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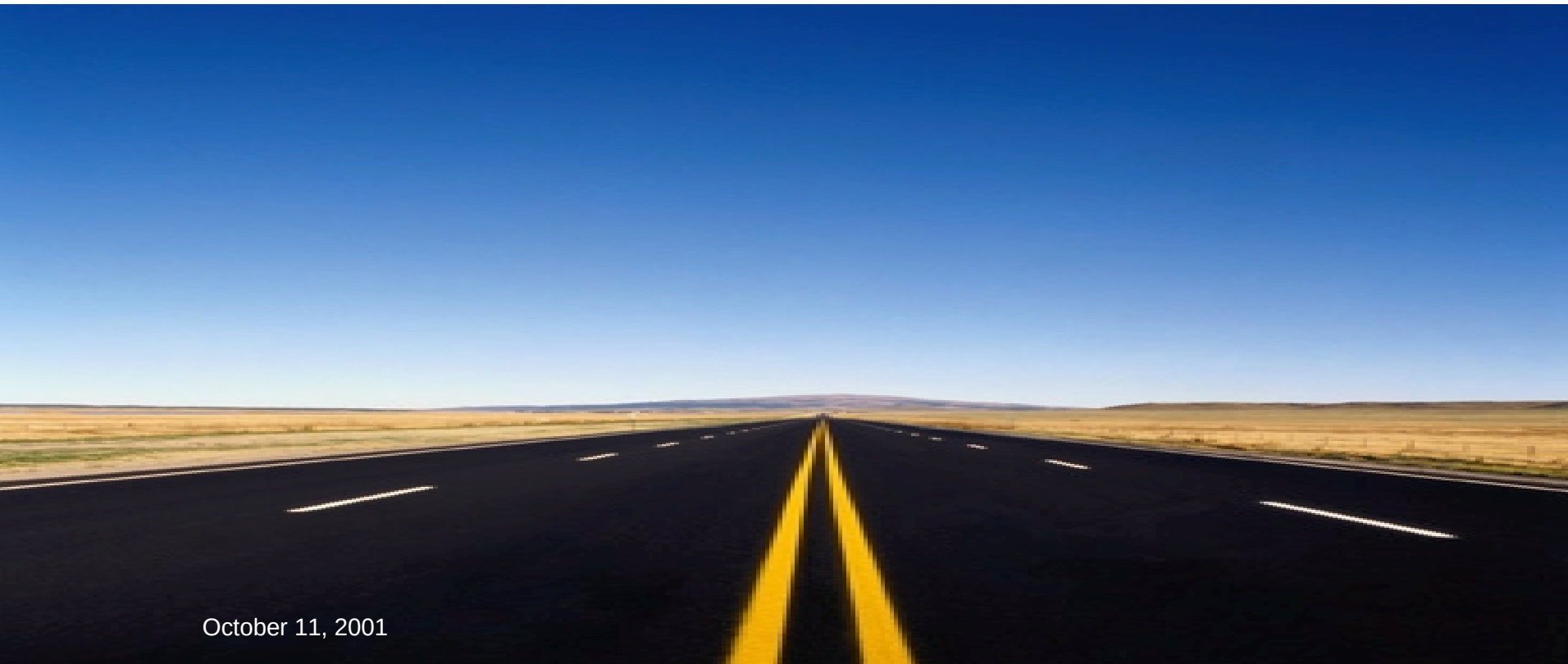
The University of North Carolina (UNC)

E-Learning Readiness Assessment (eLRA) Project:

Final Report



October 11, 2001

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Executive Summary: Critical Success Factors

The E-Learning Readiness Assessment (eLRA) has assessed the readiness of campuses to implement a more coordinated approach to e-learning. The eLRA has been driven by a set of critical success factors spanning technology and support services.

Investment in E-Learning among U.S. Colleges and Universities Continues to Grow:

Investment in e-learning continues to experience significant growth as colleges, universities and corporations continue to rely on the Internet as the delivery mechanism of choice for selected programs and courses.

