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Multimedia tools for the creation of online learning materials : a critique

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MULTIMEDIA TOOLS FOR THE CREATION OF ONLINE LEARNING MATERIALS, A CRITIQUE

By

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DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me. The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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The scripture advises that if we confess our sins, God has the right to forgive and cleanse us of these sins **(1 John 1:9)**, but if we do not confess them He will not forgive us. A lot of us face great tribulations because we do not forgive others their trespasses, neither are we merciful. A lot of you ponder why certain tribulations should come your way; you believe that you have never stolen, killed, told a lie, yet you face different kinds of problems. Search yourself properly if there are any of your brethren who have offended you, and whose trespass you have refused to forgive.

If there is any such, then quickly forgive such a person and obtain your salvation. If you decide to be merciful and forgiving, it is all to your own benefit. This is because when you do this, you stand to be saved. When you lack mercy and forgiveness, you cannot harm another person but rather, you harm yourself, because you stand to be condemned. (http://www.wordcenter.org/Forgiveness/mercy.htm)

To the many diverse people from different countries of the world, I extend my gratitude to you all and I will also cherish the invaluable experience that people can really live together in peace. I say God bless humanity

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LIST OF ABBREVIATIONS

ACTIONS	Access, Cost, Teaching and learning, Interactivity, Organisation Novel Speed model
ACCEL	Access Collaborative, Customized and Accessible, Excellent quality, Life-style fitted model
ICARE	Introduction, Connect, Apply, Reflect, Extend model
LCP	Leaner Centered Principles
PADDICQAM	Pre-Assessment, Design, Delivery, Interactive Collaboration Quality Assurance, Management model

CHAPTER ONE
MULTIMEDIA TOOLS FOR CREATING ONLINE LEARNING MATERIALS, A CRITIQUE

1.0. INTRODUCTION

Online learning has witnessed rapid growth in recent years and it is generally believed to be the next revolutionary subset in the drive for flexible teaching and learning (Centre for Advancement of Teaching and learning, 2001). The defining principles of online learning are pillared on learning and technological methodologies that foster the individualization of instructions and course materials to the needs of every student (American Psychology Association, 1993). Online learning therefore, is conceived to be a lissom system where individual students will study at their pace and time regardless of place.

Many companies and schools today provide online learning because it delivers more training to more people for the fewest dollars. More so because it is conceived to be fast, saves time, money and resources. Some of the major strong points advocated by the sponsors of the online crave draw from the following seeming advantages according to Element-k (2001, p.1), Pearson Education, Inc. (2000) that:

- It delivers knowledge on time, making education available when and where it is needed;
- It is cost effective, reducing travel expenses and offering the learner saving up 40 to 60 percent;
- There is flexibility of being able to choose either instructor-led or self paced courses, and the ease of customisation;
- There is the ability to tailor learning modules to interest, career or job;

- Varieties of courses exist covering innumerable fields.

The introduction of multimedia (sound, graphics, video animation, fractal and others) and the ability of computing and network technologies to efficiently handle and transmit multimedia, further cement these advantages. Thus the diversity of learning styles exhibited by different human beings and those imposed by course contents, at least in a theoretical sense are integrated by multimedia presentations. Despite these efforts, online learning and course materials are still characterised by de-motivation, dissatisfaction and sometimes complaints about their effectiveness.

With advances in software technologies, a variety of multimedia tools exist today that could be employed in creating attractive and motivating learning materials to encourage the learner to surf his or her way through the online learning domain. At this stage it will be wise to examine some of the thorny issues that may contribute to the effectiveness or ineffectiveness in online learning, explaining the need for this critique. This research intends therefore to examine these multimedia tools in the context of online-learning and online learning materials design.

1.1. RESEARCH OBJECTIVES

The critique research will aim at fulfilling these objectives.

1. To provide an insight into the concept of online learning and multimedia, thereby presenting their points of convergence.
2. To indicate the extent to which learning model(s) can be useful when employed in a learning environment such as multimedia online learning.
3. To identify, and examine current multimedia technology features for design enhancement of online education learning materials
4. To provide an analysis of selected multimedia software, the comparative strengths, and weaknesses.
5. To assess the extent of understanding and penetration of the multimedia-online learning technology using a stratified maritime world sample.
6. To provide recommendations for future multimedia employment in online learning materials development.

The listed objectives are presented in the belief that their attainment will greatly contribute to the improvement and development of multimedia online learning.

1.2. RESEARCH QUESTIONS AND STATEMENT OF THE PROBLEMS

Lofty as the advertised benefits of online learning are, these promises do not always come true. The system is bedecked with constraining problems. To eliminate some of the problems that candidates currently face will require a great deal of assessment of the methodologies, their union and intersection with information technologies, as well as the current procedures and approaches to materials design. Therefore, for the researcher to be able to draw good conclusions at the end of the critique, answers will be sought to the following questions:

1. What does multimedia and online learning mean? Is there a standardized understanding of what multimedia online learning entails?
2. Which issues are involved in the learning environment, and what role can multimedia play in it? Are there learning theories and philosophies for online learning? Are these theories reflected in course material creation and delivery?
3. How can multimedia be useful in the creation of online learning material? Are the models adequate?
4. What multimedia tools are available? What are their features?
5. What comparative advantages does one have over the other, regarding cost and other features?
6. Can a survey of maritime sector of developing countries indicate an understanding and penetration of online learning vis-à-vis multimedia tools and concepts?

The research will focus on these questions examining and analysing the situation to determine the exact constituents of online learning and what input can be injected to improve and maximize the benefits of multimedia online learning material design and delivery.

1.3. RESEARCH METHODOLOGY

In order to source out data for the determination of the state of affairs of multimedia and online learning in the maritime sector, a field survey will be conducted on World Maritime University MSc students. The instrument that will be used will be questionnaire. Simple percentages, mean and standard deviation will be the statistic(s) that will be used for analysis.
The Internet, World Wide Web, books and journals in multimedia and online learning will be reviewed. Moreover, Macromedia Director 8.5 training CD (purchased by the researcher) will also be employed in the study of the authoring process. Finally expert opinion and advice will be sought from research supervisor.

1.4. ORGANISATION OF THE RESEARCH

This research will be divided into six chapters. Chapter one will consist of generic introduction, objectives and statement of the problems as well as research methodologies. Chapter two will rely heavily on extensive literature review, to disclose and identify the necessary variables associated with online learning and multimedia, the endpoint being the building or adaptation of an online learning model.

Chapter three will constitute the employment of the model in a typical maritime online learning example and the analysis of the exigencies involved. Chapter four will allow assessment of features of an industry standard multimedia tool, a descriptive example and comparative summaries of the characteristics of different multimedia tools.

Chapter five on its part will adopt simple percentages, mean, standard deviation and statistical charts to analyse the level of online learning penetration in maritime sector of developing countries and the level of integration of learning styles from a field survey. Chapter six will offers a summary of findings, conclusion and recommendations.

1.5. LIMITATION OF THE RESEARCH

This research is basically focused on multimedia concepts and tools in the context of online learning and deals with application of these tools in creating online learning materials and environment. The research does not concern itself with the complex digital technologies underlying multimedia.

CHAPTER TWO

ONLINE LEARNING AND MULTIMEDIA CONCEPTS

2.0. INTRODUCTION

Learning has been variedly defined by behaviourists, psychologists, constructivists, and business concerns. It has been advocated as a process, as change in behaviour, an increase in knowledge, and as a product (Smith, 2001, pp.1-11). More evasive in terms of exact definition is online learning. Therefore, it is the intention of this literature review to define online learning, assess the psychological/philosophical approaches to learning, examine learning models and other research positions. The review will investigate into the concept of multimedia, the benefits of multimedia and its future is also examined. The chapter will also examine legal issues on online learning materials. The objective of the chapter is to provide an undertanding of online learning, multimedia and their relationship.

2.1. ONLINE LEARNING ISSUES

2.1.1. What is Online learning?

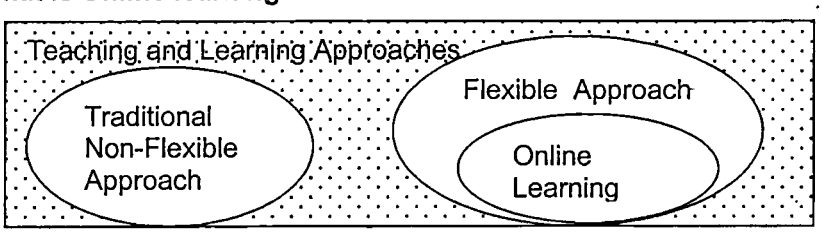


Figure 2.1. Teaching and Learning Approaches

The Centre for Advancement of Teaching and Learning (CATL, 2001) in their mission statement, "Towards a definition of online learning..." at the University of Western Australia, submits that online learning is a subset of flexible teaching and learning.

A major reason why students and teachers alike subscribe to the online learning approach is underscored by the desire for "flexible learning". The quest for flexibility also imposes obligations and implications both on the learners and the providers. It becomes incumbent that; different learning methods are provided for in a more flexible and richer environment and that, the students are guided to take full advantage of these provisions.

The United States Distance Learning Association (USDLA, 1999, p. 3) defines distance learning (another term for online learning) in terms of acquisition of knowledge and skills through mediated information and instructions. Basic requirements are obvious. These are the needs for appropriate curricula and delivery methodologies, ensuring that information and instructions are adequately mediated, providing the learner with intended objectives, understanding, and ease of use. This process is as illustrated in Figure 2.2.

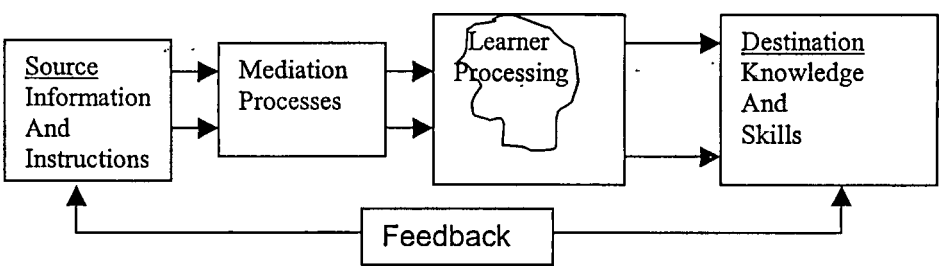


Figure 2.2. Online learning mediation process based on USDLA's definition

However, for the process to be efficient the provider must have capacity to ensure that valid information and instructions, which justify defined course objectives, and are curricula-based, are provided. It is important to develop the learner knowledge appropriation capacity, through identification, analysis and correction of noticed

The need to specify, the actual constituents of online learning is supported by Ariba (2002, p.1). "Online learning is accessing training and materials in the computer". Other terms that are classified under the same broad term of online learning include accessing training over the Internet, distance learning, viewing a compact disc (CD) on computer, Web-based Training (WBT) and e-learning. Ariba's definition makes it possible to classify and link CBT, WBT and e-learning into the online learning family. The distinction into types and the characteristics of each type are summarised in Table 2.1.

Table 2.1. Online learning types

CBT online	*Private & Corporate network Online Learning*	*Distance or Web-based or e-learning*
Knowledge and instructions available on CD and/ or via a PC	Knowledge and instructions available on network	Widest access, knowledge and instructions may be available worldwide
More cost per unit	Less cost per unit	Least cost per unit if well patronised
Tailor made for single individual	Less tailor made for specific individual	Difficult to customise to specific individual
Require less complex structure	Complex-structure dependent e.g. network	Much more dependent on complex structure e.g. the Web

What exactly is online learning? Yeung (2001; p. 1), in search for a definite meaning of online learning drew the following definitions from various sources:

> "Khan (1997) defines Web-based learning as "A hypermedia-based instructional program, which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported." Relan and Gillani (1997) defined it as "The application of a repertoire of cognitively oriented instructional strategies

"The application of a repertoire of cognitively oriented instructional strategies within a constructivist and collaborative learning environment, utilizing the attributes and resources of the World Wide Web." Clark (1996) defined it as "Individualized instruction delivered over public or private computer networks and displayed by a Web browser."

Although, there are variations in approaches to the definition of online learning, Yeung submits that a common factor exists amongst them, which is that online learning takes full advantage of the Internet or World Wide Web to deliver information. Administration details and interactive multimedia are part of online learning, in as much as they are relevant to the learning experience, the online course seeks to provide.

An analysis of the various definitions, produces important challenges. These challenges range from, ensuring hypermediation to constructing a repertoire of cognitively oriented instructional strategies within a constructivist and collaborative learning environment and ensuring that the instructions delivered over the Internet to a vast audience of diverse characteristics are individualized. Paying attention to these issues prior to the designing of learning opportunities would greatly contribute to success of online learning experience.

The concept of "on-demand" training is emphasized by Information Technology Development Corporation (ITDC, 2002, p. 1). Online learning is "on demand" training stored on a server and accessed via a browser. The need for self-direction is prominent on the part of the students and the provision of round-the-clock server must be the ideal of the learning provider, if "on demand" training must be realised.

Nazarene Bible College's (NBC, 2001, p. 1) definition of online learning is "computer-mediated, asynchronous, interactive educational delivery." Though asynchronous, online learning from NBC point of view must enable interaction amongst learning peers and faculties. Families and work requirements do thus not inhibit online learners.

The question worth asking at this juncture is: where actually does the online teacher teach? The answer is that it occurs in the virtual classroom! According to Ko & Rossen (2001, p. 3) online teaching and online learning are processes where the virtual and the real world intertwine. This, in the researcher's estimates, means a real teacher, teaching real students, in a virtual classroom, not in a real-world classroom. Virtual classroom according to Ko & Rossen is any "online area" in which instructors and students meet via their computer connections, for course activities.

Many definitions of online learning abound today, but the following assertion by (Pittinsky, 2002) sums it all up.

> To one faculty member online learning might have been as simple as a course Web site, where she could post a syllabus and additional learning materials for her students to access. To another, it meant communication and collaboration through discussion boards and chat rooms beyond class meetings twice a week. To a third, online learning allowed for delivery of a specialized course, using audio, video and interactive learning resources to students around the world, many of who would never normally visit campus. For a president or CFO, it was an opportunity to achieve a return-on-investment for millions of dollars in network and other technology investments by implementing an education vehicle that helped faculty and students connect in more powerful ways, and expand the institution's horizon.

The definition might be endless, but it is obvious that distance learning, CBT, Web training and e-learning are learning done online via computer connections today. The researcher will define online learning as: approved curricula, taught and administered through the virtual classroom, made possible by benefits of ever improving technological mediations and the desire to utilize these benefits to overcome barriers of traditional educational systems such as distance, time and linear learning approaches, by providing well designed, on demand, non-linear, interactive learning methodologies. Since online learning will, in the most cases

occur in the virtual classroom, the virtual classroom must be designed to possess the necessary interactivities and the characteristics that will motivate learning.

2.1.2. Psychology and Online learning

In this section some of the learning-oriented psychological concepts as proposed by various experts are assed and analysed.

The role of Perception

Learning relies on the learner attending to stimuli and properly perceiving them (Alessi & Trollip, 1991, p. 11). Perception in the researcher's view is prior meaning the learner assigns to learning stimuli, before they are explained, elaborated or decoded. Prior experiences can affect perception and subsequently learning; neither does the researcher underestimate the effect of socio-culture and hereditary.

The learner is besieged constantly during the learning process by stimuli from a diversity of sources intrinsic and extrinsic, all competing for attention. Thus the learning stimuli must be strong and comely enough to sustain interest. Online learning has an advantage because the learning source is a "stored repertoire" and can be replayed by the learner. There is an opportunity of relearning almost immediately.

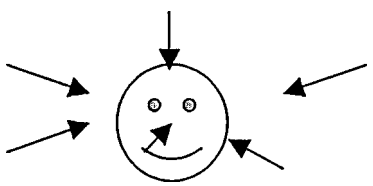


Figure 2.3. Different stimuli confronts the learner

The role of Memory

The memory serves as the first port of call for what is perceived and would later be learned.

Memory:
Storage for retrieval
Manipulation of facts

Figure 2.4. Memory

If the memory usage is to be maximized, t he implications are that stored information must be appropriately organised with indexes and search keys prior to storage, to assist the learner in retrieval. Repetition (Fleming & Levie, 1978) also plays a vital part in improving and reinforcing what is stored. Good stories, games, examples, observations and properly prepared presentations can greatly enhance storage and retrieval of information and instructions.

The role of Comprehension

Changes associated with learning can only proceed, when information read or received is interpreted and comprehended (Anderson, 1977). Information is stored, evaluated, and manipulated in the memory. From the foregoing, comprehension is dependent on interpretation, which may involve translation, transcription, conversion, analysis and/or sieving out the essence of the learning stimuli. For the learner to realise the learning objective(s), series of intrinsic comparisons and counter comparisons ensure the learning stimuli is properly evaluated and refined.

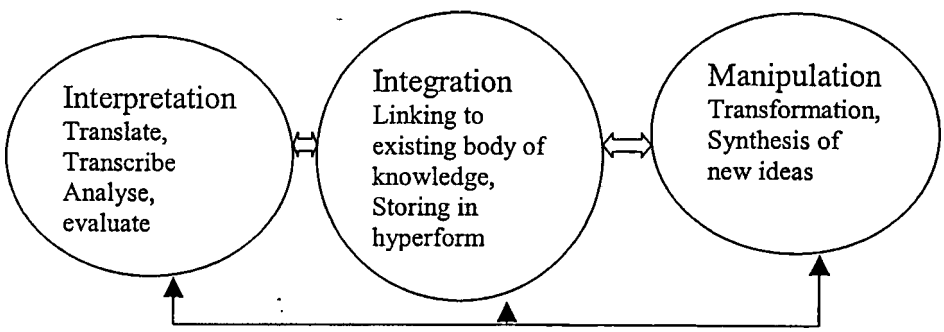


Figure 2.5. Illustration of Comprehension factors

A necessity in the comprehension pathway is the integration of the newly learned material into the learner existing body of knowledge (Alessi & Trollip, 1991, p. 12). The integration may involve finding similarly classified stimuli for linkage or storing in such a way that they could be easily linked in the future.

The role of Motivation

Motivation is highly needed in online learning mostly because the learner needs the self-direction to proceed at all learning stages. Lepper & Chabay (1985) maintained

that intrinsic motivators embedded in the course are more useful than externally applied motivators. Malone (1981) hypothesizes that four elements, which foster motivation, are challenges, curiosity, control and fantasy. Keller & Suzuki (1998) presents the four factors imperative to student motivation as maintenance of attention, relevance of course materials, student confidence, and student satisfaction.

Online learning exists to support different learning approaches. Very essential is self-directed learning. If the virtual classroom is designed appropriately with group-promoting characteristics, then people who love affiliation may succeed as online learners from the perspective of McClelland's motivating needs (Dixon, 1997, p. 76), which is the need for affiliation, power and achievement.

