Building and Managing an E-learning Infrastructure In Higher Education

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Abstract

A particular issue around access is how to support the e-learning needs of employees who don't use a computer on the job-people who are in the field, on an assembly line, in an installation, a technical or maintenance mode where they move around a lot. E-learning access is necessary for the work they do.

This paper intends to inform how to building and managing an e-learning infrastructure in higher education. Using the corporate platform rather than building a separate e-learning delivery system is actually a benefit for the training organization in two ways. First, e-learning can ride on the infrastructure practically for free and second, it drives the resources and focus of e-learning professionals back to their real competency: creating high-quality learning and information programs. Also a Learning Management System (LMS) uses internet technologies to manage the interaction between users and learning resources.

Key words : E-learning infrastructure, Learning Management System (LMS).

01. Introduction

Computers are an integral part of our lives, but how the instrumental have computers been for learning? Most people believe that e-learning is a recent educational innovation. In fact, Internet technology is the key to a profound revolution in learning. But technology or any technology is a tool and not a strategy. So, we can say that "no e-learning strategy" will be viable if people can not get to the Web. At its basic level, "access" means everyone can get online and if people do not have basic access, nothing else matters. So, access must be reliable, because we must get the Web to everyone. If you can get the Web, but your infrastructure is unreliable (it means always going "down"), or you are using an unreliable Internet Service Provider (ISP), it will become very frustrated.

Enabling access is the function of the Information Technology (IT) department, and it is their job to see that the Web reaches everyone, and to build a reliable technical infra-structure that makes connectivity possible and easy. While IT department should have enough technical expertise to be build for e-learning. A particular issue around access is how to support the e-learning needs of employees who don't use a computer on the job or people who are in the field, or maintenance mode where they move around a lot etc,;

Related to the infrastructure issue is the platform issue. The common platform / common infrastructure argument made the most sense for the firm. Using the corporate platform rather than building a separate e-learning delivery system is actually a benefit for training organization in two ways. First, e-learning can "ride" on the infrastructure practically for free. Second, it drivers the resources and focus of e learning professionals back to their competency, creating high quality learning and information programs;

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Infrastructure and facilities are two of the important components to be paid attention to in governing a university as these components play very important roles in supporting the achievements of the mission and objectives of the university. These components include quite large areas such as buildings, laboratoriums, classes, library, information technology infrastucture, etc. The above mentioned infrasturcture could only function effectively if they are well managed with great responsibilities.

The proper development of higher education facilitites and other resources management needs to be done accurately and simultaneously so that the vision and mission of the university will be achieved. The spirit of "Entrepreneurer" owned by every individual should be used in order to strengthen the process related to the management on the facilities and the available resources. Moreover if we concentrate on the paradigm stating that "life is the function of time, talent and resources (knowledge and skill, asset and health)". This means that the success in the implementation of the process is determined highly by some important factors in the life of somebody, i.e. the time needed, the talent owned and other resources in his environment. Another important thing needed is the bravery to do "innovations and changes", especially to encourage people to think of new ideas in order to achieve the vision; if necessary to use the way that has never been done before in order to find the solution to overcome the problems faced.

The proper and good supply of resources and facilities will yield optimal results if they fulfil the four main factors as follows:

- **Effectiveness:** meaning resulting maximum outcomes, in which every plan on resources should be considered its optimal advantages and its continuation.
- **Efficiency:** meaning that optimal budget will be spent in accordance to the advantages expected, and the unnecessary additional expenses should be ommitted.
- **Managing Risk:** meaning that in managing, we need to think about big things; small amount of expenses and big results. These efforts will be successful if we are able to manage in such a way so that the risk will still be able to be controlled.
- **Focussed and integrated:** meaning that the application should be focussed to the main objectives (vision) and also integrated with the other units to share the duties and the available resources.

Why Resources dan Facilities are Important?

The governance of resources and facilities in higher education follows the Model of IPO (Input-Process-Output) that is :

- **Input**: new students;
- **Output**: graduates who are independent, as well as smart and good and are ready to become "Global Citizens" who have the abilities to choose, and adapt themselves to the changing situations.
- **Process :** " Learning Process" aimed at the improvement of students' knowledge, skills, and attitudes (soft skill/values) so that they will be able become independent individuals who are ready to become "Global Citizens"

Key Question to Ask About an E-Learning Infrastructure and Tools

When assessing the readiness of your infrastructure to support e-learning, here are seven fundamental questions to ask:

- How collaborative and coordinated around e-learning are all the training organizations in the company? An environment where organizations are working at cross-purposes or for their own self-interest is extremely detrimental to a sustainable e-learning strategy.

- What is level of Web access throughout the company? Do people have access outside corporate offices? Do they need it? Because high-speed connections are less of a problem, be sure to determine the slowest speed that must be accommodated. This will impact what can be developed and delivered?
- Does the organization have a core learning management system? If not, is there a consensus about how to proceed in this area?
- What is the relationship between the training and the IT community? A good, mutually beneficial relationship is essential.
- Is there a comprehensive e-learning portal strategy in place? How well are the portals designed, and how easy is it for employees to find and use them? If there are no e-learning portals, what are the plans to deploy them?

