering a web-enhanced learning courses.

The universal critical success factors (UCSF) resulting from the literature review (chapter 3 section 3.3.2) were surveyed and grouped in five categories namely, technology tools (TT), personal relevance (PR), leaning interaction (LI), education support (ES) and technical support (TS). Each category includes several measures. The categorization was tested by surveying 220 students. Of these, 172 students completed the student questionnaire at the end of the second semester 2009. The response rate was thus around 78%. Appendix 4 presents the data format, coding and transformation, which formed part of the analysis.

The findings of the student questionnaire start with the background information which indicates general information such as age, gender and also general information of computer use, years of practising Moodle and time spent. The analysis of critical success factors, which improve the implementation of web-enhancing learning, will be the second section of analysis. It should answer the second question of the research. The last section in the student questionnaire will be for open questions where students are questioned for advantages and disadvantages of Moodle (E-learning component) and any suggestions that they are willing to have from the university in order to satisfy their expectations and (needs satisfaction).

### *6.2.1General finding analysis (part one)*

The findings of part one of the questionnaire represent items which contributed general information useful to CDPD and the AASTMT. Examples of such information are:

- demographic data
- years of using Moodle
- campus computer facilities
- the frequency of Moodle usage
- Moodle communication tools

Out of 172 students who participated and completed the questionnaire, 57% were male and 43% were female, as shown in table 6.1.

**Table 6.1: gender**

| Variable | Frequency | Percent |
|---|---|---|
| Female | 74 | 43.0 |
| Male | 98 | 57.0 |
| Total | 172 | 100.0 |

More than half of the students were younger than 30 years (65%) as shown in table 6.2 which means that, although all are at postgraduate level, they are still in the range of undergraduate average ages which means that they are likely to be able to respond quickly to the use of, and work with, rapid technology improvement. Only 10% of respondents were older than 35 years.

**Table 6.2: ages**

| Variable | Frequency | Percent |
|---|---|---|
| 21-24 | 50 | 29.1 |
| 25-30 | 63 | 36.6 |
| 31-35 | 41 | 23.8 |
| Over 35 | 18 | 10.5 |
| Total | 172 | 100.0 |

The years of using Moodle is an indication of good judgment and maturity of participants as, the more the years of using Moodle, the better the judge on the Moodle system. Table 6.3 shows that 70% of participants were using Moodle for 2 to 3 years i.e. from the beginning of establishing and implementing the E-learning methods in AASTMT, thus they can give robust and accurate information for analysis.

**Table 6.3: years of Moodle experience**

| Variable | Frequency | Percent |
|---|---|---|
| 1 year | 51 | 29.7 |
| 2 years | 73 | 42.4 |
| 3 years | 48 | 27.9 |
| Total | 172 | 100.0 |

As for the percentage of students who have personal computers (PCs), the analysis shows that almost all participants have their own PC (93%) as shown in table 6.4 and also the same participants (93%) indicate that they use the campus computer facilities to accomplish their practical work, which means that the university should have well-established computer facilities to be used by students although they have their own computers.

**Table 6.4: own PC and using campus computer facilities**

| Variable | Frequency | Percent |
|---|---|---|
| Yes | 160 | 93.0 |
| No | 12 | 7.0 |
| Total | 172 | 100.0 |

In order to know for what purposes a participant uses campus computer facilities, table 6.5 shows that accessing Moodle courses was the common factor with the first two choices (completing assignments, and reading e-mails) with a 68.6%. This was an important indication for CDPD to identify how students utilize campus computer facilities.

**Table 6.5: computer Purposes**

| Variable | Frequency | Percent |
|---|---|---|
| Complete assignments | 6 | 3.5 |
| Read my e-mail | 12 | 7.0 |
| Access Moodle courses | 18 | 10.5 |
| Browse internet | 36 | 20.9 |
| Not Applicable | 0 | 0 |
| **Complete assignments& Read my e-mail& Access Moodle courses** | 6 | 3.5 |
| **Complete assignments& Read my e-mail** | 29 | 16.9 |
| **Complete assignments& Access Moodle courses** | 35 | 20.3 |
| **Complete assignments& Access Moodle courses & browse internet** | 20 | 11.6 |
| **Read my e-mail& Access Moodle courses** | 10 | 5.8 |
| **Access Moodle courses & browse internet** | | |
| Total | 1722 | 100.0 |

The usage time and session time spent were measured respectively in table 6.6 and table 6.7 by asking the average times per week participants log on Moodle courses, followed by the question of approximate time spent in each online Moodle session. It was found that 34.3% of students log on 5 to 10 times per week, which appears to be a useful level of usage and found that 29.7% log on 1 to 4 times per week which is an acceptable level of usage. Most of the sessions were of long duration (between ½ to 2 hours) with a percentage of 61.1%.

In total (5 to 10 and 1 to 4) the level of Moodle usage was appreciated by CDPD and shows the importance of moving towards improved E-learning in AASTMT.

**Table 6.6: computer purposes**

| Variable | Frequency | Percent |
|---|---|---|
| Once/week | 33 | 19.2 |
| 1 to 4 times/week | 51 | 29.6 |
| 5 to 10 times/week | 59 | 34.3 |
| More than 10 times/week | 29 | 16.9 |
| Total | 172 | 100.0 |

**Table 6.7: times spent**

| Variable | Frequency | Percent |
|---|---|---|
| 1 to 30 min | 37 | 21.5 |
| 31 to 60 min | 45 | 26.2 |
| 1 to 2 hrs | 60 | 34.9 |
| More than 2 hrs | 30 | 17.4 |
| Total | 172 | 100.0 |

### *6.2.2 Principal Component Analysis (PCA) approach*

The main applications of factor analytic techniques as described by Darlington, et al (1973) are: (1) to *reduce the number of variables* and (2) to *detect structure* in the relationships between variables, that is to *classify variables*. Therefore, factor analysis is applied as a data-reduction or structure-detection method.

The methods employed so far attempt to repackage all of the variance in the *p* variables into principal components. We may wish to restrict our analysis to variance that is common among variables. That is, when repackaging the variables' variance we may wish not to redistribute variance that is unique to any one variable. This is Principle Component Analysis. A common factor is an abstraction, a hypothetical dimension that affects at least two of the variables. We assume that there is also one unique factor for each variable, a factor that affects that variable but does not affect any other variables. We assume that the (p) unique factors are uncorrelated with one another and with the common factors. It is the variance due to these unique factors that we shall exclude from our factor analysis. Accordingly, the central concept in Principal Component Analysis (PCA) is representation or summary. So to replace a large set of variables by a smaller set which best summarizes the larger set. Consequently, Henry Kaiser suggested a rule for selecting a number of factors m less than the number needed for perfect reconstruction: set m equal to the number of Eigen values greater than 1. (Darlington, et al, 1973).

### *6.2.3 Examination of the Principal Component Analysis*

The Principal Component Analysis (PCA) approach was conducted to specify and validate the underlying critical indicators in each of the web-enhanced CSF categories (Technology tools, Personal relevance, Learning interaction, Education support and Technical support). The PCA specifies the relations of the observed indicators to the E-learning CSF category. The purpose of the PCA is to describe how well the observed indicators serve as a critical measurement of E-learning CSF categories. Although there are significant extracted factors underlying our study, at present we do not know what these factors represent. We need to name them. Part of SPSS output will present the factor loadings. These loadings are the correlations between each variable and the factor under consideration. Variables with a large lodging on the factor are closely related to the factor. To name a factor, we select only those variables that have a high loading on that factor and use the names of these variables to derive an overall phrase to represent them. The factor should be named parsimoniously. The survey instrument was used in order to specify the critical success factors (CSF) within each category. The factor questions in the survey instrument consisted of 5 parts, each CSF was observed via a group of indicators.

Many instruments have been developed to measure E-learning student satisfaction. Therefore, various potential indicators exist to measure each CSF category.

**Part two: Technology Tools (TT).**

Based on the results demonstrated in table (6.8), the questionnaire variables X9, x10 and X12 have highest loadings on the first factor, whereas the first significant extracted factor in the study has an **Eigen value** of 3.374 and explains about 34% from the variance of dimension of Technology Tools. Therefore, the formulated name of this factor (web facility ease of use) was represented in figure 6.1 by the three correlated variables X9, X10 and X12 (TT1).

Furthermore, variables X15, X17 and X18 have highest loadings on the second factor, whereas the second significant extracted factor in study has an Eigen value of 2.662 and explains about 27% of the variance of dimension of Technology Tools, The formulated name of this factor (infrastructure reliability and effectiveness) was represented in figure 6.2 by the three correlated X15, X17 and X18 (TT2). Hence; the two significant extracted factors explain a cumulative total of 60% of all the variance of studies dimension of Technology Tools, which is a healthy total. About 40% of the variance in the dimension of Technology Tools is not explained by the variables being members of the two extracted factors.

**Table 6.8: results of factor analysis (technology tool dimension)**

| Variables | Factor 1 | Factor 2 |
|---|---|---|
| X9 | 0.816 | - |
| X10 | 0.786 | - |
| X11 | - | - |
| X12 | 0.679 | - |
| X13 | - | - |
| X14 | - | - |
| X15 | - | 0.754 |
| X16 | - | - |
| X17 | - | 0.725 |
| X18 | - | 0.768 |
| Eigenvalue | 3.374 | 2.662 |
| % of variance | 33.735 | 26.621 |
| Cumulative% | 33.735 | 60.357 |
| Extraction method: Principal Component Analysis (PCA) | | |

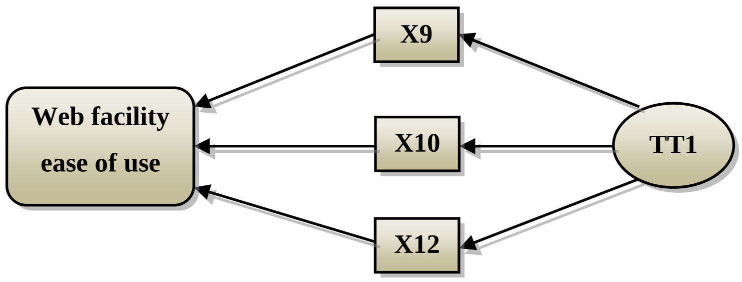



**Fig 6.1 Principle component analysis of TT1 factor**

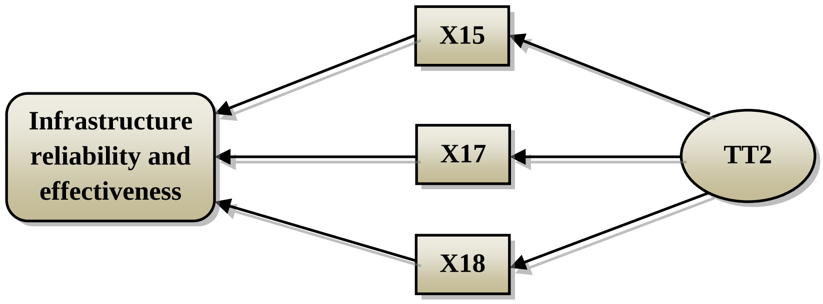



**Fig 6.2 Principle component analysis of TT2 factor**

The Technology Tools CSF (TTCSF) category was measured by 10 indicators. X9, X10 and X12 variables indicating the first group of critical factors to measure technology tools (TT1).

Table (6.9) represents low to moderate satisfaction from participants (40.1% and 48.3% respectively) to accessing the internet via campus, problem in browsing Moodle and screen design.

**Table 6.9: TT1 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 69 | 40.1 |
| Moderate | 83 | 48.3 |
| High | 20 | 11.6 |
| Total | 172 | 100.0 |

Where X15, X17 and X18 the second group of critical factors represent indicators related to communication contact, computer network and the efficiency of the information technology, almost half of participants had moderate satisfaction (49.4%) as shown in table (5.10) by communicating with instructors via Moodle tools and the efficiency of the information technology infrastructure. The low results in table (6.10) support the dissatisfaction demonstrated in TT1 for experience-browsing problems.

**Table 6.10: TT2 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 53 | 30.8 |
| Moderate | 85 | 49.4 |
| High | 34 | 19.8 |
| Total | 172 | 100.0 |

Both measurement categories (TT1 and TT2) were examined in table (6.11) and yielded 86.7% of moderate to low measures of participants' responses. This means that for web facilities ease of use, the instructional designers should make further improvement to screen design, internet access and browsing problems. Where for infrastructure reliability and effectiveness more effort from top management should be deployed in order to overcome the problems of communication tools and network infrastructure.

**Table 6.11: technology tool critical success factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 72 | 41.8 |
| Moderate | 77 | 44.8 |
| High | 23 | 13.4 |
| Total | 172 | 100.0 |

**Part three: Personal Relevance (PR)**

Regarding the results presented in table (6.12) the variables X19, X21, X22 and X26 have highest loadings on the first factor, whereas the first significant extracted factor in study has an Eigen value of 4.260 and explains about 30% from the variance of dimension of personal relevance, therefore, the formulated name of this factor (Student perception of LMS effectiveness) was represented in figure 6.3 by the three correlated variables X19, X21, X22 and X26. Furthermore, variables X27, X29 and X31 have highest loadings on the second factor, whereas the second significant extracted factor in study has an Eigen value of 2.349 and explains about 17% of the variance of dimension of personal relevance. The formulated name of this factor (Interactive collaboration capabilities) was represented in figure 6.4 by the three correlated X27, X29 and X31. Therefore, the two significant extracted factors explain a cumulative total of 47% of all the variance of studies dimension of personal relevance, which is a healthy total. About 53% of the variance in the dimension of personal relevance is not explained by the variables being members of the two extracted factors.

**Table 6.12: the results of factor analysis (personal relevance dimension)**

| Variables | Factor 1 | Factor 2 |
|---|---|---|
| X19 | 0.806 | - |
| X20 | - | - |
| X21 | 0.842 | - |
| X22 | 0.853 | - |
| X23 | - | - |
| X24 | - | - |
| X25 | - | - |
| X26 | 0.900 | - |
| X27 | - | 0.790 |
| X28 | - | - |
| X29 | | 0.869 |
| X30 | | |
| X31 | | 0.856 |
| X32 | | |
| Eigenvalues | 4.260 | 2.349 |
| % of variance | 30.432 | 16.779 |
| Cumulative% | 30.432 | 47.211 |
| Extraction method: Principal Component Analysis (PCA) | | |

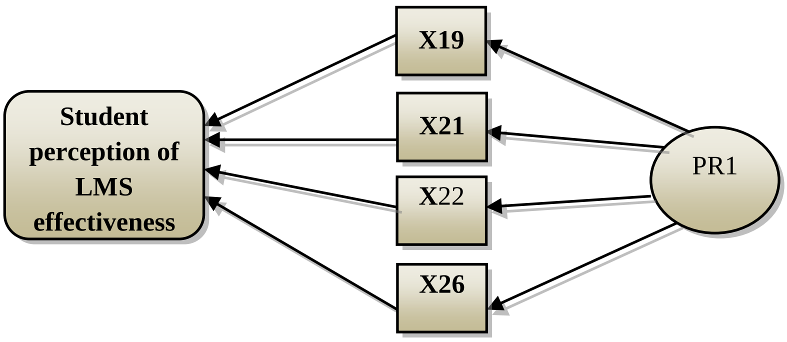



**Fig 6.3 Principle component analysis of PR1 factor**

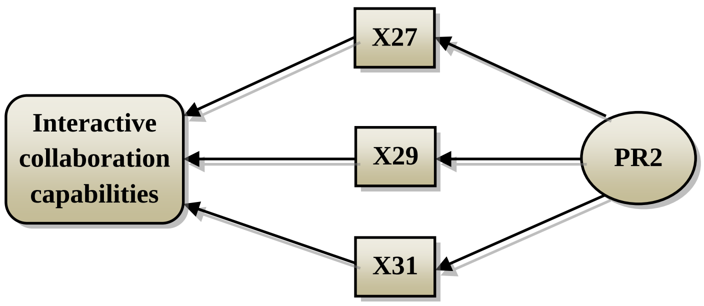



**Fig 6.4 Principle component analysis of PR2 factor**

The Personal Relevance CSF (PRCSF) category was measured by 14 indicators. The PR dimension variables, X19, X21, X22 and X26 indicating the first group of critical factors to measure personal relevance (PR1). They indicate the criticality of student motivation and perception about Moodle interactivity (E-learning component).

Table (6.13) represents moderate participant’s responses (44.8%) and accepted level of high satisfaction (21.5%) in compare with low satisfaction (33.7%), regarding

Moodle encouragement students to search for more facts with respect to traditional methods, which is an important point to increase student learning experience. But at the same time students were not satisfied with Moodle instructions, contents related to subjects and Moodle design is not well presented.

**Table 5.13 PR1 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 58 | 33.7 |
| Moderate | 77 | 44.8 |
| High | 37 | 21.5 |
| Total | 172 | 100.0 |

Where X27, X29 and X31, the second group of critical factors in table (6.14), represent indicators related to E-learning collaboration. Student experience moderate satisfaction (59.9%) regarding pressure while using Moodle, the opportunity of learning anytime, anywhere and finally lack response from instructors.

**Table 6.14 PR2 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 51 | 29.7 |
| Moderate | 103 | 59.9 |
| High | 18 | 10.4 |
| Total | 172 | 100.0 |

Both measurement categories were examined in table 6.15 and yielded 47% of low and 39% of moderate measures of participants' responses towards personal relevance.

**Table 6.15: personal relevance critical success factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 81 | 47.0 |
| Moderate | 67 | 39.0 |
| High | 24 | 14.0 |
| Total | 172 | 100.0 |

Student perception of learning management system effectiveness (PR1) for the first critical factor concluded that the students are not totally satisfied with a sufficient number of Moodle instructions, nor with the course content related to the subject and the Moodle design. Hence, instructional designers and instructors have to work hard on improving the design and the course content in order to motivate students to use Moodle (LMS) and can effectively influence the acceptance of E-learning technologies and tools. Whilst, for the second critical factor PR2 (Interactive collaboration capabilities), students experienced web-enhanced learning to be impersonal, reporting that their instructors were slow to respond to them. This could be overcome by better encouragement and guidance from instructors. Also students experienced the feeling of pressure while using Moodle and feel that learning anywhere, any time is satisfying, which is an encouraging factor for management and CDPD to work on increasing the concept of E-learning in the university. This E-learning factor indicated that the more interaction the students are exposed to, then the more opportunities they have to learn.

**Part four: Learning Interaction (LI)**

Regarding the results displayed in table (6.16) the variables X33, X34, X36 and X37 have highest loadings on the first factor, whereas the first significant extracted factor in study has an Eigen value of 3.900 and explains about 35% from the variance of dimension of learning interaction. Therefore, the formulated name of this factor (course assessment) was represented in figure 6.5 by the three correlated variables X33, X34, X36 and X37. Furthermore, variables X40, X42 and X43 have highest loadings on the second factor, whereas the second significant extracted factor in study has an Eigen value of 2.378 and explains about 22% from the variance of dimension of learning interaction. The formulated name of this factor (Course Planning and Development) was represented in figure 6.6 by the three correlated X40, X42 and X43.

Thus; the two significant extracted factors explain a cumulative total of 57% of all the variance of studies dimension of learning interaction, which is a healthy total. About 43% of the variance in the dimension of learning interaction is not explained by the variables being members of the two extracted factors.

**Table 6.16: the results of factor analysis (learning interaction dimension)**

| Variables | Factor 1 | Factor 2 |
|---|---|---|
| X33 | 0.719 | - |
| X34 | 0.831 | - |
| X35 | - | - |
| X36 | 0.842 | - |
| X37 | 0.743 | - |
| X38 | - | - |
| X39 | - | - |
| X40 | - | 0.803 |
| X41 | - | - |
| X42 | - | 0.828 |
| X43 | | 0.866 |
| Eigen values | 3.900 | 2.378 |
| % of variance | 35.454 | 21.700 |
| Cumulative% | 35.454 | 57.153 |
| Extraction method: Principal Component Analysis (PCA) | | |

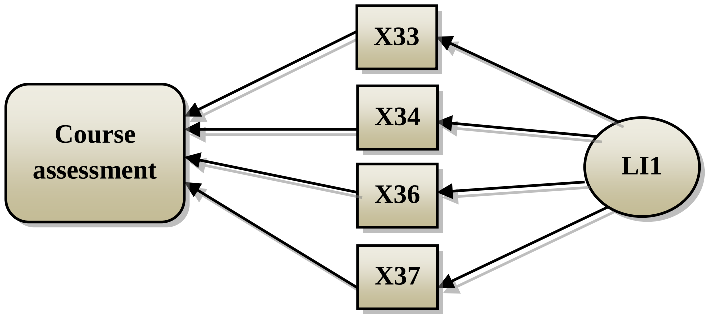



**Fig 6.5 Principle component analysis of LI1 factor**

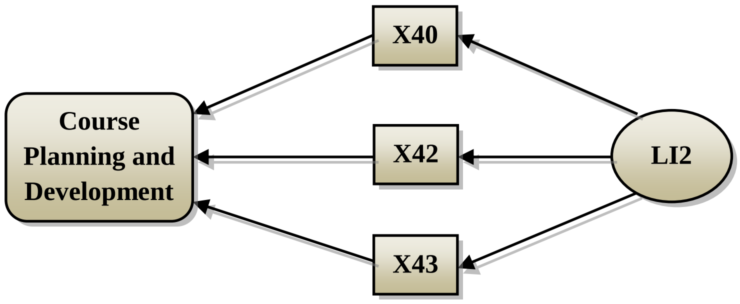



**Fig 6.6 Principle component analysis of LI2 factor**

The Learning Interaction CSF (LICSF) category was measured by 11 indicators. X33, X34, X36 and X37 variables were indicating the first group of critical factors to measure learning interaction. They indicate the criticality of assessment of the web–enhanced course. Where X40, X42 and X43 the second group of critical factors, represent indicators related to the importance of planning and development of web-enhanced learning. Both measurements categories were examined in table 6.17 and yielded 67.4% of the low measure of participants' responses towards learning interaction.

**Table 6.17: learning interaction critical success factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 116 | 67.4 |
| Moderate | 34 | 19.8 |
| High | 22 | 12.8 |
| Total | 172 | 100.0 |

The findings for the first important factor (course assessment) of learning interaction are not encouraging. Almost half the respondents (51.2%), as shown in table 6.18, are not agreed that participation in Moodle courses is enhancing their learning experience, nor the assignments /projects and exams which reflect the value of making Moodle courses more attractive for students by improving the way of delivering the course contents, assignments and quizzes. It is not encouraging to see that 67% of students found web-enhanced learning not to be an accurate tool for assessing students via quizzes and projects. On other hand, students agreed that Moodle learning by construction is better than absorption.

**Table 6.18: LI1 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 88 | 51.1 |
| Moderate | 60 | 34.9 |
| High | 24 | 14.0 |
| Total | 172 | 100.0 |

Whereas for the second critical factor of learning interaction (course planning and development) table (6.19) shows that almost half of students 49% (Moderate to High) are satisfied that web-enhanced learning helped to develop their ability to work as a team or group member, and that learning activities in Moodle courses required application of problem solving and critical thinking in order to facilitate their learning experience. It is important for instructional designers and instructors to plan and develop E-learning components (Moodle) in a way to support problem solving and critical thinking in course content. Although halves of students are in the low average of agree, still the researcher could consider that web-enhanced learning is an enriching learning experience for them.

**Table 6.19: LI2 factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 81 | 47.1 |
| Moderate | 74 | 43.9 |
| High | 17 | 9.0 |
| Total | 172 | 100.0 |

**Part five: Education Support (ES)**

Regarding the results shown on table (6.20) the variables X44, X46, X48 and X49 have highest loadings on the factors, whereas the significant extracted factor in study has an Eigen value of 2.552 and explains about 42% of the variance of dimension of education support. Therefore, the formulated name of this factor (Instructor attitude and control) was represented in figure 6.7 by the three correlated variables X44, X46, X48 and X49. Hence, the significant extracted factors explain a cumulative total of 42% of all the variance of studies dimension of education support, which is a healthy total. About 64% of the variance in the dimension of education support is not explained by the variables being members of the extracted factors.

**Table 6.20: the results of factor analysis (education support dimension)**

| Variables | | Factor 1 |
|---|---|---|
| X44 | | 0.737 |
| X45 | | - |
| X46 | | 0.750 |
| X47 | | - |
| X48 | | 0.747 |
| X49 | | 0.838 |
| Eigen value | 2.553 | |
| % of variance | 42.552 | |
| Cumulative% | 42.552 | |
| Extraction method: Principal Component Analysis (PCA) | | |

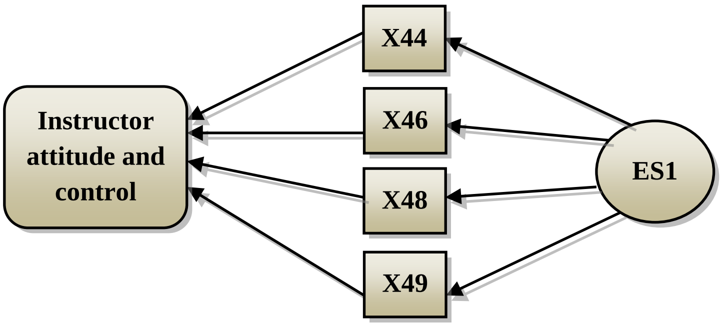



**Fig 6.7 principle component analysis of ES1 factor**

The Education Support CSF (ESCSF) category was measured by 6 indicators. The observed measurements in table (6.21) showed moderate to high fit of student respondents (57.0%) and (9.9%) respectively, therefore students consider that instructor teaching style and attitude is very important as shown by instructor welcome in seeking advice/help and in instructor encouragement and motivation to use Moodle. Likewise instructor style and control was appreciated by student where instructors were able to help students in using and explaining how to use Moodle components. These findings are encouraging management and instructional designers to conduct training programs to instructors on how to behave with E-learning teaching and how to control E-learning classes.

**Table 6.21: education support critical success factor analysis**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 57 | 33.1 |
| Moderate | 98 | 57.0 |
| High | 17 | 9.9 |
| Total | 172 | 100.0 |

**Part six: Technical Support (TS)**

Regarding the results shown on table (6.22) the variables X52, 53 and X54 have highest loadings on the factor, whereas the significant extracted factor in study has an Eigen value of 1.924 and explains about 38% from the variance of dimension of technical support. Therefore, the formulated name of this factor (university sufficient and adequacy of support activities) was represented in figure 6.8 by the three correlated variables X52, 53 and X54. Hence, the significant extracted factors explain a cumulative total of 38% of all the variance of studies dimension of technical support, which is a healthy total. About 62% of the variance in the dimension of technical support is not explained by the variables being members of the extracted factors.

**Table 6.22: the results of factor analysis (technical support dimension)**

| Variables | | Factor 1 |
|---|---|---|
| X50 | | - |
| X51 | | - |
| X52 | | 0.724 |
| X53 | | 0.707 |
| X54 | | 0.816 |
| Eigen value | 1.924 | |
| % of variance | 38.480 | |
| Cumulative% | 38.480 | |
| Extraction method: Principal Component Analysis (PCA) | | |

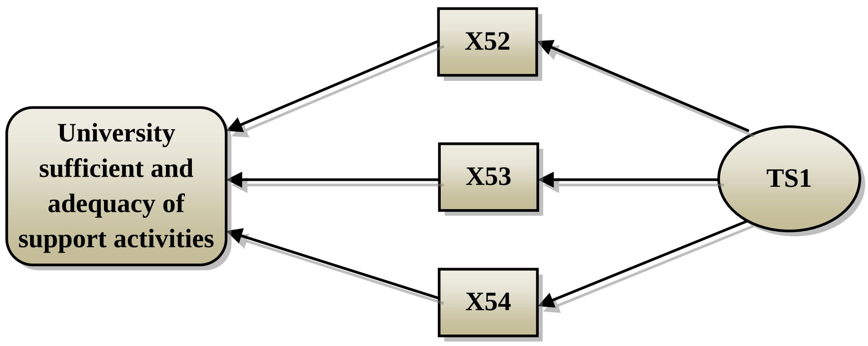



**Fig 6.8 Principle component analysis of TS1 factor**

The university technical support dimension is the second part of the technology tools and was measured using 5 indicators. All the items were related to technical support provided by the university, including library services, technicians help desk, computer labs and facilities. Student respondents were low to moderate, (42.4%) and (49.4%) respectively with university technical support. Examining the technical support factors revealed that students were not satisfied with the availability of computers to practise, neither with the availability of printing facilities and the technical difficulties students always face. The issue of using printers is now considered a problem in the university. Many departments try to reduce their printing cost by inserting a lot of information on the Moodle. The nature of technical difficulties experienced by students was investigated many times before by CDPD and the network technicians and the discussion revealed that the time frequency of solving the problems is low and that technical support is generally efficient in solving technical problems, since, almost all difficulties are resolved within 72 hours.

From the above, the survey instrument was used in order to specify the critical success factors (CSF) within the five categories (Technology Tools (TT), Personal Relevance (PR), Learning Interaction (LI), Education Support (ES) and Technical Support (TS)).

Each category has many indicators from which the PCA identified the most common factors among the indicators. For example the first CSF resulted from 3 main questions indicators (Access to campus internet found to be easy- No problems experienced while browsing- The design of screens was found to be pleasing). These were elucidating how easy it to use Moodle. The formulated name by the researcher for this indicator is ‘’web facility ease of use’’. This was the method used in order to generate the whole set of the 8 CSF’s.