On the other hand, Vroom's expectancy theory indicates that a particular individual drive for doing a particular activity is predicated upon the extent to which the result will expectedly contributes to his/her needs and goals. Thus, expectations such as improved job position, pay and status may greatly influence the online learner.

According to Dixon (1997, pp. 78-79) Chris Argyris' (1964) seven stages of development provide an understanding of infant to mature characteristics, which are listed as follows:

1. Infant passivity	to	Adult activity.
2. Dependence	to	Independence.
3. Limited behaviours	to	Many different behaviours.
4. From erratic and brief interests	to	Longer time perspective.
5. Short time perspective	to	Long time perspectives.
6. Subordinate social position	to	Equal/Supervisor position.
7. Lack of self-awareness	to	Self-awareness.

The inference that could be drawn from the above stages of maturity is that as individuals mature, the likelihood of undertaking more responsibility and the capacity

to judge outcomes, increases. Drive and maturity can positively influence the self-directed online learner.

The role of Locus of control

For a course to be successful (that is, meet its objectives), analysis of who will have control of the course in the online learning situation must be pre-determined. Depending on the aim of the course, control may reside with the learner, the lessons or combination of both. Interactivity will be discussed fully in Chapter III.

Transfer of Learning

The manifestation of learning in real life activities is desirable and indicative of transferred knowledge. Clark & Voogel (1985) see transfer of learning as the extent to which improved performance in the lesson is reflected in the real world. Factors that affect transfer include: type and quality of instructions, methods of delivery, the extent of interaction, and varying nature of these interactions (Alessi & Trollip, 1990, p.13). Student demonstrate level of transfer in their ability to solve problems e.g. mathematics, and skill tasks such as performance in a laboratory and on the simulator. However, in the wider context, transferred learning is manifested in the overall competency of the learner.

Individual Difference

Students exhibit different learning styles, capacity and perspectives (Bonk & King, 1996, p. 29). Students are inhibited or enhanced by culture, language, and previous pleasant or unpleasant learning experiences and hereditary. Every instructor and administrator must administer or conduct learning with this consciousness. Different students also adopt different approach to learning. Online learning can greatly assist in this direction by providing many learning approach using hyper-mediation.

2.1.3. Online learning Models

Models are of great values especially when mapping or building and explaining complex structures. They serve as a basis for design, imitation and measurement. In

this unit an assessment of some of the models used in web-based and distance learning is provided.

ACCEL Model

The ACCEL model presented by (Boettcher, 1997, p. 32) is an acronym for Active, Collaborative, Customized and Accessible, Excellent Quality, Lifestyle-fitted method of interactive learning based on growth projections. The ACCEL model promotes *active* learning, where the learner engages in a thought provoking session. Furthermore, the learner *collaborates* with other learners, contributing to others' body of knowledge and also learning from them.

Courses and materials are designed to cater for individual differences and differences in learning approach; thus are customised and accessible. Material quality and convenience are paramount leading to *excellent quality* and *life-style fitting*.

Requirements for success include: communication with student to and from faculty, high quality course materials, quick and easy access, cost effectiveness, on-demand retrieval, reasonable speed of access, good management, electronic sources linkages, library, database, journal and interactive instructions.

ACTIONS Model

Tony Bates' model (Villems, 2000, p. 1) is called the ACTIONS model. The model is set in the context of providing managerial approach in the provision of online learning. The model provides for:

- Access - How accessible is the technology for the students? Can the students access learning materials from home? Are there access restrictions?
- Costs - What is the cost structure of the technology? What fixed cost, unit cost and marginal are associated with the online course?
- Teaching and Learning - What kinds of teaching and learning are required for the program goals? Will the program support non-linear, on-demand land or/self directed learning?

- Interactivity and user friendliness - What kind of interactivity is enabled or should be enabled? How easy is it to use? Will the learner need a pre-lesson to equip them with the skills?
- Organizational Issues - What are the organizational requirements and barriers to success?
- Novelty - How new is this technology? Does it need retraining users?
- Speed - How quickly can the courses be developed and delivered? What are course objectives and the target audience?

Introduction, Connect, Apply, Reflect, Extend (ICARE) Model

ICARE model (California State University, 2002, p. 1) is a system that focuses the teacher and learner to paramount learning elements. The segments are as follows:

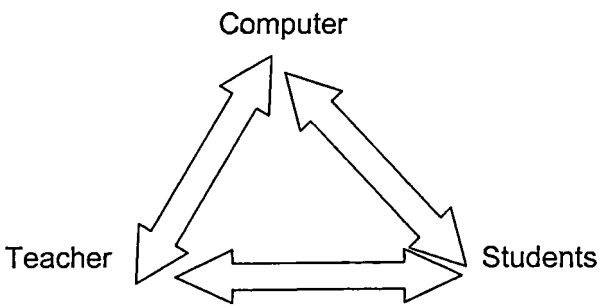
- *Introduction:* introduces the learners to the unit with objectives and context. Thus the student is conscious of what is expected and guided toward achieving them.
- *Connect:* leads the student to new information and concepts. Students can then *apply* new information to real world issues and problem.
- *Reflect:* provides a place for students to articulate their acquired knowledge a collaboration environment.
- *Extend:* allow the learners to do enriching activities and evaluation.

Analyse, Practise, Talk, APT Model

According to (California State University, 2002, p. 1), the APT system is used in the Educational Technology 541 course at San Diego State University. The *Analyse* section includes readings and reflection on each unit. *Practice* section provides exercises and problems for practise. *Talk* is the section where course interactions and collaborations take place.

Students-Teachers Model

This model according to Sediukov (2001, p. 5) has been broadened to include a third element, the computer, the Internet and various other computer-linked devices. The model expands learning opportunities and promotes qualitative triad interactions, making possible: student to teacher, student to computer and teacher to computer interaction



Source: (Serdiukov, 2001) computer-student model

Figure 2.6. Teacher-Computer-Student model based on

Computer-Student Model

In this model, according to Sediukov (2001, p. 5), the computer replaces the teacher entirely. The realization of this dream increases as the computer becomes more capable of better word recognition, more cognitive capabilities and some level of affective recognition.

The PADDICAQAM model

Motivated by the need to have a model that would cater for the developing countries, given their level of technological developments and human capacity building, the researcher presents the PADDICQAM model as follows:

- *Pre-course* Assessment identifies the training needs of the course participants, the technologies available to them, assistance (e.g. technology literacy) that could be offered. These would be achieved by an appropriate mechanism, which collects data during registrations.

- *Design* stage is where the course is specified and designed. The online learning mission, curricula (specification of course objectives, contents and methodologies), course materials, the audience, and channels of communication, and cost components are expressed.

- *Delivery* stage is where the instructors will actually deliver the course, anticipate problems and solve them before they arise, motivate and attend to students' course needs and requests. Continuous assessments are used as motivators as well the students' final assessment.

- *Collaboration* enables the students to be organised into groups for effective interactions. The expansion, extension and creation of knowledge are encouraged.

- *Quality Assurance* ensures that through feedback and system reviews, the standards specified for the online learning courses are sustained and improved.

- Management is present all through the stages to give direction, take decisions, adopt marketing strategy, motivate, hire and moderate instructors, provide certification as well as oversee outcomes.

2.1.4. Educational Philosophy and Online learning

There are many educational philosophies proposed by many experts in the field of education and online learning such as the constructivist viewpoint, the learner-centred viewpoint as well as the social theory approach, which are here examined.

Constructivist Concept

In the constructivist thinking, an educator's goal should be seen largely as that of assisting students construct their own knowledge through active learning, inquiry, reflection, and student-generated, relevant learning activities (Siegel & Kirkley, 1998). Teachers must lead and guide learners in the creation of their body of knowledge (Wells & Chang-wells, 1992).

Prior to the constructivist concepts, the teacher was largely seen as the source or the interpreter of knowledge. But now, the teacher's role is more of facilitation in context. The learners must be orientated in the constructions of their own knowledge and assisted with the best of tools. Online learning is very relevant in the context of this philosophy in that every web page could include links to resources ranging from course materials, databases to library.

However, the teacher provides the exercises that the student needs and assesses the knowledge the student creates. This philosophy also brings into focus the non-linear nature of learning.

Learner-Centred principles

The concept of learner-centred principles (LCP) fosters the creation of new interaction attributes and learning groups. There is a shift of attention away from the teacher towards learner (American Psychological Association, 1993). In this approach, teachers no longer dominate classroom-learning sessions; instead, LCPs advocate tailoring instructions towards the needs of the individual learner. The learning situation must incorporate cognitive, affective, developmental and social issues (Siegel & KirKley, 1998).

An examination of this concept will indicate that the teacher and the learner must first determine the learner's actual needs, his/her present cognitive level, what cognitive contributions should be added to reach the specified goals, weakness or lack of affective capabilities and the necessary compensating social balance that must be provided. Thus, well designed measures and standards must be developed to pre-assess the student's levels such as aptitude tests, and questionnaires, before the beginning of training. Will the learner be interested in such test? What could be done to booster his/her interest? How feasible this pre-assessment will be, is yet to be seen with regard to online learning.

Socio-cultural Theory

Human beings exist in a socio-cultural context and this has an effect on learning (Vygotsky, 1978). Socio-cultural theory emphasizes that learning cannot be divorced

from this context. The students must learn in the real world, interacting with mentors, and peers during learning sessions.

Social cultural theory is build up on such concepts as cognitive apprenticeship (reasoning and thinking capacity development), problem-based learning (developing of problem solving capability), scaffold instructions (layered instructions, the lower layer serving as prerequisite to next layer), distributed intelligence (shared intelligence), zones of proximal development, internalisation, and inter-subjectivity (overlaps of disciplines) (Bonk & King, 1998, p. 370).

For online learning to be able to provide answers to most of the provisions of the socio-cultural theory, online communities, course chat groups and video conferencing facilities will be needed and used in the learning sessions. The absence of infrastructures in some parts of the world is also socially isolating many people from using the Web for learning as it is today.

2.1.5. Enabling Technologies

Modern technology has enabled the delivery of online learning to a greater number of people. These technologies include: the Internet, World Wide Web, the development of Integrated Service Digital Network (ISDN), satellite technology and the current concerted efforts in wireless technologies.

Internet

The Internet is a global network connecting millions of computers. More than 100 countries are linked into exchanges of data, news and opinions.

American Petroleum Institute (API, 2002) sees the Internet as an umbrella term used to describe a collection of many separate networks worldwide connected together using a standardized set of communication protocols. This definition sees Internet as network collectively connected and having the capability to communicate.

The United State Naval Post-graduate School (NPS, 2002, p.1) defines the Internet as a worldwide collection of computer networks connecting academic, governmental,

commercial, and organizational sites. It provides access to communication services and information resources to millions of users around the globe: Here a part of the function of the Internet is underscored and the types of network involved such as academic and governmental are also acknowledged. The Internet Society (2002, p. 1) says that the Internet exists for sharing of knowledge and collaboration across the world.

Internet future

According to (Lerner, 2002) Internet2, formed in 1996 and administered by the University Corporation for Advanced Internet Development (UCAID), is a partnership between universities, corporations and government agencies. It transmits data at speeds up to 2.4 gigabits per second, 45,000 times faster than a 56 Kbps modem. Scientists can now test their discoveries in the real world. Other devices aside from PCs, can now link to Internet e.g. mobile phone. With these kinds of developments multimedia files are easily transmitted to students in online learning programmes.

Word Wide Web (WWW)

SearchCRM.com (2002) provides a technical definition of the World Wide Web as all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP). This definition of the WWW is a quantification of strategic technical components of the web. It recognizes all resources, the logic, the place of communicational protocol-http, and the users (though ubiquitous) "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."

This definition strips the World Wide Web of its technical complexities and rather tries to accord the Web a personality through the use of the word "embodiment of knowledge". This underpins the ubiquity of the Web to cut across faculties, and present knowledge, not just in storage format, but also in an active, request-supply form. It poses the challenge that the Web should be built and approached in

humane form, such that education, advertisement, medicine, science, business and information are provided for an in humanely adaptable manner.

2.1.6. Limitation of Online Learning

There are limitations faced by students, instructors, and curriculum developers alike (Bauman, 2002). Some of these limitations include:

- Lack of verbal, and visual cues to help the student when bored, confused or entertained. In a traditional classroom, a teacher could ask after the state of a student in a learning situation. This is absent in online learning.
- Lack of experience in writing assignment sheet and syllabi, instructor style may impede students. The instructor needs to be experienced in traditional classroom delivery and should consciously transport this experience to online teaching, judging at each point, the consequence of actions taken.
- Lack of experience in answering questions sometimes the answer is too short or too detailed or wrongly framed. Constant retraining on techniques may help.
- Lack of experience on the level of contact required sometimes fewer contact hours might make the student drop out. This is a big problem as the instructors may have had e-mails from different sources to contend with. Good performance monitoring can assist.
- The amount of time required to attend to student via email, assuming the number is large can also pose a problem.
- Students do not often have the necessary skills needed. Students need to be persistent and play a more active role.
- Students may not have the ability to analyse difficulty nor grip where to find help. Inability in language or phrasing of questions may lead to answers totally different from those desired.
- Students must be predisposed to read written material in such a way that they can get information. Proficiency in learning by oneself is required as against classroom, which you can hear, listen or see.
- Redundancy in written instruction may de-motivate student. Answering question by email is time consuming and can be boring

- Absence of real time peer group is also a big problem to the teacher. This calls for appropriate chat-group built online. The group must be reasonable and relevant to the objective of the course.

Muirhead (2002a) identifies the following:

- Inability of students to get support when they need it. There might be a delay factor, especially on unanticipated problems that the students may face.
- Students without good Information Technology (IT) skills may get frustrated. It is imperative that any online learner must be well vested in basics, such as Internet search, e-mailing, storage and retrieval, and word-processing, among others.
- Prevalence of unstructured volume on the Web may frustrate the student. Often times, items of information that the students need, though present on the Web, may not have been designed for academic purposes. Search volume might be frightening. Students need to be taught on how to ascertain the validity of these items of information.
- Downloading and printing may be time consuming
- Over information on the Web may hamper assimilation and digestion. When faced with such huge amounts of information, selecting what to read and assimilate could be a challenge.
- Students need to have the necessary connectivity in a constantly changing technological world. Updating to new technologies may incur cost, which could deter many students from continuing.

All in all the limitations are not to speak negatively about online learning, but are established so that instructors and administrators could pay more attention to them and constantly seek ways of eliminating and improving on these barriers.

2.2. CONCEPTS IN MULTIMEDIA

2.2.1. Definition of multimedia

Multimedia has a range of meanings depending on context, and concepts to which it is applied. Multimedia from the etymology point of view is made up of two words, "multi", which stands for "numerous" and "media", plural form for "medium" (Xie, 1997, p. 2). Medium can also mean a "go between", intermediary, communicator, and amplifier as well.

Webopedia (2002) on its part sees multimedia as the use of computers to present text, graphics, video, animation, and sound in an integrated way. Vargas (2002) argues that multimedia means literally, "more than one medium". Therefore anything mixing text and graphics is multimedia. But further argued that multimedia however, usually implies additional features: sound, motion and/or animation, video, interactivity (advanced).

From the definitions above, two important criteria for argument emerge, namely, the concept of multimedia as the "integration" of non-linear elements on one hand and on the other hand the concept of "combination" (mixing). The question is, can we define multimedia from calculus point of view or from the combinational theory where factorials can be found and the different ways of combining the elements determined? Which one precedes the other? It is obvious that a combination or mixing is just descriptive of the different ways in which (r) items may be combined, given (n) items. But to digitally ensure functionality toward meeting stated objectives, there has to be an integration of the media. The combination may be an art, but integrating the media certainly is a science.

Lachs (2000, pp. 2, 3) emphasized that multimedia is made up of multimedia, hypertext and interactivity. Hypertext refers to the way the text on the screen can be linked and distinguished by text colour or a word which transfers the user to screen of connected information. Therefore, (Xie, 1997, p. 3),

> digital multimedia is the field concerned with computer-controlled integration of text, graphics, still and moving images, animation, sound, and any other

medium where every type of information can be represented, stored, transmitted, and processed digitally.

Why Use Multimedia?

According to Lehrer (1996), people retain only 10% of the information they see, 20% of the information they hear, 50% of the information they see and hear, and 80% of the information they see, hear and do; therefore, because the interactivity of multimedia allows people to see, hear, and do, they retain more information. Multimedia also meets the varying needs of people; for example, visual and audio needs are met with graphics, with narration, and visual needs are met with graphics with motion.

2.2.2. Multimedia data elements

Multimedia elements include: text, facsimile (Fax), document image, photograph image, geographic information, fractals, voice command and synthesis, audio message, music, graphs,

Graphics

Graphics are computer-synthesised image also referred to as abstract images. They are formed by objects such as lines and circles, and / or based on some arithmetic calculation. They could be represented by computer algorithm in a revisable manner and can be converted to bitmap, (example Fax) (Xie, 1997 p.13)

Sound

There are three ways of realising sound. The first is conversion from analogue signals either by sampling (or time discretization) or quantization (code-word generation) The second way is through speech or voice the frequencies which lie between 50Hz-10kHz when speaking and 15Hz-20kHz during hearing. There is always a talk burst with silence in between in speech. Computer recognition for speaker independent recognition is ongoing on especially with Voice Adaptive technology. The third way is non-speech sound like music, which is continuous.

Standards for sound are realized through Waveform Audio File Format (WAVE), Musical Instrument Digital Interface (MIDI) and the Microsoft's Video Audio Interleave (AVI). (Aderson, 1991, Xie, 1997, pp.14-15)

Animation

Animation is a simulation of movement created by displaying a series of pictures, or frames. Cartoons on television are one example of animation. Animation on computers is one of the chief ingredients of multimedia presentations. There are many software applications that enable the creation of animations that could be displayed on a computer monitor. (Webopedia, 2002)

There is a difference between animation and video. Whereas video takes continuous motion and breaks it up into discrete frames, animation starts with independent pictures and puts them together to form the illusion of continuous motion.

Full-motion stored and live video

A video is a recording of the visual information accompanied by audio over a period of time at a point in space (Chua & McCallum, 1993, p.10). Video is digitally represented by a sequence of frame with each frames being a digital image sandwiched, with a delay constant between appearances of two successive frames. Sixteen frames per second may give an impression of smooth motion; a movie needs twenty frames per second to give smoothness. Moving Picture expert group (MPEG) and Microsoft AVI provide standards for video (Xie, 1997, p. 16).

Fractals

Fractals are geometric shapes, but self-similar and with fractional dimensions. For example, graphics designers use fractals to generate images of mountainous landscapes, coastlines, and flowers. In fact, many of the computer-generated images that appear in science fiction films and weather forecast utilize fractals.

