

Case Study: Quick Development Of E-Learning Course

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Abstract - In this paper we aim to explain our own experience in developing and delivering an e-learning course entitled "Introduction to Information Systems". This course was developed under the AVICENNA VIRTUAL CAMPUS Project (539INT2000), UNESCO.

The goal of this project is to increase Faculty/Instructional support staff's awareness of additional supporting resources and services available to distance learners round the clock.

The development process is based on the use of suitable scenarios and designs for the course. The course is divided into sessions and learning sequences containing welcome, overview, learning outcomes, previous knowledge, pre-test, and diagnostic assessment.

1. INTRODUCTION

The explosive growth of the Internet over the last few years, and the rapid changes in the global economy has given rise to the importance of e-learning. The growth and the importance of the educational industry in the knowledge-based economy enforce the higher education institutions to communicate the viability and strategic value of e-learning to gain the competitive advantage.

Over the last years, a large number of e-learning groups in different universities around the world have been engaged in the design, development, and evaluation of tools to develop and deliver on-line courses. This experience has resulted in the production of huge number of on-line courses. The development process for this course take into account that the faculty, staff, and students come from many information technology fields. According to the mission of the development group, the development of on-line courses is concentrated on the pedagogy of e-learning from a technology and learning perspective.

A lot of terms are used to define "e-learning". For example, some of these terms include on-line learning, distance learning, e-learning, web-based learning, and computer-based training. An internet survey found that among professionals working for institutions of higher education and vendors that offer course material, 40% prefer to use the term e-learning. 13 % used the term on-line training. 10 % used the term web-based training; while the others used terms such as distance learning and computer-based training. E-learning is the acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety (e.g., wireless, satellite), and technologies (e.g., cellular phones, PDA's) as they are developed and adopted. E-learning can take the form of courses as well as modules and smaller learning objects. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time[1]. This definition of e-learning is adopted in our work.

The next section presents an overview of e-learning in the knowledge age. Section 3 describes the structure of the course. Section 4 briefly explains the tools used in the development process. Section 5 contains the concluding remarks.

II. E-LEARNING IN THE KNOWLEDGE AGE

In the 21st century, we are facing major challenges in learning. Internet technologies have affected the technological and economic landscapes so that it is now important to use the technology for learning. Yet there is also a problem. If we concentrate our focus in the technology itself and not enough on how well it is used, we will not escape from the trouble. But if we ignore the power of the Internet, we will never go forward. In the end, successful Internet-based learning, or e-learning depends on building a strategy that optimizes the technology within an organizational culture that is ready and willing to use it. But, as we will know that, it isn't just a technological innovation that leads us to e-learning. Business needs to get the knowledge even information that's changing to large numbers of people faster than ever before. They need to reduce the cost of creating a workforce that performs faster and better than the competition, and they need to do this 24 hours a day, seven days a week for people located around the world.

The question is no longer whether organizations will adopt and implement on-line learning, but whether they will do it well. An effective e-learning strategy must be more than the technology itself or the content it carries. It must also focus on critical success factors that include building a learning culture, marshalling true leadership support, deploying and nurturing business model, and sustaining the change throughout the organization. It must be pursued by people who are highly skilled and capable of executing effectively. And, it must move us to a view of learning that is much more than formal instruction or training -to one that sees learning in a much broader, organizational context- as in the growing of the intellectual capital of the organization and the enabling of higher individual and organizational performance. Meeting this challenge requires new thinking about how we acquire knowledge and skill, and how we deploy learning resources that can keep up with the knowledge economy[2].

III. A DETAILED DESCRIPTION OF THE EDUCATIONAL STRUCTURE OF THE COURSE

Designing e-learning environments for quality professional education is a challenge for education designers, as the continuing practice of simply moving courses online can be surprisingly disabling. We argue that as universities strive to educate for excellence in professional practice, design approaches for the e-learning components must be conceptualized in a broader view of a contemporary learning environment involving integrated virtual and physical dimensions. These are comprehensively considered in an integrated way to facilitate learning experiences providing an emphasis on grounded practice.

The design of our interface and authoring system is influenced in part by the structure of the e-Learning content. Our initial e-Learning modules adhered to consistent instructional components and organizational structure. There are five main levels (Welcome, Overview, Learning Outcomes, Previous Knowledge and Pretest) in all modules "Fig. 1". The design conforms to current trends in reusable learning objects [3]. Each of the levels can be used independently or integrated into locally developed online courses. Because most of the products that we have produced are targeted for staff development

as well as pre-service programs nationally the system is designed to be accessible to a wide variety of learners in various settings, using a broad range of equipment and network connection speeds. The design of the streaming media was subject to the bandwidth constraints of dial up modems thus limiting the robustness of the audio presentations. Each level in the instructional model serves a specific function for the learner. An instructional unit may be a single module or there may be three or four modules configured as a course. Levels in Organizational Structure 1: The learner accesses the orientation level as they begin a module or course. The introduction and critical question features provide information specific to the modules whereas as the content maps detail the content to be covered in each lesson within the module or course. The structure defines each feature in the system. 2: The learner accesses the support level largely for review purposes where many of the instructional level features are aggregated. The exception being the syllabus, which approximates a comprehensive traditional syllabus, in that it details all learner responsibilities.