02. Learning Management System

While portals provide gateways to learning resources, Learning Management Systems (LMS) provide the functionality. A learning management system use internet technologies to manage the interaction between users and learning resources. Why is this important? As all forms of learning become more costly, both in direct costs and employee time, management will want more information not only on the performance of the learners, but on who is learning what, how many qualified (or certified) employees are available for any specific assignment. In addition, a learning management system is essential for creating an environment where employees can plan, access, launch, and manage e-learning on their own.

There are many types of interactions and functionality that can be deployed and coordinated by these a system including these some core capabilities:

- A common online course catalog: it can be represented all the offerings across the business, organized by business unit, curricula, product, community, etc.
- Learning assessments: The system can provide robust evaluation components that can assess the level of skill or knowledge (learning) attained by the user-based on participation in the learning experience.
- Integrating knowledge management resources: In addition to classroom and online courseware, the system can point users to specific resources based on their specific needs.
- Management of learning materials: Instead of printing instructor and student materials each time a course is offered, the system can maintain a library of these materials that users download right before the learning experience begins.
- Organizational readiness information: The system can act as an information dashboard on the competence of specific communities or the employee body.
- Supporting collaboration and knowledge communities: The ability to build, maintain, and manage knowledge communities (information, recommended learning programs for the community, discussion, or chat facilities, links to advisers and coaches, etc.) is essential.
- Customized reporting: The ability to query the system for standard and unique web-based reports related to e-learning, and workforce development in general, is important if management is to get the most informational benefit out of the data stored in the system.
- System integration: The learning management system must work with the corporate and other system the company uses to run the business.

There are dozens of Learning Managements System in the marketplace. When evaluating vendors, there are more technical questions to ask of them and their products. All questions should have a "*yes"* answer except as indicated:

- Technology: What technology or architecture does the system require Does the vendor provide the server and related technology, or is that the customer's responsibility?
- Implementation: What other companies are using this system?
- Support: What is the level of support provided by the vendor? Who handles database repair and maintenance? How are version control and upgrades managed?
- Communications: Does the system use the web and company e-mail to communicate with users?
- Security: Does the system have appropriate security protocols to protect users?
- Scalability: Can the system easily scale in size to meet the growing demand of users and the increasing number of users?
- Interface: Is the system's interface easy and intuitive for both administrators and end-users?
- Personalization: How well does the system enable users to customize the interface and their learning paths to meet their unique profile?
- Speed: Does the system respond adequately when used in a dial-up mode?
- Curriculum planning: Can the system help design and plan curricula and learning architectures?

These technical questions, along with the core capabilities described just before them, should provide a good start in evaluating the right learning management system for your business. These systems focus on providing ways for people to create and submit information, tracking that information, and organizing it in a manner that can be searched and distributed. Many of these systems also have functions that help support online communities.

03. Building and Managing an e-learning Infrastructure

3.1 The goal of interoperability

Essentially, interoperability describes the ability of your e-learning system and product to work seamlessly with each other. This is not as easy as it may sound. Many e-learning products have been built with different tools. They are organized in different ways and are often bundled with their own learning management system.

And the learning management system vendors are working with the key content providers to assure that the e-learning programs work on their learning management system. Initially, this was done through the exchange of the proprietary coding of each system. A learning management system company and a content vendor would make a business deal and would "certify" each other as compatible. The learning management system that signed up the most content vendors would be in a better market position.

3.2 Standard

More recently, the industry has been moving to a set of standards that can truly open up the e-learning management and distribution environment. These standards seek to label each major part of an e-learning product with the same tags to they will be universally recognize, and to ended this same tagging system into the tools that create these products so that they be standardized as they built.

There are many organizations working to develop e-learning standards. Here is a summary of some of the key groups, along with their Web addresses for more additional information:

- *Airline Industry CBT Committee (AICC).* Its focus is on standards online training, e.g., tests, lessons, modules, etc. (www.aicc.org)
- *EDUCAUSE Instructional Management System Project (IMS).* The focus here is developing a set of tags that can be used universally to define each component of an e-learning environment, including user characteristics. (www.imsproject.org)
- *Advanced Distributed Learning (ADL),* is also working on the standards issue. (www.adlnet.org)
- *IEEE Learning Technology Standards Committee (IEEE LTSC).* This organization will actually accredit the standards for the U.S.

Much of the standards work is based on using a more advanced Web development language. Currently, most Web sites are written in HTML (Hypertext Markup Language). Standards hold a great deal of promise for interoperability, but there is some concern. First, awareness about standards is too low in the industry, especially among buyers. It's important for standards to be a key topic in dealing with a potential vendor, and that support for standards is requirement for doing business. Second, it will require a great deal of work to get everyone (corporate buyers, vendors, etc.) on board with standards, which may require reengineering legacy system, changing development processes, and altering business models. Third, it is likely that when initial standards are published, they will likely center on more traditional training models, characteristic of CBT in many ways. The forth concern is standards acceptance. There is the question whether standards will ever get enough "traction."