The principal component analysis (PCA) test results proposed 8 categories for WEL CSFs as follows:

1- web facility ease of use,
2- infrastructure reliability and effectiveness,
3- student perception of LMS effectiveness,
4- student interactive collaboration capabilities,
5- course assessment,
6- course planning and development,
7- instructor attitude and control, and
8- sufficient and adequate university support activities.

From the previous analysis of the five dimensions (TT, PR, LI, ES and TS), it shows that the factors which lead to dissatisfaction are:

- Accessing campus internet

- Response from instructors
- Inefficient computer network
- Moodle screen design
- Insufficient course content related to subject
- Unfriendly design of Moodle component
- Unsure that assignments/projects and quizzes facilitate learning
- Insufficient printing facilities available on campus
- Insufficient computers available on campus

These entire factors require attention in order to reduce the student dissatisfaction with the web-enhanced learning experience.

As for student satisfaction, the analysis shows fewer factors compared to dissatisfaction for the same five dimensions:

- The feeling of finding the information anytime ,anywhere
- Learning is better by construction than absorption ( traditional classroom)
- The ability to work as a team / group member
- Sufficient help and suggestions delivered by instructors
- Motivation and encouragement of instructors to students to use Moodle

The instructional designers and top management have to overcome all dissatisfaction and at the same time improve the satisfaction. By establishing the QMS (chapter 4, figure 4.5) in the field of E-learning based on quality assurance concepts and guidelines such as ISO 9001 and ISO19796, dissatisfaction should be minimised as it is part of the systematic QMS approach to increase customer satisfaction which implies a decrease of dissatisfaction.

The intended QMS therefore concentrates on these dissatisfactions, by establishing procedures dealing with such dissatisfaction. For example as for dissatisfaction factors (Moodle screen design, insufficient and unfriendly design of Moodle component), core procedure named ‘’Design & Prototype development of E-learning Course/ Project’’ could be established taking into account the simplicity and friendly of screen design and navigation through the course modules.

### *6.2.4 Open question analysis*

The student survey has three open questions related to important positive or negative (advantage/disadvantages) points of using Moodle and what suggestions students may add to improve the experience of Moodle. Out of 172 respondents, 153 students answered these three questions with a percentage of 89%. Appendix (5) represents all student respondents. The typical open responses for the first question presented in table (6.23) in which the comments are represented as given by the respondents, with minor correction to spelling and sometimes with the sentence itself. I analyzed the open responses by using coloured coding, highlighting the similar meanings.

**Table 6.23: student responses to Moodle advantages**

| | Advantages | |
|---|---|---|
| 1 | Easy to Access | 17 |
| 2 | Easy To Study | 16 |
| 3 | Any where Any Time Learning | 34 |
| 4 | Save Time | 21 |
| 5 | Facilitate Contact with Instructors and Students | 16 |
| 6 | Uploading and Downloading Assignments | 25 |
| 7 | Important News Provider | 4 |
| 8 | Increase Computer Skills | 2 |
| 9 | Make Life Easier | 2 |
| 10 | Online Information Sharing | 2 |
| 11 | Good Reference | 2 |
| 12 | Interesting Learning Experience | 2 |
| 13 | Summarizing Subjects in Slides | 2 |
| 14 | More Comfortable | 2 |
| 15 | Motivate Studying | 2 |
| 16 | Tool to Take Quizzes online | 2 |
| 17 | More Knowledge | 2 |

Table 6.24 represents the actual responses for disadvantages and table 6.25 represents the suggestions.

**Table 6.24: student responses of Moodle disadvantages**

| | Disadvantages | |
|---|---|---|
| 1 | Learning Confusing | 4 |
| 2 | Poor Construction Design | 23 |
| 3 | Network Problems | 22 |
| 4 | Delay Instructors Feedback/Response | 4 |

| Disadvantages | | |
|---|---|---|
| 5 | Material not Always Updated | 7 |
| 6 | Material Content not Sufficient | 10 |
| 7 | No interaction with students and lecturers | 7 |
| 8 | Bad internet connection | 23 |
| 9 | Time consuming | 4 |
| 10 | Some lectures are not always added on time | 4 |
| 11 | It is 80% of time not updated with events like exams | 3 |
| 12 | Grades not published in time | 3 |
| 13 | Time consuming | 3 |
| 14 | Lack of access support | 3 |
| 15 | Registration problems | 3 |
| 16 | Unsafe | 3 |
| 17 | Assignments are not clear | 3 |
| 18 | Face–to-face learning is missing | 3 |
| 19 | Material objectives unclear | 3 |
| 20 | Few information about classes time | 3 |
| 21 | Lack of knowledge | 3 |
| 22 | No training done | 3 |
| 23 | Availability of computers and printers to access Moodle | 3 |
| 24 | Not all lecturers use Moodle | 3 |
| 25 | Technical problem solving missing | 3 |

**Table 6.25: student responses of Moodle suggestions**

| Suggestions | | |
|---|---|---|
| 1 | Teaching sessions training | 9 |
| 2 | Updating Course Content Regularly | 34 |
| 3 | Make Materials Easier to Use | 20 |
| 4 | Improve Instructors Response | 12 |
| 5 | Improve Moodle Design | 26 |
| 6 | Improve Network And Internet Connection | 8 |
| 7 | Let all instructors use Moodle and not some of them | 4 |
| 8 | Provide suitable Hardware | 4 |
| 9 | Make sure that all courses are available on line | 4 |
| 10 | Secure the Moodle contents | 4 |
| 11 | Send e-mail for any new information posted | 4 |
| 12 | Add information for classes time | 4 |
| 13 | Increase contact between instructors and students | 4 |
| 14 | Extra links to use in projects and assignments | 4 |
| 15 | Get grades in time | 4 |
| 16 | All assignments and quizzes should be done on the Moodle | 4 |
| 17 | Improve server capacity | 4 |

The right column represents the frequency of the response after coding using the colour coding where each colour contains same meaning of different students' responses. Only frequencies of 3% or higher are reflected in these tables. The percentages for each of the open questions are given in descending order in table 6.26, 6.27 and 6.28. The numbers of the options refer to the respective numbers of the responses on the coding frame.

**Table 6.26: frequencies of advantage response**

| | Advantages | Percentage |
|---|---|---|
| **1** | Any where Any Time Learning | 22% |
| **2** | Uploading and Downloading Assignments | 16% |
| **3** | Others | 14.5% |
| **4** | Save Time | 14.0% |
| **5** | Easy to Access | 11.1% |
| **6** | Easy To Study | 10.1% |
| **7** | Facilitate Contact with Instructors and Students | 10.1% |
| **8** | Important News Provider | 2.6% |

A logical proportion (22%) of the sample experienced web-enhanced learning (Moodle component) to be delivered any time anywhere. 16% of the sample found uploading and downloading of assignments to be a helpful advantage. Where the rest of the percentages from 10% to 14% are for easy access, easy to study and facilitate contact with instructors.

**Table 6.27: frequencies of disadvantage response**

| | Disadvantages | Percentage |
|---|---|---|
| **1** | Others | 28.5% |
| **2** | Poor construction design | 15.0% |
| **3** | Bad internet connection | 15.0% |
| **4** | Network problems | 14.0% |
| **5** | Material content not sufficient | 6.5% |
| **6** | Material not always updated | 4.5% |
| **7** | No interaction with students and lecturers | 4.5% |
| **8** | Some lectures are not always added on time | 3.0% |
| **9** | Time consuming | 3.0% |
| **10** | Delay Instructors feedback/response | 3.0% |
| **11** | Learning confusing | 3.0% |

Poor construction design and bad internet connection reflect the highest percentage in the distribution of disadvantages with a percentage of 15.0%. Network problems come second in the main disadvantages with 14.0%. The remaining percentages are distributed between insufficient content, unabated material and time consuming. These finding are similar to the findings represented before from closed question.

**Table 6.28: frequencies of suggestions response**

| | Suggestions | Percentage |
|---|---|---|
| **1** | Others | 39% |
| **2** | Updating course content regularly | 22% |
| **3** | Improve Moodle design | 17% |
| **4** | Make materials easier to use | 13% |
| **5** | Improve instructors response | 3% |
| **6** | Teaching sessions training | 3% |
| **7** | Improve network and internet connection | 3% |

Almost all mentioned suggestions in table 6.28 reflect the answers for the disadvantages where 22% of respondents see that updating course content on a regular basis will improve the Moodle experience. Also, 17% of respondents ask for improvement to the Moodle design, while the rest suggest making the material easier and improving the instructor's response will help to increase the learning outcome of using web-enhanced learning. It is noteworthy to include that student pressure is focusing on improving the Moodle design with regards to contents, screens, components and instructions. At the same time they look for more interaction from instructors in the way of communication and feedback.

The open question tries to capture the needs for a systematic development of QMS, which in turn re-enforces the needs for formulating a QA practice in the form of a formal QMS, for web-enhanced learning. This in return implies the formation of QMS conceptual model and system prototype.

## 6.3 THE LECTURER INTERVIEWS

One of the most important reasons for E-learning design and development departments at higher education institutions is to support lecturers and other related employees. By this support, lectures and other direct clients' evaluation has significant role play in the quality assurance process as Lee, J. (2002) concludes that "while teaching at a distance requires new technical skills for the new teaching and learning environment, what becomes very important is how to teach concepts within this environment, i.e. pedagogy". The lecturer interview method was used to obtain the qualitative lecturer feedback on using the E-learning component (Moodle).

Interviews were used to elicit qualitative lecturer feedback on the use of web-supported learning and the services rendered by the support team. The interview schedule is the lecturer questionnaire (Appendix 3) where the questionnaire is measuring the lecturers' experience and satisfaction.

### *6.3.1Closed question analysis*

The interview questionnaire consisted of nine categories of closed and open questions related to

- confirmation effectiveness
- top management support
- facilitation infrastructure
- training and education
- learning outcome
- feedback and evaluation
- quality of CDPD services and

Four items about the effectiveness of Moodle were assessed using a 5 point Lickert scale. The findings for these four items are presented in table 6.29 where 12 respondents out of 21, which were moderate to high, found Moodle to be an effective learning experience, whilst the rest of the respondents were low and the reasons behind most cases was that because of recent implementation and adoption of Moodle courses in AASTMT, they cannot judge the effectiveness of Moodle in the earlier stages of implementation. A second reason for the low satisfaction was due to part-time lecturers (at the AASTMT) as 3 out of 9 lecturers on the low scale said that they are not fully aware of using Moodle and as such they cannot be truly honest in measuring the effectiveness of Moodle.

**Table 6.29: frequencies of confirmation effectiveness**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 9 | 42.9% |
| Moderate | 8 | 38.1% |
| High | 4 | 19% |
| Total | 21 | 100% |

Some important notes while interviewing lecturers were noticed regarding the effectiveness of Moodle :

- the effectiveness is dependent mainly on the lecturer's way of handling the lectures via Moodle.
- that Moodle can support the administrative work in scheduling the exams and assignments; also they can track the students' grades easily and help academic advisors with student information.

- all lecturers admit and assure that the students can have a lot of information in a short time and that they can share it easily.

These notes illustrate and highlight that even lecturers are not making full use of Moodle but still admit the necessity for Moodle in improving the learning experience in AASTMT. As for top-management support, three questions reflect the importance of top management in the E-learning experience from the lecturers' point of view. Table 6.30 shows that almost half of lecturers, 47.6%, are not fully satisfied with the role of management in e-learning. Most unsatisfied lecturers indicate that management do not support Moodle with sufficient equipment and resources as a lot of them have not received the necessary laptop to use with Moodle, and that the Moodle server breaks down several time a week. Another disappointing note was that top management did not enforce the documentation of the E-learning process as they do for all processes in AASTMT, especially when they enforce all colleges to have ISO9001 certification in the education process which leads to systemization and consistency of education workflow. At the same time, and with ISO certification, they build a culture of quality and total quality management whilst building the structure of ISO9001. Similarly, interviewed lecturers were hoping to have the same encouragement for E-learning components, especially now that Moodle is an important part of education and learning in AASTMT as in traditional education.

**Table 6.30: frequencies of top management**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 10 | 47.6% |
| Moderate | 8 | 38.1% |
| High | 3 | 14.3% |
| Total | 21 | 100% |

Two items directly reflect the infrastructure. Lecturer respondents were of moderate to high satisfaction with the infrastructure, while the rest, 33.3%, were not satisfied that the AASTMT utilize the capacity of the IT infrastructure to facilitate E-learning efforts. The lecturers indicate that labs could be used more efficiently with Moodle courses when they are not used in traditional learning. These labs have equipment such as video conference cameras, server and printers, that could be used as sometimes lecturers could not find such facilities to deliver Moodle courses. This issue had been discussed with those responsible for timetabling and logistics, but unfortunately no action was taken. Almost all respondents in the interview were satisfied with the support they have from CDPD to use the E-learning component, especially answering questions with regard to handling problems with Moodle. Also they illustrate that CDPD designers try their best to improve the instructional design of courses and make a big effort in printing guidelines on how to use Moodle for both instructors and students. Table 6.31 represents frequencies of facilitation infrastructure.

**Table 6.31: frequencies of facilitation infrastructure**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 7 | 33.3 |
| Moderate | 9 | 42.9 |
| High | 5 | 23.8 |
| Total | 21 | 100 |

CDPD in AASTMT deliver training courses in Moodle with different levels in order to suit all AASTMT staff. Table 6.32 shows that almost half of lecturers were not satisfied with training courses offered, as they attend only the one-day awareness course, which in their opinion is not enough especially with those who are totally involved with the creation and development of E-learning courses. Other reasons were due to the frequent software updating of Moodle, consequently more training courses were required on new Moodle components, which is not done regularly for involved staff. For the second item the respondents agreed on the training times as almost all were attending the training courses during delivery of their Moodle course.

**Table 6.32: frequencies of training and education**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 10 | 47.6 |
| Moderate | 7 | 33.3 |
| High | 4 | 19.0 |
| Total | 21 | 100% |

Almost half of lecturers, 42.9%, as shown in table (6.33) agreed that WEL enhances the learning outcomes due to subjective instructional design along with 20% lecturers who had high satisfaction. The other low- moderate respondents were because of poor instructional designs regarding shortage of guidelines for responding to users (students & lecturers), guidelines for the learning design of course websites and finally no helpdesk for students and staff. Also lecturers indicate that WEL cannot give accurate assessment opportunities to students like those offered in traditional learning.

**Table 6.33: frequencies of learning outcome**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 8 | 38.1 |
| Moderate | 9 | 42.9 |
| High | 4 | 19.0 |
| Total | 21 | 100 |

In the feedback and evaluation section, lecturers were asked about two issues regarding CDPD, monitoring the usage of Moodle and providing what lecturers want. Table 6.34 shows moderate to high satisfaction (47.6%, 19.0%) respectively, this revealed the work done by CDPD to ensure the effectiveness of Moodle. with CDPD monitoring the lecturers' access to Moodle every week and developing a monthly report to heads of departments. Also CDPD conducts a monthly meeting with lecturers to hear their problems. As for the low respondents, the major reason was that there was no feedback questionnaire from lecturers and a delay sometimes from CDPD in responding to claims from lecturers.

**Table 6.34: frequencies of feedback and evaluation**

| Scale | Frequency | Percent |
|---|---|---|
| Low | 7 | 33.3% |
| Moderate | 10 | 47.6% |
| High | 4 | 19.0% |
| Total | 21 | 100% |

A direct survey question asked lecturers about their satisfaction with the service levels of CDPD. The data is presented in table 6.35.

**Table 6.35: frequencies of CDPD services**

| Quality of CDPD services | | | | | |
|---|---|---|---|---|---|
| | **Excellent** | **Good** | **Neutral** | **Fair** | **Poor** |
| Information help and services | 4 | 2 | 4 | 5 | 6 |
| Education material consultancy | 3 | 4 | 0 | 11 | 3 |
| Instructional design | 9 | 4 | 3 | 3 | 2 |
| Graphics | 4 | 2 | 4 | 3 | 8 |
| Project management | 7 | 3 | 3 | 5 | 3 |

The table revealed slightly higher numbers of excellent, good and neutral offered by instructional design and project management, where graphics and information help and services revealed moderate numbers. The only service which has low numbers was educational material consultancy. This may be due to involved lecturers not participating in the consultancy of material offered by Moodle instead of academic staff. Another reason was no standard course template is used to put the material on. The responses to the closed questions can be summarized as being tremendously negative, with regard to training and education and top management involvement.

Where there were reservations or qualifications to statements, these could be explained by the type and level of Moodle usage in departments.

### *6.3.2 The Open Question Analysis*

Cohen et al said "an open ended question can catch the authenticity, richness, depth of response, and honesty which are the hallmarks of qualitative data". As the scale of represented data of lecturers was small (21 lecturers) the analysis of such responses was easy to demonstrate. I analyzed each item by using coloured highlighters to code response notes of almost similar phrases or sentences. These small numbers of responses are believed to be honest with regard to their experience with Moodle teaching. The student survey has five open questions related to the following:

- the value received from E-learning component
- suggestion to top management
- problems and benefits of E-learning component facilitation
- problems and benefits of E-learning component design and development
- overall E-learning component comments

The findings of each open question are represented according to its i sequence in the lecturer interview.

**E-learning value**

The first open question was the value received by lecturers while using the E-learning component (Moodle). Table 6.36 represents some of more typical statements.

**Table 6.36: some typical statements for value**

- Money saving in long term
- New technique of learning contributes to the teaching and learning for both sides, students and lecturers
- It is the best way to minimize waste of time compared to traditional learning
- More interaction with students by making students more confident
- Enhancing the quality of learning and teaching of some courses
- Department new computers and printers
- Ease of communication with students
- Interacting with students in a more effective way
- Delivering the material contents in an easy way

From table 6.36, five important notes were identified and listed in table 6.37 together with numbers and percentage of responses.

**Table 6.37: summary of E-learning component value**

| No. | Notes | Responses | Percent |
|---|---|---|---|
| 1 | Time saving | 3 | 14.2% |
| 2 | Ease of use | 4 | 19.1% |
| 3 | Students interacting | 5 | 23.9% |
| 4 | Ease of communication | 6 | 28.6% |
| 5 | Management strategic decision | 3 | 14.2% |

Lecturers' communication with students was the higher indicator in connection with student interaction where lecturers' encourage students to use Moodle in the learning and teaching experience. This was confirmed before with the student questionnaire (section 6.3.1.3, education support and figure 6.7). Others were ease of use and time saving, which reflects how lecturers appreciate this type of learning as it minimizes the overload they faces in traditional learning and teaching. Finally, lecturers welcomed the decision of management to adopt this type of education, where it will become, in the near future, the promising type of learning in Egypt.

**Management commitment towards E-learning**

The findings of the next open question were what suggestions lecturers may offer to the top management. Table 6.38 represents some of the more typical statements.

**Table 6.38: represents some of more typical statements**

- Regular updates for newer versions
- More security control
- Nominate person to make follow ups and evaluate the work processes of Moodle
- Frequent backup of data on server
- Unifying interface for all courses
- Impose the culture of E-learning education in all AASTMT colleges and faculties as it is the now the life -style education
- Providing specialized and appropriate human resources (specialized graphics person- specialized web designers- project manager)
- Regular sufficient evaluation processes of student learning experience
- Increase investments in E-learning by providing equipment, financial resources, facilitations and locations.
- Increase the level of training of staff involved in the E-learning education and not only once but on regular basis
- Establishing documented procedures and policy for E-learning component as being done for traditional learning (we may gain ISO certificate also)

From table 6.38, five important notes were identified and listed in table 6.39 together with numbers and percentages of responses.

**Table 6.39: summary of top management commitment towards E-learning component**

| No. | Notes | Responses | Percent |
|---|---|---|---|
| 1 | Establishing policy and procedures | 8 | 38.2% |
| 2 | Problem management | 2 | 9.5% |
| 3 | Staff development and recruitment | 5 | 24.0% |
| 4 | User (student and lecturer) support | 3 | 14.2% |
| 5 | Evaluation | 3 | 14.2% |

Based on table 6.39, establishing a policy and procedures was the big issue. The area of policy and procedures is the most underdeveloped section across the CDPD. In one sense, the existence of a CDPD manager, but the absence of a policy–led approach, suggests a lack of engagement of a structured approach to the management and ongoing evaluation of Moodle activities. It would be difficult to set standards for quality assurance for lecturers and students across faculties. The other important issue was staff development, which includes training for lecturers (users), some lecturers advise making sample course websites for use as guides, advice about resource allocation, and acknowledgment of workload associated with the use of Moodle. The lecturers suggest that some would have difficulty maintaining the quality of learning supported by Moodle without more training and awareness.

User support and evaluation were also considered as important issues that management should put into consideration. In terms of supporting users (clients) some lecturers indicate that there is greater awareness of student support issues such as help desk support, standard time for queries from the help desk than for staff development issues. In term of evaluation, lecturers indicate that CDPD do not have evaluation services for learning supported by Moodle, and some lecturers indicate that they do not make any cycle review for their course website on Moodle.

Lastly, lecturers mentioned that CDPD is aware of problem management issues and the strategy necessary for implementing the learning management system (Moodle), such as systematic tests of the platform robustness and interoperability with other systems necessary for supporting teaching and learning

**Problems and benefits of E-learning facilitation**

The next open question was what were the problems and benefits of E-learning component facilitation. Table 6.40 represents some of the more typical statements.

**Table 6.40: some of typical statements on problems and benefits of E-learning facilitation**

- The staff responsible for Moodle (CDPD) are working in separate islands; not knowing what others do, especially with respect to technical support.
- The speed of the server is very slow and maximum file size to upload cannot be more than 5Mb which is often too small.
- Lack of IT infrastructure to support the whole platform.
- Sometimes students found it difficult to understand how Moodle works; accordingly, we sometimes do an awareness course, which wastes course time.
- Unacceptable changes in the Moodle interface without acknowledging the lecturers, which in consequence made both lecturers and students unhappy in using Moodle. Limited facilitation leads to minimum teaching outcome
- Saving time and money
- Give the opportunity to upload and download presentations any time anywhere.
- Communications speed
- Invaluable assignment tool and uploading presentations on to discussion board save time and cost
- Control the exams by time and speed
- Add new knowledge to student by exploring more sites
- Impose new culture of student learning (interacting- not afraid)

From table 6.40, two important notes were identified for problems and three for benefits listed in table 6.41, together with numbers and percentages of responses.

**Table 6.41: summary of E-learning facilitation problems and benefits**

| No. | Problems Notes | Responses | Percent |
|---|---|---|---|
| 1 | Technical problems | 13 | 62.0% |
| 2 | Insufficient support from CDPD | 8 | 38.0% |
| **No.** | **Benefits Notes** | **Responses** | **Percent** |
| 1 | Good communication interaction with students | 7 | 33.0% |
| 2 | Saving time and money | 8 | 38.0% |
| 3 | Students gaining new skills and experience | 6 | 29.0% |

From table 6.41 it appears that technical problems with respect to ICT infrastructure facilities were the main issue, followed by insufficient support from CDPD in respect to poor planning and in not participating with lecturers in the development of Moodle. The need for establishing guidelines and procedures in order to ensure a technical infrastructure commensurate with the E-learning component (Moodle) and to be able to plan and manage the execution of the e-leaning projects approved in the annual plan of CDPD. As for the benefits, the comments were towards students' interaction with lecturers and money and time saving of human and financial resources. This confirms what was mentioned before in the E-learning component value (table 6.37).

**Problems and benefits of E-learning design and development**

The findings of the next open question were concerning problems and benefits of E-learning component design and development. Table 6.42 represents some of the more typical statements.

**Table 6.42: some typical statements on problems and benefits of E-learning design and development**

- The layout of the course material screen is very poor; accessing the information was very difficult.
- Style consistency for all courses is misleading; every course is designed individually depending on the level of lecturer experience.
- The content search and links labels are not clear or user friendly
- Learning objectives sometimes not mentioned in the courses by some lecturers although CDPD insist on it.
- Presentation and demonstration, really poor, let me say again very poor.
- Copyright problems for papers and articles located on the server by some lecturers without any notification or warning of how to use it by students.
- Motivating and encouraging lecturers to do their best in presentation slides and the text attached.
- It experienced my thinking; facilitated learning and enhanced my course planning.
- Assessment methods and tracking students' learning outcome now are very easy. Thanks Moodle.
- Moodle frequent updates, adds more features for lecturers and students as well.

From table 6.42, three important notes were identified of problems and three of benefits listed in table 6.43 together with numbers and percentages of responses.

**Table 6.43: summary of E-learning design and development problems and benefits**

| **No.** | **Problems Notes** | **Responses** | **Percent** |
|---|---|---|---|
| 1 | Content design problems | 10 | 48.0% |
| 2 | Interface design problems | 5 | 24.0% |
| 3 | Instructional design problems | 6 | 28.0% |
| **No.** | **Benefits Notes** | **Responses** | **Percent** |
| 1 | Personal development | 5 | 24.0% |
| 2 | Assessment and evaluation support | 7 | 33.0% |
| 3 | Moodle adding value to lecturers | 9 | 43.0% |

The main problem shown from table 6.43 is concentrated in the instructional aspects relating to content design, interface design and instructional design. Hence procedures and guidelines are necessary to specify the E-learning module into learning objects with corresponding instructional strategies. Lecturers planning, organizing and motivation were seen as the benefiting learning experience from their point view in addition to the added value received by enhancing the assessment and evaluation of the student learning process

**Overall general comments**

General comments were summarizing the overall Moodle experience in the form of some short statement responses viewed in table 6.44.

**Table 6.44: some typical statements on overall comments**

- Still mature system needs more enhancement and development in lecturers' students' behaviour and in learning material design.
- Training lecturers and students is a basic fundamental of the Moodle learning experience.
- Investing more in ICT facilities will truly lead to the success of e-learning.
- Engagement of lecturers in the development of Moodle is an essential objective.
- Developing and maintaining a management system for CDPD will increase the level of satisfaction for both lecturers and students (consistency & quality).
- Help in controlling a large number of students and facilitate in delivering learning for outboard students (Arab students distance learning in postgraduate programs).

From table 6.44, five important overall comments were identified and listed in table 6.45, together with numbers and percentages of responses.

**Table 6.45: overall comments**

| No. | Notes | Responses | Percent |
|---|---|---|---|
| 1 | Establishing a management system for CDPD | 5 | 23.8% |
| 2 | Lecturers' and students' training | 4 | 19.1% |
| 3 | Support distance learning | 3 | 14.2% |
| 4 | More investment in ICT infrastructure | 5 | 23.8% |
| 5 | Change lecturer and student behaviour toward e-learning | 4 | 19.1% |

From table 6.45 the equality of the responses towards the five main notes was obvious, especially establishing the management system and investing more in the ICT infrastructure, which were discussed before in the problems and benefits of the E-learning system. Training also was a main issue discussed before but in addition to this was the behaviour change of lecturers and students towards using Moodle, which is one of the main subjects of literature discussed earlier in chapter 3 in term of change management. Also the support of top management to make AASTMT programs available for students on board to be international.

It is noteworthy to conclude that the overall comments synthesized the important factors which lead to lecturers' satisfaction. The main points may be presented as follows:

- Assure the quality of the E-learning component by establishing QMS in the CDPD as AASTMT has had a successful experiments with traditional learning.
- With respect to the above statement, changing the behaviour (change management) to deal with E-learning for both lecturers and students will take time, but this happened before with respect to traditional teaching. Organizational issues should be dealt with flexibly and administration should be flexible and fast to respond to E-learning component needs, which in result will be appreciated by lecturers and students (clients).
- Training of staff and students is considered important for both, the more training the more success.
- Lecturers should participate in the design process of new features added to E-learning components, which is appreciated and will decrease the opposition of working with new features in the E-learning system.
- Lecturers are happy with communication and interaction with students.
- Technical problems affect the right implementation of the E-learning component, as such more investments re needed (human and equipment).
- Improving the design and development of the E-learning component will encourage lecturers, as well as students, to participate effectively in the E-learning component.

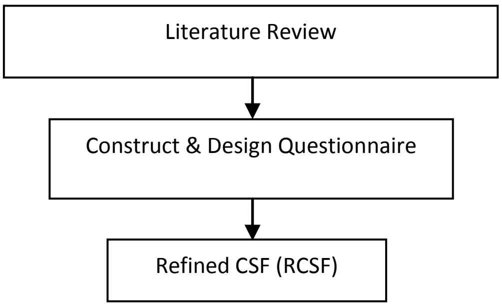
## 6.4 CONCLUSION

Web-enhanced learning has been adopted by many higher education institutions. Consequently, several adoption-related critical factors must carefully evaluate before, during and after any adoption. The adoption of the E-learning component is a complicated process of establishing and developing integrated information and communication technology. At the same time, client feedback is considered a focal point to the theory of quality assurance, where students and lecturers are the direct users of E-learning component services. The ultimate clients are students who are the end users of the E-learning products.