For the Purposes of this Assessment, E-Learning Has Been Narrowly Defined:

Defined most broadly, e-learning encompasses a range of technologies, including videotapes, audiotapes and CD ROM courses. For the purpose of this study, e-learning has been more narrowly defined as Internet-based courses, delivered and managed independently of the location of the learner.

Industry Best Practices Suggest that the Development of an Effective E-Learning Program Requires the Implementation of a Set of Critical Success Factors that Span Technology and Support Services:

Technology critical success factors include the key requirements of an e-learning technical architecture that support necessary functionality. Critical success factors around student support include academic policies, and services necessary to assist faculty and students as they develop, deliver, and enroll in a course.

E-Learning Critical Success Factors

Technology	Support Services
• Application Services • Content Authoring Tools • Course Management Systems • Data Warehousing and Reporting • Directory and Authentication Servers • E-Learning Portal • Learning Management System • Student Information System	• Course Development and Delivery Services • Student Support and Administrative Support • Faculty Support • Academic Policies • Program Planning

Executive Summary: Current Assessment

Most UNC campuses have implemented their e-learning technical architecture in isolated environments. Consequently there is significant overlap in investment across campuses. In addition, most campuses, faced with limited resources, offer a narrow scope of support services. Availability of these services varies across campuses.

Critical Success Factor	Assessment of Current State
Technology	
Content Authoring Tools	Campuses use many tools; each serve a different pedagogical purpose.
Course Management Systems	Either Blackboard or WebCT is in place at every campus. Some campuses use another CMS as a secondary system.
Data Warehousing and Reporting	IBI's Focus product is used by many campuses.
Directory and Authentication Servers	Most campuses do not have a directory and authentication server that can span all applications.
E-Learning Portal	Many campuses use Campus Pipeline as their preferred vendor; five campuses have developed a custom portal.
Learning Management System	More than half of all campuses use SCT's product. WebCT is also widely used.
Student Information System	Due to the effectiveness of the Alliance, SCT dominates campus SIS and billing systems.
Support Services	
Student Support	Most campuses offer students a variety of e-learning support but the depth of the support is limited.
Administrative Support	Admissions and registration is online at many campuses; few offer advising services online.
Faculty Support	Faculty have access to some support; they express a need for pedagogical support.
Campus Interest in a Cooperative Approach	Campuses think a coordinating entity may showcase best practices and basic faculty and student support.

Executive Summary: Recommendations

As UNC's campus-based e-learning programs and courses continue to expand, the University should leverage current investments and initiatives to develop a more coordinated, cost effective approach across all campuses.

Technology Recommendation: UNC Should Move Toward a More Coordinated Technical Architecture by Implementing either a Centralized or Distributed Architecture:

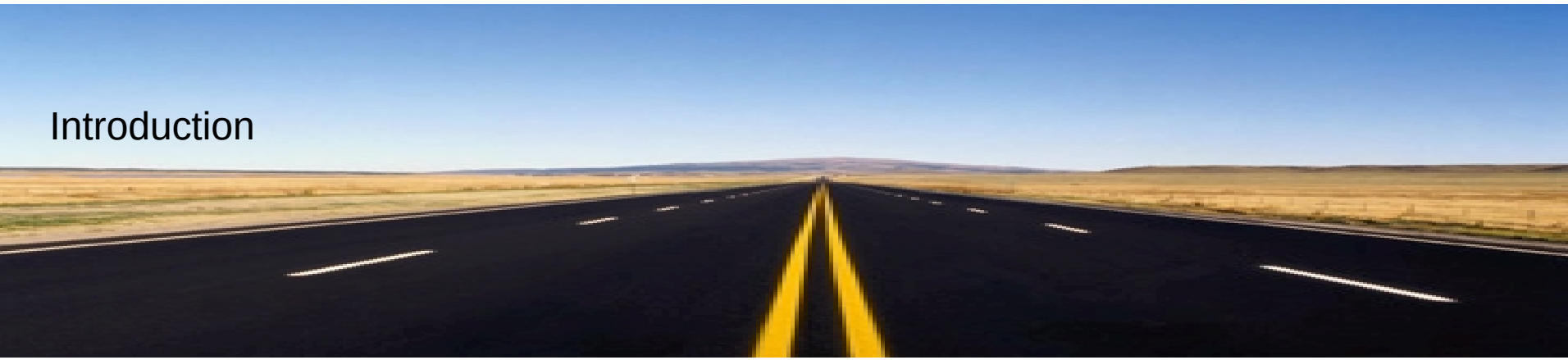
By adopting a more coordinated and cost effective approach to e-learning technology, UNC will set the stage for increased program collaboration. To accomplish this, we recommend two possible technical architectures: a Centralized Architecture and a Distributed Architecture. Both centralize the learning management systems and course management systems, thereby enabling the implementation of technical standards across campuses, and the opportunity to cost effectively enhance student and faculty technical support.