a. Objectives

This Work is a version from the course "Introduction to Information Systems" being taught in different worldwide computer science departments. The purpose of this module is to give an in-depth understanding of the fundamental concepts of information systems with a basic background in General Systems Theory, data and information, information systems in business organizations, the IT subsystem, some information systems development issues, and some advanced issues in information systems especially the ethical issues.

b. Learning Outcomes

- At the end of the course, learners will be able to:
- Conceptualize the General Systems Theory and look to the world through “system-colored glasses”
 - Differentiate between data, information, and knowledge
 - Understand the concept of information system and basic relevant issues
 - Realize the existence of the many types of information systems that operate within business firms and play a vital coordinative role all organizational activities.
 - Understand the information technology and its role in information system life cycle
 - Understand some advanced issues of information systems such as development, prospective, security, and ethics.

c. Scenario

The 45-hour conventional course is designed for the e-learning program. Part I: 20- hour distance learning program divided into 20-minute Learning Sequences, the remaining 25 hours will be used for the face-to-face learning as Part2. In this face-to-face learning, 10 hours will be reserved for tutorials, 10 hours for laboratory sessions and 5 hours for project discussion. Major topics are divided into subtopics and subtopics are divided into sessions as shown in table 1.

TABLE 1.
DIVISION OF MAJOR TOPICS INTO SUBTOPICS ALONG WITH THEIR
NUMBER OF SESSIONS

S. #	Sessions	Subtopics	N ^o of 20-m Learning Sequences	Learning Sequences Subtotal	Subtotal (Hours)
1.	General Systems Theory	Main concepts and terminology	4	12	4,00
		Systems modeling	2		
		Dynamic systems	3		
		Systems theory applications in business	3		
2.	Information	Data vs. Information	2	8	2,40
		Information Science	2		
		Information attributes	2		
		Information resource management	1		
		Information vs. Knowledge	1		
3.	Information Systems	Definition	1	20	6,40
		Components	2		
		Classification	4		
		Information systems integration	4		
		Information systems planning	2		
		Information systems development approaches, tools, and methods	4		
		Information systems evaluation	2		
		Information systems perspectives	1		
4.	Information Technology	Introduction	1	11	3,40
		Computers	3		
		Data communications	3		
		Internet, Intranet, and Extranets	2		
5.	Information Systems in Business Organizations	Electronic business	2	4	1,20
		Electronic commerce	2		
6.	Information Systems Special Issues	Implications of information age	1	5	1,40

	Information systems security and control	2		
	Ethical issues in information systems	2		
		Total	60	20

d. Material Delivery

All course materials are delivered using a standard platform and environment offered by Avicenna virtual university (see figure 1). This e-learning environment takes into consideration the following points [4]:

- Course Material: represents the content of the course. Normally, there is no distinction between the content of a traditional course and an e-learning course
 - Teaching methods: the same pedagogy used in traditional instruction can be used in an e-learning course. Teaching methods refer to organization of teaching activities, assessment, presentation of experiences, etc.
 - Students Evaluation: many methods of evaluation of students in the conventional learning are well known. In e-learning, evaluation of students represents a very hard problem due to the lack of face to face interaction. In our course we have included two forms of assessment, pre-test for each learning sequence in addition to a diagnostic assessment at the beginning of each session.
 - Each session in table1 requires a full description that represents the way the material will be presented to the learners and the interaction with them.
 - All the delivered items are represented in one or more of the following forms:
 - PowerPoint presentations
 - Figures
 - Animations
 - Audio/video
- And each session consists of:
- Overview
 - Learning outcomes
 - Learning sequences
 - Diagnostic assessment



Figure 1: Avicenna virtual university platform

e. Implementation

In the development process of an e-learning course, different approaches were used by different developers. A number of important points should be mentioned concerning the technical and educational paradigms used in this work:

- The course is divided into Sessions and each session is also divided into topics.
- Each topic is divided into a set of learning sequences. Student can select a topic and then choose the learning sequence he requires to study. This ensures that the student is not

overwhelmed with the material.

- The course content represented in PowerPoint which contains a small number of words. Too much text on a single page can be tedious. It makes the course seems more like a textbook than an online course. Short pages that do not need to be scrolled are ideal, allowing students to absorb the material at once.
- Each page shows the current page number and the total number of pages in the course. With page numbers and a total number of pages, students are working toward a goal. Student can select any page number that he requires to go for.
- The first pages of a learning sequence introduce the student to the material for that lecture. This allows the student to become proficient at navigating the lecture before the material has begun.
 - Each learning sequence has one introductory page that includes a short abstract of the lecture, the objectives of it, a list of lectures contains (including a video welcome message). This lets the student know what to expect from the lecture.
- Each lesson must end with a formative assessment. The assessment is an excellent way to engage the students and let them exercise their newfound knowledge. Answering the assessment reinforces the information, giving it stronger roots in the student's mind, particularly if a passing grade is required to move on to the next section. The assessment is a multiple choice questions type.

f. Student's environment

Simplify is an important factor in developing an e-learning course. The student interface should be made as simple as possible. When it comes to user-interface design, "simplicity" must be the rule. This include that all of the necessary functions should be simple, buttons must be easy-to-understand. In our e-learning course, such important objectives were considered.

