Cloud Computing and Rapid e-Learning Strategies in Establishing Online Education in the Visayas State University (VSU)

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ABSTRACT

The traditional delivery of education in the Philippines' **higher-education-institutions** (**HEI**s) has some unique educational management features, which makes its blending with online delivery a difficult task to do. This paper presents innovative strategies that have made it easy and cost-effective for the Visayas State University (the premier university in the Visayas, Philippines) to establish **Blended Learning (F2F+Online)** and completely **Online Education**. These innovative strategies have been implemented at the Philippine Women's University since 2003, at the Philippine Normal University (PNU) since 2008, and at the University of Makati (UMak) since 2010.

With the use of **Cloud Computing**, e.g. Infrastructure-as-a- Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS), the high cost of setting up the infrastructure is reduced to a minimum. There will be no more need of purchasing expensive computer servers. Subscription to a remote server is now the common practice even among large enterprises. The subscription cost is practically very minimal. With this scheme, the administration and management of the systems do not mandate anymore the services of tech-savvy in-house high-salaried IT personnel. Even just computer-literate staff would be able to perform these tasks easily. A high-caliber technical support is readily obtained from the subscription provider as a part of the service guarantee.

The development of online course materials and the delivery of the courses online use **Rapid e-Learning** strategies. With a plethora of user-friendly educational technology tools nowadays, e-learning materials can be produced even by just the teachers themselves. There will be practically no need for the services of the IT personnel. The successful conduct of teaching and learning online is powered by a **Learning Management System** (**LMS**), which can be seamlessly linked to the **Information Management System** (**IMS**), e.g. Academic Information Management System. The chosen LMS is capable of monitoring all the **Virtual Classrooms** for quality education assurance. It is very user-friendly, and can be easily administered even by just computer-literate individuals.

KEYWORDS: Cloud Computing, Rapid e-Learning, Online Learning, Blended Learning, Online Education, Learning Management System, Virtual Classroom

INTRODUCTION

The Visayas State University (VSU) was formerly known as the Leyte State University (LSU). It was renamed as VSU by virtue of Republic Act No. 9437, which was signed by her Excellency President Gloria Macapagal-Arroyo on April 27, 2007. At present the VSU System has 10 colleges, three institutes and one school. These are the College of Agriculture, College of Forestry, College of Veterinary Medicine, College of Engineering and Agri-Industries, College of Arts and Sciences, College of Education, College of Fisheries (VSU-Tolosa Campus), College of Agri-Industrial Technology (VSU-Isabel Campus), College of Environmental and Agricultural Technology (VSU-Alangalang Campus), College of Education and Agricultural Technology (VSU-Villaba Campus), Institute of Human Kinetics, Institute of Tropical Ecology, Institute for Strategic Research and Development Studies, and the Graduate School. It also has an Open University which takes care of the distance education program.

The Visayas State University adheres to the philosophy of promoting and inculcating the core values of truth, knowledge, work and relevance. Its programs in Instruction, Research, Extension, and Production converge and complement each other to help make Philippine agriculture globally competitive and sustainable.

To improve human resources in the Visayas and nearby regions, VSU provides relevant instructional programs that best serve the needs of its target clientele. The various degree programs of the University emphasize the development of technical, managerial, and entrepreneurial skills of the students. Hands-on practicum as well as field training using state- of-the-art facilities and equipment are provided to enrich curricular programs in Agro-Industry, Information Technology, Tropical Ecology, Veterinary Medicine, Forestry, Fishery, and Food Science and Technology. VSU also promotes distance education through its Open University.

The current VSU educational management, with Dr. Jose L. Bacusmo at the helm, is embarking on Online Education delivery which is planned to be fully established by the start of School Year 2012-2013. The service of Dr. Antonio E. Refre, as an e-Learning expert, was requested to execute the plan of establishing Online Education. The strategies being employed make use of the principles of Cloud Computing and Rapid e-Learning.

CLOUD COMPUTING

Cloud computing—a model for enabling convenient, on-demand access to a shared pool of configurable computing resources, such as networks, servers, storage, applications, and services, that are hosted by a third-party technology provider and delivered to users through the internet— is an approach that is attractive for education, because it allows organizations to scale and grow without having to own the technology. Cloud computing can be seen as offering three distinct services: Infrastructure-as-a- Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). Schools can use any or all of the three, but using the cloud for hosted applications (SaaS) such as messaging, eMail, and creating sites for sharing and other social environments is particularly relevant for education and is a natural starting point.

