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ABSTRACT

The Virginia Community College System (VCCS) has developed a model for distributed learning that addresses around-the-clock access and support, leverages the resources of 23 institutions, and retains the pedagogical integrity of courseware. The model, a four-pronged approach, addresses the technology infrastructure, portals, content, and delivery. The systematic approach allows VCCS to maintain some balance in both effort and resource allocation and it allows for the identification of gaps that will prevent the VCCS colleges from moving forward with technology-based instruction. This paper details the model, addressing the cost-effective and efficient development of content, content delivery, and the technical and academic infrastructure to support faculty endeavors and student success in the distributed learning environment. A diagram of the four-part VCCS distance learning infrastructure is appended. (AEF)

"Crossing the James River"
Infrastructure for Distance Education

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The Virginia Community College System has developed a model for distributed learning that addresses 24 x 7 access and support, leverages the resources of 23 institutions, and retains the pedagogical integrity of courseware. The model, a four-pronged approach, addresses the Technology Infrastructure, Portals, Content, Delivery. The systematic approach allows us to maintain some balance in both effort and resource allocation and it allows to see gaps that will prevent the VCCS colleges from moving forward with technology-based instruction. Coupled with the energy, enthusiasm and capacity of the VCCS colleges, we are building a model for an e-learning environment.

"Crossing the James River"
Infrastructure for Distance Education
(http://www.vccs.cc.va.us/its/resources/)

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When the first waves of settlers landed in Virginia on the James River they had to (ad hoc) construct canoes and rafts to cross the James River. Later on, the next waves of settlers were able to build upon the experience of the early settlers and obtain passage (scheduled batches) on ferries across the James. Eventually bridges were built and the succeeding waves of settlers could cross the James anytime (just in time). The same scenario is true for the distance education. Early pioneers had to build everything themselves. The second waves found software packages that invited them to build courses in batches due to the long development time. The third wave of distance education will permit "just in time" construction of a course or program. To achieve this level of maturity will require an organized and well-conceived infrastructure from both a technology and organization perspective. Essentially it will "change the way higher education works".

The Virginia Community College System is developing a four-pronged approach to distance learning. The twenty-three colleges are heavily involved in developing and delivering technology-based instruction. Over the past 4 years, there has been continued growth in both course offerings and in student enrollments. In 1999 – 2000, over 28,000 students accounted for 39,000 enrollments, up over 35% from the previous year. Approximately one half of Virginia's community colleges offer degree or certificate programs online or via videoconferencing.

At the same time, the infrastructure supporting technology-based instruction in both classroom delivery and in distance delivery has developed at a rapid pace. While great progress has been made across the system, VCCS is feeling the pressures of the e-learning environment – increased demand for degrees and certificates online, keeping faculty up to speed on new technologies, providing 24x7 support, rapid pace of new technologies, new competitors, new partnerships, cost of software licenses, the global nature of online instruction. We are facing an ever-moving target with the rules changing everyday. It is no longer business as usual. To address the many issues that we already know and those that may arise

in the future, the VCCS is using a systematic approach to technology-based instruction.

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Technology Infrastructure

The Virginia Community Colleges have a balanced mission driven information technology initiative. The strategy is to be an early adopter of new mainstream technology so the colleges can stay in front of their customers who will expect courses to be provided. College applications are organized and network centric in nature. In 1996 a statewide broadband network was created that supported data and video classroom transmission. Over the years network applications have grown to include voice over IP (instate long distance), audio conferencing, video over IP (desktop video), classroom and conference video, and several types of streaming video. Virginia's community colleges have adopted the "message broker" middleware concept and used it to integrate security, email, SIS, library access, etc. This technology is also used for SIS data conversion, application integration, and other network based applications.

All 23 colleges share a "Utility" service (ASP – Application Service Provider), which provides the network operation center, customer support center, and applications support center. The Utility provides the back room services and knowledge required to provide a three-tiered infrastructure. This service offers a cost effective approach and a core competency for the Virginia Community College System. Each college is responsible for the first tier of support related to each campus.

Applications are grouped within five "information systems" which are General Office, Student Information System, Financial and Human Resource Information Systems, Management Information Systems, and Instructional Information Systems.

The college administrative processes have undergone reengineering and deployment is underway. The student services applications use PeopleSoft and their web-based technology to support faculty and student access. Financial applications reengineering is also underway and is based upon the PeopleSoft web based applications. Human Resources will follow the Financial applications. All of these are reengineered with an eye on distance education and its demand on the administrative infrastructure.