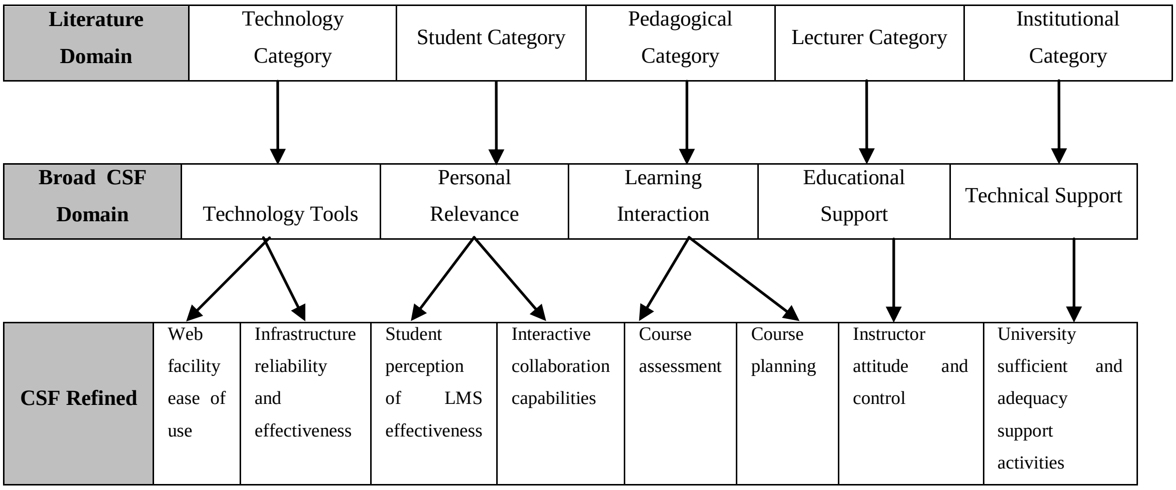
This chapter investigated two main subjects:

- the critical success factors (CSF) categories that can assist universities effectively and efficiently to adopt E-learning components from the student viewpoint
- client satisfaction for both students and lecturers of the WEL components.

The CSF construction was based on the following actions.



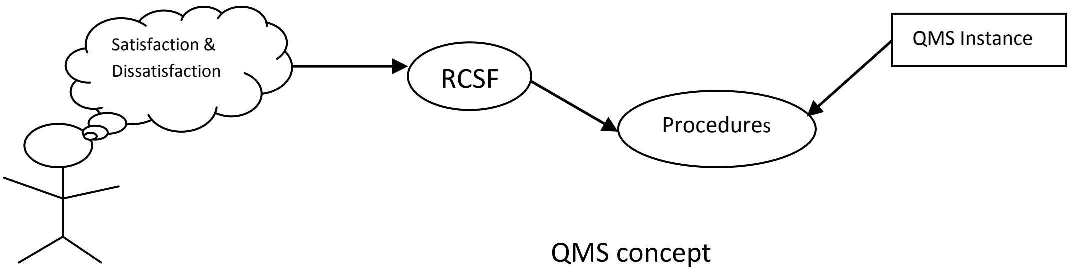

This resulted in the relationships between CSFs and information/data categories as shown below.




A student feedback questionnaire and lecturers interviews investigated the level of satisfaction of students taking the web-enhanced learning, as well as that of lecturers making use of the support services offered. The responses from this information collection show clear links between the feedback and the Refined CSF (RCSF). From this it may be assured that the RCSF are fit for purpose/validated.

The diagram indicates the relationships between the determined factors of dissatisfaction/satisfaction, the RCSF, and the developed procedures which represent the prototype WEL QMS instance. In this context it is important to make that the

RCSF's are inclusive so that both factors of dissatisfaction and satisfaction are reflected in the developed QMS procedures




QMS concept

The diagram shows the influences and contributions which formulate the prototype WEL QMS. Customer satisfaction and dissatisfaction factors influence the formulation of the RCSFs which in term form the basis for the quality system procedures which finally provide the core of the WEL QMS instance.

The students' dissatisfaction feedback, using the principal component analysis (PCA) test results the following summary:

| **Responses Feedback** | **Covered by Refined CSF** |
|---|---|
| Difficulties in accessing campus internet | Infrastructure reliability and effectiveness |
| Slow response from instructors | Interactive collaboration capabilities |
| Inefficient computer network | Infrastructure reliability and effectiveness |
| Unpleasant Moodle screen design | Web facility ease of use |
| Insufficient course content related to subject | Student perception of LMS effectiveness |
| Unfriendly design of Moodle component | Course planning and development |
| Unsure belief that assignments/projects and quizzes facilitate learning | Course assessment |
| Insufficient printing facilities available on campus | University sufficient and adequacy support activities |
| Insufficient computers available on campus | University sufficient and adequacy support activities |

Where the satisfaction feedback were as follows:

| **Responses Feedback** | **Refined CSF** |
|---|---|
| The feeling of finding the information anytime, anywhere | Interactive collaboration capabilities |
| Learning is better by construction than absorption ( traditional classroom) | Course assessment |
| The ability to work as a team / group member | Course assessment |
| Sufficient help and suggestions delivered by instructors | Instructor attitude and control |
| Motivation and encouragement of instructors to students to use Moodle | Instructor attitude and control |

On the other hand, the lecturers' satisfaction and dissatisfaction were as follows:

- Assure the quality of the E-learning component by establishing QMS in the CDPD as the AASTMT has had in successful experiments with traditional learning.
- With respect to the above statement, changing the behaviour (change management) to deal with WEL for both lecturers and students will take time. But this happened before with respect to traditional learning.
- Organization and administration should be flexible and fast to respond to E-learning component needs, which will results in appreciation by both lecturers and students (clients).
- Training of staff and students is considered important for both, the more training the more success.
- Participation of lecturers in the design process of new features added to E-learning components is appreciated and will decrease the opposition of working with the new feature in the WEL system.
- Lecturers are happy with communication and interaction with students.
- Technical problems affect the right implementation of the E-learning component, as such more investment is needed (human and equipment).
- Improving the design and development of the E-learning component will be encouraging

The next chapter will discuss the case study where a suggested quality management system will be developed in order to overcome the problems mentioned earlier in this chapter and will continually improve the benefits of E-learning components based on the ISO 9001 standard and ISO19796 guideline.

# CHAPTER 7

## THE QUALITY MANAGEMENT SYSTEM

## 7.1 INTRODUCTION

As mentioned in the conceptual framework for this research (chapter 4, figure 4.5), the quality management system (QMS) provides a set of processes that ensures process management. The system should ensure consistency and improvement of working practices, which in turn should provide products and services that meet customers' requirements.

The quality assurance standards ISO9001 and ISO19796 were used on the WEL design process in such a way as to benefit from both standards proposed QMS approach, while at the same time incorporating the WEL-specific CSF which resulted from the principal component analysis.

These being:

1. Web facility's ease of use
2. Infrastructure reliability and effectiveness
3. Students' perception of LMS effectiveness
4. Students' interactive collaboration capabilities
5. Course assessment
6. Course planning and development
7. Instructor's attitude and control
8. Sufficient and adequate university support

Based upon these refined critical success factors the detailed implementation of the QMS was based. In order to develop a QMS for evaluation, a set of documented procedures was established. The subsequent evaluation of the proposed QMS was then evaluated using the above described focus groups to measure the improvement in the result of web-enhanced learning courses after implementation.

The developed QMS approach and the prototype documentation for managing the quality of instructional design processes and procedures for web-enhanced learning is considered unique as the literature review did not find such integration between ISO9001 and ISO19796 nor a fully documented QMS based on the ISO 9001 and ISO19796 for web-enhanced learning in higher education institutions (chapter 4, section 4.4 ). It is also considered repeatable since the approach used to construct it is based upon the determining of CSF of the application under consideration, the subsequent PCA analysis of these and the selection of suitable generic and specific existing quality standards to support the quality PDCA feedback process management.

As the study is exploratory on a particular case, the outcome reflects the way the team developed the QMS-system approach to the instructional design of the web-enhanced learning course. The study is focussing on the WEL process from the view point of capturing and analysing the outputs from the WEL based instruction and using this to construct instructional improvements based on the refined CSF. The implication of this is that the actual WEL system is irrelevant and can be treated as a 'black box' producing learning outcome feedback. Thus any WEL system can be substituted without any impact on the study.

## 7.2 QMS FRAMEWORK DEVELOPMENT

In developing the WEL specific QMS there are certain fundamental process control and management principles which must be followed. Such principles are embodied in existing quality standards and can be used to create suitable new and specific QMS instances.

Any business process must be responsive to its changing environment, and, more than that it must preferably be pro-active in its prediction of such changes. The implication of this is that the process must be managed according to a strategic framework which implies control tactics which give rise to the immediate process control actions. In order to change, or control, a process it is necessary to model it, to represent its nature in some understandable form. The modelling of a process may be done using a variety of methods and techniques. The intention is to map the output to the input, or the output to the actual process actions. This deterministic nature of the process is important in terms of the predictable output of the process, and therefore of the predictable output of the overall systems of which the process is a part, and thus effect a deterministic model of the process. The analogy with classical process control theory may be useful at this point. The classical approach (figure 7.1) uses analytical methods to adjust the process input in order to produce the desired output. Analytical methods thus ensure that the output is at all times predictable. The feedback from the output indicates the deviation from target values in the output. The feedback is then used to effect changes in *the input* according to the process control tactics so that the output conforms closer to the desired targets. In a simple single-input single-output as well as multi-varietal process this is well established.

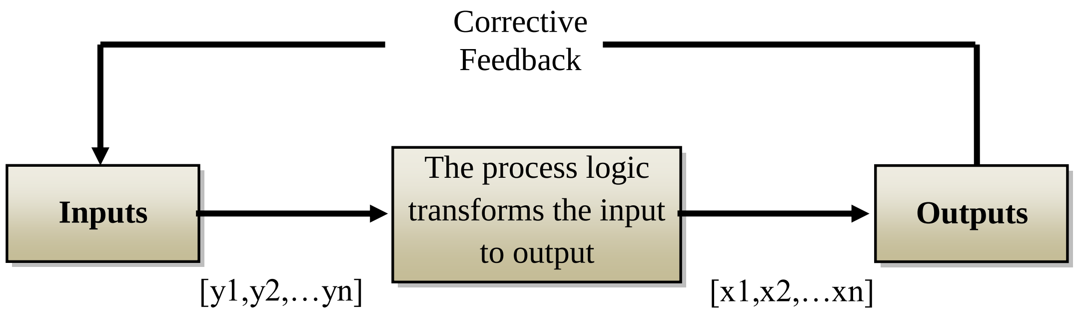



**Figure 7.1 Theory of classical business process**

The implication is that the output is measured against target values and the deviations established. In the classical control scenario the $\Delta x_i$ are used as pre-programmed inputs to the control algorithm and thus used automatically. The actual process that is transforming the input to the output is not normally changed in this context. In the context of the business process the situation is different. It is not likely that the input to the process can be altered substantially; it is, furthermore, quite likely that the input is outside control of the process. However, it is more likely that it is the actual process that requires alteration so that its output is within acceptable limits. Quality Management Systems (QMS) have historically been used to provide a form of 'process control' business processes. Such QMS systems provide domain-specific frameworks for the process actions so that some form of feedback and process consistency is achieved. Also, the need for changes to the business process can vary from time to time and environment to environment. There is always a need to monitor the process so that efficiency and effectiveness are maintained. One may regard process changes as:

- Minor changes to process
- Moderate changes
- Major changes

The case study focused on the improvement of the output of WEL (E-learning course), and affecting changes so that the output improves, thus the QMS development is focussing on the process quality management. The PCA has provided the eight refined CSF which drive the output assessment, thus driving the generation of the [$\Delta$x1,$\Delta$x2…$\Delta$xn]. The process output must be measured and compared to some desired values; any deviation must then be identified in terms of the process output objectives, as in the case of classical process control.

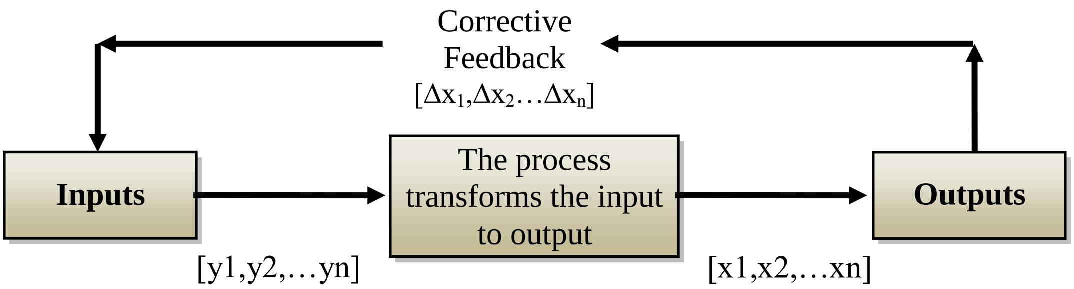



**Figure 7.2 QMS process model improvement**

In this case, the process is the business processes. The analogy with the classical process control scenario is valid inasmuch as:

- The process improvements must be practically possible and become firmly rooted within the organisation.
- The focus for the improvement activity must be the part of the process that is critical in producing the deviation in the desired process output. Process improvement is resources intensive and it is, therefore, critical to identify and select the process problem area for improvement.
- Process improvements will not happen overnight as they need to be gradually introduced.
- Furthermore, in the context of the business process it is critical to select the right 'process problem' to deal with.

Therefore, the establishment of a QMS is the means of establishing such a control system. This in turn is better focused by knowing which output components are the ones that characterise the output most effectively. The QMS design is effected by using the eight PCA critical success factors output, which in turn are telling the user about measuring the output, and what the QMS should concentrate on in terms of 'controlling' the processes. Figure 7.2 is showing the process improvement. The quality framework which is the basis of the design of the QMS is shown in Figure 7.3.

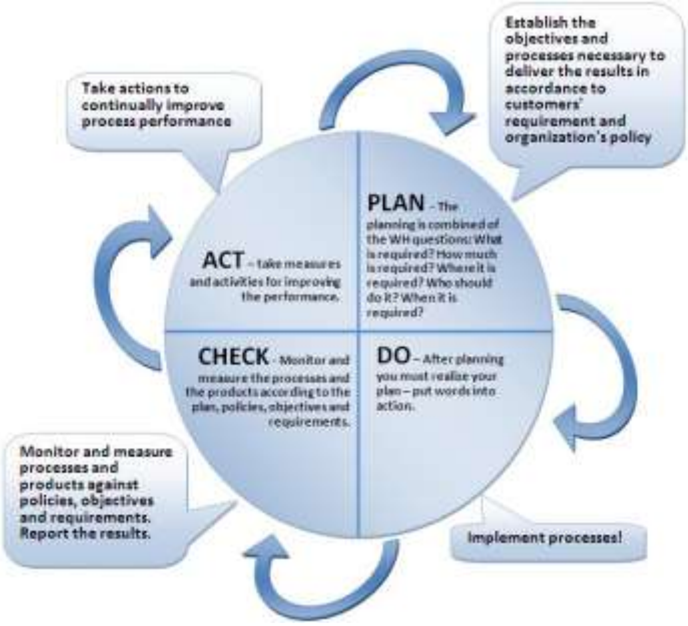



**Figure 7.3 Elements of a quality management system (source: www.9001quality.com)**

The PDCA cycle was first developed in the year 1920 by Walter Shewhart. Later it became more popular because of W. Edward Deming. The process approach promoted by ISO 9001:2000 systematically identifies and manages processes that combine the quality system and the interactions between the processes. This process model is actually based on the Plan-Do-Check-Act cycle (PDCA) which can be applied to all processes. Related to the quality management system, the PDCA cycle is a dynamic cycle that could be implemented about any process within the organization. It combines planning, implementing, controlling and continual improvement within the realization processes. The PDCA would maintain continual improvement when an organization implements the PDCA cycle throughout its processes, in any kind of processes: management reviews, corrective and preventive actions, product realization, etc. The organization determines implementing the PDCA at the core process, at a minor process or even at several processes together.

The PDCA cycle summarizes the quality assurance theory and shows how feedback loop can provide much information help to management in decision making and continually acts to improve. This is reflecting the classical process control approach described above. The new standard ISO/IEC 19796, mentioned earlier in chapter 4 sections 4.3, provides a Reference Framework for the Description of Quality (RFDQ) approaches. Such a reference framework represents the interrelationship of the aspects such as data quality, scope, methodology or interoperability of quality assurance and quality management systems and gives an orientation as to which aspects should be covered and how solutions for these aspects can be found. Thus, the RFDQ could be applied as a roadmap to consecutively design and implement an adequate solution. The standard is an instrument to develop quality in the field of e-learning. It consists of three parts:

- a description scheme for quality approaches
- a process model as a reference classification
- reference criteria for evaluation

The framework supports the development of quality profiles for organizations (such as objectives, methods, relations, and people involved). Quality profiles mean that the generic standard is tailored to the needs and requirements of an organization. It does not provide specific requirements or rules. Rather, it is a framework to guide actors through the process of quality development in the field of e-learning. The Description Model is merely a scheme to describe quality approaches (such as guidelines, design guides, or requirements). It documents all quality concepts in a transparent way. The integration between ISO9001 and ISO19796 guidelines is presented earlier in chapter 4 sections 4.4 in the form of proposed integration diagram figure 4.4.

The WEL specific QMS should thus follow the principles of ISO9001 and by using the more detailed system of ISO 19796 the WEL specific QMS can be generated using the refined CSF. Thus the WEL specific QMS development is based upon two pillars, that of existing ISO standards and the developed and RCSF. Given that the available ISO 9001 framework represents high-level guidance principles, it was not detailed enough to indicate process and procedure influences and links from desired target output. The approach taken to progress the QMS system generation was to investigate a more detailed quality standard as well as determining the most important critical success factors for the WEL application.

The former in order to provide a more detailed process overview, the latter in order to effect definition of the important process factors as well as providing a framework for measuring the WEL process outputs. The Road Map and action plan below shows the stage-by-stage work in table 7.1.

## Table 7.1: roadmap and action plan stages

### *Stage A: QMS initiation*

#### *Task A-1*: Preliminary survey/gap analysis

| | |
|---|---|
| Activities | • Understand the current documented policies, procedures and standards<br>• Understand the current practiced policies, procedures and standards<br>• Vision development<br>• Assess the extent of difference from the QMS standard and ISO19796 guideline<br>• Awareness and training using different methods, such as (workshops, conferences, and publications) |
| Deliverables | • Gap Analysis report<br>• Integrate Quality into the corporation's vision<br>• Training, documentation, review, deployment, corrective actions,…etc |
| Consultants responsibilities | • Perform gap analysis<br>• Prepare and present gap analysis report<br>• List of proposed QMS procedures<br>• Build quality strategies based on verified concepts (ISO9001&ISO19796)<br>• Contribute quality strategies to innovation and competitive value<br>• Make people aware of their responsibility and benefits |
| Team members responsibilities | • Make all documented policies, procedures, standards available with involved staff in CDPD, faculties and institutes<br>• Organize interviews with CDPD, faculties and institutes personnel<br>• Clearly communicate the vision that reflect the culture of the organization |

#### *Task A-2: Course/Project action plan*

| | |
|---|---|
| Activities | • Prepare a detailed project action plan for achieving the project regarding QMS standard and ISO19796 guideline.<br>• Clear defined quality objectives |
| Deliverables | • An Project action plan containing: List of key tasks in designing of the courses /project & Sequence of various tasks and the proposed time for achievement task<br>• Quality Assurance (QA) training material |
| Consultants responsibilities | • Prepare project action plan including timeline jointly with the team members and other involved parities (if required)<br>• Defined objectives according to principles: best quality for clients, reduction of development time, increased profitability<br>• Define quality for all user groups |
| Team members responsibilities | • Collaborate for making project action plan.<br>• Negotiate quality objectives, and all E-learning elements with consumer-oriented, consensus-based, taking into account views from inside and outside the organization |

### *Stage B: System design and documentation development*

#### *Task B-1: Development and documentation of system procedures*

| | |
|---|---|
| Activities | • Review existing documentation and customize using QMS standard and ISO19796 guideline. Also the local requirements as inputs<br>• Identify and develop new procedures using QMS standard and ISO19796 guideline. Also the local requirements as input<br>• Review and approve the documented procedures<br>• Release procedures for deployment<br>• Training to create quality knowledge for the staff |
| Deliverables | • Fully documented and approved set of management procedures. |
| Consultants responsibilities | • Support and guidance in writing processes<br>• Review of process documents especially with respect to QMS standard and ISO19796 guideline.<br>• Identify key persons for each stage<br>• Develop steering, communication, and commitment<br>• Connect experts with non-experts<br>• agreement of team members on every E-learning processes measures<br>• Allowance of time for specific quality assurance activities through documentation processes |

| | |
|---|---|
| | • Confident of benefits made at each stage of documentation development<br>• Give a variety of presentations and discussions<br>• Provide guidance, help, and feedback throughout the project |
| Team members responsibilities | • Writing and approving of the procedures with relevant responsible person in the AASTMT<br>• Provide adequate, validated methods for E-learning processes<br>• Encouraging motivation, simplicity and readability of processes, and management involvement<br>• Building awareness to reach organizational changes<br>• Collaborative review and validation of the documentation production<br>• Maintain ownership of actors' to their processes and of the quality of their work<br>• Provide and encourage steady, continuous information and regular feedback to actors and consultants |

### *Task B-2: Development and documentation of QMS policy and manual*

| | |
|---|---|
| Activities | • Quality policy/objectives brainstorming<br>• Manual writing<br>• Release of Quality Policy<br>• Set quality strategies |
| Deliverables | • Quality Policy and Objectives<br>• Quality Manual<br>• Quality strategies |
| Consultants responsibilities | • Support and guidance in writing the policy, manual and strategies<br>• Making people "quality aware"<br>• The policy clarify procedures and responsibilities<br>• Quality strategies taking external effects into account, such as trends, legislation, and developments within the society |
| Team members responsibilities | • Jointly define and document the policy, strategies and manual<br>• Writing and approving of the Manual<br>• Impose and relate quality to the culture, way of thinking, and value systems of both the organization and the individual<br>• Stress on that quality support for the innovation process of E-learning |

## *Stage C: Implementation and preparation for QMS*

### *Task C-1: System implementation*

| | |
|---|---|
| Activities | • Deploy the processes through implementing the procedures<br>• Identify & implement process improvement<br>• Perform internal audit<br>• Identify non-conformances<br>• Identify corrective actions<br>• Implement corrective actions<br>• Internal Audit training |
| Deliverables | • Deployed processes.*****<br>• Internal Audit Report<br>• Corrective Action and follow up reports. |
| Consultants responsibilities | • Support for process deployment.<br>• Perform Internal Audits<br>• Prepare Internal Audit report<br>• Identify and implement corrective actions.<br>• Consider time factor in evaluations |
| Team members responsibilities | • Take responsibility for effective implementation.<br>• Attend / facilitate auditing as auditee<br>• Regular teams reviews<br>• Collect users' feedback continuously<br>• Involve other quality experts and benchmark results |

**Process deployment could overlap process documentation.*

### *Task C-2: Management review meeting*

| | |
|---|---|
| Activities | • Prepare input material<br>• Hold meeting<br>• New techniques to improve quality of E-learning project<br>• Availability and added value of the E-learning project |
| Deliverables | • Minutes of Meeting<br>• Action Items |
| Consultants responsibilities | • Assist with preparation for meeting<br>• Attend / facilitate meeting<br>• Held continuous discussions to improve the E-learning project<br>• Revision of the quality approach takes place throughout the project, with an emphasis on the clients' feedback<br>• Discuss dissemination internally<br>• Improve and utilize structured documentation of E-learning project |
| Team members responsibilities | • Announce & prepare for meeting<br>• Identify the Top management person who will chair the meeting<br>• Prepare and issue minutes of meeting<br>• Follow-up action items and issue status updates.<br>• Listen to all opinions to keep the continuous improvement mechanism, taking into account all mind-sets and interests of the stakeholders |

## Action Plan Stages

| Stage (1) | Task | Week | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| **Analysis** Need analysis & Framework Analysis) **NA &FA** | Gap analysis | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | |
| | Vision development | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| | Setting objectives | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| | Initiate policy & strategy | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| | Identifying actors | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | |
| | Course/project need analysis | | | | | ■ | | | | | | | | | | | | | | | | | | | |
| | Choosing methods and indicators | | | | | ■ | | | | | | | | | | | | | | | | | | | |
| | Course/project initiation and approval | | | | | ■ | | | | | | | | | | | | | | | | | | | |
| | Training of staff involved in design of course/project | | | | | | ■ | ■ | | | | | | | | | | | | | | | | | |
| | Specify the course/project specification | | | | | | | ■ | ■ | | | | | | | | | | | | | | | | |
| **Design** (Conception /Design) **CD** | Prototype design & development | | | | | | | | | ■ | ■ | ■ | | | | | | | | | | | | | |
| | Lecturers prototype course/project prior test | | | | | | | | | | | | ■ | ■ | | | | | | | | | | | |
| | Prototype improvement | | | | | | | | | | | | | | ■ | ■ | | | | | | | | | |
| **Development** (development/ production) **DP** | Development of contents | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | | |
| | Development of multimedia | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | |
| | Development of communication | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | |
| | technical & maintenance | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | |
| | Training of students | | | | | | | | | | | | | | | | | | | | ■ | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Prior Evaluation** (Implementation) **IM** | Course/project tests | | | | | | | | | | | | | | | | | | | | | ■ | | | |
| | Course/project adaptation | | | | | | | | | | | | | | | | | | | | | | ■ | | |
| | Course/project release and activation | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ |
| **Stage (2)** | **Task** | **Week** | | | | | | | | | | | | | | | | | | | | | | | |
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| **Implementation** (learning process) **LP** | Delivery of course/project | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | |
| **Evaluation** (Evaluation/ Optimization) **EO** | Lecturer evaluation | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | |
| | Student evaluation | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | |
| | Review, maintenance and support | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ |

This is considered a generic, systematic and repeatable action plan and should therefore be applicable to other *analogous situations* by repeating the following steps:

1- Find relevant QA base(s)
2- Find Universal CSF
3- Refine UCSF
4- Draw and design the procedures
5- QMS instancing
6- Validate QMS via focus group

The selection and use of the 19796 standard was used to provide the process focus, which then was augmented by the CSF as found and analysed in the field. This approach is quite a standard, top-down approach *which is repeatable*. ISO9001 is similar to classical negative feed-back control theory and, as such, is generically applicable, while the investigation and search for a closely related standard which can provide a quality process framework must be seen as 'common sense' followed by its tailoring to the specific situation under investigation. In this case it was sufficient to find 19796 as this seemed close enough to the target domain (its evaluation confirmed this). In other cases it may have been necessary to combine two or more standards to provide the necessary process framework. The resultant systems output from this is also seen as a contribution inasmuch as it builds upon the general principles of the 'plan-do-check-act' ISO principles and utilises a more detailed quality framework that can be seen to be close to the actual application and the determination of the most critical success factors in order to get a link to the processes that are most likely to affect the most critical process delivery. The subsequent two diagrams indicate this.

The first diagram figure 7.4 indicates the process decomposition from ISO 9001 via ISO 19796 frameworks so that the 'plan-do-check-act' cycle becomes more focussed and process detailed. The second diagram figure 7.5 indicates the linking affected by the most critical CSFs to each QMS procedure/process, thus making the QMS WEL application specific.