Most of the universities and colleges in the Philippines purchase servers and install them in their LAN. Web applications are run in these servers. The operation and management of these servers

demand highly trained IT personnel. This causes problems in the school budget. Another significant problem being encountered is the attrition of IT personnel due to migration to a higher salary offer by other institutions. This causes instability and discontinuity in the provision of technical support.

Having considered the foregoing problems, a better-choice strategy is Cloud Computing. The very simple process in using this strategy is by doing the following steps:

1. Search for the best offer in Web hosting services. The one chosen for VSU is Bluehost.com (unlimited server space, unlimited bandwidth transfer, 24/7 technical support, and other amenities for a monthly subscription of $6.95).

2. Develop a Web application (e.g. a Learning Management System, LMS), which is tailor-fitted to the needs of the user and make it the platform in the Online Education delivery.

3. Install the LMS in the chosen Web host server.

4. Train a couple of staff (just computer-literate) to administer and manage the LMS.

ONLINE EDUCATION PLATFORM

The platform used in Online Education delivery is commonly called Learning Management System (LMS). The most popular among these is Blackboard. Only highly budgeted universities can afford this. The software is expensive and it requires a group of highly trained IT personnel. Among the Open Source systems, the Moodle is the most popular. Those who got hooked to it (because it is free) discovered in the long run that its management and operation cost them a sizeable amount and headaches in technical support.

For reasons mentioned in the foregoing, VSU chooses the LMS developed by Dr. Refre (called AERVLES). The choice made is based on the following:

1. It is programmed using simply structured PHP&MySQL making it easily modifiable.

2. The interfaces are very user-friendly. They resemble the interfaces of social networking and collaboration software. It is patterned after the Yahoo e-Group model.

3. It provides capabilities for the Deans and Academic Supervisors to monitor the quality of the education being delivered.

4. Students and their teachers can easily have collaborative learning.

5. It does not require training-workshop in order for the students and teachers to get into their Virtual Classrooms

6. Administration and management of the AERVLES does not need highly trained IT personnel. Just computer-literate staff can administer and manage it.

7. It is scalable. It can take in more than 10,000 users from different campuses.

The AERVLES

The **AERVLES** is a single piece of software, accessed via standard Web browsers, which provides an integrated online learning environment.

Its framework is based on an integrated model where most of the learning takes place via collaborative online activities and content is largely determined by the learners, either individually or as a group. Learning is very much student-centered and highly collaborative.

It can be used to support flexible and distance learning. It includes the following functions.

1. Controlled access. This means controlled, secure, access to the curriculum that has been mapped to elements which can be separately assessed and recorded. It allows the organization of students into virtual classes, with individual, secure log-ins. Content is organized in elements or modules and mapped to learning outcomes of programs, linked to the units of which they form a part. Students should have their own individual, customized workspaces.

2. Student Tracking. Tracking student activity and achievement against these elements using simple processes should make it possible for tutors to define and set up a course with accompanying materials and activities to direct, guide and monitor learner progress. The **AERVLES** allows recording of certain basic information about students, irrespective of the learning context, including registration details, course details, course prerequisites, qualification aims, study time and tracking information. It offers comprehensive tracking and recording facilities. For example, it automatically records individual students' log-in time and dates, length of time online, what content has been read and how often, assessments completed, with dates and times of these activities. Ideally, the username and passwords used to control access to the **AERVLES** is the same as those used for other systems within the institution, to allow a 'single log-in'. It should not be necessary for a user to log in several times to access different systems.