Like the other information systems groups, Instructional Information Systems has several components such as customer relation management, intellectual property management, academic subject content management, and instructional delivery methodology. The administrative infrastructure definition is the discussion for the remaining portion of this paper.

Portals
VCCSOnline

Distance learning courses offered by the VCCS colleges are listed on VCCSOnline (http://www.so.cc.va.us/vccsonline/index.html). It has been the most heavily hit web site since it was launched over a year ago – 97,000 hits per month representing 22% of the traffic on the site. There are over 1700 distance learning courses listed. A recent enhancement is the electronic postcard which students can use to request information on courses. Once students find the course they are interested in, they can click on "find more information" and send an electronic postcard requesting more information on the course or on distance learning in general. A contact at each college receives the postcard and responds or directs it to the appropriate person on campus. As we analyze the student inquiries, we will enhance the web site to address student needs.

Concern for student success in e-learning drove the development of a student orientation course. The course template was built on Blackboard and is being customized by several of the colleges for their use. The course will provide students with hands-on experiences as well as tips on learning in the virtual classroom.

Other learning resources and services are being developed to support students engaged in technology-based instruction. This "portal" will eventually be part of an integrated portal for distance learning.

Content

A key element in all of technology-based learning is the amount and variety of content. Courses will be comprised of multiple resources that come from multiple sources – digital content libraries, commercial publishers, and other producers. A faculty member will no longer be the sole creator or deliverer of all the content used in a course. Another likely track is that courses will become modular and will be pieced together to form courses and programs. Modular content will also lead to customized learning opportunities.

Online digital learning centers will be created to support one or more discipline areas. The learning centers will provide the academic support services for students and faculty. For students, there will be activities directly related to the content, supplemental resources to assist students who need both tutorial activities and enrichment opportunities. Faculty will have access to resources for use in their courses. Both faculty and students will have more options on presenting and learning content.

Several activities are underway to provide opportunities for faculty engaged in creating and delivering technology-based instruction. A Courseware Grant Program (http://www.so.cc.va.us/vccsit/CwareRFP5.htm) that supports collaborative course development activities has resulted in over 100 technology-based courses. The basis for learning centers has been established through the development of the Virtual Foreign Language Web Site

(http://www.nv.cc.va.us/vflc/) the Faculty Online Resource Site (http://164.106.217.32/frs/index.htm) , an online math center. These resources, along with the development of a student orientation to distance learning will enrich the virtual learning environment.

The VCCS is participating in the MERLOT (Merlot.org) project. Faculty will be trained in identifying and evaluating electronic resources for use in the classroom or for distance learning activities. The MERLOT faculty will disseminate what they have learned to faculty across the VCCS Colleges. One natural by-product of the Merlot activity is that faculty will evaluate their own electronic materials more effectively. Another outcome is that faculty will gain experience in building courses from a variety of building blocks. Faculty will be more astute at selecting and using content for e-learning activities.

VIVA, the Virtual Library of Virginia (http://www.viva.lib.va.us/), supports technology-based instruction through a variety of electronic resources.

Course development systems are in use in the VCCS. As these, and other tools, become more sophisticated, faculty will be able to compose learning experiences for a variety of settings and to meet the needs of differing learning styles.

Delivery of content/services – a "what" and "how" issue

There are several approaches to content delivery being evaluated in the VCCS. The strategy is to move toward a concept of Commonwealth courses and programs (in the broadest sense) delivered by VCCS colleges. While there is evidence of this concept in the distance learning programs currently being offered – Veterinary Technology, Dental Hygiene, Respiratory Therapy – we need to continue to scale up so that these high demand, highly specialized programs are available throughout Virginia. A committee is looking at the issue of distance learning program delivery. They will recommend a model for program delivery starting with Information Technology. The key issue is how to increase access for students to specialized and/or high demand programs. We will have to find creative and innovative ways to use technology to deliver content and services and we will have to look at our existing structures and practices to determine what we need to change. We will have to address the difficult question: "How can we provide technology based instruction without changing what we do now?"

The way content is delivered will be driven by both the demands of the market and the availability and variety of digital content. Faculty will be able to deliver content for both traditional degree programs and workforce development activities. The careers of the 21st Century will require continuous learning and relearning. An array of content resources will allow faculty to customize courses and programs as needed.