Support Services Recommendation: UNC Should Form an E-Learning Cooperative and Charge It with Several Key Short-Term Initiatives:

We recommend the implementation of an e-learning coordinating entity to oversee e-learning technology coordination among campuses. This coordinating entity, the E-Learning Cooperative, will be charged with leveraging economies of scale in the development and expansion of e-learning courses. Campus membership in the Cooperative will be voluntary. Potential early initiatives of the Cooperative include:

Faculty and Student Support	IT Infrastructure
• Set technical standards for faculty and student support • Assess long-term feasibility of a more coordinated approach • Work with TLT to develop pedagogical assistance for faculty developing e-learning courses	• Finalize preferred technical architecture and platform • Develop a Web-clearinghouse of e-learning courses

Introduction



- Background/Context
- E-Learning Trends
- Definition of E-Learning

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Introduction: Project Background/Context

UNC is committed to the long-term development of an e-learning program designed to best serve the needs of North Carolina. Building on the proposed E-Learning Strategy released in the Spring of 2000, this report will assess the current e-learning technical and support services infrastructures on each of the sixteen constituent campuses, the Office of the President and UNC-TV, and provide recommendations related to technology and support services.

In order to continue to offer the citizens of North Carolina quality, affordable educational opportunities, the University of North Carolina (UNC) has recognized the need to develop alternative programs and delivery methods to ensure equal, affordable access to higher education can be offered for working,place-bound adults in North Carolina. The delivery of e-learning programs has been recognized as one of the essential alternative delivery methods of higher education available to the University.

Most Campuses Have Made Investments in Building E-Learning Programs:

Over the last several years, UNC and its 16 constituent campuses have responded to the e-learning challenge. Campuses have developed hundreds of e-learning courses in disciplines ranging from social sciences and liberal arts, to education, business, technology, engineering and health studies. Approximately 30 degree programs have been developed by UNC campuses in which a major part of the instructional delivery is online.

This Project Will Assess Current E-Learning Technology and Support Services:

In the Spring of 2000, PricewaterhouseCoopers (PwC) worked with UNC to develop a university-wide e-learning strategy. Building on this work, in the Summer of 2001 PwC was asked to conduct an E-Learning Readiness Assessment (eLRA). The primary goals of this assessment were to:

- Inventory e-learning technology at each campus and determine the technical readiness of campus resources in establishing a more coordinated e-learning environment.
- Inventory e-learning support services to identify and analyze issues that may be addressed by an integrated and collaborative approach to e-learning delivery.
- Assess the level of campus interest in a cooperative e-learning model.
- Provide recommendations on a technical platform, standards and architecture along with recommendations on a support services model.

Introduction: Overview of E-Learning Trends

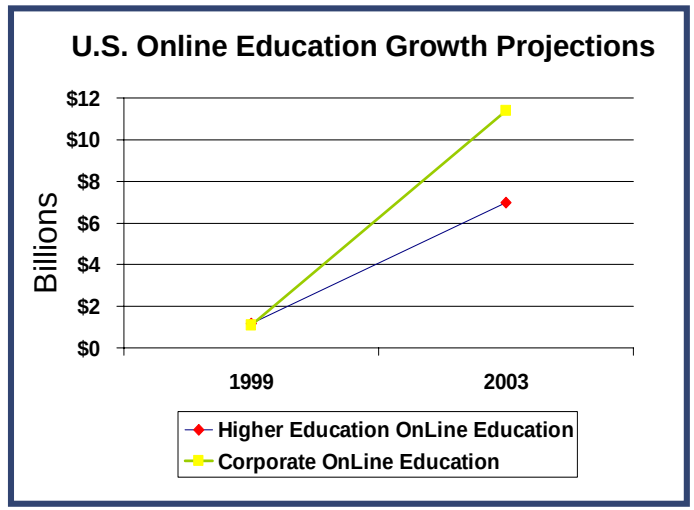
Investment in e-learning continues to experience significant growth as colleges, universities and corporations continue to rely on the Internet as the delivery mechanism of choice for selected programs and courses.