3. Resources and materials. The **AERVLES** supports online learning, including access to learning resources, assessment and guidance. The learning resources may be self-developed or professionally authored and purchased materials. The **AERVLES** is able to support a variety of content formats, not only hypertext markup language (HTML). It can easily transfer content between VLEs either because institutions (or consortia) have different VLEs or because it is necessary to change VLE (in light of circumstances such as the supplier going out of business). The **AERVLES** provides a simple method of uploading content into the environment, so that it is then available for the creation of learning programs and pathways. Methods of doing this will vary from simple drag-and-drop to more complex uploading processes, including batch uploading of files and courses. Once uploaded, contents' elements have to be assembled into programs of learning, which will mean devising pathways through the content, creating hierarchical structures, building links, etc. Again, the way this is implemented should make it easy for non-technical staff to use. From the student point of view, the **AERVLES** offers simple

navigation tools through the content, and they should be able to access their own course details and performance information.

4. Communications. This includes communication between the learner, the tutor and other learning support specialists. There are three basic methods of communication within the **AERVLES**: email, bulletin boards and asynchronous discussion rooms. These facilities are likely to be heavily used to support the students and can be used for portfolio and assessment purposes.

5. Links. This means links to other administrative systems, both in-house and externally. The **AERVLES** integrates easily with core administrative/management systems which are IMS standards-compliant. Its data should be seamlessly shared with the MIS system.

6. Customization. The **AERVLES** is customizable. It allows the look and feel of the user interface to be customized, so that it can easily be redesigned to appear in the college colors, display the college logo, etc.

It is depicted in the Figure 1 on VSU Online Education. The Virtual Classroom features are shown in Figures 2, 3, and 4.

Figure 1 The Online Education Portal

Figure 2: The Student Login	Figure 3: The Student Classes
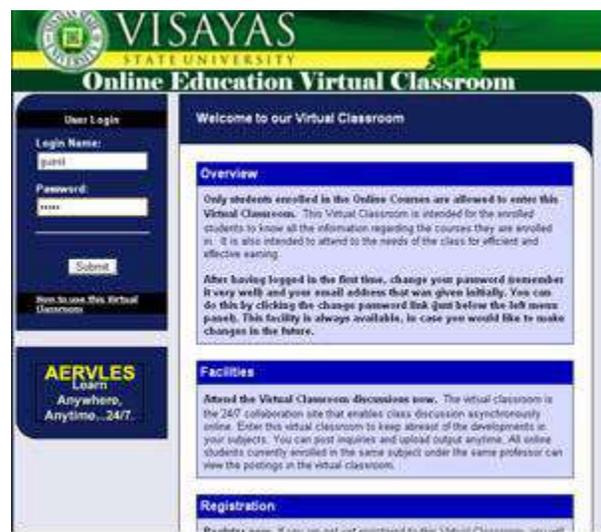
| Figure 4:The Student Virtual Classroom	The Virtual Classroom has the following sections: Bulletin Board – teacher's announcement Course Contents – syllabus and course materials Posted Files – submitted assignments Web References – referenced websites Class Discussions – collaborative discussions Class Members – enrolled students Grade Check – grades of exams and assignments Online Users – list of students who are logged in at the same time
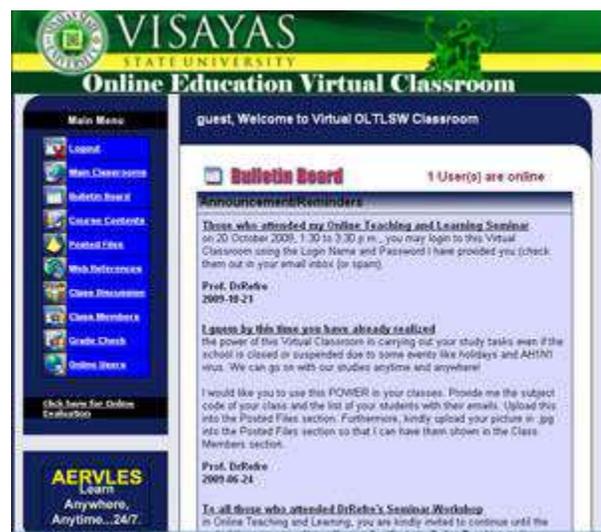
Added systems into the **AERVLES** are the **Academic Supervisor** (features are shown in Figures 5, 6, and 7) and the **Administrator** (features are shown in Figures 8. 9, and 10).