3.3. Learning Knowledge Object

One of the more promising technological advances on the horizon are the building of e-learning solutions based on learning or knowledge objects. A learning/knowledge objects is the smallest "chunk" of instruction or information that can stand alone and still have meaning to a learner.

There are several benefits of using learning/knowledge objects. First, costs are lowered because objects can be shared again and again, even for different purposes. Second, it enables real customization of learning, because the configuration of the objects can be dependent on the needs of the learner. Third, it enables e-learning solutions to be very quickly reconfigured based on change in users or the business itself.

One easy way to think about learning/knowledge objects is to envision a page you're going to develop on your Web site. You access information on databases and document files and paste the content into your site.

Many development tools and learning management systems are building this capability into their product. Initially, each system will have its own process for creating and managing learning objects, so moving between different systems will be difficult, but like everything else in this industry, as standards and a common tagging model emerge, learning object technology will increasingly move toward complete interoperability. The advantage of learning/knowledge can be seen in what Integrated Project Systems (www.ipspm.com) is doing in the area of project management training.

Building an infrastructure for e-learning is primarily about creating an environment where users can easily access the learning products (instructional or informational) they need, when and where they need them. It is also about making the entire e-learning initiative easier and more cost-effective to manage. This can not be achieved by just putting a lot of e-learning "stuff" on a server and hoping for the best. As shown in figure 1 below, the various systems and tools must work together to ensure that e-learning can be deployed to all.

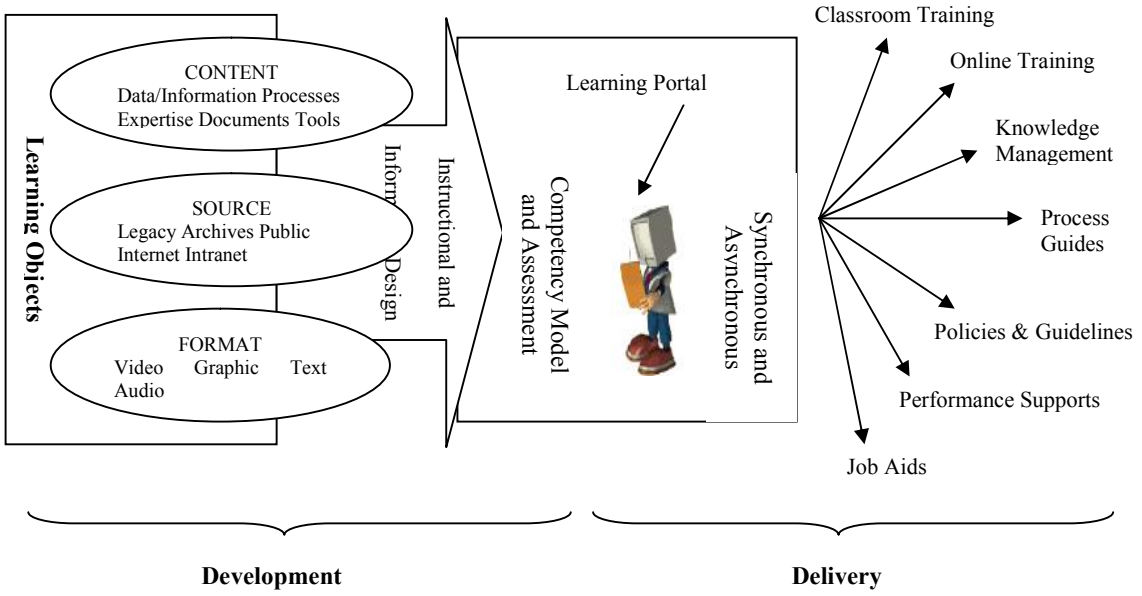

Figure 1. A sound deployment infrastructure is essential to manage and deliver traditional and e-learning solutions

Content, sources, and formats are defined as learning or information objects and then combined into sounds instruction or information. Then the material is delivered through a learning portal, either asynchronously or synchronously. Depending on the needs of the user/learner (perhaps based on an online competency assessment), the right training, information, performance support, and other resources are delivered to the desktop. The learner is also enrolled in the correct classroom programs, sequenced according to defined learning architecture or competency model.

04. Conclusions

- Resources and facilities are regarded as one of the important components which should be focused on in managing a university, because this component plays a prominent role in supporting the achievement of the mission and goal of the university.
- The implementation of the university facilities and other resource management will produce an optimal result if it meets these four main factors: effective (yielding maximal outcomes); efficient (needing minimum cost); Manage Risk (its management results abundantly with least cost); Focus and integrated (focus on and direct to the vision);
- The Learning Management System is needed to manage the e-learning process; which have three functions: define the learning object, delivery the learning process through the discussion forum and assess the assessment process.
- Computers can be an assistant to serve the stakeholders and they can also help the process of the learning itself, including all things relating to the management of the e-learning process. Besides, computers can be used as a tool for searching for scattered free knowledge in the world.

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