The Impact Of E-learning on Higher Education Has Been Widespread:

While correspondence courses, televised education programs and interactive satellite broadcasts have been used for many years to educate learners who are challenged by geographic and/or time constraints, none have offered benefits on the size or scale available through tools and technologies associated with online learning. In 1998, 710,000 students were enrolled in distance learning courses, a figure that is expected to jump to 2.2 million by 2002, representing a compound annual growth of 33%. Technology and the Internet have obviously contributed to this tremendous increase in distance education activity. And, it appears the growth experienced over the past few years is only the beginning.

E-learning Growth Rates Have Been and Will Continue to Be Significant:

The phenomenal growth expectations associated with on-line learning are well publicized. The most commonly quoted growth statistics have been developed by IDC and Merrill Lynch which predict on-line learning to expand at a compounded annual growth rate of 55% over a four year period (between 1999 and 2003) just within the higher education industry. Specifically, Merrill Lynch expects the higher education online learning industry to expand from $1.2 billion in 1999 to $7 billion in 2003.



Source: Merrill Lynch, 2000

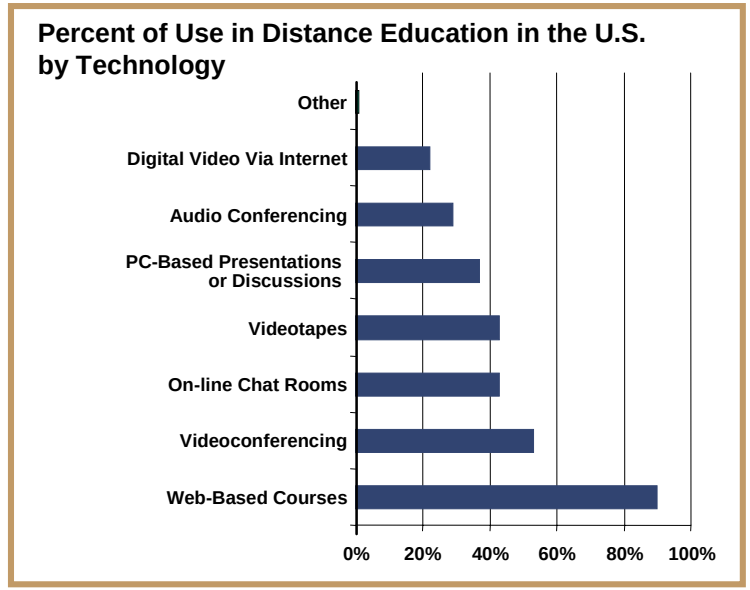
Introduction: Definition of E-Learning

Defined most broadly, e-learning encompasses a range of technologies, including videotapes, audiotapes and CD ROM courses. For the purpose of this study, e-learning has been more narrowly defined as Internet-based courses, delivered and managed independently of the location of the learner.

E-Learning Reflects a Range of Technology-Mediated Course Delivery Mechanisms:

E-learning is a segment of distance education, however, e-learning is further defined by the characteristics unique to Internet and technology-enabled learning.

E-learning provides students, faculty and administrators the opportunity to interact and collaborate in an efficient and effective manner that does not require physical proximity. Specifically, e-learning allows for both real-time (synchronous) learning activities and discussions, as well as independent (asynchronous) learning activities. Specific technologies used in the e-learning environment include those summarized in the following charts.