The **Academic Supervisor** features are shown in the following figures:

| Figure 5: The Academic Supervisor	
	The Academic Supervisor is equivalent to the Coordinator of a group of teachers. The Academic Supervisor facility empowers the Coordinator to monitor the virtual classrooms of the teachers being coordinated. The virtual classrooms of these teachers can only be viewed. In this manner, the Coordinator will be able to determine how the teachers are conducting their online courses. Thus, the quality of education delivery is assured.
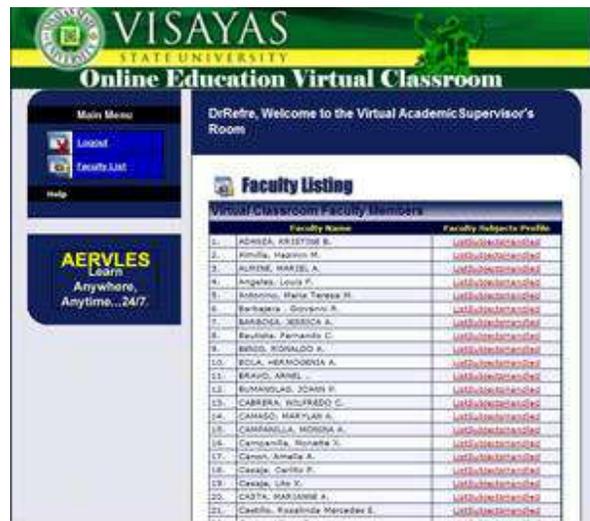
Figure 6: The List of Subjects Handled	Figure 7: View of one Faculty Virtual Classroom
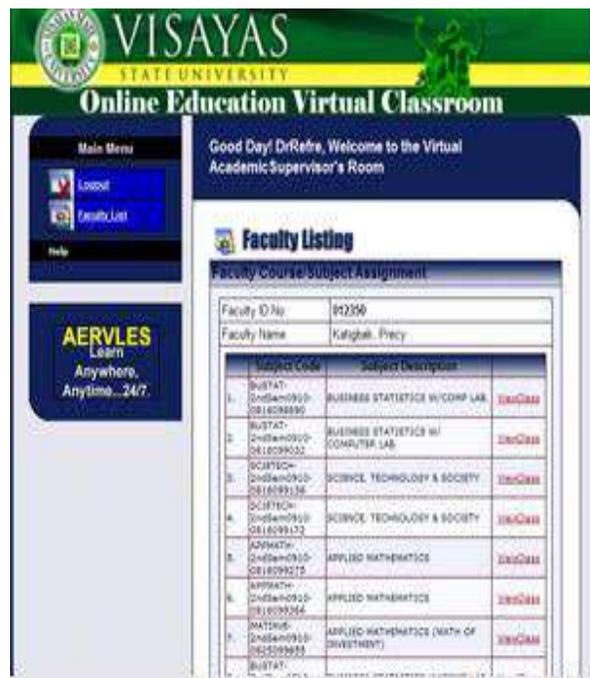
The **Administrator** features are shown in the following figures:

| Figure 8: The Putting Up of Courses	
	The Administrator Virtual Room takes care of the administrative functions that are similar to the Registrar functions. Courses/Subjects are put up in here. The teachers are assigned to these subjects; i.e they are given loads. Similarly, the students are assigned to the subjects they are enrolled in. All the virtual classrooms can be monitored for purposes of checking on how the teachers are conducting their online courses.
Figure 9: Loading of Faculty	Figure 10: Loading of Students
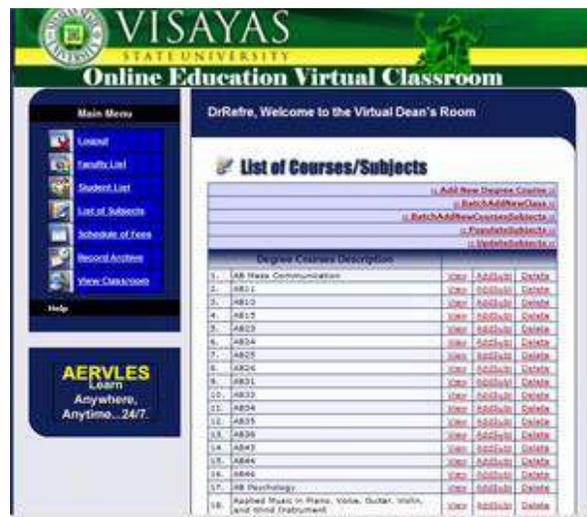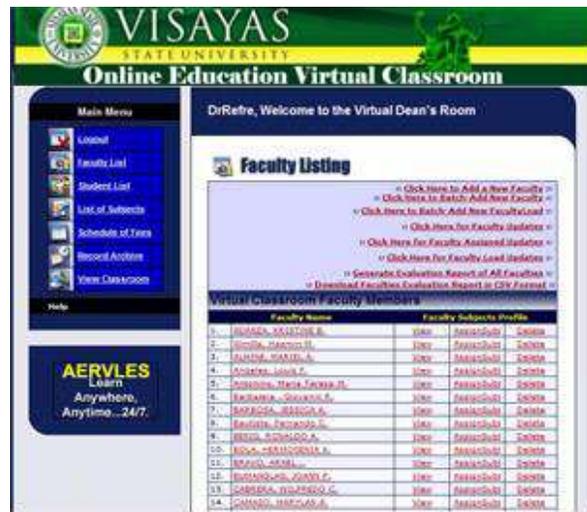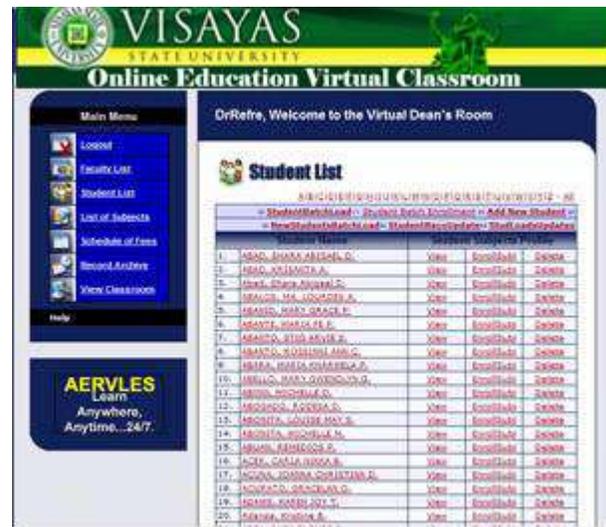
RAPID e-Learning

Building of e-learning courses in a quick (or rapid) manner is commonly referred to as Rapid e-Learning. The e-learning courses are those that incorporate technology in their presentation and delivery.

Education delivery of courses, whether face-to-face (F2F) or online, undeniably requires course materials – of course! Instructional designing of these course materials for online delivery differs a lot from the F2F delivery. Considering the fact that in online delivery the presentation of the course materials is done in a virtual manner, the instructional designing requires the assistance of technology. Incorporation of multimedia into the course materials becomes a mandatory requirement. Because of this, teachers feel that they are incompetent to meet this challenge in developing e-learning materials. This is also one of the reasons why many teachers are still keeping a distance from online teaching.

With a plethora of user-friendly educational technology tools nowadays, e-learning materials can be produced even by just the teachers themselves. There will be practically no need for the services of the IT personnel.

Technology tools needed in the production of e-learning materials include the following:

1. Office productivity software (e.g. MS Office, OpenOffice, etc.)

2. e-Books (e.g. Adobe PDF, DeskTopAuthor, etc.)

3. Graphics software (e.g. Adobe Photoshop, GIMP, Picasa, etc.)

4. Multimedia Authoring software (e.g. CAMSTUDIO, DeskTopAuthor, etc.)

5. Computer-based Exam software (e.g. TCExam, DeskTopAuthor, etc.)

The VSU Rapid e-Learning

The Rapid e-Learning strategy adopted by the VSU meets the following typical challenges in rapid e-learning:

Creating rapid e-learning is not an easy task. The typical challenges include the following:

1. Ensuring a look and feel that is consistent with traditional e-learning

2. Using good and effective instructional design principles in a short time frame

3. Integrating with the chosen Learning Management System

4. Integrating the programming and HTML

5. Providing advanced features such as links, tests, and glossary

6. Meeting schedules without compromising on quality or learning effectiveness

The challenges faced by VSU while implementing rapid e-learning are:

1. Tools: VSU has no rapid e-learning tool

2. Resource: VSU has no Instructional Designers

3. Deadline: VSU has to deliver courses online starting SY 2012-2013

4. Quality: VSU has to adhere to quality standards despite the stringent deadline

5. Budget: VSU has almost no budget for e-learning

In short, VSU has the challenge of rolling out an output that would match or surpass the output of a traditional e-learning course at a very small fraction of the school budget and with minimal resources.