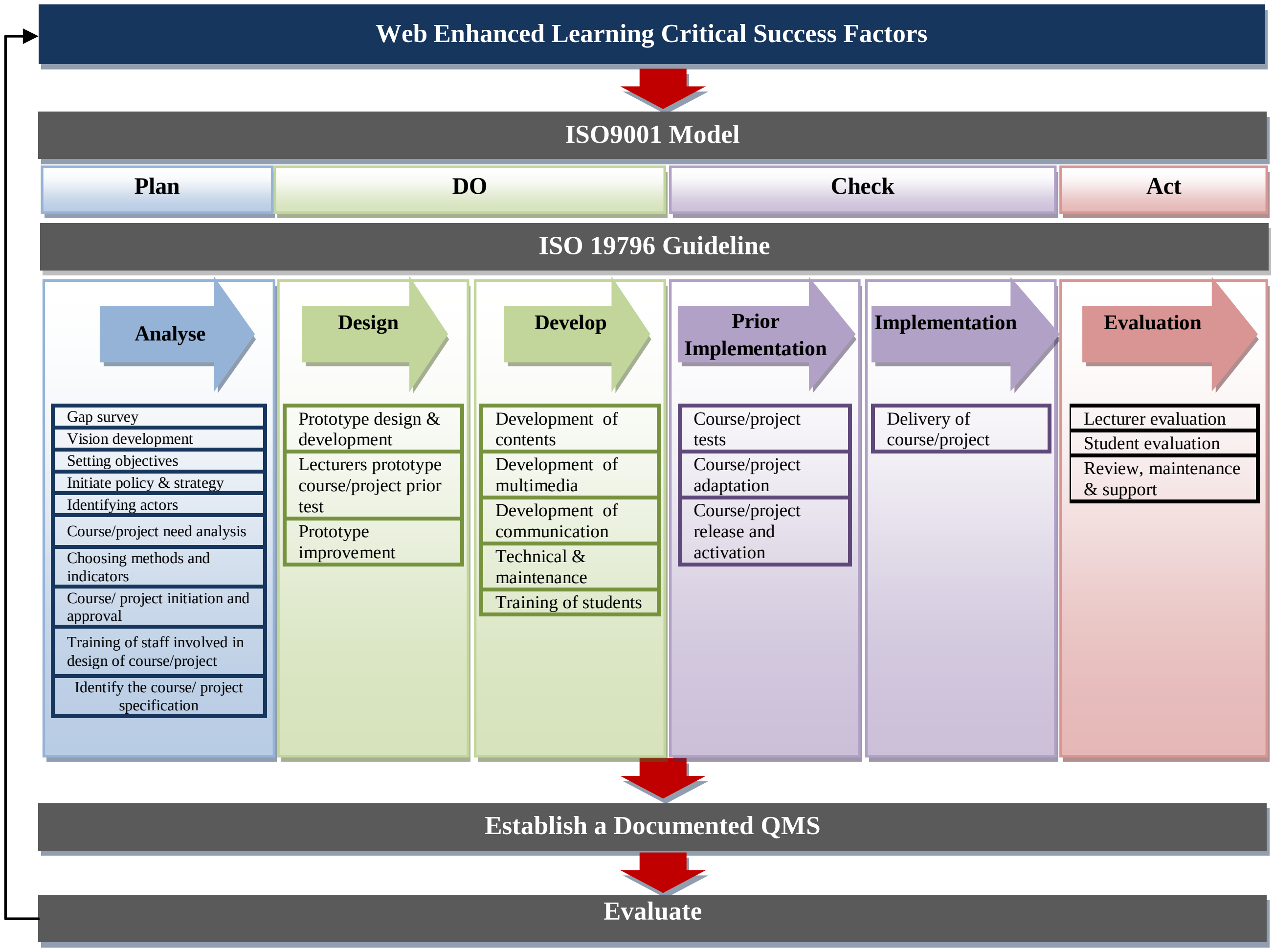



**Figure 7.4 Proposed QMS approach phases**

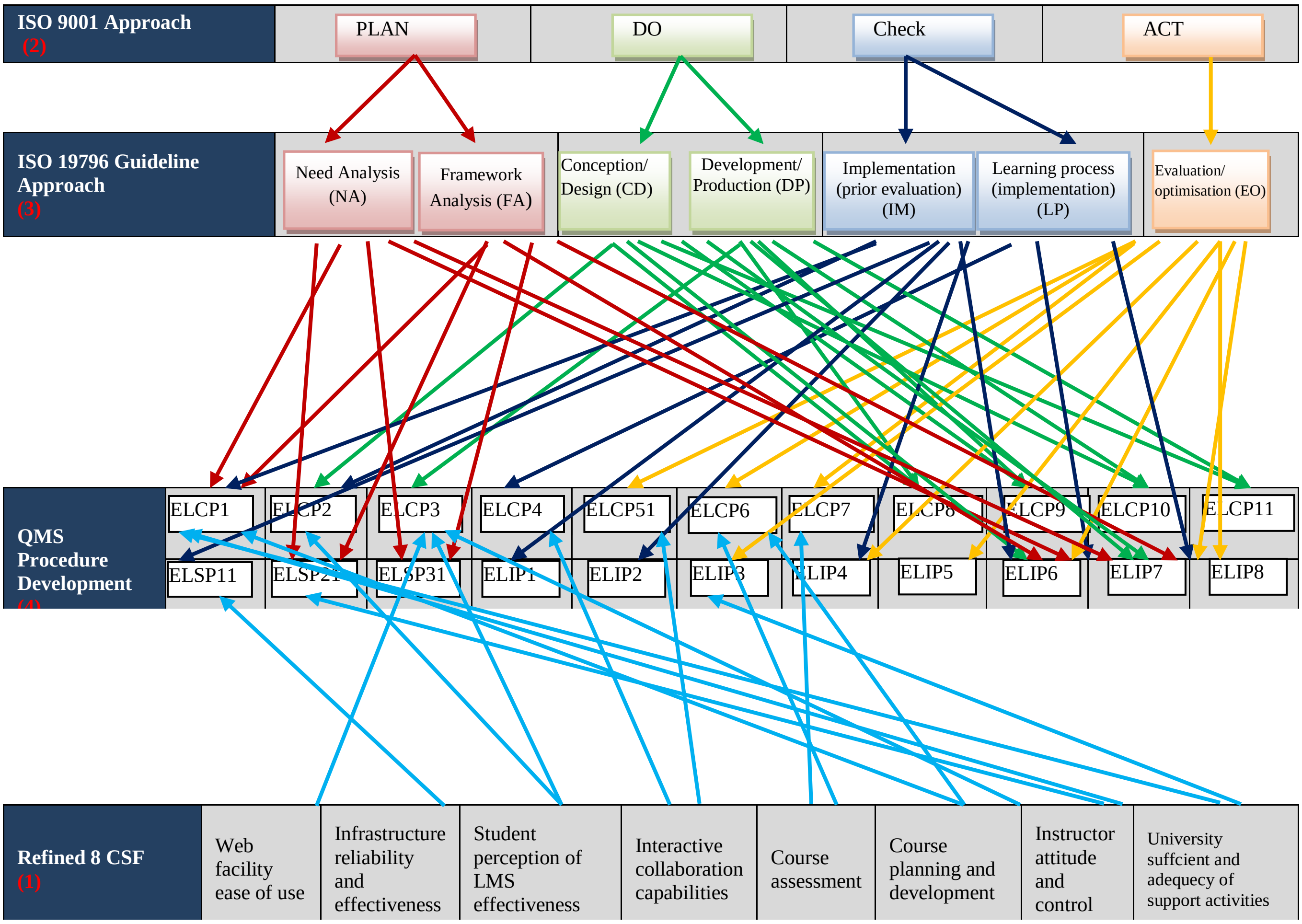



**Figure 7.5 QMS Process Approach Implementation**

Fig 7.5 represents the realized QMS instance of the conceptual system 'pyramid' in chapter 4 figure 4.6. The WEL specific QMS is shown as the collections of procedures to be used as the detailed implementation 'tools', the CSF indicated on the bottom block, 1, is seen as the base information that instance the QMS for the WEL application. The top two blocks, 2 and 3, indicate the combination of the ISO quality standards used to provide the conceptual quality framework as well as the procedural 'skeleton'. The middle block, 4, shows the detailed procedures used to actually run the QMS. The procedures are classified into 3 categories:

1. Core procedures
2. Support procedures
3. ISO procedures

The core procedures cover the course design and development. The support procedures deal with activities that support the core processes such as the technology and institutional support, while the ISO procedures handle the analysis and effect of the output so that corrective feedback can be utilized. The links between the various blocks indicate the relationships between for instant CSF and implementing procedures.

In summary, the systematic QMS approach set out here is not context dependent upon the WEL application so that it can be transported to any other similar application situation.

## 7.3 DESIGN AND EVALUATION OF THE WEL QMS

The case study context is for the course design and production department (CDPD) at the Arab Academy for Science and Technology in Egypt. The time period for this study was from 2007 to 2009. What is being analysed within the case study is the instructional design process. The web-enhanced learning opportunities are the embedded units of analysis that are designed and developed (course product) by CDPD.

The case study considered a typical or representative single case, typical of E-learning design and production units in other higher education institutions in terms of the unit of analysis and the scope of the research mentioned earlier in chapter 5.

In this case study, the intervention is the quality management system process for web-enhanced learning, in the sense of a system (see conceptual framework figure 4.5).

The case study follows the QMS approaches phases indicated in section 7.3.1 below.

The methodology of the development of the system approach developed for the WEL QMS in the case study is presented below. The data gathered for the establishment of the management system consists of documentation in the form of notes, agenda and records of CDPD, also the policies, guidelines and CDPD internal records.

### 7.3.1 QMS Detailed Development Steps

#### *7.3.1.1 Stage 1: Kick off*

Team members meetings with top management and consultation groups were held from March to May 2009. The estimated time period to finalize the project of QMS establishment was within 12 months, but due to several limitations such as shortage of time, limited consultation team and busy workloads of team members, the establishment of procedures is limited to three-core process procedures related to instructional design. These procedures were prototype documented exercise stage followed by another stage to complete the rest.

In this sense the course/project action plan was customized to include the three core procedures relating to instructional design process of web-enhanced learning. The responsibilities of the QMS Steering Committee were to:

- Assess the procedure of the AASMT quality management system in relation to intended project work
- write the consultation road map of work and course/project action plan
- identify team members to document each procedure;
- assign target start and completion dates for each team;
- identify training needs for employees and schedule training sessions
- meet on a regular basis to evaluate progress, answer questions and evaluate resource needs;
- review and approve procedures and supporting documentation submitted by the task teams.

The data sources during the steering committee meetings were the agendas, minutes and additional notes which were recorded by hand by the participant fellow. Further details of these and other data sources are mentioned earlier in chapter 5, section 5.6.3.

By the first QMS steering committee meeting, team members decided that the road map and project action plan should be considered the core process for the QMS design of web-enhanced learning. Each element in the action plan was to be documented as a formal procedure, where it is not necessary to design and develop the QMS to complete each procedure, with its inputs and outputs, before doing the next procedure.

In this case, in order to complete the procedures within the project time frame, a quick prototyping approach was used (Hamel et al., 1993). Each procedure was assigned to two nominated persons of the team. A management representative (MR) of the project appointed a team leader to manage the work among team members and submit the prototype documents generated to the MR.  This stage formed the first physical artifact and became one of the components of the QMS, where allocated procedures were documented according to the action plan and road map together with all relevant supporting documents.

***7.3.1.2 Stage 2: Training***

Training workshops were held for assigned lecturers and team members appointed to use the QMS. The workshops focused on the quality assurance theory in terms of improving the business process of WEL. The training courses were; QMS awareness courses and QMS documentation courses. These training courses introduced the primary elements of how to establish documented procedures, flow diagrams and work instructions.

Also sessions were introduced for team members on the ISO19796 and the major principle of this standard and the relation between ISO9001 and ISO19796. These sessions were not easy for either the consultation team or team members as it was the first time for the consultation team to produce a management system designed especially for E-leaning, although consultation teams have been trained before on the standard ISO19796.

***7.3.1.3. Step 3: Development***

The development of a paper prototype of the complete quality management system was the second stage. According to Boling and Frick, 1997 paper prototypes offer three benefits that electronic prototypes do not. First, they are truly hands on" since the designers must physically manipulate the content. Second, because the paper prototype was portable and able to be taken to individual staff quickly and efficiently. Third it feels more comfortable working with paper prototypes.

At the QMS Steering committee meeting, names of procedures were introduced in 23 procedures in parallel with the project road map. This provided a practical and visual representation of the structure of the QMS and made it easier for the participants to realize the value of documenting the procedures. Those procedures already documented by the task team members at that stage were reviewed by the QA consultants and proposed changes were discussed and agreed upon by the steering committee. The QMS steering committee meeting approved the listed procedures so that these could be documented by the team members and be put together to create complete paper-based QMS documentation. The paper-based prototype consisted of a work document process description of each procedure together with all its supporting documents.

As a result of this stage, two artifacts (documents) were provided to team members to assist with procedure writing. A procedure template and a complete procedure, as an example, were introduced.

In the same time, three core procedures were developed. The three procedures are dealing with the analysis, design and development of an instructional design process. The resulting procedures are :( Appendix 6)

1. Development & Approval of New WEL Course/Project (ELCP1)
2. Detailed Development of Approved WEL Course/Project (ELCP2)
3. Design, Prototype Development of WEL (ELCP3)

The team members and consultants documented all the procedures listed in the master documents register list (table 7.2), and in the action plan according to the template. All these procedures form the evidence of the self-evaluation exercise that the team members undertook and documented the decisions made by the team members. The format of each document is as follows:

- purpose
- scope
- definitions
- references
- procedure
- attachments
- records
- header and footer indicating, title, revision no., responsible person, code no. issuing date and total pages number.

**Table 7.2: WEL QMS master document list**

| No. | Procedure Name | Procedure Code | No. | Procedure Name | Procedure Code |
|---|---|---|---|---|---|
| 0 | WEL Quality Manual | WELQM | 12 | Design, Prototype Development of WEL | ELCP3 |
| 1 | WEL Quality Policy | ------------- | 13 | WEL Course Delivery | ELCP4 |
| 2 | Creation & Approval of WEL QMS document | ELIP1 | 14 | Student Assessment in WEL Courses | ELCP5 |
| 3 | Control of WEL QMS Doc. | ELIP2 | 15 | WEL Course/Project Review | ELCP6 |
| 4 | WEL Management Review | ELIP3 | 16 | WEL Course/Project Evaluation | ELCP7 |
| 5 | WEL Internal Audit | ELIP4 | 17 | WEL Content Design Guideline | ELCP8 |
| 6 | Corrective & Preventive Action | ELIP5 | 18 | WEL Screen Design Guideline | ELCP9 |
| 7 | Quality Records | ELIP6 | 19 | WEL Video Design Guideline | ELCP10 |
| 8 | Non-conforming Product/Service | ELIP7 | 20 | WEL Multimedia Design Guideline | ELCP11 |
| 9 | WEL Course Statistical Analysis | ELIP8 | 21 | WEL Technical& Maintenance | ELSP1 |
| 10 | Development & Approval of New WEL Course/Project | ELCP1 | 22 | WEL Staff Training | ELSP2 |
| 11 | Detailed Development of Approved WEL Course/Project | ELCP2 | 23 | WEL Students Training | ELSP3 |

The procedure documentation was not an easy journey, because the ISO19796 guidelines were initially unknown for the consultants, who took more than one month to clarify the ambiguity of the guidelines. Comprehensive meetings and sessions then followed with team members to explain the integration process between the two standards, in order to begin the journey of writing. The result of these meetings and sessions was a table describing integration between procedures, ISO9001 and ISO19796 as shown in table 7.3 with respect to the clauses in both standards.

**Table 7.3: procedures to ISO standards integration with respect to clauses**

| No. | Procedure | Procedure Code | ISO9001 Clauses | ISO19796 Clauses |
|---|---|---|---|---|
| 1 | Development & Approval of New WEL Course/Project | ELCP1 | 5.2, 5.4.1, 5.4.2, 5.5.1, 5.5.3, 6.1, 6.2 | NA.1, NA.2, NA.3, NA.4, FA.1, FA.2, FA.3, FA.5, FA.6 , IM.3 |
| 2 | Detailed Development of Approved WEL Course/Project | ELCP2 | 7.2.1, 7.2.2, ,7.2.3,7.3.1, 7.3.2 | CD.1, CD.2, CD.3, CD.4, CD.5, CD.6, CD.7, CD.8, CD.10, IM.3 |
| 3 | Design, Prototype Development of WEL | ELCP3 | 7.3.3, 7.3.4, 7.3.5 | DP.1, DP.2, DP.3, DP.4, DP.5, IM.1 |
| 4 | WEL Course Delivery | ELCP4 | 7.3.5, 7.3.6, 7.3.7 | LP.1, LP.2, LP.3 |
| 5 | Student Assessment in WEL Courses | ELCP5 | 7.5.2, 8.2.1, 8.5.1 | EO.1, EO.3, |
| 6 | WEL Course/Project Review | ELCP6 | 7.3.4, 7.5.2 | EO1, EO3, EO4 |
| 7 | WEL Course/Project Evaluation | ELCP7 | 8.2.2, 8.2.3, 8.5.1 | EO1, EO3, EO4 |
| 8 | WEL Content Design Guideline | ELCP8 | 5.2, 7.1 | CD.2, CD.3, CD4, DP.1 |
| 9 | WEL Screen Design Guideline | ELCP9 | 5.2, 7.1 | CD.2, CD.3, CD4, DP.2, DP.3, DP.4 |
| 10 | WEL Video Design Guideline | ELCP10 | 5.2, 7.1 | CD.2, CD.3, CD4, DP.2, DP.3, DP.4 |
| 11 | WEL Multimedia Design Guideline | ELCP11 | 5.2, 7.1 | CD.2, CD.3, CD4, DP.2, DP.3, DP.4 |
| 12 | WEL Technical & Maintenance | ELSP1 | 5.2, 7.1 | IM.2 |
| 13 | WEL Staff Training | ELSP2 | 6.2.2 | NA.1, NA.2 ,FA.3, FA4 |
| 14 | WEL Students Training | ELSP3 | 6.2.2 | NA.1, NA.2 ,FA.3, FA4 |
| 15 | Creation & Approval of WEL QMS document | ELIP1 | 4.1, 4.2.3, 4.2.4 | IM.2, IM.4 |
| 16 | Control of WEL QMS Doc. | ELIP2 | 4.1, 4.2.3, 4.2.4 | IM.2, IM.4 |
| 17 | WEL Management Review | ELIP3 | 5.6.1, 5.6.2, 5.6.3 | EO.2, EO.4 |
| 18 | WEL Internal Audit | ELIP4 | 8.2.2 | IM.1, EO.1, EO.4 |
| 19 | Corrective & Preventive Action | ELIP5 | 8.5.2, 8.5.3 | EO.4, |
| 20 | Quality Records | ELIP6 | 4.2.4 | NA,CD, IM,FA,LP, EO |
| 21 | Non-conforming Product/ Service | ELIP7 | 8.3 | NA, FA, CD, DP, IM, LP, EO |
| 22 | WEL Course Statistical Analysis | ELIP8 | 8.2.3 | EO.2,EO.3, |

Table 7.3 indicate the clauses in each ISO standard and how the clauses were mentioned in the procedures in terms of text or/and forms.

The integration of the two ISO procedures took more than 3 month's work. Minutes of meeting were introduced and a project plan was established to appoint certain team members with one consultant to accomplish the intended procedure.

The WEL QMS was divided into three major categories according to the priority of the processes. Thus, there were procedures dealing with the core process of WEL, E-learning Core Procedure (ELCP), other procedures dealing with E-learning support process (ELSP) and, finally, the procedures which deal with the ISO standard 9001 and the ISO 19796 with the abbreviation of ELIP (E-learning ISO Procedure). All these documents will be under review process to be updated when process changes are required and to remain an accurate reflection of instructional design practice in this case study.

Set of compulsory ISO9001 were intended to be established to ensure the minimum requirements of ISO9001 standard as follows:

- quality manual
- quality policy
- documents control procedure
- records control procedure
- corrective and preventive procedure
- non conforming product procedure
- management review procedure

The Quality Assurance team will establish guidelines for lecturers in order to be able to prepare the learning materials. These guidelines include the responsibilities and the roles of all staff involved in the design and the development of the learning materials.

Detailed work instruction of the ISO19796 standard will be established by the team members to lecturers and instructional designers as it was noticed, by the team members, the difficulty of explaining and understanding such standard guidelines.

Different types of supporting documents (manual, policy, procedures, work instructions and guidelines) will illustrate the variety of items which contribute to the initiatives of the quality management system. The benefits of the QMS are focused towards formalizing the documents, agreed upon and stored and maintained, instead of relying on informal and uncontrolled documents located on the computers of the team members.

## 7.4 QMS EVALUATION

### *7.4.1 Evaluation (Focus Group)*

Focus groups interviewers are an increasingly popular, albeit poorly documented, tool in education research. Focus groups were chosen as the method of validating the outcomes of this study, based on work by Morgan(1988), using a group of lecturers and group of students whose academic backgrounds are similar in qualification and educational history and because they ‘generate hypotheses derived from the insights and data from the group’(Morgan 1988, Krueger 1988). The focus group provided opportunities to explore shared beliefs and goals with respect to the QMS. The intention of the following two focus groups was to validate the results derived from the researchers’ proposed prototype QMS to improve the instructional design of WEL at AASTMT. (See chapter 5 section 5.6.4).

Due to the limitations mentioned in section 7.3.1.1, completing the whole QMS by consultancy experts and team members was difficult; as such the teams accomplished two WEL courses and followed the course/project action plan till implementation stage.

### *7.4.2 Lecturers focus group selection*

The first focus group was conducted with selected members of postgraduate lecturers. This group of lecturers was composed of 7 members. The intention of the research was to select the members from different fields of study which would provide a wider opportunity for discussion about the implementation of the proposed QMS.

The group of lecturers was ideally chosen to meet the following criteria:

- different fields of study
- work experience of more than 10 years
- proficiency of English language
- participation in a minimum of 3 taught Moodle courses

Participants of the focus group had the opportunity to read, investigate and evaluate the three prototype procedures for a period of 14 days prior to the focus group meeting.

Each member was asked to individually prepare a list of notes, remarks and pro-positions which will be discussed during the focus group session. The most significant importance of the focus group is that it shows instantaneously the points of the agreement and disagreement of the participants in a group form.

### *7.4.3 Lecturer focus group data collection and data analysis*

Participants interviewed during the focus group session that lasted from 45 to 60 minutes for each procedure, was run and managed in the following manner:

1- Each procedure was briefly explained by the moderator (the researcher).
2- The participants were allowed to have their remarks and notes about each procedure and evaluate its convenience and inclusions of their needs and notes.
3- A list of outcomes about the group's opinion was developed by the moderator to express and validate each procedure.

For each procedure, the focus group moderator recorded and wrote a detailed description of comments as mentioned below made by participants and an analysis of the issues discussed.

| **Issue number1** |
|---|
| Top management did not enforce for the documentation of E-learning |
| **Comments**<br>Three prototype procedures for WEL named: Development & Approval of New E-learning Course/ Project, Detailed Development of Approved WEL Course/Project and Design and Prototype of WEL Course were developed to ensure the establishment and documentation of a QMS for WEL.<br>An attached list showing (**Table 7.2**) the remaining procedures needed for such a QMS will also be established later.<br>The participants of the focus group expressed their satisfaction with such documentation presented in the three prototype procedures, the participants also expressed their willingness to attend a training course designed to teach them how to write down and document a WEL QMS. |
| **Issue number 2** |
| Lecturers are not participating in the design and consultancy of the course material offered by Moodle. |
| **Comments**<br>While documenting the prototype procedures, the researcher included the participation of lecturers in the development of the E-learning courses in two different procedures which are ELCP1 section 5.3 and ELCP2 section 5.1. While reviewing procedure ELCP1 section 5.3 and procedure ELCP2 section 5.1 the participants agreed that their involvement in the development of the E-learning courses was documentally covered. But, this point was very vague to them because they are not familiar with terms used by the researcher in the two procedures which are course developers and course coordinators. As such, the |

participants and the researcher agreed that a clear job description indicating the actual responsibilities and authorities for the members enrolled in the process of designing and establishment of the E-learning QMS should be developed simultaneously with the procedures.

## Issue number 3

No stable course template is used to put the material on.

**Comments**

The researcher developed a format called" course-file summary" which was included in procedure ELCP2, through which all courses will be customized and systemized in a consistent format. Also procedure ELCP3 "Design and Prototype Development of E-learning Courses" covers this main issue by developing a consistent template for all courses with a unity in colouring and text fonts and spacing.

This will be done by the CDPD specialists and developers in order to be sure of the full integration of all courses delivered for both students and lecturers.

The participants expressed their approval for such a format and they revealed that they were familiar with this form, which was basically derived from the traditional course in which they all worked and were used to from their previous experience.

## Issue number 4

Providing specialized and appropriate human resources for the course development

**Comments**

To overcome this issue related to providing specialized human resources for course development, the researcher included a section in the format of " course-file summary", which is part of the procedure ELCP2 indicating that the qualifications, special skills and the number of course developers should be specified for the lecturer, handouts, tutorials, graphics, laboratories, workshop…etc.

The participants had concerns regarding this point. They raised the issue of "what if we don't have the right, enough or specialized staff to carry on and develop this course?" The researcher clarified that a feasibility report, which is part of procedure ELCP1, should be carried out prior to the development of the course. The feasibility report clearly investigated the issues related to academic staff and support staff. Also this feasibility is directly related to the human resources department to ensure that no mistake would occur.

## Issue number 5

Lack of nominated person to make follow up and evaluate the work of the course development.

**Comments**

The researcher developed a format that is concerned with the review of courses and it was included in the procedure ELCP2. This format shows: the reviewers, their responsibilities, the planned date and the actual date of the review of course.

The participants agreed that this format covers their concern regarding the review of courses, yet this designated person to carry this task should have these responsibilities clearly specified in their job specification.

Another issue was raised by the participants related to "who will ensure that the review is done and in due time? The researcher pinpointed that the procedure details "ELCP2" thoroughly covers such a situation and marginalizes the chance of errors occurring. Another one referred to, lecturers often expect an immediate completed web-enhanced learning course, even if they are submitted at extremely short notice. The researcher stated that this would not be accepted in the new form of procedures, where you have to follow a certain service level of agreements distributed along with the procedures starting with approval of the initiation of the course, a then the designing, reviewing, prototyping, realization and finally the product (course).

## **<u>Issue</u> number 6**

Impose the culture of E-learning education in all AASTMT Colleges, Faculties and Institutions.

**Comments**

In a continuously changing world and under such tough and severe competition from other educational institutions, the importance of E-learning and adopting an E-learning strategy and culture becomes very important.

Due to AASTMT's top management awareness of such facts, their commitment to start and initiate an E-learning program in AASTMT was very obvious. This started by a kick –off meeting with members of staff to explain to top management the vision and plans to establish a respected and successful E-learning program.

Likewise department heads were responsible for communicating the essence of their program to their staff and colleagues till everyone is aware of the new program and it is fully operational.

The participants expressed that, although many of them attended the kick-off meeting held with top management, they are still in need of more comprehensive awareness sessions to clearly distinguish between traditional and E-learning mechanisms and skills, techniques and experience required for an E-learning style of education.

## **<u>Issue</u> number 7**

Poor planning of Moodle

**Comments**

To overcome the poor planning issue that was raised related to e-learning, the researcher developed procedures named ELCP1 and ELCP2 in which the whole issue of planning was covered. The procedures covered the following points:

- Process work flow of each department
- Process work flow of the college
- Process work flow of the AASTMT educational committee

After reviewing the above two mentioned procedures, the participants expressed their satisfaction and noted that they are quite familiar with those procedures as they appear to be similar to those used with the traditional learning system. However, one of the participants said that it would be much easier if these procedures translated to flowcharts, because they were facing troubles in reading the traditional learning procedures and it would result in less paper as the present procedures are voluminous.

| **<u>Issue</u> number 8** |
|---|
| Learning objectives sometimes are not mentioned in the course by some lecturers |
| **Comments** |
| The researcher ensured that planning objectives are covered in the two different procedures. First it is covered in the "course-file summary" format in procedure ELCP2 and second in the "course file description" format in procedure ELCP1. In the later format, the general objectives, general goals, course summary, course contents, skills gained and Intended Learning Outcomes (ILO's) are also covered. The participants expressed that the" Program Manager" in the procedures should ideally share with the course coordinator, course developer and the lecturer of the course, the objectives and learning outcomes before documenting them. |
| **<u>Issue</u> number 9** |
| Poor layout of course material screen, the inconsistency of style, the unclear content search and links labels and finally the poor presentation and demonstration |
| **Comments** |
| To cover the issues raised by the lecturers concerning the poor layout of the course material screen, the inconsistency of style, the unclear content search and links labels and finally the poor presentation and demonstration, the researcher developed an E-learning procedure named" Design and Prototype of an E-learning Course" to overcome all above mentioned drawbacks.<br>The participants revealed that currently they are confused with the sequence of the above developed procedure. They suggested that each member mentioned in the procedure (lecturers, graphic designers and developers) should have a separate title and a clear list of required tasks, i.e. the lecturers' guidelines and tasks should be separated from those of the developers and so forth. |

From the above, the 9 issues of lecturer's focus group were discussed. All comments (positive and negative) were solved with respect to quality assurance within the 3 prototype procedures, although satisfaction outcomes from the interviewees in general, still some minor amendments on the procedures could be developed with respect to:

- Job description to indicate responsibilities and authorities of their own work in a separate document.
- Train the involved lecturers in the basics of documenting the WEL procedures.
- Flowchart the procedures for ease of use.

### *7.4.4 Students' focus group selection*

The second focus group was selected from students who primarily were participating in the student questionnaire. Also they were selected based on the speed of their response to the invitation to take part and subsequently on their availability for the meeting.

A total of 28 postgraduate students attended the focus group held in the evening of a normal working day at the P&Q institute. The faculty origins of these students were 12 from P&QI, 7 from faculty of engineering, 9 from faculty of management. The intention of the research was to select the students from different fields of study, which would provide a wider opportunity for discussion about the implementation of the proposed WEL QMS.

### *7.4.5 Student focus group data collection and data analysis*

The researcher prepared a class equipped with video projector, PC and flip chart in order to demonstrate five comprehensive presentations to the selected students.

Students were interviewed during the focus group session that lasted 3 hours in the following manner:

1- The researcher distributed a list of dissatisfaction results from the student questionnaire (disadvantages from closed questions, disadvantages from open questions and students suggestions) with concentration on points being solved with the prototype WEL QMS.
2- The researcher split the presentation into two main topics related to Moodle interface and Moodle material contents as these were of the major issues resulting from the student questionnaire.
3- Each presentation was briefly explained by the researcher before starting.
4- The participants were allowed to have their remarks and notes about each presentation and evaluate its convenience and inclusions of their needs and notes.
5- A list of outcomes on the group opinion was developed by the moderator to express and validate each presentation.

For each presentation the focus group moderator recorded and wrote a detailed description of comments, as mentioned below, made by participants and an analysis of the issues discussed.

**Issue number1**

unfriendly design of Moodle interface component

**Comments**

The researcher started the presentation with the topic of improving the interface design of Moodle based on the specific procedure dealing with such issues of interface design called ELCP3 “Design and Prototype Development of E-learning Course”. The researcher indicated that the solutions start with the Moodle home page interfaces figure 7.6 for Moodle old interface before user login and figure 7.7 user old interface after login as the disadvantages of this interface of the old style were:

1. Student can login using his/her username and password at the main menu section, all study categories accessible (not according to each student)
2. General upcoming events
3. General site news (for all students)
4. Site calendar accessible at the right side
5. All courses displayed at the body of the site categorized according to the courses categories, and only courses enrolled by the student can be accessed, which may lead to conflict specially when there are so many courses like on this website (about 20 courses)
6. The upcoming events menu is still generic
7. Each student has to know exactly what his class is to be able to access it is or he/she will face problems in accessing it.
8. Not user friendly especially with the limited knowledge of students.