Source: IDC, 2000

For the Purposes of This Study, E-Learning Has Been Narrowly Defined as Internet-Based Programs, Managed Independent of the Location of the Learner:

The definition of e-learning being used for this study is: Internet-based programs that are developed and managed to be independent of the location of the learner. E-learning programs are not exclusively a subset of distance education programs or of campus programs but rather embrace all Internet-based programs. This distinction is important. Strategic planning, development and support must take account of the commonalities among e-learning content and program development and delivery in order to avoid duplication of effort and potential conflict among competing technologies and services.

Section I: E-Learning Critical Success Factors

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E-Learning Critical Success Factors: Introduction/Section Summary

As the demand for e-learning programs and courses has grown, colleges, universities, and private companies have developed robust e-learning programs. This section will review e-learning critical success factors based on industry best practices, including: technical infrastructure requirements, e-learning functionality and support services requirements.

Technology Critical Success Factors include Architecture Requirements and System Functionality:

A successful e-learning initiative requires critical pieces of software that will allow students, faculty and administrators to effectively teach, learn and manage an educational program virtually. We have identified eight key technical architecture requirements, organized in alphabetical order. Once implemented, these technical requirements will enable the university to successfully meet functional program needs, including admissions, registration, content delivery and content development.

Support Services Critical Success Factors include Faculty, Students and Administrative Support Requirements:

E-learning programs require a college or university to develop a mechanism for handling faculty and support services virtually. This includes student administrative needs (e.g. applying, registering for a course), faculty training (e.g. assistance in developing and delivering an online course), and technical support for both faculty and students. In addition while academic issues are not within the scope of this report, it should be noted that campuses expressed a belief that many academic policies need to be reviewed and tailored specifically to the issues inherent in e-learning (e.g. funding, faculty workload, articulation).

E-Learning Critical Success Factors: Technology

There are eight key requirements in an e-learning technical architecture. These requirements are described in more detail in the table below.

Key Architecture Requirements	Overview
Application Services (App. Svcs.)	Services that are delivered via the framework or have an integration point with the framework.
Content Authoring Tools (CAT)	The system the campus uses to help professors and staff develop course content for online courses.
Course Management System (CMS)	The system the campus uses to manage user navigation through a course and track progress.
Data Warehousing and Reporting System (Data WH)	The system that allows users to pull data from multiple systems across campuses in order to create static and ad hoc reports.
Directory and Authentication Servers (Auth.)	The system used to manage single sign-on between multiple systems and the authentication for system security.
E-Learning Portal (ELP)	Provides the user a tailored look and feel and seamless interface to the host of functionality supported by the e-learning infrastructure.
Learning Management System (LMS)	The system the campus uses to manage enrollments and the course catalog.
Student Information Systems (SIS)	The system used to manage student records and course activity.

E-Learning Critical Success Factors: Technology

E-learning programs and courses require a range of functionality throughout the student lifecycle. As reflected in the table below, each requirement supports a critical functionality.

Required E-Learning Functionality	App. Svcs.	Auth.	CAT	CMS	Data WH	ELP	LMS	SIS	Other Package
Admissions and Matriculations									
Curriculum and certification management							✔	✔	
Registration									
Searchable course catalog							✔		
Online registration							✔	✔	
Content Delivery									
Distribution and deployment				✔					
Course delivery				✔					
Synchronous/ asynchronous learning							✔		
Collaborative Tools							✔		✔
Resource libraries							✔		✔
Online tutoring									✔
Assessments									✔
Course evaluations							✔		

E-Learning Critical Success Factors: Technology

Each technical requirement also supports a series of important functionalities for faculty, staff and administrators.

Required E-Learning Functionality	App. Svcs.	Auth.	CAT	CMS	Data WH	ELP	LMS	SIS	Other Package
Administration									
Course scheduling							✔	✔	
Content Development									
Course authoring			✔						
Miscellaneous									
Interface with legacy systems	✔								
Standards conformity	✔	✔	✔	✔	✔	✔		✔	✔
Information management	✔			✔			✔	✔	✔
Security/single sign-on		✔							
Customization	✔	✔	✔	✔	✔	✔	✔	✔	✔
Reporting					✔		✔		

E-Learning Critical Success Factors: Support Services

The e-learning support services infrastructure consists of academic policies, and services to assist faculty and students as they develop, deliver, and enroll in a course.