The VSU adopted different strategies to meet the foregoing challenges. These are reflected in the following actions being taken:

1. Focus on design: The development group first defined the scope, guidelines and workflow for the course. The scope covered the extent and depth of content coverage. The guidelines included the strategies, look and feel, and the level of interactivity. Finalized the use of page-level presentation strategies such as tabbed pages, drag and drop, rollover text, click text, checklists, and so on. The standards document specified the rules for the use of fonts, audio, positioning of graphics, course length and slide and frame formats. The workflow outlined the tendering process in the form of a flowchart.

2. Content categorization: To meet the course duration and provide adequate content to the audience, content was categorized and segregated into two parts, main content and additional content. Main content was covered in detail in the course. Additional content was placed in the Reference section of the course. It was included as optional reading at appropriate places.

3. Tool used: It was decided to use PowerPoint to create storyboards. The storyboards were scripted using PowerPoint called wire frames. They had detailed visualization and instructions for the graphics and construction team. Visualized scripts ensured that there was no additional time spent by instructional designers with the graphics and construction team to clarify graphics and presentation-related doubts.

4. Parallel processing: There was no time wasted by either graphics or construction in waiting for inputs from the subject expert/instruction designer (ID). Let us see how this happened:

   a. The ID worked on the table of content and content categorization; people from the construction team created the shell; graphics person created common icons and graphic elements for the course.

   b. The ID starts scripting using existing templates. The smallest module is rolled out in 2 days. The module is passed on to the graphics and construction team. The module is also sent for user's feedback. Based on the feedback, other modules are modified and created.

      c.   User's feedback is incorporated by the ID while others continue scripting the other modules. The graphics team creates the icons. Development team is simultaneously working on the shell and integration of the module.

      d.   This synchronized process resulted in the constructed modules being rolled out quickly after the completion of scripting, resulting in successful completion of the project.

The types of development tools currently used for e-learning course creation are:

1. Rapid development tools
2. PowerPoint to e-Learning conversion tools
3. Custom Flash development
4. Custom HTML development
5. Office productivity software such as MS Office or OpenOffice

The VSU e-Learning Course Design Process

The design process and tools used are depicted in the following figures:

Note: The above images are copyrighted by Harbinger Knowledge Products

The software used corresponding to the design process are the following:

PROCESS	ACTIVITIES	TOOLS CATEGORIES	TOOLS	SOFTWARE
*Content Authoring and	*Testing on LMS	*Authoring Tools	*LMS	*AERVLES

Integration *Interactivity Building *Special Artifacts Creation	*Screen Capture *Image Editing *Audio Recording *Video Recording	*Interactivity Tools *Specialty Tools	*Screen Capture Tools *Image Editing Tools *Audio Recording Tools *Video Recording Tools	*OfficeProductivity *DeskTopAuthor *CutePDFWriter *FlashSlideshowMaker *Adobe Photoshop *GIMP *Picasa *Screen Shot Captor *Camtasia *Audacity *Microsoft Windows Movie Maker *Xerte Rapid e-Learning Suite *eXe

Whenever possible and because of budgetary constraints, the freeware or open source software are chosen first.

CONCLUSION

Establishing the Online Education (OE) is a major educational thrust in the academic programs of the VSU. This is prompted by the big demand for distance learning by students who reside quite a distance from the campus and who are already employed.

To be able to put up the OE in a very short time and with minimal investment, innovative strategies have to be implemented. The strategies which fit very well the situation in the VSU are Cloud Computing and Rapid e-Learning. These strategies have been successfully implemented at the Philippine Women's University (PWU), at the Philippine Normal University (PNU), and at the University of Makati (UMak).

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4. The Rapid e-Learning Blog: http://www.articulate.com/rapid-elearning/

5. Web Hosting: http://www.bluehost.com/