Fractal emanates from "Chaos", a science that has usefulness in modelling nature, crystal growth and electrical phenomena. (Sjørtken, 2002, p.1)

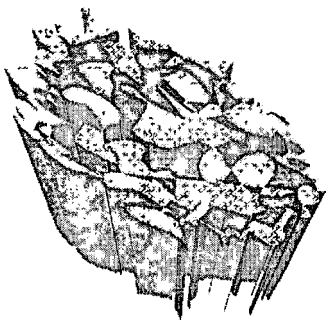


Figure 2.7. Fractal

2.2.3. Colour Representation

Colour is a perceptual sensation (due to different wavelength of light) (Xie, 1997, p. 11) The basic characteristics of colour include luminance which is the measure of brightness of light (emitted or reflected by an object), hue which is colour sensation due to the presence of certain wavelength of colour, and saturation which is the measure of colour intensity. Colour matching can be achieved by mixing an appropriate amount of no more than three other different colours.

According to (Webopedia, 2002) red, green (not yellow) and blue, or RGB represent an *additive* colour system since colour is added to a black background. RGB is the primary colour of light. There is also the *subtractive colour system,* the CMYK, with primary colours of the cyan (C), magenta (M) and yellow (Y), the same colours that are the secondary colours of the RGB system. The letter "K" in CMYK stands for black. On the screen, colours are displayed in pixel; one pixel consists of a set of RGB units (Fujtsu, 2002, p. 1).

2.2.4. Classification of Multimedia

Multimedia according to Xie (1997, p. 6) is classified into captured (e.g. photograph, speech) and synthesized on one hand, discrete and continuous, which are spaced based, and time based (e.g. animation) on the other hand.

Aberer & Klas (1993, p. 6) indicate that multimedia data can also be classified iinto *time dependent* data like audio, video, and animation or *time-independent* data (e.g. text, still images and alphanumeric data types. Time dependent data can only be

interpreted in a constantly progressing time scale. An established time scale enables each time dependent data to be interpreted at a specific time interval.

2.2.5. Benefits of Multimedia

Xie (1997) is of the view that multimedia is easy to understand and easy to use. Though the technology is complex at the background, once it is integrated it can be manipulated by many categories of people, including children.

Multimedia is integrated and interactive. Multimedia allows various media that could be complimentary and compensatory to one another to integrate into a common learning unit. It also provides the much sought after interactivity, and allows learners to create their own knowledge which dovetails into the constructivist idea of learning (Lachs, 2000, p. 8).

Multimedia supports a cooperative work environment. It usually takes a team ranging from instructors, artist, to designers and programmers to design multimedia-learning materials. This provides for cohesiveness and cooperation. Multimedia also supports large audiences providing the needed captivation during learning session, since stimuli are all blended.

2.2.6. Challenges

There are many challenges towards the realization of multimedia, which include, host computing power requirements, data storage and management requirements, human interface usability requirements, network latency and throughput requirements (Xie, 1997, p. 8).

2.2.7. Future of Multimedia

The stage for enhanced audio and video has been set by compression techniques (SPIE, 1991) and standards such as JPEG (Wallace, 1991) and MPEG (LeGall, 1991). The future is expected to offer better file management flexibility at systems and operating levels (Polimenis, 1991) such as: parallelism (Nakajima, 1991), window management (Anderson, 1991), synchronization (Anderson, 1991). Other aspects are real-time requirements (e.g. transmission and decompression of data

(Umemura, 1991), scheduling of resources (Anderson, 1990, p. 820), and architectural issues.

According Ana et al (200, p. 2) MPEG-7 has brought a lot of refinement to multimedia because:

> MPEG-7 aims at standardizing tools for describing multimedia data. MPEG-7 framework consists of Descriptors (Ds), Description Schemes (DSs), a Description Definition Language (DDL), and coding schemes. Descriptors represent features or attributes of multimedia data such as color, texture, textual annotations, and media format". MPEG-7 is currently an international standard since October 2001.

The most important factors that will promote or ebb multimedia future are political decisions, economic supports and social acceptance (Podgorny, 1997, p.1).

2.3. MULTIMEDIA AND LEGAL ISSUES

Without delving much into legal details, every multimedia production is protected under the copyright and fair use laws irrespective of country or region.

It is more permissible to use multimedia materials for non-commercial purposes, for example during teaching in the class, but abuses like copying can still constitute copyright breach. Web pages of multimedia work not copyrighted can be freely linked, but seeking consent from the originators is desirable. Copying large amount outside define limits is not permissible. There are legal implications if the multimedia work market value becomes negatively affected by copying or improper use.

According to Ko & Rossen 82001, pp.180-188), the United States Fair Use guidelines permit multimedia to be use for academic and curriculum development purposes within a two years time frame. In terms of duplicating multimedia work, two copies may be electronically copied.

Inserting links to other people's web pages is not copyrighted, but the owner's consent should be sought first, for courtesy reasons. Up to 10% of text or 1000 words, of work can be copied whichever is less; motion (video and animation), up to

10% or 3 minutes which ever is less; music, up to 10% or 30 seconds, which ever is less; database information, 10% or 2,500 fields, photograph, up to 5 works from the same author and poem, up to 250 words.

Sometimes, an academic institution and the creator of the multimedia work might jointly hold the copyright. A lecturer can still use his work in another institution for teaching.

(See this link for more information: http://www.adec.edu/admin/papers/fair10-17.html)

2.4. ONLINE LEARNING AND MULTIMEDIA RELATIONSHIP

Multimedia has become one of the key factors that are used in promoting online learning today. Integrated multimedia on its part has been widened by modern technologies.

Table 2.2. Comparison of traditional with online learning

	Traditional learning	Web-based learning
Main source of information	Teacher and textbook	Various resources on internet
Format of information	Text	Multimedia
Presentation format	Linear	Hypermedia
Interaction type	Synchronous	Asynchronous / Synchronous
Interaction space	Time / Space bound Classroom	Time / Space free Networked world
Instructional emphasis	Acquiring knowledge	Building knowledge
Objectives	Specific, pre-defined	General, negotiable

Source: Yeung (2001, p. 7)

The points of convergence are here summarised in Table 2.4.1 by (Yeung, 2001). There is now a shift from text only format of information to a multimedia based approach and the linear presentation and learning format to a hypermedia approach. Thus, different styles of learning are supported today, time and space giving way, and learning is theoretically, made available everywhere.

In conclusion, it is clear that multimedia, hypermedia, interactivity, computer networks and Internet has greatly expanded and extend the frontiers of online learning presenting new opportunities.

CHAPTER THREE

USING THE PADDICQAM MODEL FOR ONLINE COURSE MANAGEMENT

3.0. INTRODUCTION

In this chapter, the PADDICQAM model proposed in chapter II is employed in teaching and learning, course materials design considerations, interactive collaboration, quality assurance and management. To provide a direction for the attainment of the objective of determining the usefulness of multimedia when employed in an online learning environment, a case study in freefall lifeboat is selected for application. Some of the concepts in teaching and learning are also examined alongside the model application.

The PADDICQAM model

PADDICQAM is an acronym for Pre-course Assessment, Design, Delivery, Interactive Collaboration, Quality Assurance and Management. This model will be use in illustrating a typical case of online learning course implementation.

Case

The Nigerian Niger-delta is an oil rich belt with various multinational companies, local oil servicing companies, fishing and passengers' ships and boats sailing daily on a radius of 200 miles to the Atlantic Ocean. Accidents and loss of life of personnel are common. To stem this tide the Maritime Academy of Nigeria with the support of World Maritime University is to run a refresher course on the theoretical part of freefall lifeboat on the World Wide Web where students could access online. The practical drills will be

conducted at the Maritime Academy of Nigeria. The purpose of the course is to provide efficient course delivery, serve costs and reduce lengthy work disruptions. Apply PADDICQAM model to the running of this online course.

The course in this case is freefall lifeboat training, and it will be multimedia in nature. Lach (2000) had defined multimedia as consisting of multimedia itself, hyperlinks/hypertext and interactivity. The PADDICQAM model fully supports and extends this definition for training purposes.

3.1. PRE-COURSE ASSESSMENT

The main objective of the pre-course assessment is to determine and establish a reasonable knowledge of the students' or participants' situation prior to the course delivery. Knowledge of this kind can greatly assist in students' management and forestall excessive drop out rates. The following amongst others are included in the Pre-course assessment of potential participants/students.

Bio-statistics. It involves obtaining the students' personal data and earlier educational attainments. Many online operators do this during registration. The information is registered on a database for retrieval when needed.

Language proficiency. Language proficiency tests are administered to reveal the student abilities in written and oral aspects of the language of instructions. For most countries' educational systems, it is a requirement and it should be extended to online learning.

Technologies available. The students' access to technologies must be pre-determined. This will assist in graphics and sound file design specifications, also in data compression methods adopted for transmissions especially in some parts of the developing world where telecommunication infrastructure is low. Access periods, Internet connectivity and browsers at the disposal of the students are also pre-assessed. The access speed is dependent on the infrastructure available, at the country where the student resides. The course administrators can advise participants on technologies updates.

Previous learning experience. Previous learning of the students, whether in traditional setting or in online situation would be useful to instructors and counsellors in the striping the students of previous negative learning experiences thereby elevating the one to a more egalitarian state of being ready to undertake the online course.

Learning styles. Students' learning styles could serve as an important input to the design of course materials. The following learning styles (Rochester Institute of Technology, 2001) are identified amongst many that may exist:

- *Kinaesthetic learners* prefer body motion when learning. They like to write and take notes and participate in demonstration; in maritime learning, they will be happier on a simulator. The teacher can booster the learning situation with written and practical assignments such as assembling of engine parts, examining parts of the freefall lifeboat and other participatory schedules.

- *Visual learners* process new information better when they can see it. Those exhibiting this style of learning easily digest information that is illustrated in diagrams, pictures, graphs, demonstration and site seeing. In online learning, information needs to be converted into graphs, pictures or diagrams to assist the visual learner.

- *Auditory learners* on their part do better when new ideas or information are spoken. The implication is that they will prefer lectures and discussion style of learning than any other style.

- *Environmental learners* are like workers who need the hygiene factors as well as the motivators to do their work. The environmental learner will have difficulty learning if the environment is not conducive, such things as lighting, room temperature and other hygiene factors affect their learning.

The adult learner is mostly a self-paced, self-timed and self-directed learner most of the time. A range of issues are involved in motivating him/her. These range from those that capture interest and curiosity to those that portend negative consequences. Survey questionnaires can provide meaningful basis for inferring on the learning styles of the prospective learners.

A particular course can also impose different learning styles on the student. Take the case of the freefall lifeboat for example; the students or learners will be involved in auditory, kinaesthetic and visual learning compulsorily because the different styles are embedded in course objectives.

Thinking style is also very vital aspect of the learner that could be pre-assessed prior to the beginning course. It might serve some useful purpose to identify the following thinking styles.

- Conceptual thinkers relate better when they have the entire picture of the concepts revealed to them. They try to relate the current concept to other concepts previously known. They are satisfied when they are conversant with how things work. Take freefall lifeboat for example, the conceptual learner will easily pick sense of it when the whole concept is explained and the comparison is drawn with fast rescue boat.

- Creative thinkers believe in deducing their own meaning of the issues being taught, by expanding, identifying problems and synthesizing solutions within the subject matter. They are inquisitive, seeking to know why things are the way they are presented.

- Practical thinkers want straightforward knowledge and transfer of skills that could be applied to real practical problems. They constantly seek for the shortest most efficient way to do things.

- Reflective thinkers on their part reflect subjectively on ideas and issues presented to them and weigh them against related or similar issues and ideas. They are interested in the effect the new idea will have on their feeling of other issues.

Many adult learners who will be participating in the online learning process may exhibit one or a mix of these lines of thinking. Thus the course instructor must be willing to provide for and sustain interest and understanding while still pursuing the course objectives. A survey questionnaire can also indicate the thinking style of students. The information so collected is stored and analysed via computer. Useful

inferences about the students could be obtained in addition to recommendation by referees. Thus students' management could be greatly enhanced.

3.2. DESIGN OF COURSE MATERIALS

The specification and the design of multimedia course materials is the next stage in the PADDICQAM model. This stage will involve experts in curriculum development or modification; instructors to design the materials for publishing on web pages or slides, and computer technicians to fit the course materials to the technologies for publishing.

Design personnel and facilities

The course design personnel will include curriculum experts, instructors, artists, and computer technicians. Facilities will include: up to date workstations (hardware), authoring tools, Web education management systems (WEMS), e-mail facilities, Internet connectivity, supporting software (e.g. word processor, spreadsheet and databases), printers, reference materials, and other facilities deemed necessary to facilitate the work.

Curriculum development

In the quest for teaching and learning in today's knowledge constructing world, curricula and syllabi are very vital. A curriculum does not only serve as a minimum expected level of achievement, it is also a foundation for which knowledge could be constructed upon. Curriculum has, implied in it, the direction the course must follow and the standards for assessment and evaluation.

Fisher & Muirhead (2001, p. 15-27) identifies the major constituents of a curriculum to include the context of the course, the rationale of the course, the aims of the course, external and internal requirements, reference materials, the syllabus objectives, contents or performance objectives, assessment methods and course evaluation. Applying this approach to course design could be useful. In the paragraphs that follow, the application of this approach to the development of free-fall lifeboat is illustrated.

Context: The course context is an indication of knowledge about the current situation of things. For the freefall lifeboat course, it is set in the context of safety of life of shipboard personnel in emergency situations in the Niger-delta.

Rationale: The course rationale on its part gives a justifiable reason(s) why the course should be run. Given the proneness of a sailing ship to emergency and sometimes hazardous situations and the need for international accredited uniform training for safe rescue of personnel on board, based on international concerns, expressed in SOLAS chapter III, Life Saving Appliance Code (LSA), STCW 95, an internationally standardized training, knowledge and skills in freefall lifeboats becomes mandatory.

Aim: The aims of the course are to familiarize the students/participants with the construction, functions, and use/usefulness of the freefall lifeboats in emergency rescue of shipboard personnel.

Participants. Participants means the learners, people for whom the course is designed, the trainees, or students. In this case they will be officers currently serving on board ships in the Niger-delta belt.

Instructors: This may refer to lecturers or teachers. The instructors will include captains and chief officers who are experienced in shipboard safety.

Internal Environment: The environment where the course will be taught, the resources and technologies available denote the internal environment. The course will be delivered on the World Wide Web to companies who have registered their personnel for it. The participants must have reasonable access (enough for learning) to a personal computer, with graphic adapter and sound card, an e-mail facility a browser (Internet Explorer or Netscape), word processor, spreadsheets, Internet connectivity and access to printer. On the side of the course provider hyperlinks will be established to International Maritime Organisation websites, SOLAS and STCW 95, maritime related electronic libraries, journals and databases.

External Environment: The external environment constitutes issues that though not internal to the course, would affect the learning situation. Examples of such are: IMO and its instruments like SOLAS chapter III, LSA Code, STCW 95, Shipping companies' policies and manuals, maritime training institution facilities.

The units' objectives and the contents expressed in terms of achievable performance objectives are illustrated in the Table 3.1. The syllabus is designed based on the manual of ERNST HATECKE (1999).

Table 3.1. Objectives and contents

General objectives	Performance objectives (contents)
Know the handling and use of freefall lifeboat. Content: Knowledge of handling and use of the freefall lifeboat.	At the completion of this unit the student should be able to: • Describe and explain the launching arrangements • Understand the launching rules • Know when and when not to put on the lifejacket • Differentiate launching in emergency and drill • Understand the lifting back of the boat

Table 3.1. Objectives and contents contd.

General objectives	Performance objectives (contents)
Understand and appreciate stowage plan of equipment. Contents: Knowledge on how the freefall lifeboat is stowed.	At the completion of this unit the student should be able to identify and know the purpose of the: • Painter • Sea anchor • Water/provision/inventory • Battery • Boat hook/car • Emergency tiller • Fuel tank • Fire extinguisher • Bile pump • Key for fuel tank cap and seat mounting screws
Understand the procedures to follow on emergency alarm or on drill. Content: Ability to organize drill and knowledge of procedures during emergency.	At the completion of this unit the student should be able to know and understand how to: • Proceed to the boat • Disengage the boat • Disconnect the battery charger • Board the free-fall lifeboat • Use lifejacket • Close all hatches and openings • Fasten seat belts as soon as seated

General objectives	Performance objectives (contents)
Understand the launching operations Content: An understanding of actions to be taken during emergency.	At the end of the unit the student will be able to understand how to: • Close the valve screw • Operate the hydraulic pump • Launch the boat down the ramp • Make an emergency release • Replacing the boat in the launching ramp
Understand and know recommended maintenance procedures and time. Content: knowledge of timely maintenance procedures.	At the end of the unit, the student will be able to know how to: • Charge battery from ship and solar generator • Perform checks on electrical installation • Perform checks on time on engine • Perform checks on hydraulic release gear • Perform miscellaneous checks

Course Handouts

Course handout and reading materials are detailed explanatory descriptions and illustrations of the contents of the freefall lifeboat as indicated in the syllabus in Table 3.1. The contents could be compressed into a portable distribution file (.pdf) and linked to the main menu, where students could download and print.

Screen specification and design

Online learning relies heavily on appropriate and humane human computer interface. It is therefore imperative that screen designs should encourage learning and not discourage it. The adaptability to different background colours is desirable for flexibility and to cater for students that may have problem with a particular set of

colour scheme. Also, the number of learning frames should be minimized as much as possible. Consistency in fonts, fonts colours and background colours according to Muirhead & Fisher (2001) can greatly enhance learning. In screen design, font should be less fanciful and more legible to the students. After designing every page or slides satisfactorily, they will be hyperlinked to the homepage. The homepage will be the introductory page containing menus and sub-menus, introductory labels, and copyright information, frequently asked questions as well as date of latest update. Typical examples of screen displays are illustrated in Fig 3.1. and Fig. 3.2.

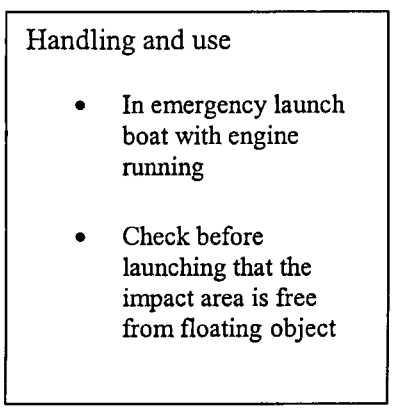


Figure. 3.1. Illustrations of screen slide

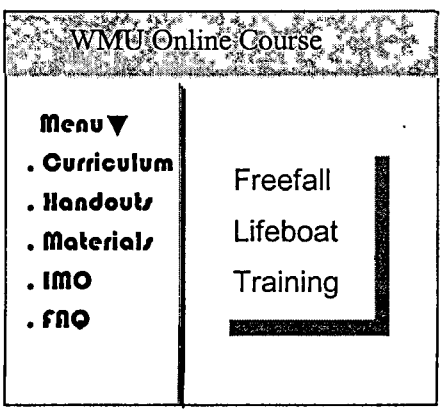


Figure. 3.2. Homepage screen design.