This is the area where will activities will become unbundled. In many instances, faculty will be part of an instructional team. Once content is readily available, faculty will have great flexibility in packaging instruction. While electronic content supports flexible delivery options, administrative issues often present obstacles. Faculty workload and compensation are based on seat time and fixed schedules. It is likely that this area will be impacted by external forces rather than internal changes. Beyond the administrative issues, the role of faculty is changing because of e-learning. Faculty/student interaction increases and instruction can be directed toward individual needs and abilities.

One approach to course delivery in a virtual setting is the VCCS Virtual Foreign Language Classroom. A foreign language faculty member coordinates the delivery of foreign languages across the system. This year 8 (French, Spanish, German, Russian, Chinese, Japanese, Arabic and Latin) languages are available to the VCCS colleges. Enrollment for the Fall semester is over 300. A faculty member is developing a virtual math lab to support students and faculty in math and related subject areas. Nursing faculty are developing a web-based program that will allow EMT's and military corpsmen to obtain a nursing degree. All of these initiatives involve "change" in the way we do things.

Another element anticipated to support delivery of content is an engine that will manage/coordinate all of the resources and learning events for faculty and students. The objective is to have a seamless, transparent infrastructure for faculty and students. The "engine" will be an important component of a sophisticated learning environment that provides customized learning opportunities for students.

The strategy is to "scale up" program delivery through better use of technology, new delivery strategies (unbundling the content and delivery processes), more content options, improved assessment methods, and creative partnerships.

It is obvious that we will have to step out of the "business as usual" concept. We will have to change the way we do things, invent new approaches to providing instruction and services, and remove the restrictions imposed by a time/place based educational system.

At this time, the delivery of content is the area that has changed the least in some respects but it is the area that will feel the greatest impact of e-learning. E-learning will cause us to examine the very heart of the institution and relationships with faculty. It is likely that content and instructional services will be delivered by teams – faculty, tutors, technical staff, and other support personnel. Faculty will have opportunities to co-teach or team teach where they may play very specific roles rather than sole provider. It is not a question of if change will take place but rather "how" and "when".

Instructional services may be provided differently than they are now. Institutions may turn to other agencies to provide some services. Institutions may partner with each other to provide services in support of the e-learner. Testing, tutorial services, management of clinical activities, technical support, portals are some of the areas where institutions may consider alternative methods of delivering services. Credit banks and agencies that evaluate non-credit instruction for application to credit programs will appear in greater numbers. The possibilities for innovative and creative ways to support the e-learner will increase.

E-learning has forced accrediting agencies to re-think their guidelines. Regional boundaries fall as e-learning takes on a global perspective. Questions arise on what gets accredited – institutions, faculty, students. The question of quality and integrity of technology-based instructional programs will remain an issue for providers and students.

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Summary

The virtual learning environment appears to be fragmented and even chaotic. There are more questions than answers. We have chosen a systematic approach so that we can begin to piece the learning environment together and keep the four areas we have identified – infrastructure, portals, content and delivery -- in relative alignment. The virtual environment is multi-dimensional and complex. The systematic approach allows us to maintain some balance in both effort and resource allocation and it allows to see gaps that will prevent the VCCS colleges from moving forward with technology-based instruction. Coupled with the energy, enthusiasm and capacity of the VCCS colleges, we are building a model for an e-learning environment.

Appendix A

Virginia Community College System
Distance Learning Infrastructure

Technology Infrastructure Internet 2 VOIP – voice & video Video conferencing Streaming video Message broker Student Information System Utility – ASP Instructional Information System	**Content** **Courseware grants** Virtual Foreign Language Classroom Faculty Online Resource Software libraries -- NetG VIVA (virtual library) IP Policy Professional Development Program New Horizons Conference Course management Systems – BB, WebCt MERLOT Microsoft mentors
Portal VCCSOnline — course database Student Orientation Electronic postcard Virtual Foreign Language Classroom *Online Math Center *Discipline specific online centers	**Delivery** Quality Assurance DL Action Plan College Technology Plans Administrative Procedures Accreditation Funding base Faculty issues Workload Intellectual property *Co-teaching *Instructional teams *Modular instruction *Continuous enrollment *Fee structure DL Program Committee

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Transforming Education Through Information Technologies

Abstract

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