In the focus group, students discussed the disadvantages of the Moodle interface and agreed that these were major conflicts for them and one commented: I was really confused every time I use Moodle interface and surprised to see that I wasn’t the only one who was struggling and not understanding how to access my own topics.’ Another student said:” when I asked am I the only confused, 10 other replied to say that I wasn’t the only one... You felt that you were on the same boat.

The researcher then presented the enhanced Moodle user interface figure 7.8 and indicated the enhancements as follows:

1. By login, the home page will contain directly:
    a. Only courses enrolled by the user
    b. Any pending tasks for each user
    c. Only calendar events specific for each user
2. Also the site calendar at the right hand side still exists for other events related to the whole website

One of the students in the focus group discussion mentioned he like the design and said ‘it was very nice and a simple layout’. All participating students were very pleased with what they saw.


Figure 7.6 Old Moodle interface before user login


Figure 7.7 Old Moodle user home interfaces


**Figure 7.8 Enhanced Moodle interface of user home after login**

| **Issue number 2** |
|---|
| unfriendly design of Moodle course interface |

**Comments**

The researcher represented the old course interface figure 7.9 and indicated that the problem of the course interface was due to much information located at the course main page which may appear confusing for some students.

The course page consists of:

- Main body containing weekly course outlines, student shall scroll down to access all weeks inside the course
- Left menu containing:
    - Course participants
    - Course activities
    - Search bar
- Right side containing:
    - Course upcoming events
    - Course news
    - Recent activities of the course

The researcher then presented figure 7.10 the enhanced course main interface and included the advantages that students will gain from the improved course interface design. The advantages were:

1- Neat clean user interface without a lot of detail which may confuse students.

2- The main page body only includes the recent announcements sorted by today, last 7 days, last month and all announcements.

3- Sorted tabs at the left side, indicating main links important on a daily basis for each student as:

a. Announcements

b. Module Information – includes time table and manual on how to use this section

c. Module documents – includes all weeks data organized weekly

d. Course assignments – includes all assignments throughout the semester

e. Discussion Board – the specific area where all students are supposed to post their answers to all assignments and share their thoughts on the course information

f. News Headlines – all news related to the current course

4- Separate menu can be added to include all tools and may be used by the students, including the communication tools with the course tutors.

The students in the focus group stated that they valued the comments on, and the evaluation of work done for the course interface. The group agreed with the consistency among modules. They also commented that they would prefer clarity on what medium was to be the official means of communication between staff and students in the optional communication menu tool. In some modules there was confusion between announcements, e-mails and notice boards, and moreover, this was also inconsistent among modules.

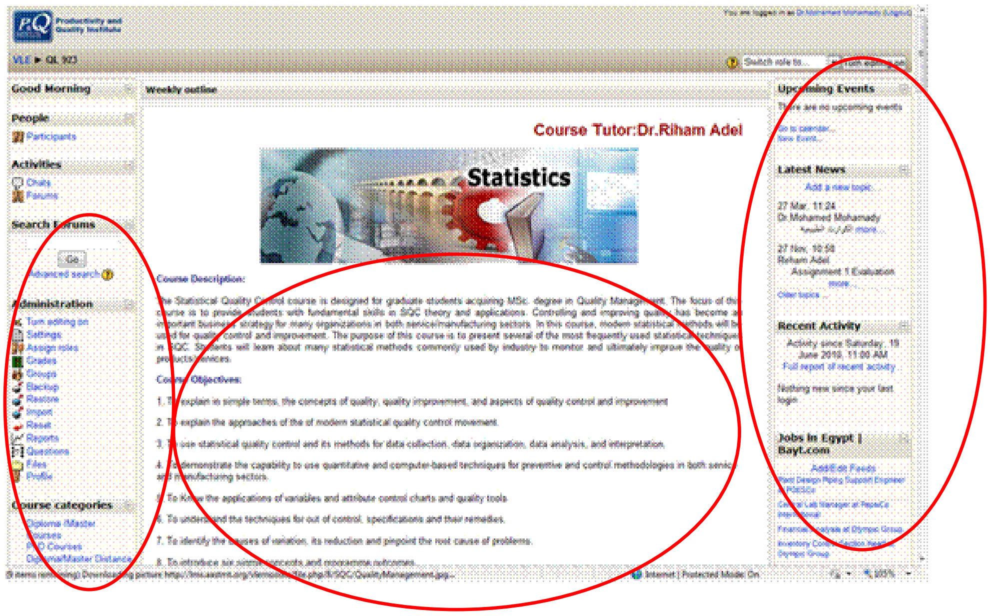



**Figure 7.9 Old Moodle course interface**


**Figure 7.10 Enhanced Moodle course interface**

## Issue number 3

Course module documents are inconsistent and contents are insufficient

**Comments**

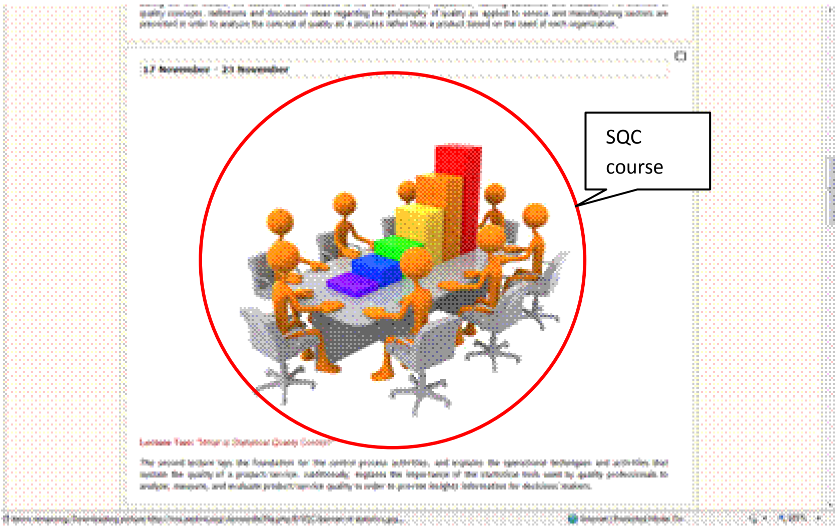
The researcher indicates that for the insufficient material content in the course, two important procedures were established to overcome this problem and these procedures contain a process of instruction for the lecturers, developers and designers to follow before the material contents are uploaded to Moodle. This will ensure that sufficient information and knowledge are delivered to students in the form of material contents. The procedures called "Development & Approval of New E-learning Course/Project" ELCP1 and "Detailed Development of Approved E-learning Course/Project" ELCP2. The researcher concludes that, for the material document view, the problems were:

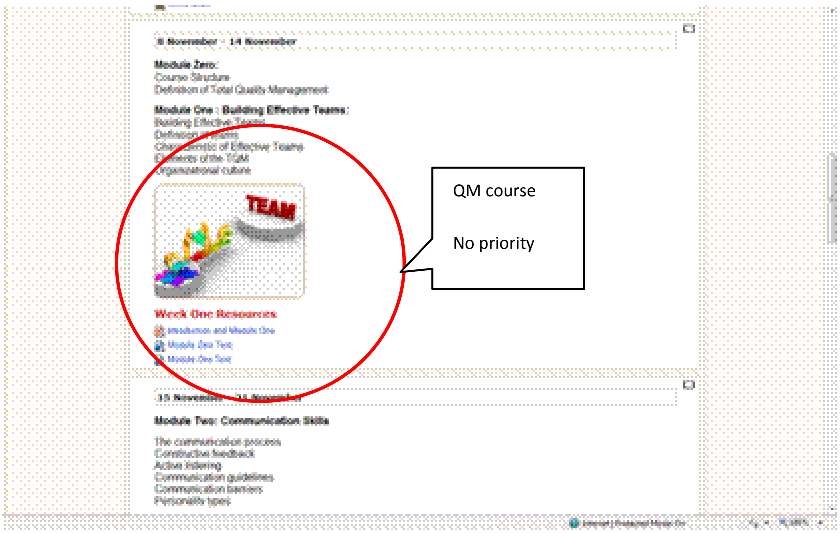
- no unique course data format enforced to be used by the course tutor
- some of the students could not download the attached files, especially if they did not disable the pop-up blocker
- students may by confused about exactly what files they have to study and what is the priority

Figures 7.11, 7.12 and 7.13 represent shots of different material contents of different lecturers. These shots represent examples of the old view of the weekly outlines and types of data files attached to each week as PowerPoint, Word files and PDF. The students in the focus group stated that they wanted to see varied methods of presentations in Moodle – not just text. This was because they felt that more interesting approaches were an aid to learning. The researcher mentioned that the enhanced course material documents still have the opportunity to put whatever extension format the lecturer wishes. At the same time, the researcher represents the new enhanced course material document in figure 7.14. The researcher indicates the advantages of such improvements made on the course contents as follow:

- All the course data listed into one page
- All weeks contain the same kind of data where all files are with same name, even with different extensions.
- A real improvement is the HTML package which can be opened directly online without any need to download it.

The students in the focus group stated that they appreciate the work done for the module document and they felt that some lecturers appeared to need more training on Moodle use, and commented that some seemed to have a fear of the unknown.



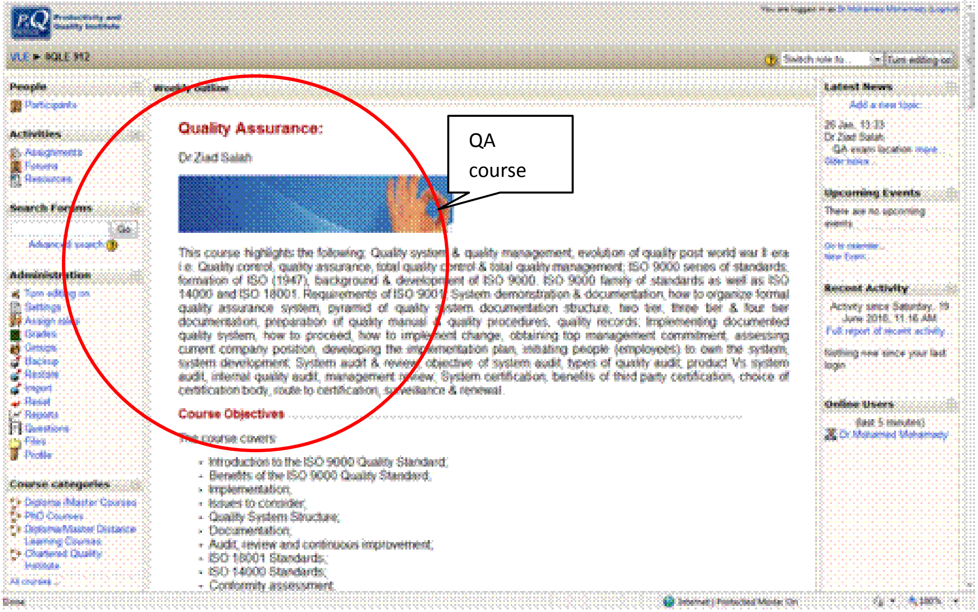



**Figure 7.11, 7.12 and 7.13 respectively different material module document and extensions**

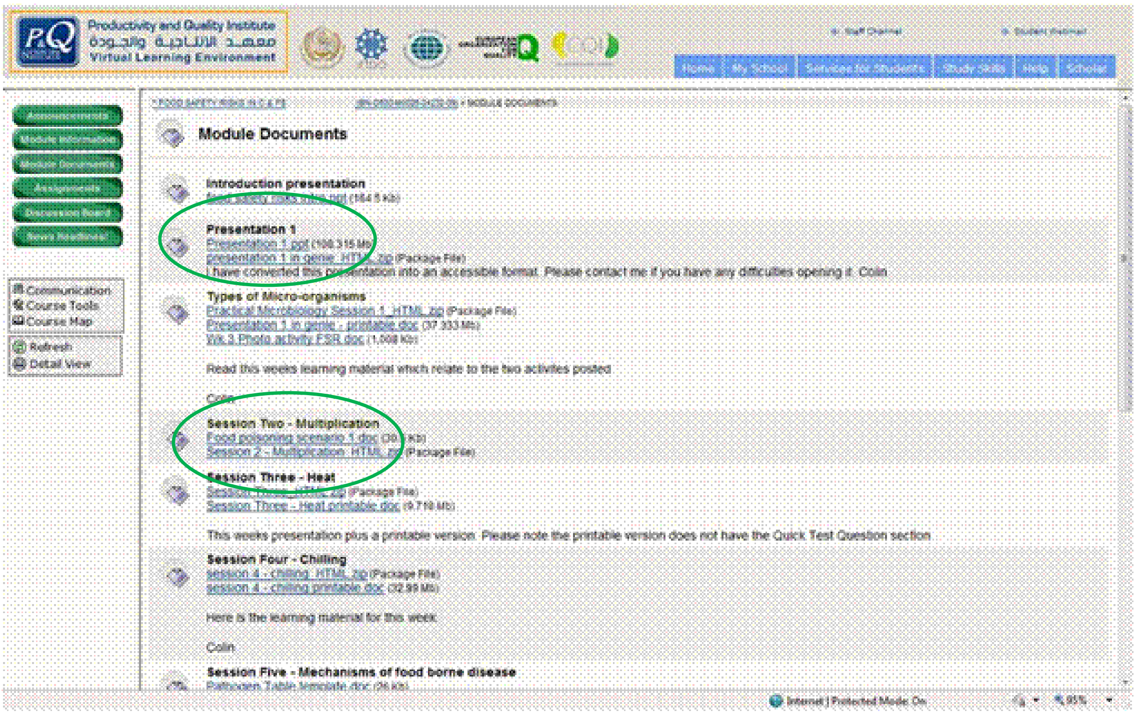



**Figure 7.14 Enhanced course module documents**

## Issue number 4

Poor construction design of presentation course contents

**Comments**

The researcher found that apart from the dissatisfaction mentioned above, students were dissatisfied with the following:

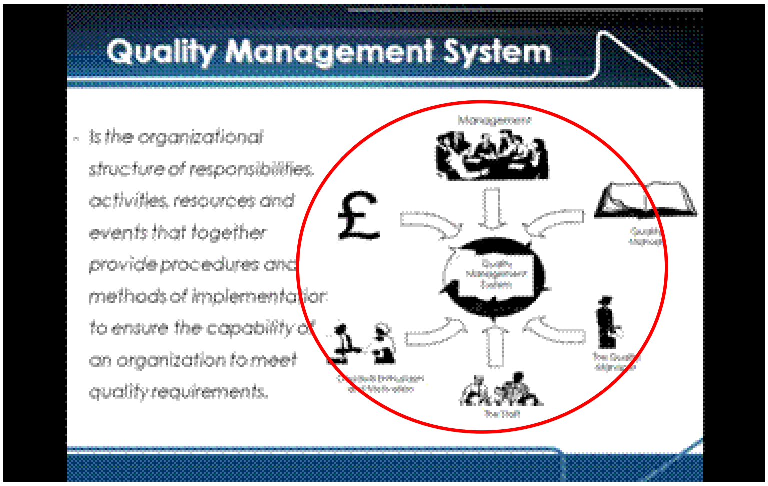
- leaving all course tutors free to create their own style, PPT led to loss of conformity within all data provided to students and increased the variation which led to a decrease in the quality of course material being provided.
- some of the PowerPoint presentations may not appear to be correct on the students' personal computers, due to missing fonts.
- use of colors without control may lead to unclear information when this PPT is printed out in grey scale.

Figure 7.15, 7.16 and 7.17 represent different PPT presentations of different courses. The focus group stated that these issues were important and reflected the importance of unifying the presentation of the course contents. The researcher then presented on screen, figures 7.18, 7.19 and 7.20, which allowed enhancement of the course content presentation.

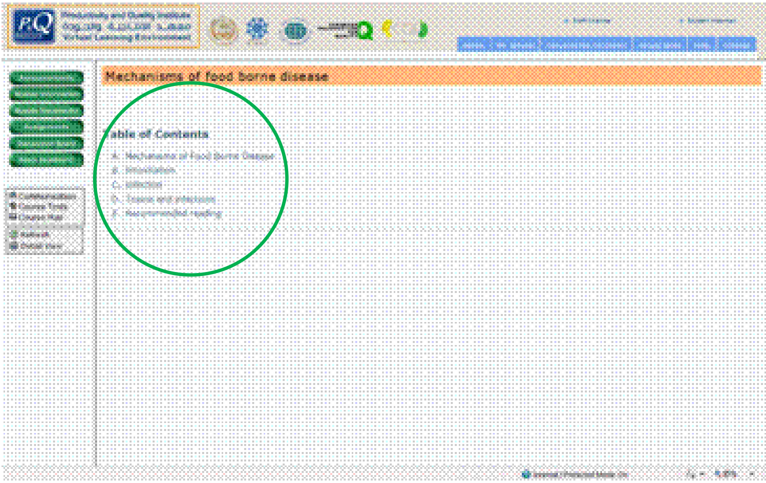
The enhancement was done at this point by ensuring uniformity of the type of data provided to students by using HTML format of the courses which will appear on all PCs to all students correctly and will not need downloaded data and uploads quickly. The enhanced figures are as shown, simple and user friendly, table of contents at the left side increasing the integration of course data, navigation arrows at the right- hand side of each screen, same colours and fonts. Also, students were able to access all relevant data by the left-hand side menu tabs.

One of the students in the focus group suggested that the course presentation could be enhanced by the improvement of some lecturers' proficiency in presentation skills. The researcher indicated that the procedure ELCP3 "Design and Prototype Development of E-learning Course" controls such issues by letting CDPD make the presentation of courses after initial delivery by lecturers.

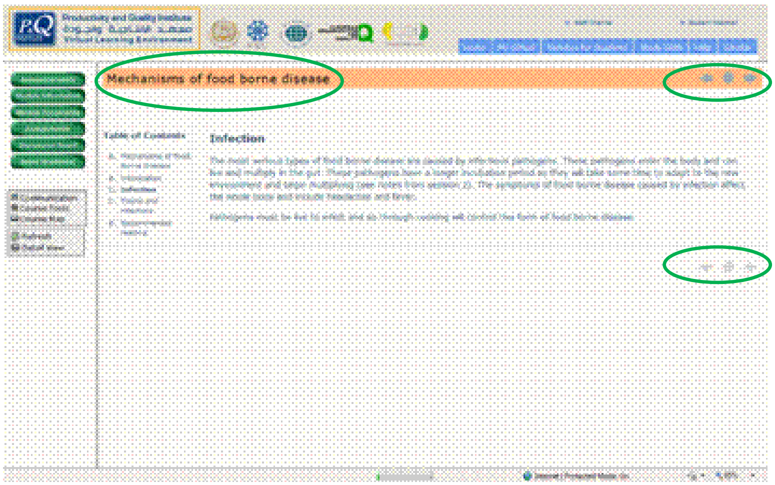





**Figures 7.15, 7.16 and 7.17 represents different PPT presentations of different courses**








**Figures 7.18, 7.19 and 7.20 represent enhanced course PPT presentation**

| **<u>Issue</u> number 5** |
|---|
| Course assignments are not clear |

**Comments**

The researcher shows that some students were not satisfied with the course assignments. Students do not know where to put their assignments and how. Also, they cannot access their colleague's submitted files in order to share more knowledge in the same course, as shown in figure 7.21.

The researcher adds that a new tool was introduced by using the discussion forum in a new way. Also, students can search the discussion forum either by name or date. All assignments appearing in threaded format increase the accessibility of all replies. Total posts, unread posts and total participant numbers give fast information figures around the course data. Figure 7.22 was presented to the students to ensure improvement of the course assignments. The focus group students were adamant that printouts of assignments were necessary, besides the on-line one: they were portable when they could not access the internet from home, and have no time to send it from another site. So they suggest that lecturers should have both types of assignments, i.e. the on-line one and the printed one, and give students the opportunity to choose either method.

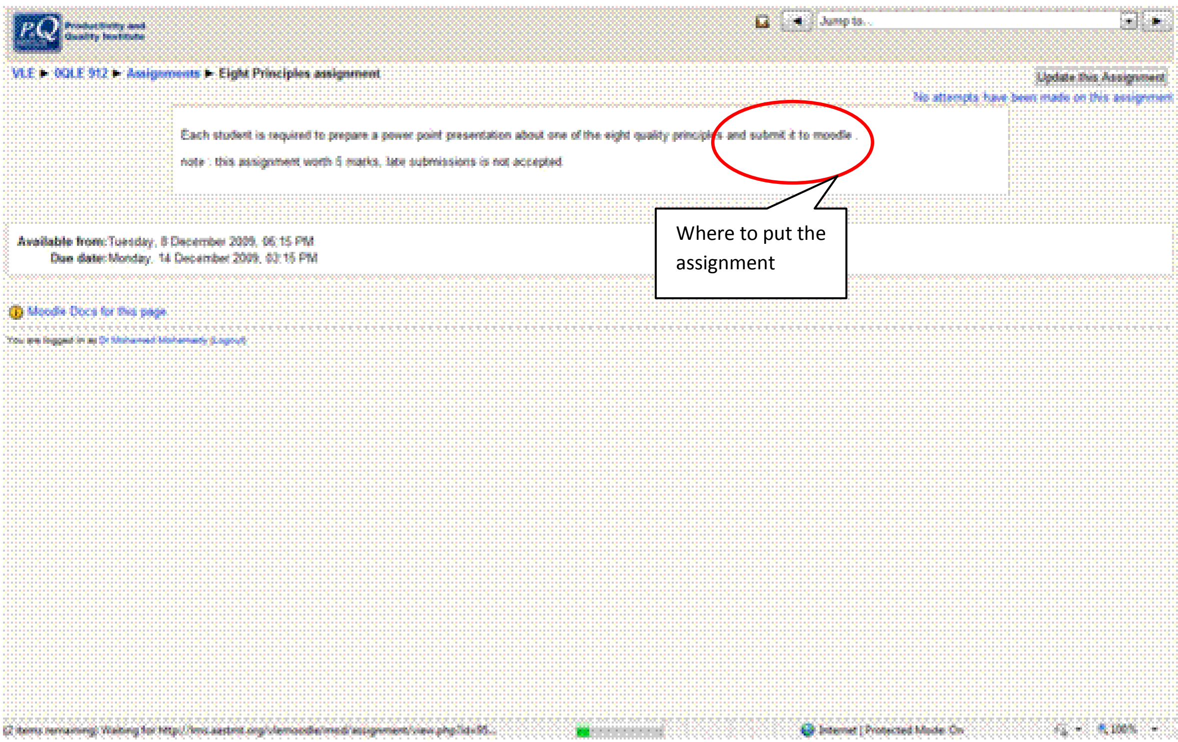



**Figure 7.21 Old course assignments**

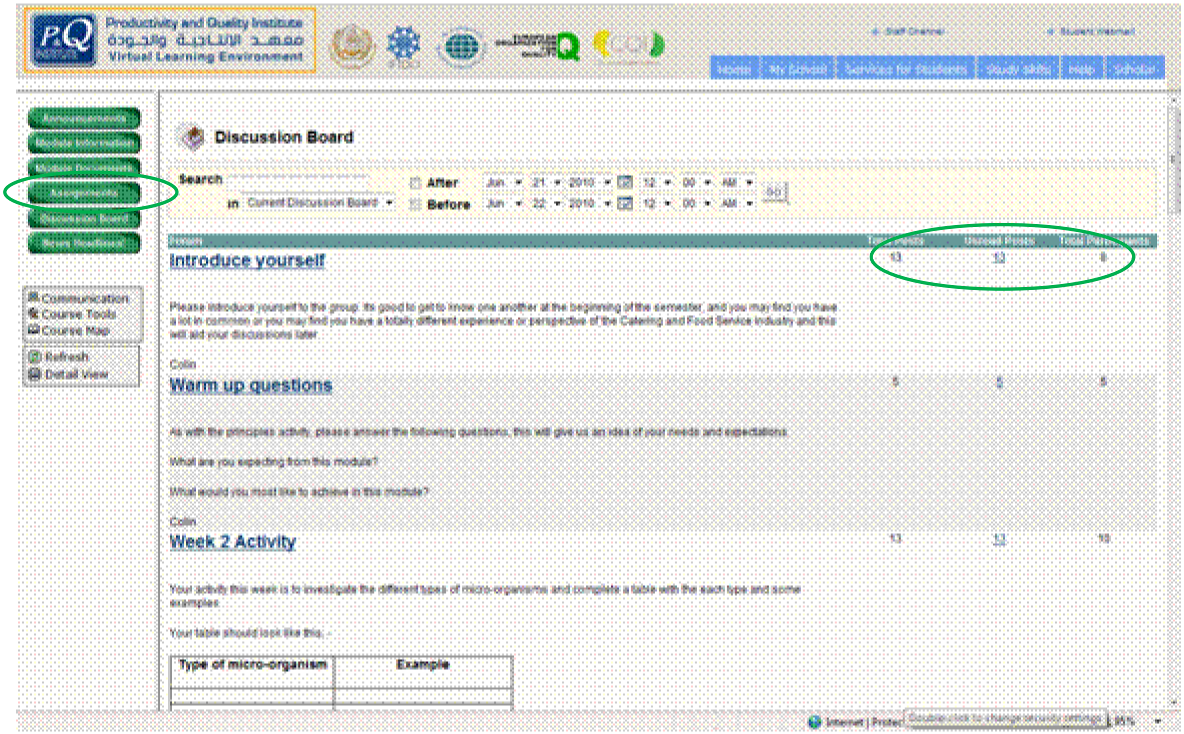



**Figure 7.22 Enhanced course assignments**

From above, it is obvious that the level of satisfactory from student focus group was high. Comments and suggestions' from students were mainly dealing with the way of implementing rather than modification of procedures similar comments came from lecturers stressing the need for lecturers to receive training in using Moodle.

***7.4.6 Focus groups output summary***

Results from the analysis indicate that both participating lecturers and students are satisfied with the prototype establishment of QMS. The lecturers' with the QMS results from the reading of the prototype procedures, as they will be more aware with this type of documentation. While students' satisfaction was with results from the practical presentation slides of the enhancement being applied on the instructional design of Moodle on the screen, accessing the information, assignments and course interface.

Enhancements facilitates by the QMS were identified from lecturers' focus groups;

- formal documentation of the WEL process is a step towards assuring the quality in this type of learning. This is streamlined and standardized as far as possible in such a dynamic and changing environment.
- clear analysis and evaluation processes of learning programs / courses.

- identification of the persons concerned with careful WEL design contents
- unification of WEL courses template
- contents, screen design and links were enhanced

While the suggestions themes revealed from the participating lecturers were towards the following:

- Lecturers need guidelines in order to prepare WEL materials for simplicity and also they need guidance on the responsibilities and authorities of their own in a separate document.
- Train the involved lecturers in the basics of documenting the WEL procedures.
- Lecturers sometimes expect an immediate response from the CDPD to their WEL course; hence they are willing to have a roadmap or action plan summarizing the whole instructional design process in one page instead of reading the whole of procedures ELCP1 and ELCP2.

In the case of student focus group, enhancements facilitates by the QMS were identified:

- ease of navigation in the WEL courses
- clear content
- able to revisit topics inside the user screen
- chat rooms use of group-based activities were a good way of improving skills and knowledge by sharing ideas with peers;
- the use of the diary was considered to be useful as a reminder for homework/assignment hand-in deadlines and could be used for recording all kinds of calendar events;
- the inclusion of a variety of small activities made the WEL much more interesting to use.

While the suggestions revealed from the participating students were as follows:

- Find a way to agree on the communication media with the lecturer from the outset
- Advise training for lecturers on Moodle use
- Give students the opportunity to deliver assignments by both on-line and printing methods.

By comparing the two focus groups, the results indicate that there has been much enhancement and improvement done for the instructional design of WEL course using the QMS procedures. The two groups agreed on the improvements to screens, contents, interface and easier accessibility of the WEL course.

**7.5 CONCLUSION**

Instructional design of web-enhanced learning in higher education is a complex and unstable process due to various interventions such as role players who have various priorities and different levels of commitments. In designing, developing and implementing a formal quality management system for the CDPD at AASTMT, consultation and team-working techniques were used.

Only three out of 23 QMS procedures, that being named by the QMS Steering committee meeting were established due to limited time and the workloads of consultants. In this connection, three- core procedures were established, which address the main concerns and outcomes, from the students’ questionnaire and lectures interviews. Training courses were held for the team members on quality assurance practices, such as an awareness course and a documentation course, also a session for the relationship between ISO9001 and the ISO19796 guidelines. Remarks advised by team members were considered and encouraged in order to enrich the documented prototype QMS procedures. This chapter presented evidence from the focus groups’ output that attempted to know the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning. Thus it answers research question 3 and shows that it is possible to bring quality to WEL.

The result is a formally designed three-core procedures QMS that have various benefits in formalizing and streamlining the processes by documented procedures to be used by the CDPD at AASTMT. By implication, such guidance for improved practice should translate into an improved web-enhanced learning course, although the dynamic aid of all role players means that a system alone cannot guarantee an improved course.

The use of focus groups in the case study provided the researcher with access to groups of individuals who were the role players in the assessment of the prototype QMS. Also focus groups validate the QMS output. Generalization could be considered in this research as the proposed QMS may teach other similar instructional design departments from focus group outcomes and steps to establish and implement a QMS and be able to customize the QMS for their own requirements. Evaluation of the effectiveness of the QMS itself after implementation provides scope for further research. The next chapter will discuss the significance of the research, recommendations and conclusions.