Hypermedia design specifications.

For an online learning that will be web-based, it is necessary to specify the different media types and the number of hyperlinks that will be required. The media type selected and the number of hyperlinks so desired are useful only in their relevance. They should not be a barrier to the designer or the student; hyper mediation exists to ensure different styles and non-linear learning and should not be excessive if unnecessary distraction is to be avoided. The major contents should be divided into contiguous pages or slides as the case may be and links should be established amongst them. According Assafalg et al (2002), information should be allocated different media types in a manner that suite user-perceptual capabilities. In pursuance of this, they adopt the Sutcliffe5 design taxonomy which classifies the conceptual nature of information into eleven types (Visio-spatial, physical, composition, event, action, procedure, causation, state, description, value and

abstract and organizes audio into (realistic, non-realistic, still moving image, audio and linguistic, photographs, drawing speech and 3D graphics).

Considering the curriculum specified in Table 3.1., ten major contents objectives stands out. The specified media types are shown in Table 3.2.

Table 3.2 Media type specifications.

Content	Media types
Handling and use of freefall lifeboat	Text (description of handling and use)
Stowage plan of equipment	Graphic (drawing), text (integrated for labelling)
Description of free fall lifeboat	Text, graph (illustration), picture, text for description
On Alarm	Animation (animated person goes into the boat) or video (actual streaming video is used), text for operation description
Launching system	Animation (closing of hatches) or graphic could be used, text for description
Emergency release	Animation (showing freefall from ramp, hydrostatic release), simple graphic for diagrams, text for descriptions
Emergency tiller/Radar Reflector	Graphics (storage, radar reflector mounting), animation can show tiller mounting
Engine starting	Graphics (steering wheel board, ignition speed and gear box lever), sound (engine starting sound), text for description

Content	Media types
Charging battery	Graphics (drawing battery socket), text for operation description
Recommended Maintenance	Text (Table of recommendations)

If the pre-assessment of the population indicates good infrastructure, then sound could be used to accompany and describe each operation in addition to text.

Specifying hyperlinks

Hyperlinks allow sequential and non-sequential linkage to items specified. Many hyperlinks use text. Linked text is formatted with colours and underlined. Once an object is Http supported, be it sound animation, or image, hyperlinks can be established to it according to Cyberskills (2002, p. 86). Internal hyperlink is connected to pages or files inside the web. Internal hyperlinks also make it easier for students to navigate and to move to different location within the web.

External hyperlinks are links to other websites or pages in other websites. Also there should be an e-mail hyperlinks on the learning materials so that the learner could easily send a mail if there are course problems that need to be resolved. Hyperlink exist to enable return to path for – backtracking, homepage, overview of diagrams, and guided tours

Fitting to technology

After the various aspects of the course have been specified and designed, they are fitted to technologies, graphic and sound files are compressed, and the materials are transferred to a server. The product is tested, errors noted, corrections made, before the materials are published.

3.3 DELIVERY OF COURSE

Delivery is the stage in the PADDICQAM model where the main teaching and learning process occurs, after so much work have been put into other stages. It is

with the instructors that this responsibilty lies.The instructors needs to be constanly reminded of the mission of the training programme, in this case the freefall lifeboat training aims at achieving internationally accepted competence in safety of shipboard personnel. Being the instructors in an online course will entail is much more involving. The instructors must be willing to familiarize themselves with technologies, respond to e-mails and collaborate patiently with students.

The teachers have to equip themselves with currents instructional processes and methodologies. They must have reasonable knowledge in their field and must be willing to interact with colleagues to share experiences and knowledge discovered. Motivating students is the hallmark of any good teacher. Students require that instructors should anticipate and correct anticipated problems and must be willing to adapt their materials on reasonable request(s) from students. Whatever delivery (tutorials, drills, games, simulations) approach is used, feedback from students plays a central role in course delivery.

Building the virtual classroom

The classroom is where learning takes place and must be conducive and hold expectations for the learners. A good and effective classroom should be devoid of barriers and noise. The screen displays should enhance learning rather than discourage it. The availability of the necessary learning tools and materials and links to where learners could find materials can greatly enhance students' learning. The classroom should provide the learner with the opportunities to test their knowledge, practice tasks, and apply new ideas learned according to Rochester Institute of Technology (2002). The case at hand (i.e. the freefall lifeboat) will require rich media, and the instructors must be willing to provide timely responses to student's requests.

Schedule design

It is pertinent to design events and contact schedules for the smooth running of the freefall lifeboat online course. The information in Table 3.4. indicate some useful schedule points.

Table 3.3. Schedule of event in online learning

Course	Instructor	Instituition
Course number Course pre-requisite	Name and biostatistics of instructors	Grading policies course policy on issues such as late assignments
Course objectives, goals, course calender	Contact rules e.g. time, length of email, telrphone calls	Policies on admission, electives and examination certificate award
Course calender, schedule of conferences, linkages to library, database, and MO.		Schedule of extra-curricula activities.

Assessments.

Assessment has been a great motivator to students through the ages and it has been fundamental in promoting meaningful learning. The freefall lifeboat course emphasizes continuous assessment in the belief that it will provide the necessary motivation on a continuous basis.

Students tend to put in more effort when there is a test or examination at hand. Assessment should be planned and administered in such a way that the students' genuine efforts come out. It is expected that assessments remain fair and equitable regardless of prior achievement, gender, race, language, or cultural background. Consistency with the curriculum tasks that are necessary to master the course, and a range of behaviours desired should be demonstrated in assessments.

According to Muirhead & Fisher, assessment can preparative (before instructional delivery), formative (during instructional delivery) or summative (after instructional

delivery). Test and examination whichever method (essay, multiple choice, select or fill in the answers, pass or fail) of measure is used, should be consistent, valid and practicable.

Evaluations

After course delivery, collecting information from students about how the course went can greatly impact on the design and improvement of future courses. Evaluation should be planned and the systems used in extracting students' opinions, such as questionnaires, interviews and observation diaries properly designed. The results of the evaluation after analysis should also be utilized effectively.

3. 4. INTERACTIVE COLLABORATIONS

In the PADDICQAM model the next stage after course delivery is interactive collaborations. There should be good and adequate interactions between faculty and student, student-to-student and group to instructors in synchronous and asynchronous mode. It is pertinent to note that interaction is not just clicking hyperlinks or responding to emails at longer-than-required periods. For interaction to occur, people must collaborate. They must be brought by well-focused schedules to collaborate. Consider the following conversation between teacher and two students:

> Teacher: A computer can be defined as an automatic machine.
> Student K: Why is a computer an automatic machine?
> Teacher: Because it works under the action of programs stored in its memory
> Student P: What is a program?
> Teacher: A computer program is a set of instructions written in programmable language, which the computer obeys to process data into information.

Obviously through interactive collaboration the definition of computer, which formerly was an "automatic machine", has been broadened into an automatic machine that works under the action of stored programs to process data. The students have participated in the creation of their own knowledge while the teacher served as the integrator of the knowledge.

The freefall lifeboat's contents can be better learned if the students are made to share their experiences in a well-focused manner. Many of the students might have had experiences, many may not, and newer students may ask questions or pick interest in the freefall lifeboat components that the experienced students have never thought of. The teacher then integrates these various forms into a more concrete body of knowledge. Thus at the end of the collaboration, the students will leave the classroom with well-balanced ideas. Interactive collaboration exists to fulfil the following amongst many objectives; provision of diversity of ideas, achieving higher thinking order, skill building, increase in creative responses, teamwork and interpersonal relationship. According Rochester Institute of Technology (2001, p. 2):

> The amount and quality of interaction between the student and instructor and between the students determine more than any other factor the extent to which students feel that a distance education course is better or worse than a traditional course. If the instructor can cajole or coerce students into a collaborative approach to learning, they will share ideas with each other in a way that is seldom or never seen in the traditional classroom.

Bonk (1998, p. 150) divided interaction into six levels. The level zero interaction occurs at the level the student uses the computer, for example clicking hyperlinks and so forth. Level one is where e-mail and delayed message tools are used to build faculty to student and students to faculty relationship. It is a communication mode that is useful for assignment giving, sending reminders, scheduling, long distance correspondence, and document feedback. There should be clear-cut policy on e-mailing (i.e. the apparent reasonable time for e-mail replies established to regulate faculty and students).

The level two interactions consist of remote access and delayed conference tools that allow the user to remotely control and update documents irrespective of geographical location or time. Level three is composed of facilities that allow real

time dialoguing, multiple users to cross exchange ideas and brainstorm simultaneously. Here experiences in freefall lifeboat safety are presented and shared Level four on its part presents the ability for two or more people to make changes to a shared text document at the same time. This will allow changes made to a shared handout in freefall lifeboat by one person to be seen by all the participating students. Level five encompasses real time multimedia or hypermedia collaboration and include document sharing of level four as well as hypertext, graphics, video, images, music, speech, and animation. The freefall lifeboat online course should implement all the levels using technologies like Netmeeting, chat systems, bulletin boards and groupware to provide the needed collaborations.

The next reasonable thing to do in any collaborative environment is to divide the students into manageable groups of say three, but not more than ten for effectiveness. Provisions should be made for "too fast" students or problems making students who may want to hijack these processes. A group leader will normally be assigned in students to students' collaboration situation for regulatory purpose. The slow students would be identified and assisted. Interactive collaboration will require effective coordination and management.

3.5. QUALITY ASSURANCE

Quality Assurance implies quality control. The PADDICQAM model insists on quality control. Every institution involved in the training of manpower for the maritime industries, whose government is a party to the revised STCW 1978 popularly referred to as STCW'95, is under obligation to ensure that its quality standard system is evaluated periodically. Under section A-1/8, a 5-yearly periodic evaluation by auditors, external to the organization is required proposed according to Muirhead (2002b, p. 1 & 2).

The major items for evaluation range from all quality activities, application documented procedures, the documentation of the results, the communication of the results of the evaluation to the appropriate areas, to the timely correction of noticed

deficiencies. The ultimate aim of quality assessments is not to invalidate set objectives, mission or vision, but to ensure that in a simple way the entity does what it had laid out to do. The assurance of quality should be pursued with reference to the nominations in (A-1/8, B-1/8) and sub section 6, 7, and 8 of section B-1/8 of the Code.

The freefall lifeboat course as proposed in this chapter will run within an institution and is quality systems and policies are intrinsically linked to that of the institution. In performing an audit on the online course the following key areas will be explored and variances to their stated objectives noted:

- The organization, size, mission statement, aim and objective, corporate plan number of staff and students.
- Statements of quality assurance, quality manuals and reviews that had been done to improve the system previously
- The design process, arrangements for design of programs, organization of the design process, adequacy of staff, adaptations to changes in industries, use of modern technologies to enhance operations, course modules review, relationship between academic planning and allocation of resources, as well as sustainability of the programs.
- The teaching and learning process, the admission systems, the quality of teaching staff, relationship with other faculty members, willingness to learn and adapt to technologies, the extent of participation in interactive collaborations, the application of different media to effect better learning environment, and learning materials' control.
- The assessment process, realization of curriculum specifications through assessment, competency and certification assurance, consistency in marks awarded by internal and external examiners, the realization of national accrediting bodies expectation through assessments, and relationship between the internal systems and external bodies with interest in the assessment.
- Staff engagement policy and procedures, confirmation, upgrading, appraisal, promotion, staff monitoring procedures and staff development policies.

- Technological policies, Internet connectivity, upgrade, software upgrade, knowledge improvement on technologies, research and cost management.

Sources: Muirhead (2002), Quality Assurance Agency for Higher Education (2002)

These and many other enquires should be sought and the current status documented. Management on its part should study the reports and effect corrections to identified deficiencies, so that the quality standards and mission as well as vision of the institution and the online course will be sustained.

3.6. MANAGEMENT

The PADDICQAM model prescribes that management should be present at all stages of the model. The effective involvement of management at every stage of the model creates efficiency, but fosters job satisfaction, offers leadership; motivates staff which in turn transcribes to students' motivation. Though faculty is separated in online courses from students, personality can still be transmitted through a show of interest. Management leads the way in this direction.
Management starts by establishing a business or corporate plan, which include the online learning mission (what it hopes to achieve), vision (where it hope to be in future), the strategies, including market strategies, short term and long term objectives of the online learning, and staffing policies.

Management establishes responsibility structures, source for funds, manages cost components (fixed cost, variable cost, marginal cost), determines marketing and pricing policies and establishes profit utilization mechanism. Management must communicate, so that instructors can communicate and do their work effectively. Management also has responsibilities for legal and copyrights matters within the online learning system. Finally everything dovetails into management, effectiveness, efficiencies, and success, must emanate from management.

CHAPTER FOUR
A SURVEY OF THE AUTHORING PROCESS

4.0. INTRODUCTION

The authoring process is the hub of any interactive multimedia online materials creation and delivery, meaning that it should be understood and properly applied. Chapter four will focus on providing a balanced perspective to the issues involved in an authoring process. Using a selected authoring tool (Director 8.5), with an application example in free fall lifeboat, the authoring process will be described. The major objectives of the chapter are: examining a selected authoring tool and providing a comparative analysis on the strengths and challenges associated with authoring tools.

4.1. OVERVIEW OF AUTHORING AND TOOLS

Authoring tools are application software with interfaces designed to simplify and reduce significantly the huge syntax logic and labour that have been associated with the creation of multimedia materials using programming languages. Authoring tools use simplified interfaces to offset complexities of full-blown programming languages thereby serving as alternatives, with less steep learning curves. In typical authoring systems, there are ample arrays of routines for combining and integrating multimedia elements such as text, graphics, sound, animations and video. Facilities also exist for the building in of answer judging mechanisms and students' control functions (Alessi & Trollip, 1995, p. 341).

The success of an authored piece lies in good planning; the basic rules governing programming can be helpful. Errors and omissions can be avoided by drawing up

plans and flowcharts. The structure of the design should be sectioned into modules (even if they are frames) and the relationship between modules diligently established. Planning and anticipating (or judging) what the students' response and feedback might be, should be carefully determined.

Graphics, sound, animation and video are central to a multimedia piece; therefore a plan for the type functions and subsequent inclusion of these components should be drawn. The components can be created within the authoring tool, or can be imported mostly from other graphic packages, Web or Internet sources, scanners, digital cameras, and video recording devices. The process of authoring also requires that adequate documentations be undertaken to preserve information that will be useful during course implementation and reviews or revisions.

During the design and test stages, the designed course materials must be checked for syntax and semantic (logical) errors at every stage. Moreover, the use of step-by-step execution, flags to alert on usual situation(s), numbering display and the incorporation of online comments will assist in tracing and identifying problems in the designed course. Fixing the problems might not be as easy as it looks as new problems may emerge during the correction process.

It is part of authoring that support materials, such as student manual or help contents be provided in a file that students can refer to when they are in a fix. An instructors' manual with information that will enhance the instructor's course delivery must also be provided. A technical manual, which will serve as the depository for all the design specifications, program details and files, must also be preserved for the future.

For courses that are designed to be Web-based, it will be more plausible to use Web-based authoring tools. Examples of such tools include: Microsoft FrontPage, Macromedia DreamWeaver, Claris Homepage, Adobe PageMill, Homesite. The attributes of these tools enable them to be utilized with Internet and Web-based technologies.

Every course at the delivery stage must be administered and managed. Authoring tools are designed to support issues pertaining to course management. A good approach to course materials, students, instructors, and miscellaneous course attributes management is through the use of Web-based course management tools. These tools are designed for educators and present tools for instructors, learners and administrators to properly manage their teaching and learning interests, according to Dabbage (2001, pp. 1-5). The features of Web-based course management tools can permit instructors and learners to contribute their ideas to course materials, engage in collaboration and modify content. Web-based course management tools also advantageously integrate multimedia presentation tools, self-assessment tools, note-taking tools, management tools, authoring/publishing tools, and collaboration/ conferencing tools.

According to Dabbage (2001), Web-based course management tools have an application in distance education programs, Web-based instruction, knowledge networks, asynchronous and synchronous learning environments, distributed learning environments, communities of practice and learning communities. Example of Web-based course management tools include: WebCt, Blackboard, TopClass, Virtual-U, Lotus LearningSpace, WebMentor, Convene, Embanet, Real Education, eCollege.com, Symposium, Softarc's FirstClass, Serf, and Eduprise.com.

4.2. SURVEY OF A SELECTED AUTHORING SOFTWARE- (DIRECTOR 8.X PROGRAM'S LAYOUT)

In order to demonstrate an authoring process using a multimedia tool, some features of Director 8 (one of the most widely used multimedia authoring tools) will be examined concurrently in the description of an application (the freefall lifeboat).

Micromedia Director 8.x is a multimedia-authoring tool that supports the creation of interactive media for the World Wide Web, compact disc, information kiosk, presentations, and interactive TV. Director provides an interface that allows the combining and integration of graphics, sound, video, text and other media in any

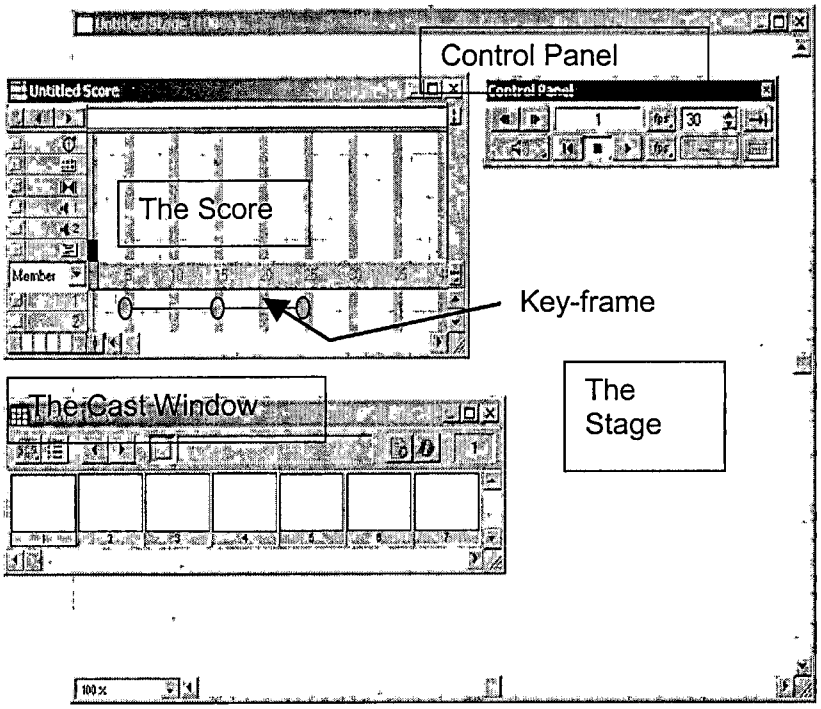
sequence. Director's scripting language Lingo can also be used to add interactive features. A program created with Director can also be self-running.