Requirement	Description	Critical Success Factors
Course Development and Delivery Services	These are the functions at the core of e-learning. They relate to the actual development and delivery of the online course. Services include professional assistance to faculty developing a course (e.g., instructional design specialists), content development and content conversion.	• Providing faculty with pedagogical assistance to develop a course. • Ensure courses are based on accepted content standards. To ensure effectiveness, these standards must be enforced. See Appendix A for a detailed list of these standards.
Student Support and Administrative	Support services provide students with the support they need to take a distance learning course. For the purposes of this study they include: a help desk for students, advising, and library services. Administrative support includes admissions, student aid, and registration.	• Offering online students a range of supplemental academic services including library access, book buying and tutoring. • Enabling online students to seamlessly apply for student aid, register for courses and seek program advisement. • Providing students ongoing technical assistance, including 24 X 7 help desk support.
Support Faculty Support	These services provide assistance to faculty engaged in teaching through an Internet-mediated course. These services include: professional development, a help desk for faculty, and faculty mentoring.	• Providing faculty with ongoing technical assistance and help with efficient management of course instruction. • Providing faculty with mentoring to improve pedagogical effectiveness while teaching an online course.

E-Learning Critical Success Factors: Support Services

In addition to faculty and student support, there are a number of other requirements that need to be in place before a multi-campus institution can fully engage in a cross-campus e-learning initiative. While these requirements are included in the analysis and recommendations, they remain critical success factors for UNC.

Requirement	Description	Critical Success Factors
Academic Policies	Provides the context for making decisions. Key policy areas driving the development of a robust e-learning program include: conferring of degrees, intellectual property, quality assurance, faculty workload, and articulation.	• Determining an approach to conferring degrees for cross-campus programs. • Addressing intellectual property issues. • Addressing faculty workload concerns, including recognition and reward of faculty conducting online courses. • Developing articulation policies that enable cross-campus programs while maintaining academic standards at each campus.
Program Planning	Provides planning required to make strategic decisions about program priorities and marketing. Key activities include: program development priorities, market analysis, and marketing and promotion.	• Determining e-learning program and course development based on market analysis. • Developing a sophisticated marketing strategy aligned with needs identification.

Section II: UNC E-Learning Current State

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UNC E-Learning Current State: Introduction/Section Summary

To assess UNC's e-learning current state relative to the e-learning critical success factors, PwC conducted interviews with faculty, staff and administrators on each of UNC's 16 constituent campuses. Each campus was asked to provide an inventory of their current technical infrastructure and level of support services. This section provides a high-level overview of our findings.

The eLRA Reviewed the Current State of UNC Relative to the E-Learning Technology Critical Success Factors:

This section includes an overview of current campus investments within each of the e-learning technology critical success factors provided in the previous section. During our on-campus visits, representatives reported on their current e-learning infrastructure, including vendors, applications, interfaces, and level of customization for each of the technology critical success factors. Based on the data, we found that campuses are operating in siloed, isolated e-learning environments and that cross-campus technical standards do not exist. See Appendix E for detailed technical infrastructure data.

The eLRA Reviewed the Current State of UNC Relative to the E-Learning Support Services Critical Success Factors:

This section includes an overview of the level of support services available for stakeholders engaged in an e-learning program or course. During our on-campus visits, we met with faculty, staff and administrators to understand the level of support services available on the campus. We found that while each campus offers some level of faculty, administrative and support, campuses do not have the resources to support a wider array of support services. See Appendix F for detailed support services data.

The eLRA Assessed Campus Interest in a Cooperative E-Learning Model:

This section highlights specific successful cooperative e-learning efforts across campuses and assesses campus interest in a cooperative e-learning model. During our on-campus visits, we asked faculty, staff and administrators to assess their interest in an e-learning cooperative model relative to support services critical success factors. We found that campuses were interested in working cooperatively with one another on very targeted issues.

UNC E-Learning Current State: Technology

Based on our analysis, there are two critical issues facing UNC's e-learning technical infrastructure: campuses are operating in isolated e-learning environments, with distinct investments in e-learning technology, and technical standards do not exist for content development or delivery.