# CHAPTER 8

## FINDINGS AND RECOMMENDATIONS

## 8.1 INTRODUCTION

This chapter reflects the significance of this research and is based mainly on the research findings presented in Chapter 6 and Chapter 7. These findings were arrived at with respect to methodology and through the literature review, questionnaire, interviews, observation and focus groups that were conducted by the researcher. Chapter 8 further seeks to provide possible answers to the research questions and to draw conclusions and recommendations with possible further research investigation. Also, it contributes to the scientific body of knowledge.

The findings made in this research are an effort to provide answers to the following research questions:

- What are the critical success factors for quality web-enhanced learning?
- How could a quality management system be used effectively in the design process of Web–Enhanced Learning?
- What are the factors that promote/hinder the students and lecturers satisfaction of quality management system when applied to web-enhanced learning?

In order to find possible answers to the research questions, the findings of the three research questions are summarized, presented below and related to the conceptual framework chapter 4 figures 4.5.

As for the first question ‘’what are the critical success factors for quality web-enhanced learning?’’ the literature review began by identifying the universal critical factors presented in the international frameworks, best practices and benchmarks for web–enhanced learning (WEL), as a result, seven universal categories for critical success factors were concluded (see chapter 3). The work by Fresen, (2005) was chosen as a suitable base because his taxonomy provides a holistic approach. He categorizes factors from different resources and presents an overall classification. The taxonomy emphasizes the human aspects of enhancing quality, the dynamic nature of the teaching and learning process and the non-negotiable nature of staff and student training, staff and student technical support, and accessibility and reliability of the technology.

Student questionnaires and lecturer interviews were used to test and explore the most critical success factors from Fresen’s taxonomy. A principal component analysis (PCA) of the selected CSFs resulted in eight prioritized categories as follows: (1) web facility ease of use, (2) infrastructure reliability and effectiveness, (3) student perception of LMS effectiveness, (4) student interactive collaboration capabilities, (5) course assessment, (6) course planning and development, (7) instructor attitude and control, (8) sufficient and adequate university-support activities (see chapter 6 section 6.2.3).

The findings for the first research question were presented in chapter 6 in terms of the student feedback questionnaire and lecturer's interviews investigated the level of satisfaction of students taking the web-enhanced learning, as well as that of lecturers making use of the support services offered. The responses from this information collection show clear links between the feedback and the Refined CSF (RCSF). From this it may be assured that the RCSF are fit for purpose/validated.

The resulted CSF confirms to select/define the most important CSF at any point in time since many of these factors are systemically interrelated and interdependent, depending on the learning environment.

Student and lecturer's satisfaction and dissatisfaction factors influence the formulation of the RCSFs which in term form the basis for the quality system procedures which finally provide the core of the WEL QMS instance.

The second research question "How could the quality management system be used effectively with process design of Web–Enhanced Learning?'' the researcher designed a QMS based on the ISO9001/2008 generic standard and ISO19796/2005 guidelines, which is affected by using the eight PCA critical success factors output. The design process explained by the designed conceptual framework and resulted in the following:

- WEL QMS roadmap and action plan (table 7.1).
- Table detailed the integration between procedures; ISO9001 and ISO19796 (table 7.3).
- List of WEL QMS master document includes all documented procedures for assuring the quality of WEL.

This is an application of integrating quality management system standards to the field of WEL explained by the conceptual framework (chapter 4 figures 4.5).Summative evaluation procedures were written for both students and lecturers with WEL courses.

As for the last question “What are the factors that promote/hinder the students and lecturer’s satisfaction of quality management system when applying to web-enhanced learning?’’ The third question is to understand student and lecturer satisfaction in terms of evaluation of web-enhanced courses in the search for continual improvement. The evaluation within the instructional system design using interviews and the evaluation of quality management system using focus groups represent what promote/hinder the client satisfaction. All evaluations are analysed in order to improve the overall QMS implemented for WEL.

The focus groups showed the positive WEL promotion factors in terms of the issues which found positive resonance with the staff and students. Such as:

- formal documentation of the WEL with a document control procedure;
- Lecturers need guidelines in order to prepare learning materials for WEL delivery. They also need guidance on the roles and responsibilities of all role players in the design and development team, including their own.
- clear-need analysis and evaluation processes of learning programs / courses;
- identification of the persons concerned to carefully WEL design contents;
- unification of WEL courses template;
- E-learning lecturers and managers sometimes doubt the need for a formalized quality management system or fail to realize its usefulness.
- advice training of lecturers on WEL system use;
- implement a fundamental instructional design model to serve as the main process in the quality management system.

Thus the findings for the three research questions complement each other and provide a strong platform for quality web-enhanced learning, established from critical success factors, client satisfaction measures and process-based guidance for best practice.

In conclusion, it was clear that there are identifiable factors which promote or hinder successful implementation of a WEL specific QMS system. It must, of course, be clear that these factors are subject to the CSF so that the former are seen as tactical implementation factors while the latter are seen as more strategically oriented.

## 8.2 CONTRIBUTIONS OF THE RESEARCH

The overall contribution from this work is seen as the investigation into and creation of the WEL specific QMS. The associated capture and analysis of the critical success factors (CSF) is a repeatable approach and as such is a contribution. The combination of existing ISO standards upon which to base the WEL QMS procedural instance is also repeatable and a methodological contribution. The evaluation of the QMS validates the approach and indicates that the QMS instance is generic for WEL systems. The Road Map and Action Plan defined in chapter 7 table 7.1 indicates this.

The process of a proposed quality management system approach in this case study and the results in terms of the methods, approach and detailed analysis results artifacts it produced, are contributions to quality assurance practice and criteria that will assist the Egyptian Ministry of Higher Education in evaluating higher education institutions practicing e-learning, with particular reference to web-enhanced learning.

Although this study is based on a case study of the WEL in the CDPD at the AASTMT, various methods and findings are generalized to other E-learning higher institutions. These are:

- The refined critical success factors are a contribution to the theory of quality web-enhanced learning.
- Development of a systematic and repeatable QMS approach for web-enhanced learning that brings together the critical clauses from ISO9001 standard and ISO19796 frameworks.
- The hierarchical QMS concept being flexible so that if any layer (level of abstraction) changes, then the resultant changes at dependent layers are easier to handle than would be the case for a monolithic construct, thus re-enforcing the systemic nature of the resultant QMS. For instant the inclusion of further quality procedures doesn't cause a re-design of the existing ones as each procedure's scope is defined in the contributing general ISO framework; the amendment of CSF with time may cause new procedures to be designed but little effect on existing procedures.
- The questionnaires and interviews for measuring student and lecturer satisfaction and dissatisfaction are practical examples of how measures of client satisfaction may be used to provide quantitative and qualitative information for continuous improvement.

In spite of the debates against quality management, it was found that by taking a pragmatic approach in the interests of continuous improvement, such principles may be modified and successfully applied to a WEL production department. It became clear that client satisfaction needs to be researched and addressed in the interests of service quality.

## 8.3 LIMITATIONS AND SCOPE OF THE RESEARCH

Owing to time constraints, the research included a limited sample drawn from lecturers, consultants, students, and instructional designers in only three out of seven of the Arab Academy for Science, Technology and Maritime Transport (AASTMT) colleges and institutions namely College of Business, College of Engineering and the Productivity and Quality Institute. Borg & Gall (1989) state that selecting a limited problem and treating it well is far better than attempting the study of a broad general problem and doing it poorly. It is hoped that, although being limited, this research will eventually reveal the status of applying quality management systems to Web-Enhanced Learning and make tangible recommendations in an attempt to make a contribution to the existing body of knowledge of quality management systems in E-learning at higher education institutions.

- Some instructional designers did not see themselves as benefiting from the research other than being used for the elevation of the researcher's status in the academic field.
- The research focused mainly on the quality of the components of a learning program and not on the supporting learning material.
- Although the use of Moodle has existed in the course design and production department (CDPD) for several years, there are still some properties in Moodle that have not yet been utilised, as there is currently no need due to education being heavily dependent on face to face the medium of lecturing.

Other areas are outside the scope of this study

- All participants selected for this study had a minimum of two semesters of Web-Enhanced Learning experience.
- Does not measure the quality of academic programs offered in AASTMT, but measures the effectiveness of educational programs that use Moodle.
- Does not examine institutions quality audits nor accountability and self-evaluation, although the research results make strong recommendations to institution self-evaluation.

## 8.4 VALIDITY OF RESEARCH

Three criteria are commonly used to establish the quality of research designs in the social sciences: construct validity, internal validity and external validity.

Construct validity in this study has been demonstrated by the careful analysis of the construct quality and of the element parts of a quality management system, such as processes input, products, and feedback and clients' satisfaction. These constructs were the three knowledge domains: quality, E-learning (WEL) and higher education and presented in chapter 1.

Construct validity in the student questionnaire was enhanced by basing it on validated categories and instruments from the literature. The lecturer interview schedule instrument was developed and part of this research effort was to validate and improve it by piloting it.

As to address the internal validity the study made use of different techniques in sort of a participant researcher, peer examination of data and mechanical means to record, store and retrieve data.

Being a member of the instructional design team at CDPD, I was not noticed as an external researcher. My input and my suggestions in team work was clearly influenced the type and content of the artifacts produced. My contribution cannot be described as causing any distortions or bias, since peer examination of the artifacts occurred when task team members reflected on their practice and reached agreement on the documentation

With respect to the student survey, the data was electronically captured, generated and stored in Excel and SPSS software format. The data existed in two types of format in order to contribute the internal validity where these alternative formats were used to validate frequency counts.

External validity can be considered as equal with generalizability. That is what this case study aims to do: the themes and issues within instructional design practice and the need to merge the theory of quality assurance and web-enhanced learning are international issues experienced by many E-learning practitioners.

The use of focus groups in this study has been shown to be a sound method to validate the prototype QMS, in which the QMS was built from the student questionnaires and lecturers' interview data analysis.

## 8.5 RECOMMENDATIONS AND FUTURE WORK

The following recommendations for the practice of improved web-enhanced learning may be made as a result of this study. These recommendations have emerged from within this case study. Although, it may be implementing by other similar E-learning institutions in higher education, it could vary according to the educational and culture environment.

1. The findings of the student questionnaire and lecturers' interviews suggest that it is necessary for top management administrators to be cognizant of technological and institutional support factors based on lecturers and student perspectives that affect success in WEL courses or programs.
2. Training of students and lecturers on using E-learning such as Moodle is mandatory for the success of WEL. Training should be customized for particular courses delivered to students and has to be followed with feedback sessions from lecturers after implementation. Whereas for lecturers, training is needed for more comprehensive awareness sessions to clearly distinguish between traditional and WEL mechanisms and the skills, techniques and experience required for a WEL style of education
3. To build a robust WEL QMS, all role-players (students, lecturers, designers and top management) shall be involved in the design of the WEL in order to satisfy all clients' requirements, which were applied when designing the WEL QMS. For this, summative evaluation in the form of lecturer and student feedback shall be administered at the end of each year in order to measure the effectiveness of implemented WEL courses and the added value to the learning experience as well as the institution return on investment.
4. ISO 19796-1 is suitable to the E-learning organizational needs for harmonized and standardized processes and supports the implementation or re-design of the WEL quality management system as well as improvement initiatives.

As for future recommendations

5. The QMS should be updated and that re-training and re-associate with the system are required. After that has taken place, the updated QMS should be incorporated into the daily practice of instructional designers and project managers in the e-learning support unit.

6. In this study, the student feedback data was analyzed in detail. An ongoing longitudinal study should investigate the trends in levels of student dissatisfaction and satisfaction. Although the findings will not be replicable due to the self-selecting sample and the fact that the student population shifts each year, trends in the dissatisfaction and satisfaction indices will provide evidence of continuous improvement as well as areas causing concern.
7. Include other Higher Education Institutions in the base line of the study in order to explore more insight focus on the success of implementing QMS with regard to ISO19796 guidelines. Similarly, monitor the output from other communities on WEL in more detail.
8. Complete the whole procedure and documentation in order to get an overall and clear overview of the success of a WEL QMS with a larger sample of students and lecturers over a longer period.

## 8.6 CONCLUSION

This study investigated the application of quality assurance practice to web-enhanced learning in higher education. The rationale presented in chapter 1 motivated this study in terms of six national and international calls, which illustrate the need for research in this field.

The image for this research is the instructional design process of web-enhanced learning, shown in the conceptual framework (Figure 4.5).

The holistic approach in this study applies quality management (Assurance) practice to the field of web-enhanced learning, by integrating the continuous improvement of products, services and processes with respect to web-enhanced learning.

The refined critical success factors for web-enhanced learning courses, underlying the universal success factors, includes web facility ease of use, infrastructure reliability and effectiveness, student perception of LMS effectiveness, student interactive collaboration capabilities, course assessment, course planning and development, instructor attitude and control, and sufficient and adequate university support activities.

Client satisfaction, in terms of student and lecturer experiences, with web-enhanced learning was measured and led to building the WEL QMS system based on ISO9001 and ISO19796 guidelines. This is one possible measure to inform the feedback loop of continuous improvement.

The development of a QMS approach may help higher institutions provide quality learning products which reflect improvements of the learning and teaching process, besides increasing demand to adopt the learning using WEL domain.

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# APPENDICES

# Appendix 1

## Best Practices, Guidelines and Standards

| Papers | | | |
|---|---|---|---|
| Document Title | Author | Critical Success Factors | URL |
| **E-learning Course Design factors** | *Don McIntosh, 2006* | • Target Audience<br>• Objectives<br>• Pre-assessment<br>• Design (Instructional design=learning strategy+ content design+ adaptive)<br>• Motivation<br>• Aesthetics<br>• Navigation<br>• Media<br>• Interactivity<br>• Feedback<br>• Learner Assessment<br>• Tools<br>• Technical Issues Evaluation | http://www.trimeritus.com/design.pdf |
| **Critical factors for effective e-learning,** | *Davoud masoumi, 2006* | • Pedagogical<br>• Technology<br>• Student<br>• Lecturer<br>• Institutional<br>• Interface design<br>• Evaluation | http://www.e-quality-eu.org/pdf/seminar/eQuality_WS3_DMasoumi.pdf |
| **Critical Success Factors and Effective Pedagogy for E-learningin Tertiary Education** | *Background paper for ITP New Zealand* | • organisational infrastructure (McPherson, 2002b);<br>• enabling technology (Currier & Campbell, 2002; Riddy & Fill, 2002);<br>• curriculum development (Brook Hall & Concannon, 2002);<br>• instructional design (Nunes, 2002); and delivery (Coman, 2002; Nunes & Mackey, 2002) | http://www.itpnz.ac.nz/reports/NZCER_Final_Report_Critical_Success_Factors.pdf |
| **What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction** | *Pei-Chen Sun a,*, Ray J. Tsai b, Glenn Finger c, Yueh-Yang Chen d, Dowming Yeh* | • Learner dimension<br>• Instructor dimension<br>• Course dimension<br>• Technology dimension<br>• Design dimension<br>• Environmental dimension | http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VCJ-4MT5532-1-3&_cdi=5956&_user=875629&_orig=search&_coverDate=05%2F31%2F2008&_sk=999499995&view=c&wchp=dGLbVzW-zSkzV&md5=c288ebc7d8ef3f22ef94e051a77a9c9e&ie=/sdarticle.pdf |
| **Critical success factors for E-learning acceptance: Conformatory factor models _** | *Hassan M. Selim* | • Instructor;<br>• Student<br>• information technology<br>• university support | http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VCJ-4HG69JW-2-H&_cdi=5956&_user=875629&_orig=search&_coverDate=09%2F30%2F2007&_sk=999509997&view=c&wchp=dGLbVzW-zSkzV&md5=e3dd378904707c34182f66cce39796e7&ie=/sdarticle.pdf |
| **An activity-theoretical approach to investigate learners' factors toward E-learning systems** | *Shu-Sheng Liaw a,*, Hsiu-Mei Huang b,1, Gwo-Dong Chen c,2* | • Learning models<br>• Instructional structure<br>• Learning meta cognition | http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VDC-4JHMFH2-1-1&_cdi=5979&_user=875629&_orig=search&_coverDate=07%2F31%2F2007&_sk=999769995&view=c&wchp=dGLbVzW-zSkzV&md5=37891f9ffe786c6df11ef06ac075e86f&ie=/sdarticle.pdf |
| **Establishing a Quality Review for Online Courses** | *Tracy Chao, Tami Saj, and Felicity Tessier* | • Institutional support<br>• Course development and instructional design<br>• Teaching and learning<br>• Course structure and resources<br>• Student and faculty support<br>• Evaluation and assessment | http://www.net.educause.edu/ir/library/pdf/EQM0635.pdf |

| Papers | | | |
|---|---|---|---|
| Document Title | Author | Critical Success Factors | URL |
| | | • Use of technology<br>• E-learning products and services | |
| **Frameworks for Research, Design, Benchmarks, Training, and Pedagogy in Web-Based Distance Education** | *Curtis J. Bonk Indiana University cjbonk@indiana.edu Vanessa Dennen San Diego State University* | • Psychological Justification<br>• Participant Interaction<br>• Level of Web Integration<br>• Student and Instructor Roles<br>• Pedagogical Strategies | http://www.corfield.org/articles/frameworks.pdf |
| **Instructional design tips for online instruction** | *Joan Van Duzer* | • Learner Support and Resources<br>• Online Organization and Design<br>• Faculty use of student feedback<br>• Instructional Design and Delivery<br>• Assessment and Evaluation of Student Learning<br>• Appropriate and Effective Use of Technology | www.csuchico.edu/tlp/.../instructionalDesignTips.pdf |
| **Enhancing Quality in Online Learning: Scaffolding Planning and Design Through Proactive Evaluation** | *Rod Sims, Graeme Dobbs & Tim Hand* | • Online content—major components<br>• Online learning design—major components<br>• Online interface design—major components<br>• Interactivity<br>• Assessment<br>• student support<br>• content utility<br>• outcomes | www.informaworld.com/index/L0TTBMC99FFP5DNW.pdf |
| **Introducing a new learning management system: An institutional case study** | *Robyn Benson and Tom Palaskas* | • Training and professional issues<br>• Pedagogical issues<br>• Staff and student support issues<br>• Administrative issues<br>• Technical issues<br>• Communication issues<br>• Overall response | AJET 22(4) Benson and Palaskas (2006) - introducing a new learning management system - case study.htm |
| **Towards greater quality literacy in a eLearning Europe** | *Dr. Ulf-Daniel Ehlers* | • Needs Analysis<br>• Design / Conception<br>• Framework analysis<br>• Design / Conception<br>• Development / Production<br>• Evaluation | http://www.elearningeuropa.info/files/media/media11559.pd |
| **Developing and Delivering E-learning at Cranfield University UK Defence Academy** | *Bernard Scott* | • Need analysis<br>• Specify learning outcomes<br>• Specify content<br>• Specify tutorial strategies<br>• Specify student support systems<br>• Specify assessment procedures<br>• Development<br>• Implementation<br>• Evaluation | www.accessdinghy.org/images/pdf/newsletters/5-2_mar04.pdf |

| Standards, Guidelines and Best Practices | | |
|---|---|---|
| Document Title | Author | URL |
| **Ten Keys to Quality assurance and assessment in online learning** | Alley,2000 | http://www.worldclassstrategies.com/ papers/keys.htm |
| **Implementing the Seven Principles -Technology as lever** | Chickering & Ehrmann (1996) | http://www.aahe.org/technology/ehrmann.htm |
| **Quality guidelines for technology-assisted distance education** | Barker, 1999 | http://futured.com/form/pdf/english.pdf |
| **Quality on the Line. Benchmarks for success in internet-based distance education** | Institute for Higher Education Policy (2000) | http://www.ihep.com/PR17.html |
| **Standards for Quality Online Courses** | Michigan Virtual University | http://standards.mivu.org |
| **Guidelines on the Quality Assurance of Distance Education** | Quality Assurance Agency for Higher Education (QAAHE) | http://qaa.ac.uk/public/dlg/append1.htm |
| **Guide to Best Practice for Electronically Offered Degree and Certificate Programs** | Western Interstate Commission for Higher Education (WICHE) | http://www.wcet.info/Article1.htm |
| **Distance Education - Guidelines for Good Practice** | American Federation of | http://www.aft.org/higher_ed/ |

| Papers | | | |
|---|---|---|---|
| Document Title | Author | Critical Success Factors | URL |
| | | Teachers | technology |
| **Quality Assurance and Distance Learning** | | Council for Higher Education Accreditation (CHEA) | http://www.chea.org/Research/index.cfm#qualityassurance |
| **Canadian Recommended E-learning Guidelines** | | Commonwealth of Learning | http://www.col.org/newsrelease/0206ConsumersGuide.htm |
| **Standards for Online Teaching (SOLT)** | | Curtin University of Technology | http://cea.curtin.edu.au/solt/ |
| | | | Department of Education, South Africa Distance Education |
| **Open and Distance Learning Council** | | Standards for Open and Distance Learning | http://www.odlqc.org.uk/odlqc/standard.htm |

# Appendix 2

## Moodle Student Survey

***Dear Student***
*We are evaluating the quality of the Moodle courses at the AASTMT. Please take 15 minutes of your valuable time to complete this Moodle Experience survey. We need to know if you had technical or access problems and how you experienced online learning in general.*

*Please highlight your selection with red color*

**Part 1: Background Information (BI)**

X1. Gender
- Female
- Male

X2. Age
- 21-24 years
- 25-30 years
- 31-35
- older than 35

X3. Years of using Moodle
- 1year.
- 2 years
- 3 years

X4. Do you have your own PC?
- Yes
- No

X5. Do you use of computer facilities on campus for your University work (e.g. assignments, Moodle), apart from practical computer classes?
- Yes
- No

X6. If yes, what other purpose do you make use of campus computer facilities, besides for practical computer classes? (You may mark more than one option)
- To complete assignments
- To read my email
- To access my Moodle course/s
- To browse the Internet
- Not applicable

X7. In Average how many times per week did you log on to your Moodle course?
- Once per week
- 1 to 4 times per week
- 5 to 10 times per week
- More than 10 times per week

X8. What was the approximate time spent of each online session?
- 1 to 30 minutes
- 31 to 60 minutes
- 1 to 2 hours
- More than 2 hours

**Part 2: Technology Tools (TT)**

| | Strongly dissatisfied | Dissatisfied | Neutral | Satisfied | Strongly satisfied |
|---|---|---|---|---|---|
| X9. Access to campus internet found to be easy | | | | | |
| X10. No problems experienced while browsing. | | | | | |
| X11. Over all the web site was easy to use | | | | | |
| X12. The design of screens was found to be pleasing | | | | | |
| X13. The Moodle information was well presented and | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| structured | | | | | |
| X14. The browsing speed was satisfactory | | | | | |
| X15. I can easily communicate and contact the instructor | | | | | |
| X16. I do practicing using campus computer labs | | | | | |
| X17. I can rely on the computer network | | | | | |
| X18. Overall, the information technology infrastructure is efficient | | | | | |

**Part 3: Personal Relevance (PR)**

| | Strongly dissatisfied | Dissatisfied | Neutral | Satisfied | Strongly satisfied |
|---|---|---|---|---|---|
| X19. The Moodle encourages me to search for more information than the traditional learning | | | | | |
| X20. I enjoy working on personal computers | | | | | |
| X21. I found the instructions on how using the Moodle components to be sufficient clear | | | | | |
| X22. I found the course content to be sufficient and related to the subject | | | | | |
| X23. It was easy to understand the structure arrangement of the Moodle components | | | | | |
| X24. It was easy to pilot through the Moodle course | | | | | |
| X25. The course materials were placed online in appropriate way | | | | | |
| X26. I see moodle components design to be good | | | | | |
| X27. I feel discomfort and/or pressure while using | | | | | |
| X28. This type of learning created a sense of community among students | | | | | |
| X29. I found the opportunities for 'anywhere; anytime' learning convenient. | | | | | |
| X30. I feel web enhanced courses are as effective as face-to-face courses. | | | | | |
| X31. I felt frustrated by the lack of feedback from my teacher | | | | | |
| X32. Although I could not see the teacher and students in the class, I felt their presence, and this makes learning experience impersonal | | | | | |

**Part 4: Learning Interaction (LI)**

| | Strongly dissatisfied | Dissatisfied | Neutral | Satisfied | Strongly satisfied |
|---|---|---|---|---|---|
| X33. Participation in Moodle courses enhancing my learning | | | | | |
| X34. I learn better by construction than absorption | | | | | |
| X35. The course documents – lessons or lecture notes used facilitated my learning | | | | | |
| X36. The assignments and/or projects facilitated my learning | | | | | |
| X37. Preparation for quizzes/exams facilitated my learning | | | | | |
| X38. I learnt from the contributions made by other students. | | | | | |
| X39. Web-Enhanced learning helped me to develop my ability to plan my own work. | | | | | |
| X40. Web-enhanced learning helped me to develop my ability to work as a team/group member. | | | | | |
| X41. I found the web-enhanced course to be an enriching learning experience. | | | | | |
| X42. The learning activities in Moodle courses required application of problem solving skills which facilitated my learning | | | | | |
| X43. The learning activities in Moodle courses required critical thinking which facilitated my learning | | | | | |

**Part 5: Education Support (ES)**

| | Strongly dissatisfied | Dissatisfied | Neutral | Satisfied | Strongly satisfied |
|---|---|---|---|---|---|
| X44. The instructors help and suggestions in the Moodle system was sufficient | | | | | |
| X45. The instructor's style of presentation slides holds me interest | | | | | |
| X46. Students felt welcome in seeking advice/help when needed by instructors | | | | | |
| X47. The instructor handles the Moodle units effectively | | | | | |
| X48. The instructor explains how to use the Moodle components | | | | | |
| X49. The instructor encourages and motivates me to use Moodle | | | | | |

**Part 6: Technical Support (TS)**

| | Strongly dissatisfied | Dissatisfied | Neutral | Satisfied | Strongly satisfied |
|---|---|---|---|---|---|
| X50. I can access the library website and search for materials | | | | | |
| X51. I can get technical support from technicians | | | | | |
| X52. There are enough computers to use and practice | | | | | |
| X53. I can print my assignments and materials easily | | | | | |
| X54. I often face technical difficulties | | | | | |

X55. What are, in your opinion, the most important positive (advantage) points of using the web based courses using Moodle? (Please state only 3 points.)

………………………………………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………………………

X56. What are, in your opinion, the most important negative (disadvantage) points of using the web based courses using Moodle? (Please state only 3 points.)

………………………………………………………………………………………………………………………

………………………………………………………………………………………………………………………

………………………………………………………………………………

X57. What suggestions can you make to improve your web-based courses? Please answer in point form and limit your response to a maximum of 3 points.)

………………………………………………………………………………………………………………………

………………………………………………………………………………………………………………………

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# Appendix 3

## Lecturer Interview

E-learning is defined as learning facilitated on-line through network technologies. Considering lifelong learning has become an imperative, and communications technologies are transforming higher education (Carrison and Anderson, 2003), studying the acceptance of E-learning empirically would lead to an in-depth understanding e-learning, and thus facilitate the adoption of E-learning in the university.

The success of implementing an E-learning system in the university relies on its effective adoption by academic staff to respond to growing demands from students for electronic access and to maintain and improve the quality of learning effectiveness.

Please complete this survey to build an understanding overview of lecturer's involvement and satisfaction with E-learning and the support services at the AASTMT.

| | | | | | |
|---|---|---|---|---|---|
| Department | | | | | |
| Programme | | | | | |
| Name | Date | | | | |
| **Confirmation Effectiveness** | | | | | |
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| My experience with using E-learning component (Moodle) was better than what I expected | | | | | |
| Moodle helps me more in my administrative tasks than what I expected | | | | | |
| I found that the Moodle facilitates my educational work (facilitate learning) | | | | | |
| Over all, most of my expectations from using moodle in enhancing the teaching and learning were confirmed | | | | | |
| What is the **value** you receive from E-learning component? | | | | | |
| **Top Management Support** | | | | | |
| Top management provide resources and leadership for the implementation of the system. | | | | | |
| Top management document and endorse E-learning component in the AASTMT. | | | | | |
| Top management works on building E-learning culture. | | | | | |
| What **suggestion** you offer to top managements? | | | | | |
| **Facilitation Infrastructure** | | | | | |
| AASTMT utilize capacity of IT infrastructure to facilitate the E-learning efforts. | | | | | |
| CDPD department in AASTMT support and facilitate the use of E-learning system. | | | | | |
| What **problems** and **benefits** did you face in facilitation of E-learning component? | | | | | |
| **Training and Education** | | | | | |
| AASTMT provide lecturers with adequate and quality training to facilitate use of E-learning component. | | | | | |
| Training provided in proper times while you presented your module (before-after-during). | | | | | |
| Any **comments** you may add on training? | | | | | |

| | |
|---|---|
| **Community and Empathy** | |
| Peers have influence on my use of an E-learning component. | |
| Encouragement form leaders and supervisors from CDPD have influence on my acceptance and use of E-learning component. | |
| I will adopt the E-learning component for communication with students and knowledge holders. | |
| **Learning Outcome** | |
| The E-learning component enhances the learning outcomes due to subjective instructional design. | |
| The E-learning component provides significant assessment opportunities. | |
| From above indicate in what way? | |

| | |
|---|---|
| **Feedback and Evaluation** | |
| CDPD monitors your usage of the acquiring to enhance the acceptance and use of the E-learning component. | |
| CDPD keep lecturers interests in the acquiring by providing what they want. | |
| What **problems** and **benefits** did you as a lecturer experience in the design and development of this E-learning component? | |

| Quality of CDPD services | Excellent | V.good | Good | Fair | Poor |
|---|---|---|---|---|---|
| Information help and services | | | | | |
| Education material | | | | | |
| Instructional design | | | | | |
| Graphics | | | | | |
| Project management | | | | | |

**Other overall comments**

Lessons learnt from delivering E-learning components in your department:

1-
2-
3-

Comments related to services offered for E-learning component:

1-
2-
3-

# Appendix 4

## SPSS Data Analysis

# Factor Analysis

**Communalities**

| | Initial | Extraction |
|---|---|---|
| VAR00009 | 1.000 | .906 |
| VAR00010 | 1.000 | .873 |
| VAR00011 | 1.000 | .242 |
| VAR00012 | 1.000 | .805 |
| VAR00013 | 1.000 | .180 |
| VAR00014 | 1.000 | .149 |
| VAR00015 | 1.000 | .797 |
| VAR00016 | 1.000 | .323 |
| VAR00017 | 1.000 | .861 |
| VAR00018 | 1.000 | .900 |

Extraction Method: Principal Component Analysis.