Director is based on the movie/theatre production metaphor. All the action takes place on the *stage* and the cast members appear on stage as *sprite*, in a timeline called the *score*. The score specifies where and when the cast member or sprite should be. Each movie, cast member, sprite, and point in time (*frame*) can also have its own script and lingo can be used to achieve this. The designer becomes the director of the movie. The piece of work created by the designer in Director is called the movie. A movie can be a simple graphic, animation, or motion pictures with interactivity (using Lingo). A movie is given qualities as deemed fit by the designer in terms of stage size, position, colour and attributes via the Property Inspector.

4.3. MENU SYSTEMS AND TOOLS FOR MANIPULABILITY

In creating and editing a movie, the designer will work principally in four key windows making up the Director work area. These are: the *stage*, the *cast*, the *score* and *control panel* windows. These are illustrated in figure 4.1.
The menus provide a standard user interface and ensure that menu items and other interface elements are consistent throughout the program. Most Director commands can be accessed through the menus as well as keyboard shortcuts.

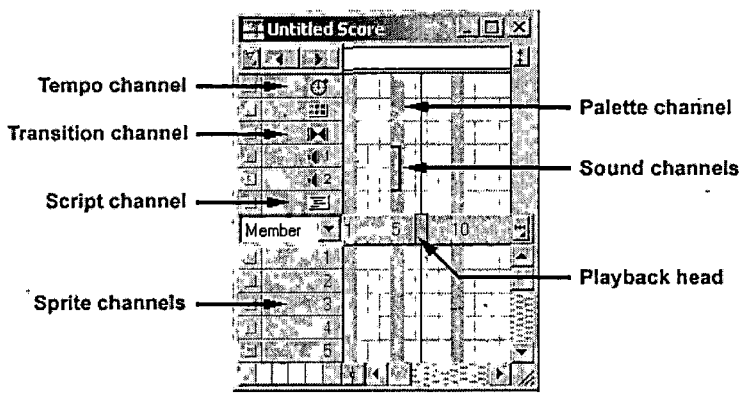
- *The cast window* is where the media elements like sound, graphics, digital video, text or other Director movies are stored. The cast window acts as an offstage area where the cast members wait until they are called on stage. The same cast members can appear on stage at the same time in multiple places.



Source: Macromedia Training CD

Figure 4.1. The four major work areas of Director 8.5.

- The *stage* is where the action occurs, where the movie plays.
- The *control panel* provides the movie control buttons just like in a VCR
- The *score* provide the means for sequencing and synchronising of the media elements. It is like a script that directs the cast members on where and when to appear on the stage, what to do and when to exit. The score window is illustrated in Fig. 4.2.



Source: Macromedia Training CD

Figure 4.2. The Score window

The features of the score window in Fig. 4.2. are explained in the following descriptions.

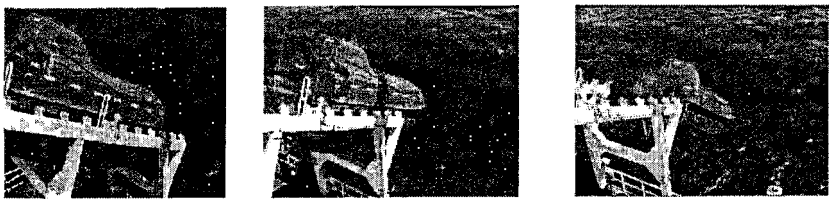
The horizontal rows in the score are called channel and are used to hold the sprite for control of media. The *tempo channel* is used in regulating the speed of the movie it plays, the number of frames per second to be displayed and auto control (movie can be paused until say, a mouse is clicked or for other events to occur using the tempo channel). *The palette channel* sets the colour the movie will use. The *transition channel,* on its part enables the setting of screen transition such as drive in, fade or wipe. For music, sound effects and voice-overs, the *two sound channels* permits these to be added. *The behaviours channel* (sometimes called the script channel) provides a place for frame script writing. Frame script offers interactivity. *The frame channel* or *timeline* is the block area containing the numbers 5, 10, 15, 20... The number identifies the frame number and the frames are numbered from left to right.

The *playback head* indicates the frame that is currently being displayed on the stage. Sprite is a representative of a cast. The numbered channels are *sprite channel,* which allow the assemblage and synchronization of all elements e.g. button, additional sound, graphics, background, text and digital video. There is the Property Inspector, which integrates much of the behaviours and functions, as well as enabling movie attribute and properties to be set or assigned from a single platform.

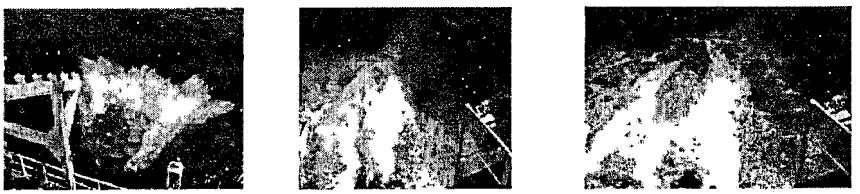
Sources: Gross P. (2000), Utian D. (2002)

4.4 TYPICAL CASE EXAMPLE

In chapter III under curriculum content (performance objective) where "the student should be able to make an emergency release", the multimedia types for this content were defined to include: animation (showing freefall from the ramp) and sound (a splash sound indicating the boat coming into contact with the sea). The following example will describe how a freefall boat from ramp to the sea can be animated using pictures created, scanned or edited in another package (e.g. Microsoft Photodraw V2) and imported into Director 8.



a. On the ramp b. Released c. Free fall



d. Splash e. Totally submerged. f. Successful

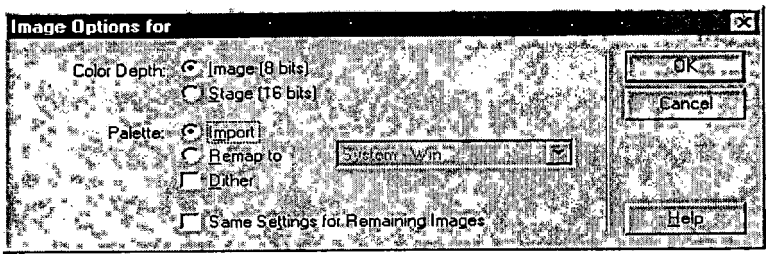
Source: Armadillo Marine (2001)

Figure 4.3. Picture frames showing different transitions in the freefall lifeboat release

The picture frames that will be used are illustrated in pictures a, b, c, d, e and f of Fig. 4.3. Director will be used to demonstrate the implosion and the beeping of the splash down sound as the boat comes into the sea.

Before describing the typical example, the basic assumption is that the designer is conversant with menu accessing, object or item selection, dragging and cut and paste functions.

This example uses Director to animate changing images of the freefall lifeboat. Assume the picture slides in Fig. 4.3. were edited in Microsoft PhotodrawV2 and saved as a .JPEG files of equal dimensions, then brought into Director. Once Director is running, the files could be imported by choosing *File>Import* and the six images selected. Fig. 4.4. being the window for the image option will appear. The designer then chooses *Colour Depth – Image {8 bits}* and *Palette – Import* and Clicks the *OK* button.



Source: Macromedia Training CD

Fig. 4.4. Image option window

The sequencing of sprites can be achieved through the copy and paste or the *Modify > Reverse Sequence* could be used to modify the sequence.

1. After importing the first image, the Image option window will pop up again when the next image is imported. The designer then choose *Colour Depth –Image {8 bits}, Palette-Remap to* (see Fig.4.4.), to make the palette of the subsequent imported image the same as the first and ensure that the remaining images have the same palette setting as the first. Then the next operation takes place in the cast window.

2. On opening the cast window, seven cast members will be found. These are the 6 images with their palette properties included as the 7th cast member. To make the images into a single sprite that is automatically placed on the score, the designer will then choose *Modify > Cast to Time*. This will ensure that a single sprite containing the six images is placed on the score.

3. The next stage is to create an animation of a single cast member comprising six images. The designer selects the entire sprite and while holding down the mouse button drags it to a vacant slot in the cast window. A window will pop up allowing the designer to give the film loop a name. To complete the design the designer should delete the sprite, drag the film loop into the score and extend it to a reasonable frame, say 40.

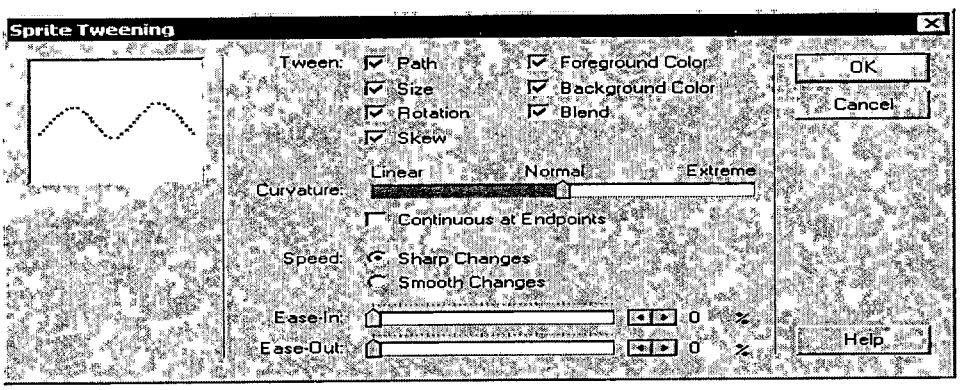
4. Using the control panel the movie can be played, fine-tuned and saved.

5. Sound can be inserted say before/after the Splash frame (Fig. 4.3. d) to indicate the lifeboat coming into contact with the sea. Let the splash image be in key-frames 30 for example, then, a splash (splash.wav) sound could be inserted between frame 30 and dragged to frame 35. Thus, the splash sound starts playing at frame 30 to 35. This is just a typical description of imploding multiple images, one of the features that Director 8 provides. Other modules of the freefall lifeboat can be designed using similar or many other features and processes that Director provides.

Animation can be created in Director by using tweening, step recording and real time recording capabilities.

Tweening is Director's term for 'in-betweening (in-between)' where the sprite properties at key-frames are defined by the designer and Director is allowed to work out the in-between steps. The designer has the choice to adjust the way Director tweens objects as follows:

1. Selecting the animated sprite by clicking anywhere between 2 key-frames.
2. Choosing *Modify* > *Sprite* > *Tweening* opens a dialogue box that allows the choice of properties to be tweened as well as how they are tweened.



Source: Macromedia Training CD

Figure 4.5 Sprite Tweening window

3. On clicking and dragging the curvature slider to the extreme left, the path diagram in the top left corner will become more linear.
4. Pressing OK and then playing the movie.

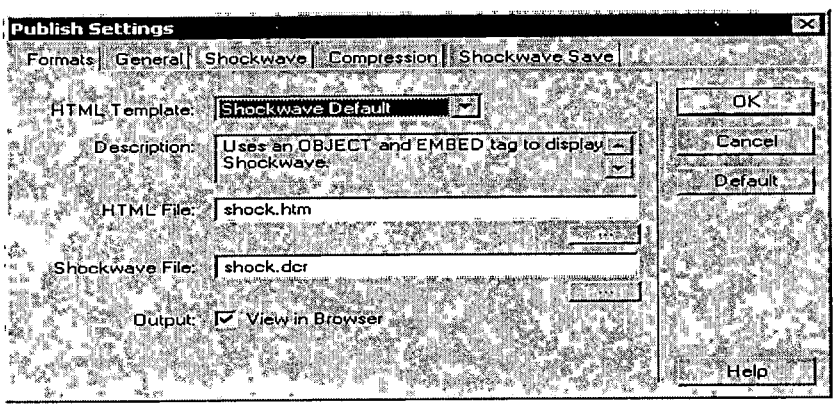
Thus the same effect as the one described in the example above could be achieved by tweening a lifeboat picture against a background of a ramp and the sea by setting a linear flight path.

Step Recording is another animation approach where the new position/sprite property is worked out at each frame. By selecting the sprite and choosing *Control* > *Step Recording*, it will be possible to step forward 1 frame using the Control Panel. At each subsequent frame a key-frame will automatically be created, allowing the setting of new sprite properties.

Real-time Recording is where the sprite is dragged around on the Stage and Director will record the path in real-time, creating key-frames at appropriate locations. For example, a frame of the lifeboat can be dragged along the flight path on the screen and the locations will be recorded. The Real-time recording capability can be accessed through *Control* > *Real-time Recording.*

Publishing the movie

According to Gross (2002) Shockwave is the latest technology for delivering interactive multimedia and large sound files over the Web and intranet. Shockwave Director delivers high-impact movies to the World Wide Web. Director movie is saved with .dcr file extension, which compresses a movie into a smaller file. Shockwave will decompress the movie at the user's browser.



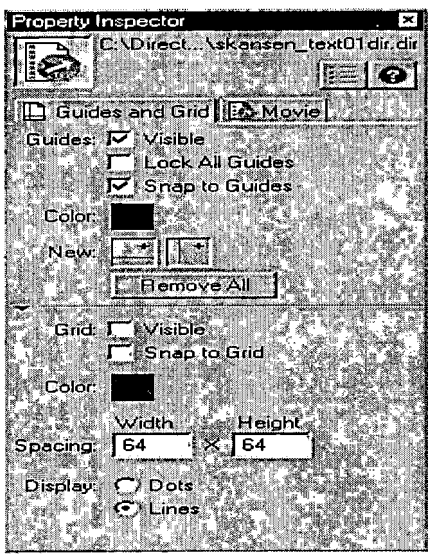
Source: Macromedia Training CD

Figure 4.6. The Publish Settings window.

If the movie was prepared to stream it will begin playing at the arrival or any number of frame(s), while other frames download at the background. With the publish setting, the movie can be configured variedly, but the Format tab in the publish setting provides the default settings. On the HTML template the designer selects the Shockwave default to apply the default settings. The information in the Description dialogue box indicates that the movie uses object and embedded tag scripts, which enables the movie to run in Netscape and Internet Explorer. By default the output file will be placed in the same folder as the source.

Consequences of using Director 8.x

Director 8 is a multimedia course materials creation tool that is largely used in the industry. It integrates a lot of functions and makes it possible for a single cast to be made up of different other casts with their scripts or sprites. The property Inspector also integrates many other functions that used to be disparate. However, in online course delivery, Director 8 cannot be used for course management (admission, online marking, records) but materials created in Director 8 and published as Shockwave can be integrated into Web-based course management tool.



Source: Macromedia Director 8.5.

Figure 4.7. The Property Inspector

Creating course materials with Director 8 still requires some degree of knowledge of the package and adding more interactivity means proficiency in the Director scripting

language Lingo. The consequences are that an online instructor must learn the technology, or rely on designers for the design of online course materials.

Expressing the actual intentions of the instructor in the designed course materials might be difficult and will depend to a large extent on whether the designer has some degree of knowledge in instructional techniques as well as the extent of understanding the instructor's actual intentions and expectations. There are always misunderstandings. Thus, goal incongruence often results between the instructor's goals and designer's product.

Getting exactly what the instructor desires might mean design after design leading to the replication of cost, time, energy and disruption of schedules. The fear of these implications would mean that the instructor has to settle for a poorer the envisioned course materials. If the designer is well versed in the mix of instructional methods and authoring technologies, a resultant product better than the instructor's expected average might even ensue.

However, the solutions to these observations will still depend on 'technologies interface improvements' that will reduce the current steep learning curve associated with high-level interactive multimedia materials design. It is the belief of the author that online students would be served better if the good online instructors would eventually be able to design course materials on their terms, by themselves.

4.5. COMPARATIVE SUMMARIES OF THE FEATURES OF MULTIMEDIA TOOLS.

In order to fulfil the objective of providing a comparative analysis of the features of multimedia tools, the comparative lists by Vargas (2001) are summarized in Table 4.1. The comparisons presented in Table 4.1. are illustrative of features available in each category of multimedia tools. The level of interactivity desired or defined for a particular online course is a determining factor in the choice of the type of tool that will be used for course materials design.

Table 4.1 Comparative summaries of multimedia tool features

Table 4.1 continues from page 63 to 64

Tool Type	Examples	Features	Challenges
Entry level	Lotus Freelance Graphics, Corel Presentation, Astound	Site licensed, easy to use, provision for slides presentation, has good organisation tools (e.g. slide sorter), simulation for cell-based animation, basic interactivity via buttons, sound video support, support for standalone presentation, has tool for web-based presentation	Very basic, single object at a time animation, no looping, no control over path, very basic interactivity, no control over start/stop, cross-platform compatibility problems, good for simple on the screen presentation
Extended animation	Micromedia Flash	Objected oriented (vector) artwork, good audio support, support motion paths, rollover feature, action buttons /movie frames, bitmap to vector conversion, cross platform support, support Web-delivered animation learning curve easier comparatively, support Java and GIF format/animation	Requires plug-in to play in the Web, relatively difficult interface, no programming capability, less interactivity, no video support
Video editing	Aodobe Premiere, Adobe after	Support timeline for assembling clips, support multiple (video	Steep learning curve, video can be huge, effect must be rendered

Tool Type	Examples	Features	Challenges
	effect, MediaCleaner	& graphics) layers and transitions, has filter for video cleaning and modification, extensive plug-in support, built-in CD-ROM authoring support, sold with digitising cards.	not in real time, operations are laborious
3D animation	MetaCreation Infini-D, Ray Dream 3D(with Corel suite as CorelDream) Inspire 3D/Lightwave 3D (New Tek), Extreme 3D (Macromedia w/Studio, Electric Image, Studio 3D Max (kinetix) or Soft Image	Relatively easy interface, support modelling, shading, and animation, support links between models for joint and bonds, has a particle generator, graphics for textures and new procedural ones supported, support cross cultural platform and field based video rendering	Significant learning curve, no inverse kinematics, distributed (more cost), entry-level program, needs hardware accelerators for real-time 3D
Full blown Multimedia	Director movie 8.5, Asymetrix Toolbook, Mtropolis	Key-frame based time line animation, fully programmable, support C, multiple media plug-in adds functionality, Web support via shockwave plug in or Java export, good for tutorials, program demos, educational software	Big expense ($1000), steep learning curve, Lingo is simple but C is supported, larger file (bitmapped graphics), require Mac and PC versions to create platform, Shockwave required

Source: Vargas (2001)

Some courses by their nature require that the cognitive, affective and psychomotor attributes be learned, and thus impose different learning styles on course contents (e.g. freefall lifeboat course contents). In such cases, full-blown multimedia has to be used. However, cost, the extent of familiarity with the technology, time schedules, the risks and uncertainties associated with such design in terms of translating the instructor's desired objectives into reality will have to be considered when choice of multimedia tools are being made.