Navigation buttons should use simple graphics to show their function, and only necessary functions should be included. The function of each button should be obvious. All buttons should have a similar look and have the same functionality for each course. Students should not have to spend time figuring out how to navigate the course. This takes valuable time and mental energy away from learning the material.

g. Interactivity

Interactivity is another key aspect of e-learning course. Too many e-learning courses navigate themselves, presenting slide after slide without requiring the student to do anything but stare at the screen. Research has shown that many people lose focus during this kind of learning experience. In order to learn, the student must be engaged and active in the learning process. Even the simple activity of pressing a navigation button to get to the next page keeps the student alert. We have used some video segments, button to be activated only by student interaction. To start a video, require the student to press a button. Overviews and formative assessments force material and allow interaction with the student "Fig. 2,".

IV. TOOLS USED IN DEVEHOPING THE COURSE

Developing e-learning courses requires the usage of various tools. In this section we will introduce the tools used in developing our course.

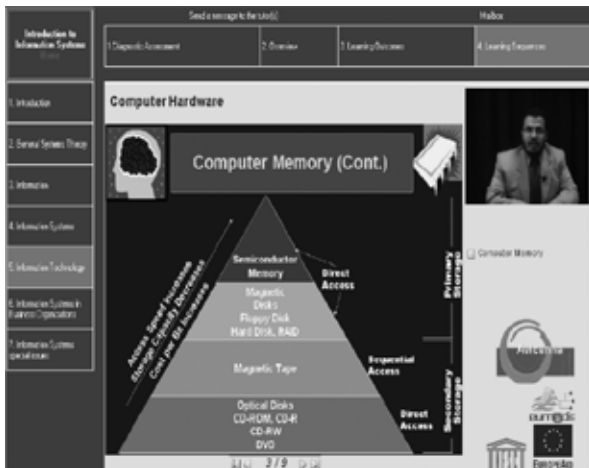


Figure 2: The students' E-learning Environment

a. Animation Tools

The trend in e-learning is to use the animation because it brings up images to the learner which makes learning a kind of fun. Motion graphics often are very effective if used properly in e-learning courses. But we have to know that in addition to the complexity of animation creation and the time required, we may also face expensive charges from animation designers who are specialized in producing high quality animation product. It may be advisable to find some other alternatives that can be of help to make decisions about animation and some less complicated and inexpensive alternatives to use for the development and creation of an e-learning course. The speed of a learner's Internet connection is a significant consideration in e-learning design. In addition, file size delivered to the learner is an important part of keeping the learner engaged in an e-learning course. We were very aware of these limitations. This imposed on our product, in addition other constrains, to deliver our e-learning course without animation.

b. The tools used in the development process

Combinations of tools were used to develop our course. Also we were limited to up load the course to a very specific platform. A brief discussion will be presented showing these tools.

c. Textual material

Slide presentations have been the major tools of our e-learning courses. To convert classroom slide presentations for use in an e-learning course, several steps required to be done:

- evaluate the complexity of slides, such as animation,
- transition,
- sounds,
- other special effects.

As in most e-learning courses, all the course material was prepared by using MS PowerPoint. A number of designs were considered:

- The colors for both the background and the text.
- The background of all figures and tables.
- The header and the footer of the slides.

Each of the above points was carefully considered in producing an acceptable material.

d. Preparing Video records

Alongside with the PowerPoint presentations, all course material was recorded using high quality video camera. The video tracks

were based on giving the learner some more facts and concepts that are not shown on the slides.

This could be one of the easiest ways to convert lectures is to video recording the instructor, digitize and compress the video, and post the video clip onto a streaming- media server. This may not be the best solution for some e-learning courses, however, especially for learners who lack fast Internet connections or for subjects not easily.

e. Animations

A small number of lectures required to be delivered using animation; these lectures were prepared using Macromedia Flash.

f. Integrating Items

Putting all together needs the integration of text, video, and animation. To do so, we used a suitable integration language called SMIL 2.0 (Synchronized Multimedia Integration Language) and the associated package LIMSEE2 [5], and then uploaded to Avicenna platform. This package is normally useful for complex e- learning requirements.

IV. CONCLUSIONS AND LESSONS LEARNED

Many e-learning products offer integrated solutions. We have examined many technologies used in developing e-learning content. Current technologies, such as text and graphics, multimedia, etc. are leading to newly emerging technologies.

The developed course is used in our faculty as a support material for the course

"Introduction to Information Systems". This experience gave an opportunity for the developers and the tutors teaching this course to discuss the content and the organization of the whole material. We faced many challenges while developing the course. Some of them are summarized below:

1. It was not easy to deal with the development tools.
2. Initial specifications were vague.

Feedback from students and tutors increased the likelihood of success of the course to measure how effective is the course and how it is accepted by the learners.

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