**Total Variance Explained**

| | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| Component | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.374 | 33.737 | 33.737 | 3.374 | 33.737 | 33.737 |
| 2 | 2.662 | 26.621 | 60.357 | 2.662 | 26.621 | 60.357 |
| 3 | .972 | 13.116 | 73.474 | | | |
| 4 | .913 | 9.522 | 82.995 | | | |
| 5 | .747 | 7.472 | 90.468 | | | |
| 6 | .571 | 5.709 | 96.177 | | | |
| 7 | .161 | 1.614 | 97.791 | | | |
| 8 | .116 | 1.157 | 98.948 | | | |
| 9 | 5.963E-02 | .596 | 99.545 | | | |
| 10 | 4.555E-02 | .455 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Component Matrix**[a]

| | Component | |
|---|---|---|
| | 1 | 2 |
| VAR00009 | .816 | -.491 |
| VAR00010 | .786 | -.504 |
| VAR00011 | .387 | .304 |
| VAR00012 | .679 | -.586 |
| VAR00013 | .421 | -5.24E-02 |
| VAR00014 | .333 | -.195 |
| VAR00015 | .478 | .754 |
| VAR00016 | .562 | -7.92E-02 |
| VAR00017 | .579 | .725 |
| VAR00018 | .557 | .768 |

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| VAR00019 | 1.000 | .713 |
| VAR00020 | 1.000 | .130 |
| VAR00021 | 1.000 | .710 |
| VAR00022 | 1.000 | .731 |
| VAR00023 | 1.000 | .236 |
| VAR00024 | 1.000 | 8.313E-02 |
| VAR00025 | 1.000 | .223 |
| VAR00026 | 1.000 | .811 |
| VAR00027 | 1.000 | .722 |
| VAR00028 | 1.000 | .177 |
| VAR00029 | 1.000 | .791 |
| VAR00030 | 1.000 | .333 |
| VAR00031 | 1.000 | .754 |
| VAR00032 | 1.000 | .194 |

Extraction Method: Principal Component Analysis.

# Factor Analysis

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 4.260 | 30.432 | 30.432 | 4.260 | 30.432 | 30.432 |
| 2 | 2.349 | 16.779 | 47.211 | 2.349 | 16.779 | 47.211 |
| 3 | .943 | 10.095 | 57.305 | | | |
| 4 | .928 | 8.914 | 66.219 | | | |
| 5 | .914 | 8.171 | 74.390 | | | |
| 6 | .810 | 5.786 | 80.177 | | | |
| 7 | .705 | 5.033 | 85.209 | | | |
| 8 | .678 | 4.842 | 90.052 | | | |
| 9 | .460 | 3.288 | 93.340 | | | |
| 10 | .333 | 2.377 | 95.716 | | | |
| 11 | .221 | 1.576 | 97.293 | | | |
| 12 | .167 | 1.190 | 98.482 | | | |
| 13 | .123 | .880 | 99.363 | | | |
| 14 | 8.923E-02 | .637 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Component Matrix[a]**

| | Component | |
|---|---|---|
| | 1 | 2 |
| VAR00019 | .806 | .251 |
| VAR00020 | .359 | 3.629E-02 |
| VAR00021 | .842 | -4.04E-04 |
| VAR00022 | .853 | 6.794E-02 |
| VAR00023 | .481 | -6.69E-02 |
| VAR00024 | .185 | .221 |
| VAR00025 | .401 | -.249 |
| VAR00026 | .900 | 2.750E-02 |
| VAR00027 | -.314 | .790 |
| VAR00028 | .420 | 9.775E-03 |
| VAR00029 | .190 | .869 |
| VAR00030 | .561 | -.136 |
| VAR00031 | -.145 | .856 |
| VAR00032 | .401 | .183 |

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| VAR00033 | 1.000 | .872 |
| VAR00034 | 1.000 | .780 |
| VAR00035 | 1.000 | .293 |
| VAR00036 | 1.000 | .771 |
| VAR00037 | 1.000 | .629 |
| VAR00038 | 1.000 | 9.234E-02 |
| VAR00039 | 1.000 | .178 |
| VAR00040 | 1.000 | .701 |
| VAR00041 | 1.000 | .296 |
| VAR00042 | 1.000 | .840 |
| VAR00043 | 1.000 | .833 |

Extraction Method: Principal Component Analysis.

# Factor Analysis

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.900 | 35.454 | 35.454 | 3.900 | 35.454 | 35.454 |
| 2 | 2.387 | 21.700 | 57.153 | 2.387 | 21.700 | 57.153 |
| 3 | .982 | 14.022 | 71.175 | | | |
| 4 | .975 | 8.867 | 80.042 | | | |
| 5 | .787 | 7.158 | 87.200 | | | |
| 6 | .510 | 4.634 | 91.834 | | | |
| 7 | .375 | 3.409 | 95.243 | | | |
| 8 | .203 | 1.845 | 97.088 | | | |
| 9 | .170 | 1.542 | 98.630 | | | |
| 10 | 9.139E-02 | .831 | 99.461 | | | |
| 11 | 5.933E-02 | .539 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Component Matrix[a]**

| | Component | |
|---|---|---|
| | 1 | 2 |
| VAR00033 | .917 | -.178 |
| VAR00034 | .831 | -.301 |
| VAR00035 | .534 | 8.576E-02 |
| VAR00036 | .842 | -.285 |
| VAR00037 | .743 | -.277 |
| VAR00038 | .289 | 9.343E-02 |
| VAR00039 | .417 | -6.16E-02 |
| VAR00040 | .238 | .803 |
| VAR00041 | .539 | 8.000E-02 |
| VAR00042 | .394 | .828 |
| VAR00043 | .287 | .866 |

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| VAR00044 | 1.000 | .543 |
| VAR00045 | 1.000 | 5.363E-02 |
| VAR00046 | 1.000 | .562 |
| VAR00047 | 1.000 | .135 |
| VAR00048 | 1.000 | .558 |
| VAR00049 | 1.000 | .701 |

Extraction Method: Principal Component Analysis.

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.553 | 42.552 | 42.552 | 2.553 | 42.552 | 42.552 |
| 2 | .954 | 19.233 | 61.785 | | | |
| 3 | .935 | 15.583 | 77.367 | | | |
| 4 | .579 | 9.647 | 87.015 | | | |
| 5 | .472 | 7.866 | 94.881 | | | |
| 6 | .307 | 5.119 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Component Matrix**[a]

| | Component |
|---|---|
| | 1 |
| VAR00044 | .737 |
| VAR00045 | .232 |
| VAR00046 | .750 |
| VAR00047 | .367 |
| VAR00048 | .747 |
| VAR00049 | .838 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| VAR00050 | 1.000 | .234 |
| VAR00051 | 1.000 | 1.791E-03 |
| VAR00052 | 1.000 | .523 |
| VAR00053 | 1.000 | .500 |
| VAR00054 | 1.000 | .666 |

Extraction Method: Principal Component Analysis.

# Factor Analysis

**Total Variance Explained**

| Component | Initial Eigenvalues Total | Initial Eigenvalues % of Variance | Initial Eigenvalues Cumulative % | Extraction Sums of Squared Loadings Total | Extraction Sums of Squared Loadings % of Variance | Extraction Sums of Squared Loadings Cumulative % |
|---|---|---|---|---|---|---|
| 1 | 1.924 | 38.480 | 38.480 | 1.924 | 38.480 | 38.480 |
| 2 | .966 | 23.919 | 62.399 | | | |
| 3 | .832 | 16.639 | 79.038 | | | |
| 4 | .568 | 11.364 | 90.402 | | | |
| 5 | .480 | 9.598 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Component Matrix[a]**

| | Component 1 |
|---|---|
| VAR00050 | -.483 |
| VAR00051 | -4.23E-02 |
| VAR00052 | .724 |
| VAR00053 | .707 |
| VAR00054 | .816 |

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

# Appendix 5

## Student Open Question Analysis

| cases | X55 Advantages |
|---|---|
| 1 | quickness |
| 2 | easy |
| 3 | Quick uploading speed |
| 4 | uploading assignments |
| 5 | announcing news |
| 6 | direct and rapid access for resources(handouts and assignments) |
| 7 | easy communication |
| 8 | less time |
| 9 | easy to be access |
| 10 | offer enough time to focus on lectures |
| 11 | easy to reach courses by moodle |
| 12 | learn at any time is available |
| 13 | easy to learn |
| 14 | increase computer skills |
| 15 | help in study |
| 16 | assignments |
| 17 | connection with lecturers |
| 18 | make life easier |
| 19 | learn and use any where |
| 20 | make studying easier |
| 21 | get information fast |
| 22 | very helpful |
| 23 | very good idea |
| 24 | short notes |
| 25 | easy to study |
| 26 | available any where |
| 27 | summary for all chapters |
| 28 | important to facilitate the chapter in every exam |
| 29 | learning environment |
| 30 | online information sharing |
| 31 | access to needed documents |
| 32 | easily access any time of day |
| 33 | good reference |
| 34 | 24 access to course material |
| 35 | to be communicated with teachers and doctors |
| 36 | upload my assignments by easy way |
| 37 | easy |
| 38 | interesting |
| 39 | uploading assignments |

| | |
|---|---|
| 40 | downloading notes |
| 41 | connecting Teachers |
| 42 | make it easy to communicate with our doctors |
| 43 | summarizing our subjects in slides |
| 44 | more easier |
| 45 | more comfortable |
| 46 | safe time |
| 47 | finding what I need any time any where |
| 48 | finding what I need easily even if I lost it before |
| 49 | if the lecturers are loaded in high quality this will giving me chance to keep up |
| 50 | contact students with college |
| 51 | require some assignments |
| 52 | uploading assignments and downloading PowerPoint |
| 53 | uploading assignment |
| 54 | staying up to date with assignment |
| 55 | motivate |
| 56 | faster to get section and lectures information |
| 57 | the moodle is a provider for important material |
| 58 | the update and news feed provider |
| 59 | a tool to take quizzes on line |
| 60 | facilitate studying |
| 61 | safe time |
| 62 | more knowledge |
| 63 | easy to get knowledge |
| 64 | more experience |
| 65 | brief content of lectures |
| 66 | contact with lecturers |
| 67 | helping me to study |
| 68 | to send assignments |
| 69 | get notes and PowerPoint |
| 70 | project on line |
| 71 | updates rarely |
| 72 | communication with teachers and students |
| 73 | data any where any time |
| 74 | uploading assignments |
| 75 | access courses |

**X56 Disadvantages**

| | |
|---|---|
| 1 | I don't know where I can study from the original book or from the Moodle |
| 2 | Bad browsing design |
| 3 | system breakdown |
| 4 | network not available some times |
| 5 | slow feedback |
| 6 | unfriendly presentation design |

| | |
|---|---|
| 7 | not always updated |
| 8 | waste time when low or not working |
| 9 | material not sufficient |
| 10 | material objectives unclear |
| 11 | no proper contacts with students |
| 12 | some technical prblems and server down |
| 13 | some lectures are not always added on time |
| 14 | no interaction with students and lecturers |
| 15 | no enough material to study |
| 16 | navigation is very difficult |
| 17 | links are spread and scumbled |
| 18 | Poor material information |
| 19 | it is 80% of time not updated with events like exams |
| 20 | it is confusing |
| 21 | grades not published in time |
| 22 | slow sending access |
| 23 | difficult design |
| 24 | time consuming |
| 25 | system always down |
| 26 | too slow access |
| 27 | not easy to use |
| 28 | boring design |
| 29 | slow access |
| 30 | lack of access support |
| 31 | poor material design and content |
| 32 | slow access |
| 33 | server down |
| 34 | server down |
| 35 | moodle material not updated |
| 36 | registration problems |
| 37 | few information about classes time |
| 38 | lecturers delay responding |
| 39 | hard web browser |
| 40 | no access to internet |
| 41 | bad internet connection |
| 42 | moodle does not include features notes needed |
| 43 | time consuming |
| 44 | Material not always updated |
| 45 | unsafe |
| 46 | slow internet |
| 47 | assignments are not clear |
| 48 | downloading problems |
| 49 | some time it is not enough to study |
| 50 | face to face learning is missing |

51 loss of details
52 less communication with instructors and students
53 difficult to reach moodle on line
54 all courses are not available on line
55 slides design are not satisfying
56 lack of knowledge
57 bad connection
58 unfriendly design
59 no training done
60 availability of computers and printers to access moodle
61 not all lecturers use moodle
62 logon problems
63 network down
64 technical problem solving missing

**X57 Suggestions**

1 teaching sessions training
2 let all instructors use moodle and not some of them
3 provide suitable Hardware
4 the slide should show the contents
5 make sure that all courses are available on line
6 tarining for the best using of moodle
7 make the material easier to use
8 improve the slide presentation
9 always update the course
10 secure the moodle contents
11 more subject information
12 teacher responding
13 send e-mail for any new information posted
14 be more organized
15 increase uploading capacity
16 add information for classes time
17 improve the material
18 update information
19 update the design
20 increase contact between instructors and students
21 improve course content
22 improve network and internet connection
23 upload high quality lectures and sessions
24 extra links to use in projects and assignments
25 fast and update material
26 get grades in time
27 make it easier to use
28 hire a better web designer

| | |
|---|---|
| 29 | make navigation easier |
| 30 | make all buttons and links clear and accessible |
| 31 | constant updates of information |
| 32 | All assignments and quizzes should be done on the moodle |
| 33 | uploading should be improved |
| 34 | make it easier to use |
| 35 | proper contact with studet |
| 36 | improve server capacity |
| 37 | establish an good design for web |
| 38 | make it friendly user |
| 39 | quick feedback from instructors |
| 40 | update the moodle with new information |

# Appendix 6

## Prototype WEL QMS Procedures

# DEVELOPMENT & APPROVAL OF NEW E-LEARNING COURSE/PROJECT

**ELCP 1**

| Doc no. | ELCP1 |
|---|---|
| **Revision** | **1** |
| **Owner** | **Deans** |
| **Approver** | **MR** |
| **Doc. Name** | **Development & Approval of New EL-Course/Project** |

## DOCUMENT APPROVAL / REVISION

| **Rev.** | **Effective Date** | **Approver's** | | |
|---|---|---|---|---|
| **1** | | | **Name/Position** | **Signature** |
| **Summary of Change** | | **1** | | |
| 1) | | **2** | | |
| | | **3** | | |
| | | **4** | | |
| | | **5** | | |
| | | **6** | | |

| **Rev.** | **Effective Date** | **Approver's** | | |
|---|---|---|---|---|
| | | | **Name / Position** | **Signature** |
| **Summary of change** | | **1** | | |
| 1) | | **2** | | |
| | | **3** | | |

**ELIP1/1**

## 1.0 Purpose

1.1 To describe the needs and demand leading to an E-learning educational project and describing relevant factors for the course/project.

1.2 To ensure that new E-learning project/course of study are developed and approved in a consistent manner throughout the Academy.

## 2 Scope

2.1 This procedure applies to all new taught E-learning courses/projects at undergraduate and postgraduate levels.

## 3 Definitions

3.1 Project/course: A stand-alone component of a student degree programme that is taught through a semester.

## 4 Related Documents

4.1 ELCP2 Detailed Development of new E-learning course/project.

4.2 Resolutions of the Supreme Council for Higher Education.

4.3 ISO19796-1/2005 guideline

4.4 Lecturer C.V.

## 5 Procedure

### 5.1 Feasibility Study

5.1.1 Members of staff shall identify the need for new E-learning course of study consistent with the Academy's educational and business strategies.

5.1.2 When a need has been identified the member of staff shall determine the feasibility of the project/course by completing the information required in appendix 7.1. (New E-learning Project/Course Feasibility Report)

5.1.3 The member of staff shall submit the feasibility report to local management (College, Institute, and Center) for review and approval.

5.1.4 If approved, the Dean or Manager shall attach a Letter of Recommendation (Appendix 7.2) to the feasibility report and forward it to Educational Affairs for review and approval.

5.1.5 The Dean or Manager shall forward the letter of Recommendation to the Academic Committee for undergraduate programmes and the Post Graduate Council for post graduate programmes for review & approval.

5.1.6 In reviewing the feasibility report, the Academic Committee/Post Graduate Council shall confirm that:

5.1.6.1 The proposal is consistent with the Academy's academic strategy and framework.

5.1.6.2 The financial and human resource implications are acceptable.

5.1.6.3 The number of students available for recruitment, the marketing strategy and entrance requirements are appropriate and consistent with the Academy's needs.

5.1.7 If necessary the Academic Committee/Post Graduate Council shall return the feasibility report to the Dean or Manager for further information, in which case a new letter of recommendation will be submitted.

5.1.8 The final decision of the Academic Committee/Post Graduate Council shall be communicated to the Dean or Manager of the originating unit and to members of the Executive Council for information by the Chairman completing the Letter of Recommendation.

### 5.2 Summary Description Structure

5.2.1 Approved new E-learning course/project shall be assigned by Deans or Managers to qualified and competent members of staff for the development of a summary description structure. Resolutions of the Supreme Council for Higher Education shall be referenced for this.

5.2.2 The summary description structure shall be developed by completing the information required in Appendix 7.3. (New E-learning Course/Project Summary Structure).

5.2.3 The completed outline structure shall be submitted to local management for review and approval.

5.2.4 When approved the Dean or Manager shall attach a Letter of Approval (Appendix 7.4) to the E-learning course summary structure and forward it to Educational Affairs for review and approval.

5.2.5 In reviewing the Summary Description Structure the Educational Affaires shall ensure that the criteria in Paragraph 5.2.1 continue to be met and that the information supplied in appendix 7.3 is acceptable and meets the Academy's requirements.

5.2.6 If necessary the Educational Affaires shall return the Summary Description Structure to the originating Dean or Manager for clarification or further information.

**5.3 Detailed Development**

5.4 On receipt of approval from the Educational Affaires, new E-learning Course/Project shall be assigned by Deans or Managers to qualified and competent members of staff for detailed development in accordance with ELCP2 (Detailed Development of new E-learning course/project).

5.4.1 In reviewing the Request for Approval the Academic Committee/Post Graduate Council shall ensure that :

a. The content of the new E-learning Course/Project is consistent with the requirements identified in the feasibility report.

b. The new programme continues to meet the criteria referenced in paragraph 5.2.1.

5.4.2 If necessary the Academic Committee/Post Graduate Council shall return the package to the originating unit for clarification, additional information or modification.

5.4.3 When a new E-learning Course/Project has been approved by the Academic Committee/Post Graduate Council the Chairman shall sign the Request for Approval and return it to the Dean or Manager of the originating unit. Who shall send a copy to :

- The Executive Council for information.
- The information Centre for updating Registration Database.
- The admission & Registration Deanery for making necessary preparation for registration.

In addition the Information Centre and the Deanery of Admission & Registration shall be sent a copy of the Summary Description

Structure ELCP 1/3 and the Course Summary Descriptions from ELCP 2/2.

## 6.0 Quality Records

| Title | Form # | Kept by | Where | Time |
|---|---|---|---|---|
| Feasibility Report | ELCP1/1 | Programme Manager | Local | 5 Years |
| Letter of Recommendation | ELCP1/2 | Programme Manager | Local | 5 Years |
| Summary Description Structure | ELCP1/3 | Programme Manager | Local | Till next issue |
| Letter of Approval of Outline Structure | ELCP1/4 | Programme Manager | Local | Till next issue |

## 7.0 Appendices

| Title | Form # |
|---|---|
| 7.1 Feasibility Report | ELCP1/1 |
| 7.2 Letter of Recommendation | ELCP1/2 |
| 7.3 Outline Structure | ELCP1/3 |
| 7.4 Letter of Approval of Outline Structure | ELCP1/4 |

# NEW PROGRAMME FEASIBILITY REPORT

## General Information

| | | | |
|---|---|---|---|
| Designation of Originator | | Name of Originator | |
| Programme Title | | Course/Project | |
| Anticipated Start Date | | Type of Degree | |
| Mode of Study | | | |

## Marketing and Recruitment

| |
|---|
| Entry Qualifications Required : |

| **Anticipated Student Numbers** | Minimum | Maximum |
|---|---|---|
| First Intake Target | | |
| Annual Intake Target | | |

| |
|---|
| Marketing Strategy (Please describe any market surveys undertaken and highlight the target groups for recruitment activities) : |

**The following are paragraph headings; please expand each section as necessary**

- Fee per student
- Any implications for existing courses
- Additional academic staff
- Additional support staff
- Usage of Library
- Usage of computer facilities
- Additional space required
    1. Teaching space (consider maximum class size)
    2. Other
- Equipment requirements
- Any start-up costs? (advertising, promoting, equipment etc)
- Additional running costs
- Any impact on other Colleges/ Institutes/ Centres?
- Any impact on other Academy Units
- Possible External Funding Sources

## Financial Data

| | Year | | | | |
| --- | --- | --- | --- | --- | --- |
| | 1 | 2 | 3 | 4 | 5 |
| Fee Income | | | | | |
| Funding | | | | | |
| Academic Staff (Costs) | | | | | |
| Support Staff (Costs) | | | | | |
| Running Costs | | | | | |
| Start Up Costs (year 1 only) | | | | | |
| **Profit** | | | | | |

**Justification if no Profit**

| | | | |
| --- | --- | --- | --- |
| Originator | Name | Approved by : | Name |
| | Sign | | Sign |
| | Date | | Date |

**LETTER OF RECOMMENDATION FOR NEW E-LEARNINGCOURSE/PROJECT**

## General Information

| | | | |
|---|---|---|---|
| Designation of Originator | | Name of Originator | |
| Programme Title | | Course/Project Title | |
| Anticipated Start Date | | Type of Degree | |
| Mode of Study | | | |

**The attached feasibility report is submitted for consideration by the Academic Committee/Postgraduate Council.**

| **Educational Affairs/Postgraduate** | **Dean / Manager Council** |
|---|---|
| Name | Name |
| Sign | Sign |
| Date | Date |

**Committee Decision:**

---------------------------------------------------------------------------------------------------------------------------

---------------------------------------------------------------------------------------------------------------------------

---------------------------------------------------------------------------------------------------------------------------

Name

Sign

Date

**ELCP 1/2** **App.7.2**

**COURSES SUMMARY DESCRIPTIONS**

## General Information

| | | | |
|---|---|---|---|
| Designation of Originator | | Name of Originator | |
| Programme Title | | Course/Project Title | |
| Anticipated Start Date | | Type of Degree | |
| Mode of Study | | | |

**Originator** Name **Approved by :** Name

Sign Sign

Date Date

**COURSES SUMMARY DESCRIPTIONS**

| **Course Code** | **Course Title** |
|---|---|
| | |
| **General Objectives** | |
| **General Goals** | |
| **Course Summary** | |
| **Skills Gained** | |
| **Course Contents**<br>1-<br>2-<br>3-<br>4-<br>5-<br>6-<br>7-<br>8- | 9-<br>10-<br>11-<br>12-<br>13-<br>14-<br>15-<br>16- |

**ELCP 1/3** **App.7.3**

## LETTER OF APPROVAL OF

## COURSE SUMMARY DISCRIPTION FOR NEW E-LEARNINGCOURSE/PROJECT

### General Information

| | | | |
|---|---|---|---|
| Designation of Originator | | Name of Originator | |
| Programme Title | | Course/Project Name | |
| Anticipated Start Date | | Type of Degree | |
| Mode of Study | | | |

The attached Summary Description Structure is submitted for consideration by the Academic Committee/Postgraduate Council

**Educational Affairs/Postgraduate Council** **Dean / Manager**

| | |
|---|---|
| Name | Name |
| Sign | Sign |
| Date | Date |

**ELCP 1/4** **App.7.4**

# DETAILED DEVELOPMENT OF APPROVED E-LEARNING COURSE/ PROJECT

**ELCP 2**

| Doc no. | ELCP 2 |
| --- | --- |
| **Revision** | **1** |
| **Owner** | **Deans** |
| **Approver** | **MR** |
| **Doc. Name** | **Detailed Development of Approved E-Learning Course/Project** |

## DOCUMENT APPROVAL / REVISION

| Rev. | Effective Date | Approver's | | |
|---|---|---|---|---|
| | | | Name/Position | Signature |
| Summary of Change | | 1 | | |
| 1) | | | | |
| | | 2 | | |
| | | 3 | | |
| | | 4 | | |
| | | 5 | | |
| | | 6 | | |

| Rev. | Effective Date | Approver's | | |
|---|---|---|---|---|
| | | | Name / Position | Signature |
| Summary of change | | 1 | | |
| | | 2 | | |
| | | 3 | | |

**ELIP 1/1**

| Doc no. | ELCP 2 |
|---|---|
| **Revision** | **1** |
| **Doc. Name** | **Detailed Development of Approved E-Learning Course/ Project** |

## 1.0 Purpose

1.1 To ensure that approved E–learning course / project is developed in accordance with the specified requirements.

## 2.0 Scope

2.1 This procedure applies to all new E-learning courses / projects developed as part of programmes of study at undergraduate and post graduate levels.

## 3.0 Definitions

3.1 Course Developer: A member of staff who is assigned the Detailed Development of an approved New E-learning Course/Project.

3.2 Course Development and Production Department (CDPD): members are responsible for reviewing the developed E-learning course before it is submission.

## 4.0 Related Documents

4.1 ELCP 1 Development & Approval of new E-learning Course/Project.

4.2 Resolutions of Supreme Council for Higher Education.

4.3 ISO 19796-1 Guideline

4.4 ELIP 2 Document Control

## 5.0 Procedure

### 5.1 Development & Approval

5.1.1 The Programme Manager shall allocate new E-learning courses from the Detailed Development Plan to qualified and competent members of staff (Course Developers).

5.1.2 Course Developers shall review the approved E-learning course/ project summary description information. Reference will be made to Resolutions of Supreme Council for Higher Education and other Accreditation standards as required.

5.1.3 Course Developers shall prepare an E-learning Course Development Plan in accordance with Appendix 7.1.

5.1.4 Course Developers shall prepare new E-learning course materials and construct a E-learning Course File Summary in accordance with App. 7.2.

5.1.5 Course Developers shall conduct periodic progress reviews with instructional designers and other interest parties as the development work progresses. A summary report shall be issued after each review.

5.1.6 Course Developers shall participate in periodic reviews with the Programme Manager as defined in the E-learning Detailed Development Plan.

5.1.7 Course Developers shall submit the completed E-learning Course File Summary to local management (College, Institute, Centre, and CDPD) for review and approval.

5.1.8 Course Developers shall submit the approved E-learning Course File Summary to the Programme Manager who shall distribute it in accordance with document control procedure ELIP2.

5.1.9 Programme Manager shall send a copy of all course file summaries to the library to be available for student to read.

**5.2 Amendment of Approved E-learning Courses**

5.2.1 Amendments to approved E –learning Courses are initiated by completing Appendix 7.3 E-learning Course Amendment Request and submitting it to the Programme Manager and CDPD Manager.

5.2.2 The Programme and CDPD managers’ decision shall be recorded on the Amendment Request and returned to the requestor.

5.2.3 The Programme and CDPD managers’ shall assign approved the Amendment Request to qualified and competent members of staff for detailed development of the change.

5.2.4 Assigned members of staff shall develop the changes and modify the E-learning course file as appropriate.

5.2.5 The member of the staff shall submit the modified E-learning Course File Summary to the Programme Manager and CDPD manager for review & approval.

5.2.6 The Programme Manager shall distribute modified the Course File Summary in accordance with document control procedure ELIP2.