It should be noted also that a good teacher could still provide adequate useful learning experience through entry-level technology such as PowerPoint. After all, finding a contact e-mail in personal web pages is less exasperating sometimes than doing so in some of the big fortune corporations web pages which are designed with extensive magnetic 3-dimensional graphics. Good learning materials are, and will still remain, the products of the conscience of a good teacher, no matter the technology that is used.

4.6. NEW MULTIMEDIA FEATURES

Director 8.5 movies and Shockwave studio packages have, incorporated in them many useful features such as the Property Inspector (making it possible for diverse behaviours to be added to a movie from a single point), elegant zoom feature and image manipulation at run time as well additional capabilities to Lingo or direct C scripting. These upgrades have greatly improved manipulability. According to Macromedia (2002, p. 1.),

> Macromedia Director 8.5 Shockwave Studio now includes Intel Internet 3D Graphics Software. This combination for the first time ever, provides an easy way for developers to deliver scalable, bandwidth-friendly interactive 3D Web content to over 300 million people.

This is a major breakthrough for online learning on the Web. Prior to this the assertion that online learning is learning available everywhere was just a theoretical concept (because of the absence of appropriate infrastructure on the part of some users), but is now in the real realm. The concept of scalability means that contents delivered over the Web can have multiple scaling (up or down) irrespective of the

processor (Pentium 4 and above or lower) or the video card on the user's monitor while still maintaining the original validity and exactness.

The intelligent streaming technologies of Shockwave studio imply bandwidth friendliness (because streaming frames plays as they arrive, while others load on the background). Thus, developing countries, with low bandwidth will be able to participate in online learning using high-density graphics web pages.

The researcher's desire is that shared memory technology will develop to the extent that there will be a Server Transmitted Compensatory Virtual Memory (STCVM), that will automatically compensate (transmit scalable virtual memory to compensate inadequate memory of the user computer) and scale the users memory alongside the requested contents, on a URL request. Memories within a region could be mobilized to store dedicated website for faster access within those regions.

The realization of a technology of this nature in the researcher's view will greatly assist in reducing the frequent memory upgrades in the users' computers as well as make downloaded materials capable of running in any computer irrespective of the memory constraints

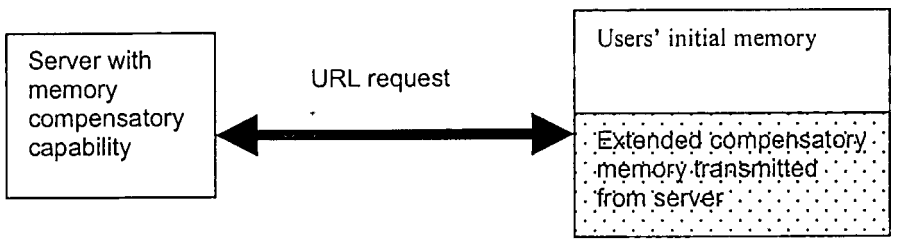


Figure. 4. 8 .Proposed Server Transmitted Compensatory Virtual Memory (STCVM)

In chapter four the authoring process and the multimedia tools that could be employed in the process were described. The features that enable online learning materials creation were also examined. The greatest feature of any multimedia tool is the material creator. The tool (whichever it is), should be used to ensure that learning occurs.

CHAPTER FIVE
DATA ANALYSIS BASED ON FIELD SURVEY, 2002

5.0. INTRODUCTION

Chapter five is devoted to data analysis of the field survey conducted by the researcher using questionnaires administered to World Maritime University students. The main objective of the chapter is to assess the extent of understanding of online learning, multimedia tools and their concepts as well as accessibility to Internet.

5.1. SAMPLING CHARACTERISTICS

The Population

The sample was drawn from a population comprising of World Maritime University students. The students, from 45 different countries of Africa, Asia, Eastern Europe and South America, were prior to their studies employees in the maritime sector of their countries. The population elements are *not proportional* by ratio, that is to say there are more students from Asia, compared to Eastern Europe or South America. The population is mostly male dominated, and the total number of students ranges from 150 to 200, depending on the intake.

The population elements are not randomly composed implying that the composition has some degree of political, funding, academic and slot bias. Though biased, the population is a seemingly a fair representation of developing countries maritime sector, since most of its elements had occupied middle or senior level management positions in the sector prior to their studentship. The population could be better described as stratified.

The sample

The number of questionnaires administered was seventy (70). The questionnaires were sectioned into three parts; a. determining the level of accessibility to the Internet at the disposal of the respondents comprised 7 questions, b. determining the respondent's participation and opinion(s) on multimedia online learning comprised 10 questions and c. determining the learning styles of the respondents comprised 31 questions, presented in statement form.

Fifty-two (52) out of the seventy (70) questionnaires administered were returned, representing 71%, which is a reasonable high rate of return. Thus the sample size for this study is fifty-two (n=52).

Sampling Error

Every sample taken for a study would only yield estimates. In order to take into account random errors (difference between true results and random results) systematic errors (sample results variations), sample design errors and measurement errors (surrogate information errors), the sampling error margin at 95% confidence level will be calculated from:

$$\bar{x} \pm 1.96\frac{s}{\sqrt{n}}$$ (where n=sample size, s=standard deviation, 1.96 =95% confidence z-score)

The sample mean ((24+20+4+3+1)/52) is 10.4, and the standard deviation is 10.7. Therefore the sampling error margin is equal to ±2.9.

5.2. ACCESSIBILITY TO INTERNET

Distribution of respondents by regions

The numbers of respondents are discriminated as follows: 24 respondents or 46% were from Africa, out of which 17 or 71% were male and 7 or 29% were female. Twenty (20) respondents were from Asia out which 17 or 85% were male and 3 or 15% were female. Respondents from Europe and South America were 4 and 3 out of which male respondents were 2 or 50% for Europe and 3 or 67% for South America while the female statistics were 2 or 50% and 1 or 33% respectively

The Middle East had only one respondent while North America had no respondent. The total male respondents in the region were 39 or 75% and the female respondents represented 25%. These are illustrated in Table 5.1.

Table 5.1. Distribution of respondents by region

Countries	Male		Female		Total	
		%		%		%
Africa	17	71	7	29	24	46
Asia	17	85	3	15	20	38
Europe	2	50	2	50	4	8
South America	2	67	1	33	3	6
Middle East	1	3	0	0	1	2
North America	0	0	0	0	0	0
Total	39	75	13	25	52	100

Source: Field Survey, 2002

Accessibility to the Internet

Most online learning in today's modern world would rely on the Internet to get the lectures to their audiences.

Table 5.2. Accessibility to the Internet

Internet Connectivity	Office only		Home only		Both		None	
		%		%		%		%
Africa	12	50	2	8	3	13	7	29
Asia	9	40	0	0	11	60	0	0
Europe	2	50	0	0	2	50	0	0
South America	1	33.3	1	33.3	1	33.3	0	0
Middle East	0	0	0	0	1	5	0	0
North America	0	0	0	0	0	0	0	0
	24	46	3	6	18	34.6	7	13.4

Source: Field Survey, 2002.

A survey of the sampled responses indicates that 7 or 33.4% out of the 52 respondents claimed that they had no access to the Internet. All of the '7 no-access to Internet' respondents were from Africa. Twenty-four (24) or 46% of the respondents have Internet connectivity to their office only, while 18 or 34.6% acknowledged having Internet connectivity both in office and in the houseThe indication is that 34% appears to have enough accessibility to Internet which could be tapped for online learning. The full picture is illustrated in Table 5.2.

Responses on downloading speed

The ability of the students to easily download course materials when they are needed is a big plus for any multimedia online learning. The field survey indicates that out of the 52 respondents, 21 or 40% believed that the speed of downloading materials from the Internet was slow. Four (4) or 8% believed that downloading was fast and 27 or 52% believed downloading was either slow or fast depending on the period of the day (slower during peak periods as there would be high volume of traffic). These results are illustrated in Table 5.3.

Table 5.3. Internet Downloading speed by region in developing countries.

Internet downloading speed	Slow		Fast		Either Depending on time	
		%		%		%
Africa	13	54	3	13	8	33
Asia	6	30	0	0	14	70
Europe	0	0	1	25	3	75
South America	1	33	0	0	2	67
Middle East	1	100	0	0	0	0
North America	0	0	0	0	0	0
	21	40	4	8	27	52

Source: Field survey, 2002

5.3. SURVEY OF UNDERSTANDING AND OPINION (S) ON MULTIMEDIA AND ONLINE LEARNING

Responses to the statement, "I have participated in online learning"

In Table 5.4. Seventeen (17%) of the respondents admitted that they have participated in online learning. Eighty-three (83%) had never done so before. Only 4, 4, and 1 respondents from Africa, Asia and South America respectively admitted participating in online learning.

Table 5.4. Participation in online learning by region

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	4	17	0	0	4	20	0	0	1	33.	0	0	9	17
No	20	83	1	100	16	80	4	100	2	67	0	0	43	83

Source: Field survey, 2002

Though the ratio of respondents from Europe was relatively low in the survey, all four respondents admitted not ever having participated in online learning.

Responses to the statement, "I prefer online learning to traditional classroom"

Table 5.5. Preference for Online learning to traditional classroom

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	0	0	0	0	3	75	0	0	1	100	0	0	4	44
No	4	100	0	0	1	25	0	0	0	0	0	0	5	56

Source: Field survey, 2002.

The number of respondents in Table 5.5. admitting that they have participated in online learning before the survey was 9 or 17% of the 52 respondents. Out of this, only 4 indicated preference for online learning against the traditional classroom method.

Responses to the statement, "I know someone who has participated in online learning before"

In response to this question, 6 or 25% in Africa, 3 or 15% in Asia, 1 or 25% in Europe and 1 or 33% in South America respectively altogether making 11 respondents or 21% affirmed *'Yes'* to this question while 41 respondent or 79% said *'No.'* The responses are presented in Table 5.6.

Table 5.6. Known a participant on online learning

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	6	25	0	0	3	15	1	25	1	33	0	0	11	21
No	18	75	1	100	17	85	3	75	2	67	0	0	41	79

Source: Field survey, 2002

Responses to the statement, "The comment(s) by the participant of online learning was favourable."

In response to this question, 8 or 73% of the 11 participants (50% in Africa, all in Asia, Europe and South America) answered *'yes'* to the question. The indication based on this question is that online learning has some positive advantages. The results are illustrated in Table 5.7.

Table 5.7. Positive comments on online learning

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	3	50	0	0	3	100	1	100	1	100	0	0	8	73
No	3	50	0	0	0	0	0	0	0	0	0	0	3	27

Source: Field survey, 2002

Responses to the statement, "I have used multimedia tool before in teaching and learning"

The result in Table 5.8. shows that 33 or 63% of the 52 students who responded have actually been exposed to at least a lecture where the instructor may have used a multimedia tool in a traditional classroom setting prior to the survey. Nineteen (19) respondents or 36% indicated to the contrary. Table 5.9. shows detail responses to the question.

Table 5.8. Users of multimedia tool in teaching and learning

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	14	68	0	0	16	80	1	25	2	33	0	0	33	63.5
No	10	42	1	100	4	20	3	75	1	67	0	0	19	36.5

Source: Field survey, 2002.

Responses to the statement, "The multimedia tool enhanced my learning"

The results from this question illustrated in Table 5.9. indicate that 30 out of 33 or 91% of the respondents who had acknowledged the use of multimedia in teaching and learning affirmed that it enhanced their teaching and learning. This is a good omen for multimedia and encourages its use.

Table 5.9. Benefit of multimedia in teaching and learning

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	11	78.6	0	0	16	100	1	100	2	100	0	0	30	91
No	3	21.4	0	0	0	0	0	0	0	0	0	0	3	9

Source: Field survey, 2002

Responses to the question "I or my institution can afford this tool."

Thirty-six (36) or 69% (see Table 5.10.) respondents indicated that their institution could afford to buy a multimedia tool if it is within the $500 to $1000 range. However

31% of the 52 respondents said that affordability might not be possible even within the financial range prescribed by the survey. Twenty-nine percent in Africa however said *'No'* to the affordability question.

Table 5.10. Affordability

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	17	71	1	100	14	70	3	75	1	33	0	0	36	69
No	7	29	0	0	6	30	1	25	2	67	0	0	16	31

Source: Field survey, 2002

Responses to the statement, "Should World Maritime University to extends its programmes via online learning in addition to traditional classroom methods"

The responses to this question indicate that 44 or 85% will prefer WMU to extend multimedia online learning be added *in addition* to the traditional classroom methods that. Results from Africa (79%), Asia (95%), Europe (75%), South America (100%) favoured this view. However, 15% or 8 (see Table 5.11.) of the respondents indicated objection to the view.

Table 5.11. Responses to programme extension by WMU

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	19	79	0		19	95	3	75	3	100	0	0	44	85
No	5	21	1		1	5	1	25	0	0	0	0	8	15

Source: Field survey, 2002

Reponses to the statement, "Multimedia will represent the future for Maritime Training"

Seventy-seven percent (77%) of the respondents will likely want to see multimedia online learning represent the future for maritime education. Twenty percent totally rejects this view. Table 5.12. illustrate these views.

Table 5.12. Multimedia and future of MET

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	16	67	1	100	19	95	3	75	1	33	0	0	40	77
No	8	33	0	0	1	5	1	25	2	67	0	0	12	23

Source: Field survey, 2002

Responses to the statement, "I will require training if I am to design course with multimedia tools"

In response to this question a great majority (46 or 88% out of which 6 of them work MET institution) of the respondents indicated that they would need training if they were to design courses with multimedia tools. The result is indicative of the fact that many would still need to be trained in multimedia tools. The responses are analysed in Table 5.13.

Table 5.13. Need Training in multimedia tools

Responses	Africa		M.East		Asia		Europe		S.America		N.America		Total	
		%		%		%		%		%		%		%
Yes	20	83	1	100	18	90	4	100	3	100	0	0	46	88
No	4	17	0	0	2	10	0	0	0	0	0	0	6	12

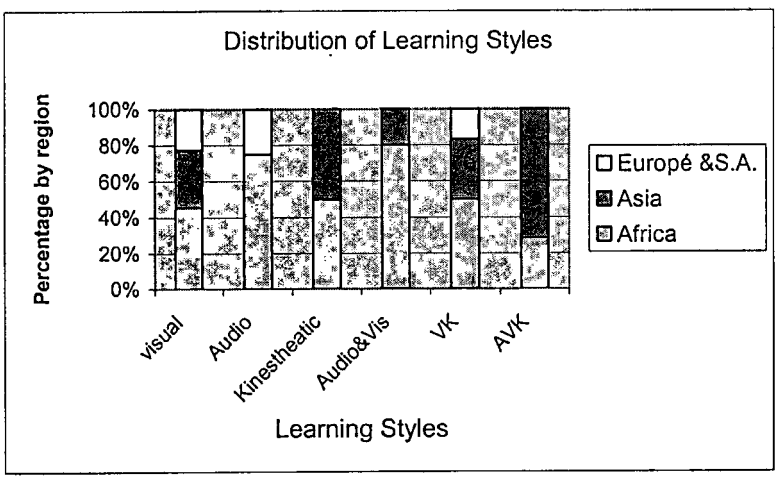
Source: Field survey, 2002

5.4. SURVEY OF LEARNING STYLES DISTRIBUTION

Due to differences in physiology, culture, school systems, learning contents and training methods, learners variously adopt learning modalities that can be kinaesthetic, auditory or visuals. On one hand the reason for the adoption of any learning modality could be physical or neurological impairment. But on the other hand, a more often reason for adopting a learning style is usually limited experience in learning how to use these modalities or styles.

It is imperative that course content and material designer should be aware of this fact. In order to determine the distribution of learning styles across the sampled population, a survey based on Wong's (1997) survey format was conducted. Thirty-one (31) of the most likely questions were selected in the visual, auditory and kinaesthetic categories, and the survey was administered.

- The responses were analyzed and the results are presented in Figure 5.1. The scores were analyzed as follows:



Source. Field survey, 2002

Figure. 5.1. Distribution of learning styles in a sampled maritime sector of developing countries

- The highest score indicated the learner's preference. The lowest score indicate the weakest modality.
- If two highest score were the same or very close, both modalities were regarded as the learner's preference.
- If three of the scores were identical, then the learning styles were regarded as being well integrated
- Scores that were 7, 6, and 5 indicated the modality used frequently by the learner. Scores lower than 7, 6, 5 indicated modality that is scarcely used.

From the Figure 5.1., 45% in Africa, 27% in Asia and 28% in Europe and South America (combined) of the sampled respondents had preference for visual modality. Most respondents in Asia (70%) seemingly had integrated their learning.

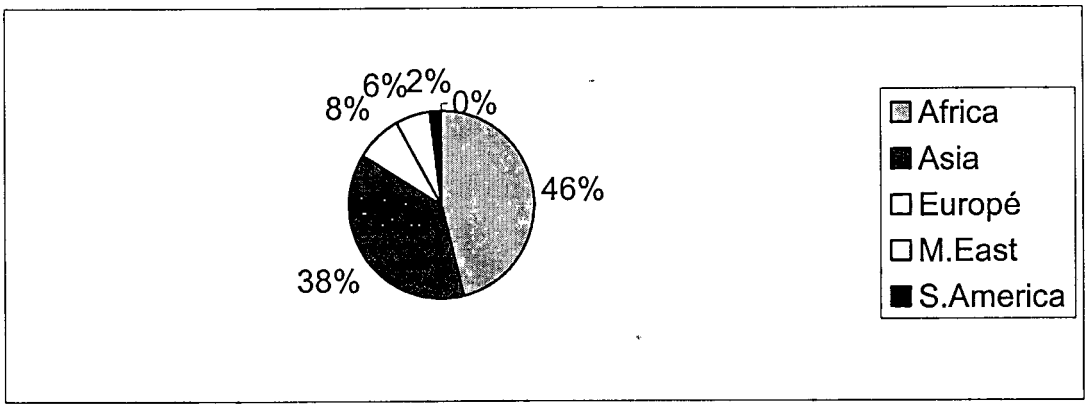
The results from the graph in Fig 5.1. indicate patterns, but is very premature to be used for any meaningful estimation because, firstly, the proportions in the data were disparate and secondly such data need to be collected over a time series. Thirdly, only 31 questions were selected out 54 presented in the original survey.