## 6.0 Quality Records

| TITLE | Form # | Kept by | Where | Time |
|---|---|---|---|---|
| E-learning Course Development Plan | ELCP 2/1 | Course Coordinator | Local | 5 Years |
| E-learning Course File Summary | ELCP 2/2 | Course Coordinator | Local | Till next issue |
| E-learning Course Amendment Request | ELCP 2/3 | Course Coordinator | Local | 5 Years |

## 7.0 Appendices

| Title | Form # |
|---|---|
| 7.1 E-learning Course Development Plan | ELCP 2/1 |
| 7.2 E-learning Course File Summary | ELCP 2/2 |
| 7.3 E-learning Course Amendment Request | ELCP 2/3 |

| | |
|---|---|
| Doc no. | ELCP 2 |
| **Revision** | 1 |
| **Doc. Name** | **Detailed Development of Approved E-Learning Course/ Project** |

## E-LEARNINGCOURSE DEVELOPMENT PLAN

### General information

| | | | |
|---|---|---|---|
| Course Title | | Course Code | |
| Course Developer | | Position | |

### Assigned Personnel

| Name | Position | Start Date | End Date | Sign |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

### Technical Interfaces

| Function Name | Contact Person |
|---|---|
| | |
| | |
| | |
| | |

**Created by** **Approved by**

Name Name

Position Position

Date Date

# E-LEARNINGCOURSE DEVELOPMENT PLAN

| Activity | Assigned to | Start | Finish | Reviewed by | Date |
|---|---|---|---|---|---|
| Course File Summary | | | | | |
| Transparencies | | | | | |
| **Slides** | | | | | |
| Video Tapes * | | | | | |
| **Software** | | | | | |
| Session Plans * | | | | | |
| Exam Criteria | | | | | |
| Attendance Register | | | | | |
| Question Bank | | | | | |
| Continuous Assessment Criteria ** | | | | | |
| Hand - outs | | | | | |
| Text Books (for lecturer) | | | | | |
| Practical/ work documentation ** | | | | | |
| Thesis Exam Criteria ** | | | | | |
| Term Exam criteria | | | | | |
| Other (Please Specify) | | | | | |
| | | | | | |

* If applicable

** If required by E-learning course file summary

## PLAN FOR E-LEARNINGCOURSE DEVELOPMENT REVIEWS

| Reviews | Responsibility | Planned Date | Actual Date |
|---|---|---|---|
| | | | |
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| Doc no. | ELCP 2 |
|---|---|
| **Revision** | **1** |
| **Doc. Name** | **Detailed Development of Approved E-Learning Course/ Project** |

# E-LEARNINGCOURSE FILE SUMMARY

| **Course Information** | | | |
|---|---|---|---|
| College / Institute / Centre | | Department | |
| Programme Title | | Programme Code | |
| Course Title | | Course Code | |

**# Hours** ---------------------- ----------------------- -------------------------

| | Lecture | Lab / Tutorial | Credit |
|---|---|---|---|

**Pre Requisites :**

| **Course Aim** |
|---|
| |

| **Course Objectives** |
|---|
| |

| **Staff Requirements** | | | |
|---|---|---|---|
| | | | |
| | **Qualifications** | **Special Skills** | **Number** |
| Lectures | | | |
| | | | |
| Tutorials | | | |
| | | | |
| Laboratories / Workshops | | | |
| | | | |

**Lecture Schedule**

| Lecture | | | Description |
|---|---|---|---|
| # | Week | Hrs | |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |
| … | …… | … | …………………………………………………………………………… |

**Text Books**

| Code* | Description |
|---|---|
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |

**Reference Books**

| Code* | Description |
|---|---|
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |
| …… | …………………………………………………………………………………… |

**Tutorial Schedule**

| Tutorial | | | Topic |
|---|---|---|---|
| # | Week | Hrs | |
| … | …… | … | ……………………………………………………………………………… … |
| … | …… | … | ……………………………………………………………………………… … |
| … | …… | … | ……………………………………………………………………………… … |

| **Laboratory Workshop Schedule (If applicable)** | | | | |
|---|---|---|---|---|
| Laboratory | | | | Description |
| # | Week | Hrs. | Code | |
| … | …… | …… | …… | …………………………………………………………………… |
| … | …… | …… | …… | …………………………………………………………………… |
| … | …… | …… | …… | …………………………………………………………………… |
| … | …… | …… | …… | …………………………………………………………………… |
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**Moodle Tool Kit Usage**

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**Grading and Assessment Method**

| Week # | Points | Written | Oral | Term Paper | Continuous | Thesis | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 30 | | | | | | | | | |
| 12 | 20 | | | | | | | | | |
| 1-15 | 10 | | | | | | | | | |
| 16 | 40 | | | | | | | | | |

**Prepared by** :

Designation

Name

Sign

Date

**Approved by :**

Designation

Name

Sign

Date

## Reading Material

| Code* | Description |
|---|---|
| ……… | ………………………………………………………………………………… |
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* TB : Text Book  RB: Reference Book  ST: Standards / Codes

LN: Lecture Notes  EB: E-Book

## Supplementary Material

| Code* | Description |
|---|---|
| ……… | ………………………………………………………………………………… |
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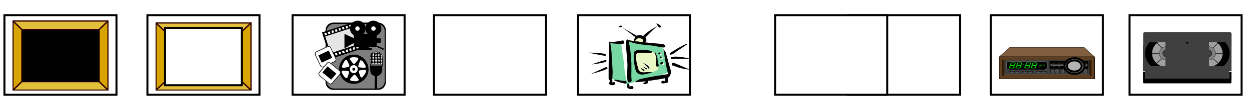
*PR: Periodical  SW: Software  VT: Video Tape  MD: Model  AC: Audio Cassette

## Educational Resources



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# APPROVED E-LEARNINGCOURSE

# AMENDMENT REQUEST / APPROVAL

## General Information

| Designation of Originator | | Name of Originator | |
|---|---|---|---|
| Programme Title | | Course Title | |
| Programme Code | | Course Code | |

## Details of Change

| Nature | Reason | Implementation Date |
|---|---|---|
| | | |

**Originator**

Name

Sign

Date

**Dean / Manager Approval**

Name

Sign

Date

**Educational Affairs/Postgraduate**

**Council Approval**

Name

Sign

Date

**Approval of Amended Programme / course**

**Submitted**

Name

Sign

Date

**CDPD Approval**

Name

Sign

Date

**ELCP2/3** **App. 7.3**

# DESIGN & PROTOTYPE DEVELOPMENT OF E-LEARNING COURSE/ PROJECT

**ELCP 3**

| Doc no. | ELCP 3 |
|---|---|
| **Revision** | **1** |
| **Owner** | **Deans-CDPD** |
| **Approver** | **MR** |
| **Doc. Name** | **Design &Prototype Development of E-learning Course** |

| | |
|---|---|
| **Revision** | **1** |
| **Doc. Name** | **Design & Prototype Development of E-learning Course** |

## DOCUMENT APPROVAL / REVISION

| **Rev.** | **Effective Date** | **Approver's** | | |
|---|---|---|---|---|
| | | | **Name/Position** | **Signature** |
| **Summary of Change** | | **1** | | |
| 2) | | | | |
| | | **2** | | |
| | | **3** | | |
| | | **4** | | |
| | | **5** | | |
| | | **6** | | |

| **Rev.** | **Effective Date** | **Approver's** | | |
|---|---|---|---|---|
| | | | **Name / Position** | **Signature** |
| **Summary of change** | | **1** | | |
| | | **2** | | |
| | | **3** | | |

**ELIP 1/1**

| Revision | 1 |
|---|---|
| Doc. Name | Design & Prototype Development of E-learning Course |

## 1.0 Purpose

1.1 To ensure that the design of any product will add educational value to the learning experience

1.2 To ensure the accurate selection of programming approach.

## 2.0 Scope

2.1 This procedure applies to all E-learning courses / projects developed as part of programmes of study at undergraduate and post graduate levels.

## 3.0 Definitions

3.1 Prototype: developed to demonstrate the educational value of the E-learning course and the functionality layout, navigation and structure of the final product before release.

3.2 Course Developer: A member of staff who is assigned the Detailed Development of an approved New E-learning Course/Project.

3.3 Instructional Designer: A person who is responsible for overseeing the implementation of instructional design techniques, usually in an academic setting or in corporate training.

3.4 Education Consultant: is an independent consultant who helps instructional designers and lecturers with educational planning.

## 4.0 Related Documents

4.1 ELCP 1 Development & Approval of new E-learning Course/Project.

4.2 ELCP2 Detailed Development of Approved E-learning Course/Project

4.3 ELCP8 WEL Content Design Guideline

4.4 ELCP9 WEL Screen Design Guideline

4.5 ELCP10 WEL Video Design Guideline

4.6 ELCP11 WEL Multimedia Design Guideline

4.7 Resolutions of Supreme Council for Higher Education.

4.8 ISO 19796-1 Guideline

4.9 ELIP 2 Document Control

## 5.0 Procedure

### 5.1 General

5.1.1 The design process of any E-learning product uses the output from the content received from the staff departments and the detailed development of approved E-learning course/project, to develop a prototype that will be refined during the development stage.

5.1.2 The prototype outcome will be used to demonstrate the possible functions and uses aimed from the E-learning course.

### 5.2 Project meeting

5.2.1 As soon as the CDPD receive the approved E-learning Course Development Plan (ELCP2/1 App1) and the E-learning course file summary (ELCP2/2 App2), the CDPD manager will forward the two documents to the project manager.

5.2.2 The project manger shall initiate for a meeting with involving people in the program (lecturer, course developer, instructional designers and specialists).

5.2.3 At the meeting the project manager shall discuss the following:

- the instructional design toolkit
- deadline times for each module in the program
- educational support issues
- copy rights and scanning issues

5.2.4 A minute of meeting and a preliminary project schedule (App 3) shall be completed.

### 5.3 Learning Objectives

5.3.1 The project manger shall assign an instructional designer who will review the documents and validate the learning objectives with the course developer.

5.3.2 The instructional designer will use the appropriate metrics / criteria to analysis of experiences, comparison with needs in real practice with the course developer support.

### 5.4 Concept of content and didactical methods

5.4.1 The instructional designer shall ensure with the course developer that each course have content presentation format and entry points based on the course developer experience and E-learning course file summary. (See ELCP8 content design guideline).

5.4.2 On review, the instructional designer and the education consultant shall ensure that the following are located in the course file summary and in the feasibility study of the program/course:

- the educational model
- national standards
- the methodical concepts
- controlling points
- any activity schemes (if applicable)
- location
- technical equipment
- duration, learning time

5.4.3 The instructional designer shall complete the instructional design document (App 4) with the course developer and other involved parties if required.

### 5.5 Media and interaction design

5.5.1 The instructional designer with the involved specialist shall use the screen design table for Moodle (App 5) or the multimedia checklist (App 6) to evaluate the intended prototype. (See ELCP 9 screen design guideline).

5.5.2 The prototype shall include the following :

- media design,
- interaction design
- media functions
- presentation of information
- editing and interaction
- communication tools

The instructional designer and involved parties shall consider the related guidelines when designing (See ELCP8, ELCP9, ELCP 10 and ELCP 11).

5.5.3 The instructional designer with the involved parties shall discuss possible changes and makes their own notes of changes required.

5.5.4 After final changes the project manger shall complete (E-learning Course Amendment Request App 7) and arrange for a suitable venue and time for a demonstration session for the content specialist evaluation with the involved lecturers.

5.5.5 After the demonstration of the prototype, the project manger shall ensure that the original design specifications are used to develop the required media.

5.5.6 The CDPD manger shall supply all equipment (H/W and S/W) to develop and complete the required multimedia.

5.5.7 Instructional designer / project manager shall decide on the suitable programming, applicable media and authoring tool to use.

5.5.8 When the instructional designer decided, he shall develop a flowchart and story board (App8) (if required) on the Moodle template for the course.

5.5.9 The instructional designers shall complete the navigation, layout and the structure of the multimedia according to the storyboard and navigational flowcharts.

5.5.10 The navigation, layout and structure of the multimedia should be completed first according to the story board and flowcharts.

5.5.11 The instructional designer in cooperation with the graphical designer shall decide on the suitable buttons, images and backgrounds fill in the course.

5.5.12 The instructional designer in cooperation with the audiovisual specialist shall decide on the audio and video needed in the course

5.5.13 Any changes subjected to clauses 5.511 and 5.512 shall be dealt in accordance to (E-learning Course Amendment Request ELPC2/3 App 7).

## 6.0 Quality Records

| TITLE | Form # | Kept by | Where | Time |
|---|---|---|---|---|
| E-learning Course Development Plan | ELCP 2/1 | Course Coordinator | Local | 5 Years |
| E-learning Course File Summary | ELCP 2/2 | Course Coordinator | Local | Till next issue |
| Project schedule | ELCP3/1 | Project manager | Local | 5 Years |
| Instructional design document | ELCP3/2 | Instructional Designer | Local | 5 Years |
| Screen design table for Moodle | ELCP 3/3 | Graphic Designer | Local | 5 Years |
| Multimedia checklist | ELCP 3/4 | Graphic Designer | Local | 5 Years |
| E-learning Course Amendment Request | ELCP 2/3 | Course Coordinator | Local | 5 Years |
| Prototype /story board flowchart | ELCP3/5 | Instructional Designer | Local | 5 Years |

## Appendices

| Title | Form # |
|---|---|
| 6.1 E-learning Course Development Plan | ELCP 2/1 |
| 7.2 E-learning Course File Summary | ELCP 2/2 |
| 7.3 Project Schedule | ELCP 3/1 |
| 7.4 Instructional Design Document | ELCP 3/2 |
| 7.5 Screen Design Table for Moodle | ELCP 3/3 |
| 7.6 Multimedia Checklist | ELCP 3/4 |
| 7.7 E-learning Course Amendment Request | ELCP 2/3 |
| 7.8 Prototype/ Story Board Flowchart | ELCP 3/5 |

# E-LEARNINGCOURSE DEVELOPMENT PLAN

## General information

| | | | |
|---|---|---|---|
| Course Title | | Course Code | |
| Course Developer | | Position | |

## Assigned Personnel

| Name | Position | Start Date | End Date | Sign |
|---|---|---|---|---|
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## Technical Interfaces

| Function Name | Contact Person |
|---|---|
| | |
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| | |

**Created by**

Name

Position

Date

**Approved by**

Name

Position

Date

| Revision | 1 |
|---|---|
| Doc. Name | Design & Prototype Development of E-learning Course |

# E-LEARNINGCOURSE DEVELOPMENT PLAN

| Activity | Assigned to | Start | Finish | Reviewed by | Date |
|---|---|---|---|---|---|
| Course File Summary | | | | | |
| Transparencies | | | | | |
| **Slides** | | | | | |
| Video Tapes * | | | | | |
| **Software** | | | | | |
| Session Plans * | | | | | |
| Exam Criteria | | | | | |
| Attendance Register | | | | | |
| Question Bank | | | | | |
| Continuous Assessment Criteria ** | | | | | |
| Hand - outs | | | | | |
| Text Books (for lecturer) | | | | | |
| Practical/ work documentation ** | | | | | |
| Thesis Exam Criteria ** | | | | | |
| Term Exam criteria | | | | | |
| Other (Please Specify) | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

* If applicable

** If required by E-learning course file summary

## PLAN FOR E-LEARNINGCOURSE DEVELOPMENT REVIEWS

| Reviews | Responsibility | Planned Date | Actual Date |
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# E-LEARNINGCOURSE FILE SUMMARY

| **Course Information** | | | |
|---|---|---|---|
| College / Institute / Centre | | Department | |
| Programme Title | | Programme Code | |
| Course Title | | Course Code | |

**# Hours** ---------------------- ---------------------- ----------------------

Lecture Lab / Tutorial Credit

**Pre Requisites :**

| **Course Aim** |
|---|
| |

| **Course Objectives** |
|---|
| |

| **Staff Requirements** | | | |
|---|---|---|---|
| | | | |
| | **Qualifications** | **Special Skills** | **Number** |
| Lectures | | | |
| | | | |
| Tutorials | | | |
| | | | |
| Laboratories / Workshops | | | |
| | | | |

| **Lecture Schedule** | | | |
|---|---|---|---|
| Lecture | | | Description |
| # | Week | Hrs | |
| … | …… | … | ………………………………………………………………………… |
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| **Text Books** | |
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| **Reference Books** | |
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| **Tutorial Schedule** | | | |
|---|---|---|---|
| Tutorial | | | Topic |
| # | Week | Hrs | |
| … | …… | … | ………………………………………………………………………… |
| … | …… | … | ………………………………………………………………………… |
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| Laboratory Workshop Schedule (If applicable) | | | | |
|---|---|---|---|---|
| Laboratory | | | | |
| # | Week | Hrs. | Code | Description |
| ... | ...... | ...... | ...... | .......................................................................... |
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**Moodle Tool Kit Usage**

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**Grading and Assessment Method**

| Week # | Points | Written | Oral | Term Paper | Continuous | Thesis | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 30 | | | | | | | | | |
| 12 | 20 | | | | | | | | | |
| 1-15 | 10 | | | | | | | | | |
| 16 | 40 | | | | | | | | | |

**Prepared by** :

Designation

Name

Sign

Date

**Approved by :**

Designation

Name

Sign

Date

## Reading Material

| Code* | Description |
|---|---|
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* TB : Text Book  RB: Reference Book  ST: Standards / Codes
LN: Lecture Notes  EB: E-Book

## Supplementary Material

| Code* | Description |
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| ……… | ………………………………………………………………………………………… |
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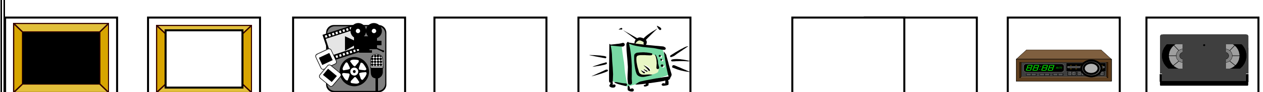
*PR: Periodical  SW: Software  VT: Video Tape  MD: Model  AC: Audio Cassette

## Educational Resources



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## Project Schedule

| | Jan | | | | | | | | | Feb | | | | | | | | | | Mar | | | | | | | | | | April | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Work Activities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Project initiation** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Ongoing liaison and project management** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Compliance , Monitoring and reporting** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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**ELCP3/1** **App. 7.3**

| | |
|---|---|
| **Revision** | 1 |
| **Doc. Name** | Design & Prototype Development of E-learning Course |

## Instructional Design Document

<table>
<tr><td>Instructor name:</td><td colspan="2"></td><td>Instructional designer name:</td><td></td></tr>
<tr><td>Date:</td><td colspan="2"></td><td>Time:</td><td></td></tr>
<tr><td>Program title:</td><td colspan="2"></td><td>Course title:</td><td></td></tr>
<tr><td>Purpose of the course:</td><td colspan="4"></td></tr>
<tr><td>Audience description:</td><td colspan="4"></td></tr>
<tr><td>Major course objectives:</td><td colspan="4"></td></tr>
<tr><td>Learning assessment:</td><td colspan="4"></td></tr>
<tr><td>Course description structure</td><td colspan="4">• Table of contents<br>• References<br>• Sample design document<br>• Enlarged graphics of key processes and concepts<br>• Sample instructor and student guides for evaluation<br>• Sample aids for evaluation</td></tr>
<tr><td>Course scope</td><td>Analysis<br>• Performance Analysis<br>• Training Needs Analysis<br>• Task Analysis<br>• Conducting the Task Analysis</td><td>Design<br>• Identifying Performance Objectives<br>• Writing Performance Objectives<br>• Writing Assessments<br>• Creating the Course Structure<br>• High Level Outline<br>• Organizing Lessons<br>• Design Document</td><td>Developing the course<br>• Methods and Outcomes<br>• Exercises and Activities<br>• Deciding Media<br>• Writing Instructional Materials<br>• Creating Visual Materials</td><td>Implement and Evaluate<br>• Pilot Test and Revise<br>• Evaluating the Training</td></tr>
<tr><td>Development tools</td><td colspan="2">☐ Full shot for taking screen captures<br>☐ Microsoft Visio</td><td colspan="2">☐ Adobe Photoshop<br>☐ HTML S/W</td></tr>
</table>

| **Course detailed outline** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Lesson (1) description** | | | | | | | |
| **Time** | **Topic** | **Content** | **Design/treatment** | **Instructional strategies** | | **Media** | |
| | | | | | Demonstration | | Course guide |
| | | | | | Discussion | | Instructor |
| | | | | | Question and answer exercise | | Slide presentation |
| | | | | | Case study | | Audio/Video |
| | | | | | Classification and discrimination of new concept | | Flip chart/ Post it notes |
| | | | | | Application of guidelines | | Paper and pencil |
| **Lesson (2) description** | | | | | | | |
| **Time** | **Topic** | **Content** | **Design/treatment** | **Instructional strategies** | | **Media** | |
| | | | | | Demonstration | | Course guide |
| | | | | | Discussion | | Instructor |
| | | | | | Question and answer exercise | | Slide presentation |
| | | | | | Case study | | Audio/Video |
| | | | | | Classification and discrimination of new concept | | Flip chart/ Post it notes |
| | | | | | Application of guidelines | | Paper and pencil |
| **Lesson (3) description** | | | | | | | |
| **Time** | **Topic** | **Content** | **Design/treatment** | **Instructional strategies** | | **Media** | |
| | | | | | Demonstration | | Course guide |
| | | | | | Discussion | | Instructor |
| | | | | | Question and answer exercise | | Slide presentation |
| | | | | | Case study | | Audio/Video |
| | | | | | Classification and discrimination of new concept | | Flip chart/ Post it notes |
| | | | | | Application of guidelines | | Paper and pencil |

| | |
|---|---|
| **Owner** | |
| **Development time** | |
| **Support requirements** | |
| **Project manager signature** | |

## WEL Screen Design Table

<table>
<tr><th colspan="2">Objectives</th></tr>
<tr><td colspan="2">To ensure that screen design are simple, clear and elegant with consistent use of colour, fonts, and layout and navigation techniques.</td></tr>
<tr><th colspan="2">Scope</th></tr>
<tr><td colspan="2">All courses/projects shall comply with the requirements of the Higher supreme counsel and to the national and international standards.</td></tr>
<tr><th colspan="2">Technical Issues</th></tr>
<tr><td>Resolution</td><td>Screen :800 x 600 pix OR 640x480 if required by lecturers/students</td></tr>
<tr><td>File size</td><td>HTML not exceed 70K including all graphics and state the file size when it is large downloadable</td></tr>
<tr><td>Functionality</td><td>• Extras such as Java, Shockwave, video, audio should add value and enhance interactivity.<br>• Such extras should be made available as downloads or on CD-Rom so that the user can work offline.<br>• Keep graphics to a minimum for the same reason.</td></tr>
<tr><th colspan="2">Accessibility</th></tr>
<tr><td>Readability</td><td>• Language quality<br>• Language clarity<br>• Reading level<br>• Separate content and function<br>• Top down / left right<br>• No timed pauses<br>• No automatic scrolling</td></tr>
<tr><td>Consistency</td><td>• Navigation<br>• Instructions to student<br>• Key presses / mouse actions<br>• Screen locations</td></tr>
<tr><td>Graphics</td><td>• Clarity<br>• Fidelity<br>• Relevance<br>• Parsimony<br>• Optimised size and quality<br>• Format: GIF or JPG<br>• Backgrounds: seamless and blend</td></tr>
<tr><td>Legibility</td><td>Color:<br>• Colour contrast between background and text<br>• Consider colour blindness<br>• Use for information transmission, not effect (less is better)<br>• Avoid backgrounds with high intensity/ flat colour<br>• Avoid clashes with background colour<br>Avoid using highlighting<br>• Bold (ok for headings, but never for a whole sentence / paragraph)<br>• Italics fonts<br>• Boxing<br>• Colour</td></tr>
</table>

| | |
| --- | --- |
| | • Avoid Flashing<br>• Varying size<br><br>**Information density**<br>• Chunks<br>• Graphics<br>• White space<br>**Fonts**<br>• Headings: 12 pt (size 3), Bold<br>• Other text: 10pt (size 2)<br>**Typefaces**<br>• Not more than two/three different ones<br>• Avoid non-standard fonts<br>• Mudir MT fonts in Arabic and Arial for English display better on screen<br>**Underlining: use consistently for hyperlinks** |
| **Web Features** | |
| **General** | Avoid the following:<br>• Under construction<br>• Hit counters<br>• Horizontal scroll bars<br>• "Click here" or "general info" |
| **Hyperlinks** | • Hyperlink the text, not buttons<br>• Hyper lined text: short, descriptive and meaningful<br>• Functional in Internet Explorer and Netscape |
| **Moodle** | • Add images and set the font type for the text on each HTML page.<br>• Titles of the HTML pages are used to create the Table of Contents.<br>• Background image and text colors are set within Moodle.<br>• Navigation bar allows the user to go to Homepage, Table of Contents, page forward, page backward, retrace and reload a page. Therefore the only navigation required is links to other content pages or URL's. |
| **HTML** | • The left margin could vary depending on the length of the Title of the HTML page. Default: 150 pixels. The same should be used for Arabic Version<br>• Reference large files such as graphics, Java, sound, video clips, streaming etc. from navigational pages only.<br>• Vertical scrolling: max 2 to 3 printed pages<br>• Comply with W3C standards.<br>• Keep dropped elements in mind. |
| **Motivation** | • Attract attention<br>• Keller's ARCS theory : Attention, Relevance, Confidence, Satisfaction<br>• Maintain attention<br>• Malone's theory: Challenge, Curiosity, Control, Fantasy |

# Multimedia Checklist

| **Program Title** | **Course Title/Code** | **Evaluator Name** | **Program Manager Name** | **Date** |
|---|---|---|---|---|
| | | | | |

| | | | |
|---|---|---|---|
| **Section Evaluation Overview** | | | |
| consistency | Yes | | Comments |
| | No | | |
| harmony &balance | Yes | | Comments |
| | No | | |
| legible | Yes | | Comments |
| | No | | |
| Simple & elegant | Yes | | Comments |
| | No | | |
| clear instructions | Yes | | Comments |
| | No | | |
| Easy navigation | Yes | | Comments |
| | No | | |
| Animation & graphics contribute knowledge | Yes | | Comments |
| | No | | |
| Uncluttered & lean | Yes | | Comments |
| | No | | |
| **Content** | | | |
| learning outcomes communicated to learners | Yes | | Comments |
| | No | | |
| Spelling error free | Yes | | Comments |
| | No | | |
| Grammar error free | Yes | | Comments |
| | No | | |
| Reading level appropriate for learner | Yes | | Comments |
| | No | | |
| **Target market** | | | |
| Design style appropriate for target market | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Different cultures has been taken into consideration | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| **General screen layout principles** | | | |
| Screen layout used consistency throughout the program/course | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Screen elements support navigation | Agree | | Comments |
| | Disagree | | |

| | | | |
| --- | --- | --- | --- |
| | Not sure | | |
| | N/A | | |
| Enough white space on the screen | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Information has been chunked effectively on each screen | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Text generally aligned | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Images have been convey information the contents | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Top down/ left right principle has been adhered to | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Functional area on the screen used consistently | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Contrasts used to create visual support | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Contrasts used to highlight important features | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| **Color** | | | |
| Colors used for the screen elements consistently | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Rule of thumb 4-7 per screen has been applied | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Color limitation and clashed has been considered | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Colors are directed | Agree | | Comments |

| | | | |
|---|---|---|---|
| eyes with the important areas on screen | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Possible culture, emotional and physiological implications of colors considered | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Current colors connections are adhered to | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| **Font type and Text** | | | |
| Fonts used have been kept to minimum | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Fonts used are harmonized with the color used | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Font type contrast match with the background colors | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Adequate font contrast used with the different screen elements | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Underlined font type indicate hyper links | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Text aligned to left in E and aligned to write in A | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Using uppercase in the screen is appropriate | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Eligible text | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Excessive scrolling of text is avoided | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |

| | | | |
|---|---|---|---|
| | N/A | | |
| Timed text is avoided | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |

| | | | |
|---|---|---|---|
| **Imaged** | | | |
| Images supports the content and the design | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| The style of images is consistent | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Images can be used without loss of resolution | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| **Navigation** | | | |
| Navigation is intuitive | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| If not instruction are exist to show how to navigate | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Navigation method is used consistently through program | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| User can always return to main menu | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| There is always a way to exit from the program | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |
| Navigation suited to the profile of user end | Agree | | Comments |
| | Disagree | | |
| | Not sure | | |
| | N/A | | |

## APPROVED E-LEARNINGCOURSE

## AMENDMENT REQUEST / APPROVAL

### General Information

| | | | |
|---|---|---|---|
| Designation of Originator | | Name of Originator | |
| Programme Title | | Course Title | |
| Programme Code | | Course Code | |

**Details of Change**

| Nature | Reason | Implementation Date |
|---|---|---|
| | | |

**Originator**

Name

Sign

Date

**Dean / Manager Approval**

Name

Sign

Date

**Educational Affairs/Postgraduate**

**Council Approval**

Name

Sign

Date

**Approval of Amended Programme / course**

**Submitted**

Name

Sign

Date

**CDPD Approval**

Name

Sign

Date

**ELCP2/3** **App. 7.7**

# PROTOTYPE /STORY BOARD FLOWCHART

| | |
|---|---|
| **Title:** | **Page:** |

| | | |
|---|---|---|
| | | |

| | | |
|---|---|---|
| | | |

| | | |
|---|---|---|
| **Action:** | | |
| **Dialogue:** | | |

| | | |
|---|---|---|
| **Translation:** | | |
| **Timing:** | | |

**ELCP3/5** **App. 7.8**

# Appendix 7

## Quality Policy

The Computer Design and Production Department (CDPD) is committed to the provision of electronic education courses materials products and training services to student, lecturers and customer base and to ensuring that these services and products conform to agreed customer requirements**.**
The products and services are provided by academically qualified and technically competent members of staff who continuously seek to achieve and improve levels of performance that will enhance the reputation of the department. Performance data are analysed to ensure that the improvement objectives are met.

It is our policy to ensure that our services satisfy the requirements of appropriate registration, accreditation and certification agencies.

Commitment to this policy is demonstrated by the implementation and continual improvement of a Quality Management System that satisfies the requirements of ISO 9001:2008 & ISO19796 guidelines and is documented in the Quality Management System Manual, supported by Management Procedures.

| Management Representative | Head of Department |
| --- | --- |
| ………………………… | ……..…………… |
| Date: | Date: |