By and large the graph in Figure 5.1. confirms the fact that different students exhibited different learning styles, which the survey aimed at demonstrating in the first place. Many learners are bi-modality learners and many could integrate these modalities if they are properly exposed. Course materials, and content designers as well as instructors must always take this very important student attribute into account.

5.5. ANALYSIS OF RESULTS

It would be meaningful at this point to deduce some basic inferences from the analysis that has been done so far. It would also be fair to indicate prior to the analysis, that the inferences to be drawn are not conclusive due to the disproportionate nature of the sample (Africa 46%, Asia 38%, Europe 4%, S.

America 6% and the Middle East 2%. North America had 0%) in terms of number of respondents.



Source: Field survey, 2002

Fig. 5.2. Distribution of respondents by regions

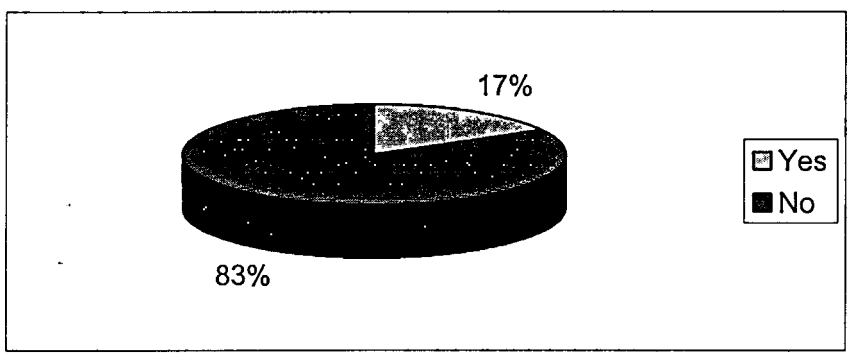
However, the respondents' proportions between Africa and Asia are closed enough for our inferences. The error margin for this analysis at 95% confidence level is 2.9%.

Online learning will rely heavily on Internet, and the survey sought to qualify the downloading speed in the different regions of the developing world. The results indicated that 21 or 40 % ± 2.9% of the respondents said the Internet was slow in Africa, Asia, South America, and Middle East, while only 4 or 8 % ± 2.9% out of 52 respondents believed the downloading speed was fast. But the majority position (27 or 52% ± 2.9%) is that speed is dependent on the time of the day (slower at peak periods).

There are basically three explanations for this state of affairs. The first and most important may be the quality of telecommunications infrastructure. Most of the countries do not have broadband. The second issue may be the quality of service the Internet Service Provider (ISP) is offering in these regions and thirdly, the speed of the modem the respondents are using. Improvement in these infrastructure and services can greatly improve downloading speed.

Every good methodology can replicate its use by its good attributes and goodwill. Based on these noble desires, the survey sought to know the views of participants

on online learning. It was gathered from this survey that only 9 or 17%± 2.9% of the respondents had participated in online learning out of which only 4 or 44%± 2.9% indicated their preference for online learning in comparison to the traditional classroom methods. Also, only 11 or 21%± 2.9% acknowledged knowing someone that has done so. It will not be unwise to say that online learning at present is not that much promoted as an alternative learning methodology in most developing countries, even in the maritime sector. However, 8 or 73% of the 11 or 21% ± 2.9% of the respondents said their known online learning students made favourable comments about the methods. This is good for the future of online learning methods in the maritime sector. But the methods need to be constantly appraised and improved.



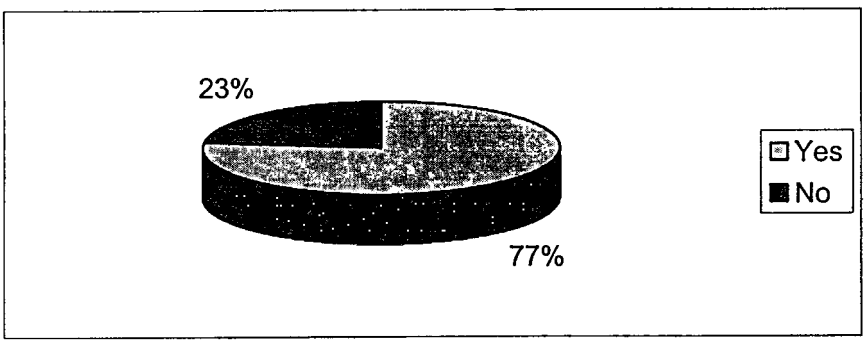
Field survey, 2002.

Fig 5.3. Participation in online learning

Many of the respondents (33 out of 52 or 63.5%± 2.9%) have used a multimedia tools in teaching and learning or at least have been at a classroom or lecture where multimedia tool (e.g. PowerPoint) was used. Moreover, 90%± 2.9% or 30 out of 33 respondents claimed the multimedia tool enhanced their teaching and learning. The results are not surprising because multimedia presentation, of course, has innumerable attractive and enhancing features to capture and sustain the attention of the audience.

On the question of affordability 69%± 2.9% agreed their institution could afford multimedia tools if the cost range is within $500 and $1000. Also very striking was the indication by 85%± 2.9% or 44 respondents that they would not be against

World Maritime University extending its programmes via online learning *in addition* to the traditional classroom methods A striking high point also was the belief by 77% or 40 respondents that multimedia will play a role in future maritime education and training. Thus the market is open. It is now the responsibilities of the instructional domain to use the technologies to foster increased and improved learning experience to learners.



Source: Field survey, 2002

Figure 5.4. Multimedia Future in MET

In conclusion, it must be argued that most of the supports multimedia seems to enjoy in the survey are based on dreams and an expectation resulting from the advertised and sometime sizzling fantasy that multimedia tools seems to present. Teaching and learning is not multimedia, it must be understood, but could be improved if done in multimedia modes. For now only 6 or 12% ± 2.9% of the respondents claimed they can design materials with multimedia tools. A large chunk of the respondents, 48 or 88%± 2.9% including respondents from maritime training institutions said they would need training, if they are required to design with multimedia tool. A lot of issues still need to be harmonized in terms of training, course materials quality improvement and interactivity if multimedia online learning is to represent the future in the maritime sector.

CHAPTER SIX
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.0. INTRODUCTION

Chapter six is the concluding chapter of this research work. It is devoted to drawing conclusions and making recommendations. In the chapter, a summary of findings is also provided.

6.1. SUMMARY OF FINDINGS

There were six categories of questions the research set out to answer. The outcomes are discussed below.

1. *What does multimedia and online learning mean? Is there a standardized understanding of what multimedia and online learning entails?*

In order to answer this question a wide literature review was carried out on the concepts relating to online learning and multimedia. It was discovered that there is no common denominator on what online learning is, neither is there, a standardized classification of its components. The major argument advanced for this position was that it would be premature to define distance education vis-à-vis online learning at this stage.

On its part, it was found that multimedia extend beyond the multi-sensory media elements such as sound, video, text, and others into hyper-mediation and interactivity. Multimedia involved combining, integrating media elements and enhancing interactivity. It was also discovered that multimedia is more academically classified into captured (e.g. photograph, speech) and synthesized on one hand, discrete and continuous, which are space based, and time based (e.g. animation) on the other hand.

Legally speaking, every multimedia production is protected under copyright and fair use laws in most countries. There is also a point of convergence between online learning and multimedia in that online learning is now done with rich media in multimedia mode with hyper mediation and interactivity.

2. *Are there learning theories and philosophies for online learning? Are these theories reflected in course material creation and delivery?*

In terms of learning philosophies, the constructivist, the Learner Centred Principles (LCP), and the social cultural theories were identified. Of interest to this research was the constructivist ideology, that learners should be assisted to create and build their own knowledge of the subject. Online learning becomes very relevant in this regard because students are no longer restricted by the facilities available in their school library or text only type of learning. Additionally, learners are provided with repertoire of learning materials on the Internet, libraries and databases. They can now have access to a wide range of resources on the Internet and World Wide Web in hyper-mediated format, which they can use to their advantage.

Learner Centred Principles (LCP) insist on the individualization of instructions. Web based learning can achieve meaningful results in this regard by providing adaptable and scalable learning formats for every learner. Social cultural theory on its part emphasized social interaction to widen the knowledge and capacity of the learner. Online learning will suit these thinking, if courses are designed to incorporate interactive collaboration.

Do these theories reflect on learning materials? The answer is that most learning materials on the online learning spectrum are not yet reflective of these principles and theories, although most academic institutions use these learning theories in their materials design. But most companies are more concerned with their dollar return on investment than the educational quality they offer.

3. *How can multimedia be useful in creation of online learning materials? Are the models adequate?*

The question of online learning models was surveyed. Many models exist among them ACCEL ACTION and PADDIQAM. The ACCEL (acronym for Active, Collaborative, Customized and Accessible, Excellent Quality, Lifestyle-fitted method) model promotes material quality and collaboration. The ACTION (acronym for Access, Cost, Teaching and learning Interactivity, Organisation and Novelty) model focuses on managerial concerns like access, cost and organization.

In order to cater for the interest of the developing countries the researcher presented PADDICQAM (acronym for Pre-course Assessment, course Design, course Delivery, Interactive Collaboration, Quality Assurance and Management) model developed to support total school management, including pre-assessment of state of readiness (including access to technology) of the students for studies and quality assurance.

The PADDICQAM model was applied in the implementation of a multimedia based course (the freefall lifeboat course). The challenging issues discovered included, defining the appropriate course contents that cater for different learning and thinking styles, building appropriate user-graphics interfaces, design related–problems, determining the level of hyper-mediation, building effective classroom during course delivery and conducting effective interactive collaboration.

4. *What tools are available? What are their features?*

On the question of types of multimedia tools available, it was discovered that there are innumerable multimedia presentation (e.g. PowerPoint), authoring (e.g. Director

8.5), web publishing (Microsoft Outlook XML, Macromedia Shockwave), and course management (WebCt, Blackboard) tools and technologies (XML, HTML and others) available. The major problems were that of identifying the course needs depending on the complexities of its contents, costs, technological cross-platform compatible problems and employing the appropriate tools.

A survey of Macromedia Director 8.5 indicated that the authoring tool integrates a lot of functions that makes it possible for a full-blown movie to be created and published.

There is improvement in interface and functions. For example, a single cast can be made up of different other casts members with their scripts or sprites. The property Inspector also integrates many other functions that used to be disparate providing a platform for movie behaviours controlled. Cast properties and behaviours can also be adjusted in real time. Director movie is bandwidth friendly and scale to support any monitor or processor. The major problem again is that the learning curve becomes steeper as the desired interactivity increases and scripting with Lingo requires knowledge in programming.

5. *What comparative advantages does one multimedia tool have over the other regarding cost and other features?*

Multimedia authoring tools can be divided into entry, extended animation, Video editing, 3D animation, and full-blown Multimedia levels. In term of cost the more features the multimedia offers, the more costly it becomes and the more problems it has with cross-platform compatibilities, learning and production curves steep, increased software and plug-ins requirement.

6. *Can a survey of developing countries indicate an understanding of online learning vis-à-vis multimedia tools and concepts?*

To ascertain the state of affairs in the maritime sector of the developing countries a questionnaire was designed, administered and analysed. On the question of accessibility, only 24%± 2.9% of the respondents have Internet connectivity both at

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To ascertain the state of affairs in the maritime sector of the developing countries a questionnaire was designed, administered and analysed. On the question of accessibility, only 24%± 2.9% of the respondents have Internet connectivity both at

office and home. On downloading speed from the Internet, the results indicated that 21 or 40 % ± 2.9% of the respondents said the Internet was slow in Africa, Asia, South America, and Middle East, while only 4 or 8 % ± 2.9% said it was fast. But the majority position (27 or 52% ± 2.9%) was that speed is dependent on the time of the day (slower at peak periods).

It was gathered from this survey that only 9 or 17%± 2.9% of the respondents had participated in online learning out of which only 4 or 44%± 2.9% indicated their preference for online learning in comparison to the traditional classroom methods. At the time of this survey, only 6 or 12% ± 2.9% of the respondents claimed they could design materials with multimedia tools. A striking high point also was the belief by 77% or 40 respondents that multimedia will play a role in future maritime education and training.

The survey also indicated patterns that people in maritime sector of developing countries show varied integration of learning modalities (Kinaesthetic, auditory and visual), making course materials presented in multimedia and hyper-media format even much more desirable.

6.2. CONCLUSIONS

The research set out to provide a critique or an examination of multimedia tools in the context of online learning materials design and creation. In online learning, it is the learning materials that provide a medium through which training and learning is offered and consumed. Multimedia tools on their part assist in providing an avenue for multimedia elements to be created as or in learning materials for delivery in multi-sensory and flexible formats.

Therefore, in relation to online learning, multimedia design is a subset and its union and interactions with other subsets of the online learning universe were the main theme of this research. There is a union of multimedia with learning philosophies, psychological concepts, didactic methodologies and social interaction all in the effort

toward quality teaching and learning. At this stage, the computer to student model that is expected to eliminate the teacher completely is in the queue until technologies with more reasoning, affective as well as voice recognition capabilities are developed. Thus, the teacher still carries the day and the materials delivered online will still rely on the dexterity of the online instructors for quality and learning nurturing.

This research is not advocating the elimination of the classroom methods, but was aimed at carefully identifying those problematic components in these traditional methods and systematically adopting online methodologies to solve them. Making technologies transparent and subordinate to course materials so that learners could focus on learning rather than technology must command priority in the domain of interest for online school planners. It is obvious that, the Web poses opportunities, but it is also a distracting environment with advertisement pop ups and search results that may bring undesirable pages. Safeguarding the virtual classroom from these sometimes-obscene externalities should be given the priority it deserves.

Online learning should be conceived as subset of flexible learning. It would be proper to adequately define what flexibility implies with respect to course materials, learning pace and access to technology because these are very uneven attributes of flexible learning. It must be acknowledged that learning has always occurred through the instrumentality of a teacher and therefore whether the teacher is web pages, or videoconference lectures, it should be manage in a form that will actualise learning.

In the pursuit of flexibility in learning, over focus on weak students can totally warp the educational motivation of those hitherto described as intelligent, just like over focus on intelligence destroyed the participation of slow paced learner through the years. The ideal thing is to find a working balance that will cater for all. That balance may require assessing the economic, socio-cultural, and psychological effects that flexible learning may pose on faculty and learner.

This research therefore concludes by re-enforcing the following:

- Internet, which is marriage of networks, has brought wonderful opportunities.
- That the World Wide Web, which allows the building and provision of libraries, online education, advertisement, sales and business, must be built in a human convenient formats.
- Web based/online learning could be progressively introduced in segments, weak points noted and corrected. Educational materials must be properly planned and designed before delivery.
- Multimedia tools with further development in compression utilities, appropriate interfaces, and bandwidth friendliness will greatly assist in the delivery of education to maritime interest in the future.
- The reduction in cost of satellite service charges (the use of Mobile Packet Data System) also represents the future for maritime education delivery at sea.
- The current limitations in online education delivery must be vigorously explored. Ways of eliminating them must be also constantly pursued.
- As experience grows online learning expectedly will improve.
- Current learning theories should be used, and improved to assist learners
- Costs of multimedia online learning programmes are likely to notice an asymptotic reduction in the future, as more and more students get online.
- Student isolation and frustration is beginning to be compensated for through Web facilities such as chat, net-meeting, video conferencing and other properly designed interactive collaboration.
- Availability of different Web-based colleges will offer the learner a choice to select the one that best suit him.
- As more teachers and designer get more experienced, the materials for delivery it is hoped get will better and better.

6.3. RECOMMENDATIONS

Based on the findings of the research, the following recommendations are proffered.

- Online learning as a subset of flexibility learning should have balancing mechanism that is capable of assessing the economic, socio-cultural, and psychological effects that flexible learning may pose on faculty and learners.

- There should be a working standardization body, which will ensure that online learning (distance learning, Web-based learning) is properly defined.
- The different terminologies (e-learning, Web-based learning, distance learning and others) used in field should be standardized and classified.
- It would be important if technologies were held transparent and subordinate to learning.
- In the context of online learning, multimedia must be defined to incorporate interactivity.
- Interactivity on its part should means interaction of participants or learners' logic and exchanges through collaboration. Interactive multimedia must ensure that knowledge is build and expanded, sieve and validated through collaboration.
- Though in the domain of technology, multimedia tools should be able to offer integrated work environment such that behaviours could be modified at single platform.
- Models should be constantly adapted and improved for multimedia online learning, for systems reviews, problem solving and decision-making.
- More and more members of the academe with experience in teaching and learning should be brought in to help in graphics interfaces designs.
- Teachers and instructors must be willing to devote their time to learning multimedia technologies to enhance course material production.
- In the developing countries where there is low bandwidth and transmitting problems, multimedia tools that are bandwidth friendly and offer display scalability should be used in material design.
- The INMARSAT Fleet 77 Mobile Packet Data System (MPDS) could be utilize to assist in a low cost efficient delivery of maritime multimedia online learning to learners at sea and in remote areas.
- Another good way of speeding up transmission of data in developing countries pending the installation of broadband (ISDN) infrastructure could be through shared virtual memory. This will reduce transport distances thereby increasing speed.

- Traditional classroom from the survey is still preferred in maritime sector of developing countries. For online learning to get a segment, it must be promoted with good quality.

The awareness of these recommendations and many others different academic research positions could in the researcher's opinion improve and extend the benefits that multimedia tools offers to online learning.

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APPENDIX A

World maritime University
P. O. Box 500
Malmö
28th June 2002

Dear Students,

Letter of Introduction

I am an MET 2002 student undertaking a dissertation on the topic:

Multimedia tools for creating online learning materials, a critique.

The questionnaire attached is meant to collect data/information for the realization of this research work.

I hereby solicit your cooperation in filling this questionnaire. Any data/information so provided will not be used for any other purpose except for that which pertains to this research work.

Please kindly return the filled questionnaire to any of the following: the Reception, HSH Room 511, or the hostel Mistress' office.

Yours sincerely,
Udosen, Victor
METN2002

Section A. Accessibility to Internet

Instruction: Please tick (√) or circle (O) your preferred option.

1. My Sex: a. Male ☐ b. female ☐

2. Indicate your Region:

a. Africa ☐ b. Asia ☐

c. Middle East ☐ d. Europe ☐

e. South America ☐ e. North America ☐

3. What is your country's level of industrialization?:

a. Not industrialized ☐

b. Semi-industrialized ☐ c. Industrialized ☐

4. I work with:

a. Port ☐ b. Shipper ☐

c. Maritime Administration ☐ d. MET ☐

e. At sea ☐ g. Other Maritime concern ☐

5. I work with computer at:

a. Office ☐ b. Home ☐

c. Both ☐ d. None ☐

6. There is Internet connection to my computer at:

a. Office ☐ b. Home ☐

c. Both ☐ d. None ☐

7. Downloading or requesting web pages with music and graphic is usually:

a. Slow ☐ b. Fast. ☐

c. Either, depending on time ☐

Section B. Survey of participation in Multimedia online learning

S/N	Statement (Please tick one option)	Yes	No
1	I have participated in online learning before *If no, go to no 3*		
2	I prefer online learning to traditional classroom		
3	I know someone who has attended online learning *If no, go to no 5*		
4.	The comment by person in 3, about online learning was favorable		
5	I have used multimedia tool(s) e.g. PowerPoint, before in teaching and learning		
6	The Multimedia tool enhanced my learning		
7	I or my institution can afford the cost of Multimedia tools (if the price is between $500- $1000)		
8	I prefer that the WMU should extend her programs via multimedia online learning to wider audience in developing nation in addition to the traditional classroom methods used now		
9	I believe that multimedia online learning will represent the future for maritime training		
10	I will require training on multimedia if I am to design a course for online learning		

Section C: Determining the distribution of learning style in developing countries Maritime sector: A support for multimedia online learning tools

The survey would provide data on the learning modality you use most frequently namely: visual, auditory, or kinesthetic. This survey has been taken from Wong, L. (1997) Essential Study Skills: Houghton Mifflin Company, pp. 91-92.

Instructions

Tick (√) **YES** if the statement relates to you *all* or *most* of the time.

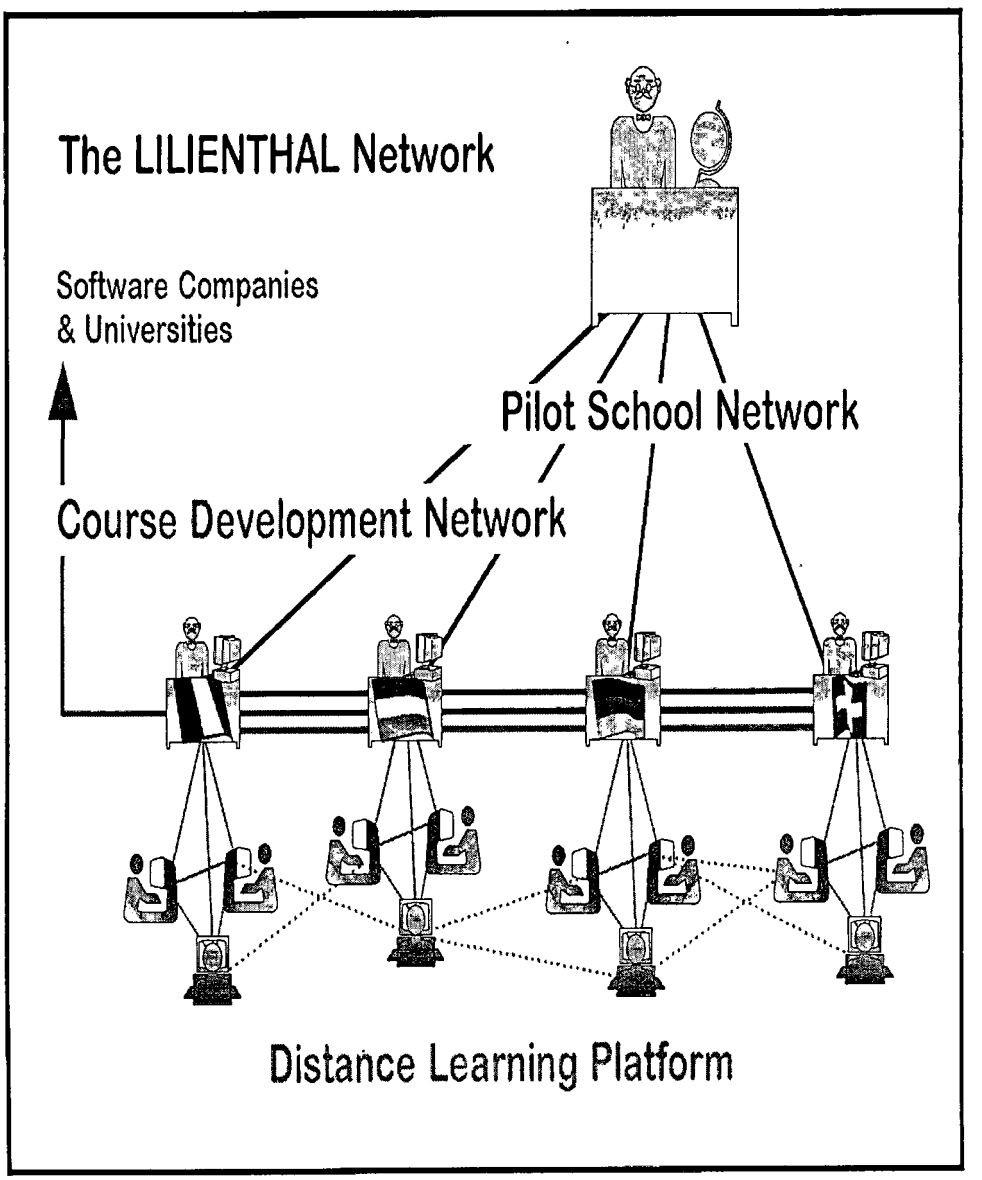
Tick (√) **NO** if the statement *seldom* or *never* relates to you.

Note: Your first reaction to the statement is usually the best response.

STATEMENTS	YES	NO
1. I prefer to learn something new by reading about it.		
2. I prefer instructors to write out homework instructions so that I don't forget them.		
3. I learn best when I can see new information in charts or diagrams.		
4. I am able to visualize ("see" things in my mind) easily.		
5. I learn best when someone talks or explains to me.		
6. I usually write things down so that I can look back at them later.		
7. I have a good memory for songs I learned as a child.		
8. I can remember the faces of actors and other visual details of movies I have seen.		
9. I often move my hands and body when I'm explaining something.		
10. I prefer to redraw diagrams on a chalkboard rather than on paper.		
11. I seem to learn better if I get up and move around while I study.		
12. If I have to assemble, say, a set of shelves, I would need pictures or diagrams to help me with each step.		
13. I remember objects better when I have touched them or worked with them.		
14. I learn best by watching someone else first.		
15. I have learned to speak a foreign language.		
17. I can understand a lecture on tape.		
18. I am good at using machines or tools.		
19. I need frequent breaks while studying to move to around.		
20. I have little difficulty understanding people with different accents.		
21. I can hear different pitches or melodies in music.		
22. I follow written directions better than oral ones.		
23. I like to create rhymes or jingles to memorize things.		
24. I wish college classes had more hands-on experiences.		
25. The things I remember best are the things I have seen in print or pictures.		
26. I follow oral directions better than written ones.		
27. I could learn the names of 15 medical instruments easier if I could touch and examine them.		
28. I need to say things aloud to myself to remember them.		
29. I can look at a shape and copy it correctly onto paper.		
30. I follow directions easily when someone gives me landmarks, such as specific buildings or trees.		
31. I like to paint, draw, or make sculptures.		
32 I enjoy constructing things with my hand		

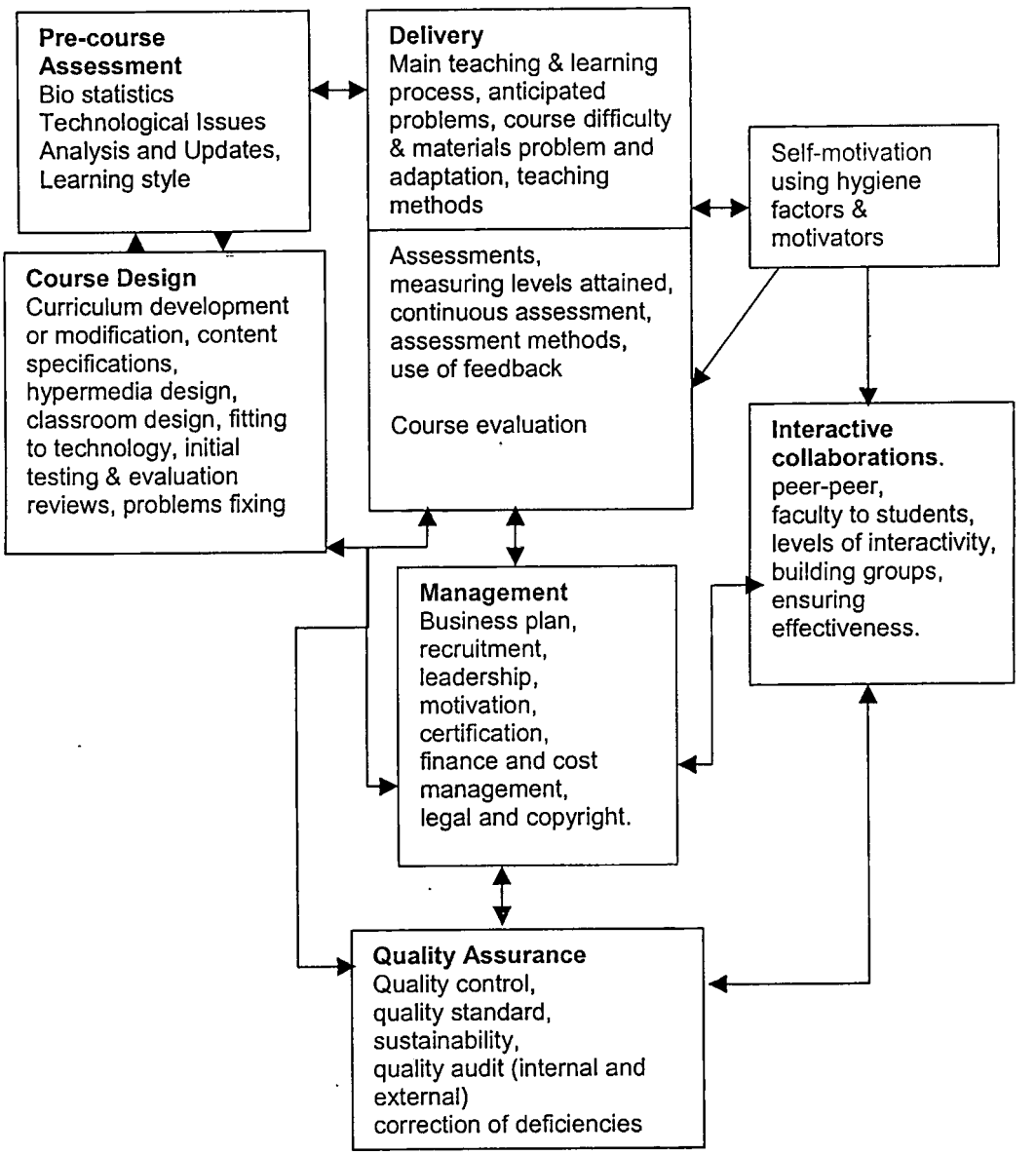
APPENDIX B

DISTANCE LEARNING PLATFORM
Lufthansa Flight Training School, Bremen.



APPENDIX C

THE PADDIQAM MODEL ILLUSTRATED



APPENDIX D

ONLINE EDUCATION MANAGEMENT SYSTEM

Features/Tools and Tech Info for WebCT from
http://www.c2t2.ca/landonline/evalapps.asp

Features/Tools/Notes

Learner_Tools

Web_Browsing

Accessibility WebCT has optimized accessibility for the following assitive technologies: Screen reader software: JAWS 4; Browser: Internet Explorer 5.5 SP2; Operating system: Windows 2000. Both Chat and Whiteboard are navigable by keyboard. New color scheme provides high contrast between background and foreground elements. The high contrast color scheme can be the default or overridden by users. Invisible navigation links can be used by screen readers.
Bookmarks Software keeps track, on a per-student basis, of the most recently visited page of content. When the student returns to a course the software can place that student back at that same position and in the same context in order to allow a quick return to learning. Version 2 and up have a bookmark tool that allow users to add bookmarks.
Multimedia Any format of multimedia can be added to content pages without knowing HTML including PDF, Flash, Shockwave, and streaming audio/video.
Security Support for Secure Sockets Layer protocol (SSL) allowing requests from the following areas to be authenticated via a secure server: user logon; user logon hint; user password changes via myWebCT; administrator interface; helpdesk interface. Added security features for online assessment include support for IP subnet masks, proctor passwords and selective release to individuals based on multiple, varied criteria. Administrators can set password length restrictions and require password changes after initial logon and after specified period of time.

Asynchronous_Sharing

E-mail E-mail supports searching. E-Mail is also integrated into student tracking and grade maintenance tools enabling lists of students with particular grade or participation charactisticsto be sent group e-mail.

BBS file exchange The conferencing tool also supports the use of attachments for file exchange. In addition, students can upload assignments, and there are settings for allowing multiple submissions, late assignments and cut-off dates.

Newsgroups The conferencing tool supports threaded discussions.

Synchronous_Sharing

Chat Chat can be within same course, or outside course to any course on same server. Chat conversations can be logged and read by instructor.

Voice Chat

Whiteboard Can upload and write on standard image formats including JPEG, GIF and BMP.

Application sharing The presentation tool allows groups of students to share files and co-edit then in order to publish group projects.

Virtual space

Group browsing

Teleconferencing

Videoconferencing

Student_tools

Self-assessing The software supports three types of assessment - quizzes, self-tests and surveys. Multiple choice, matching, short answer, calculated and paragraph questions are supported. All but paragraph questions can be autograded by the software. Self-tests can be integrated with learning modules and provide instant feedback, without counting toward a grade. Surveys are anonymous, and do not count towards a grade.

Progress tracking Software tracks both student-centered information (first access date, most recent access date, histogram showing detailed access ratios to all parts of course for this student, conferencing tool readings and contributions, etc) and content-centered information (number of accesses to each page of content, average time spent on each page of content, etc). Information can optionally be released to students.

Searching Course notes and discussions can be searched.

Motivation_building Students can have their own homepage for the course and a student homepage generation tool is for students to build their own homepages in a course without any html knowledge.

Study_skill_building Software supports annotation of each individual page of content by the student, which can later be compiled, with the content itself, into an individualized study guide for printing. Instructors can add tips to course to suggest learning strategies.

Support_Tools

Course

Course_planning The Course Builder tool is interactive.

Course_managing Student access can be customized based on group, previous course activity, or prior mastery of a learning goal. Support for terms allows courses to be organized within school terms.

Course_customizing

Course_monitoring Software tracks both student-centered information (first access date, most recent access date, histogram showing detailed access ratios to all parts of course for this student, conferencing tool readings and contributions, etc) and content-centered information (number of accesses to each page of content, average time spent on each page of content, etc). Information can optionally be released to students.

Lesson

Instructional_designing Software includes templates for the construction of various kinds of standard pagesi ncluding course outlines, assignments and recommended reading lists.

Presenting_information Software supports the presentation of all forms of Web-enabled content. Multimedia, images, sounds, HTML, PDF, and other document types can all be presented using WebCT. Images, sounds, and streaming media can be embedded in content without knowledge of HTML, and minor edits to online content (such as correcting a typo) can be simply made in the browser window.

MathML-based Equation Editor allows users to enter and edit mathematical notations in WebCT tools.

Testing Software supports three types of assessment - quizzes, self-tests and surveys. Multiple choice, matching, short answer, calculated and paragraph questions are supported. All but paragraph questions can be autograded. Math ML-based Equation Editor allows users to enter and edit mathematical notations in WebCT tools.

Data

Marking on-line Software will autograde multiple choice, short answer, calculated and matching questions. Paragraph questions can be graded, online, by the instructor or teaching assistant.

Managing records Records management allows: addition of students; change of passwords; maintenance and distribution of grades and statistics; queries to show, compare and analyze subsets of students according to any search characteristics; addition of arbitrary content categories to student records (e.g. section number, attendance, comment, etc) much like a spreadsheet.

Analyzing and tracking Supported with basic statistical analysis

Resource

Curriculum Managing

Building knowledge Links to www.webct.com, the eLearning hub. Instructors may share information in a number of discipline-specific or general interest forums.

Team Building Supports manual or automatic division of students into groups, and the assigning of a presentation area and private conference forum to each group.

Building motivation

Administration

Installation Most installation is performed by local administrators. Optional, for-fee consultation is available.

Authorization Each user is assigned a role as student, teaching assistant, instructor/designer, or WebCT Administrator, with appropriate access to tools, functions and information.

Registering WebCT 3.7 Campus Edition includes optional, out-of-the-box integration with SCT Banner and Campus Pipeline portal systems. The IMS Enterprise API included in this version also permits customized integration with other SIS or portal systems.

On-line_fees_handling

Server_security Access to all course materials is protected with a username and password. Software supports the integration of third party authentication such as Kerberos or LDAP.

Resource_monitoring WebCT admin interface provides resource usage info such as disk usage per course, number of student accounts per course, etc.

Remote_access WebCT administration (not just course design) is all web-based.

Crash_recovery Supports local backup of course to desktop for archival/crash recovery purposes. Courses can be restored over another course.

Help_desk

Student_support On-line help for conferencing system and e-mail. Rest of tools have small descriptions.

Instructor_support Full, on-line, context sensitive help, also available as separate manual (130 pages). On-line tutorial document to get first-time users up and going. Finally, WebCT maintains a mailing list where instructors can seek help.

TechInfo

Server_Platform

RAM 512 MB for Linux/Unix, 1 GB for Microsoft operating systems 64MB or 128MB if using Win NT

Disk_Space 10MB plus 2MB per course and 30-70k per student

WindowsNT_40_Server Microsoft Windows 2000 Server SP2 (Warning: Because WebCT 3.7 uses a newer version of Perl (version 5.6.1), WebCT 3.7 cannot be installed alongside earlier versions of WebCT on the same Windows server.)

Apple_Server

Unix_Server Red Hat Linux for Intel libc6 6.2 and 7.2 , Sun Sparc Solaris 7 and 8

Client_Platform

Minimum_Level Netscape 4.76 , Internet Explorer 5.0, AOL 7.0

Target Level Netscape 6.2.1, Internet Explorer 6.0, AOL 7.0

Pricing

Start-up Cost

On-going Cost Dependant on maximum number of students

Technical Support Available via web form, email or telephone. Free to 2 administrators per license. Available fora fee to instructors or additional administrators.

Limitations of package

IMS Compliance WebCT has created an IMS Content Migration Utility which allows schools to save their courses in a nonproprietary format that can easily be shared with other IMS-compliant software. It also facilitates importing IMS-compliant courses created outside the WebCT environment. In addition, the Campus Edition's IMS-compliant Student Data API allows integration with IMS compliant SIS systems.

Number of courses No theoretical limit - depends of available server resources.

Number of students License works by limiting number of students. There are administrative mechanisms that send alerts when the maximum number of students is being reached.

Number of connections Limited only by operating system configurations.

Number of instructors No theoretical limit.

Other Limitations WebCT Campus Edition version 3.7

Extra_Considerations

Options

Exit Considerations

Send comments to: asplandon@c2t2.ca