All Constituent Campuses are Operating in Siloed, Isolated E-Learning Environments:

Because there has been no formal coordinated initiative directed at e-learning technologies, as e-learning programs at each of the campuses have evolved over the last several years, they have done so in relative isolation of their peers. While there have been pockets of collaboration in program development and delivery (see page 32 for more detail), campuses have made many of their technology decisions with little formal discussion with other campuses or the Office of the President. In addition, there does not appear to be any application, service or content sharing between campuses. Consequently:

- There is significant duplication of e-learning software investments within the UNC campus community. In some cases, campuses have invested in similar e-learning applications, failing to capture on inherent economies of scale. In other cases, campuses have invested in differing software applications. This approach may affect the experience of some students. If a student takes an e-learning course from more than one campus, they may have to learn a different system and access help desks from different schools.
- Some campuses are meeting the e-learning technical requirements by implementing software applications for a use other than their intended purpose (e.g. Web for Students/Web for Faculty as a portal; IBI as a Data Warehouse and Reporting System).
- As a whole, UNC is incurring higher costs to operate all of the e-learning systems (i.e. resources). It is paying higher licensing fees for e-learning software than it would if the campuses were working together.

University-Wide Technical Standards Do Not Exist for Content Development or Delivery:

Because there are no university-wide technical standards for content development or delivery, there can be no assurances to quality or consistency.

The Alliance Has Set the Stage for a More Coordinated Approach Moving Forward:

Because of the work of the Shared Services Alliance, most campuses rely on a SCT application as their billing and student information system. Therefore while any integration initiative will not be easy, because of the common SIS, an LMS integration process could be standardized (or templatized) across campuses.

UNC E-Learning Current State: Technology

As part of an ongoing IT Strategy initiative, campuses have collaborated to purchase several software packages, including SCT Web for Students and Web for Faculty and the student portal software Campus Pipeline. As is reflected in the eLRA, several campuses are utilizing this software to meet e-learning functional requirements. Others plan to put this software in production in the coming year.

Several Software Applications Have Been Purchased Collaboratively by 13 Campuses:

As part of the ongoing IT Strategy initiative to Web-enable 53 baseline student services, the SCT software Web for Students and Web for Faculty, and the student portal software Campus Pipeline, have previously been collaboratively purchased for 13 campuses.

The 13 campuses have this software either in production or will be in production ready this year. As seen in data on succeeding slides, some campuses are utilizing this software to meet certain e-learning applications.

Collaboratively Purchased Software	Campuses Participating
Web for Students Web for Faculty Campus Pipeline	• Appalachian State University (ASU) • Elizabeth City State University (ECSU) • Fayetteville State University (FSU) • North Carolina Central University (NCCU) • North Carolina School of the Arts (NCSA) • North Carolina A&T (NCAT) • UNC Asheville (UNC-A) • UNC Charlotte (UNC-C) • UNC Greensboro (UNC-G) • UNC Pembroke (UNC-P) • Western Carolina University (WCU) • UNC Wilmington (UNC-W) • Winston Salem State University (WSSU)

UNC E-Learning Current State: Technology (Content Authoring Tools)

Content authoring tools help professors and staff develop course content for online courses. Campuses have invested in a range of content authoring tools. There is no clear market leader among providers.

Campus Choices Reflect No Clear Content Authoring Tool Vendor Preference:

Many campuses use a number of tools to assist faculty in developing online course material. Tools are chosen to be appropriate to the material being developed, the level of interactivity and the available bandwidth. Thus each tool used plays an important role in the overall design and customization of the course.

Vendor	Application Now Used	Campus Penetration	Campuses
Microsoft	Microsoft	9	ASU, ECU, FSU, NCSA, NCSU, UNC-CH, UNC-C, WCU, UNC-W
	Macromedia	8	ASU, ECU, NCSU, UNCC, UNC-CH, UNC-G, UNC-P, WCU
Bb Blackboard	Blackboard	8	ECSU, ECU, NCCU, NCSA, UNC-CH, UNC-G, UNC-P, WSSU
	Other	7	ECU, NCSU, UNC-C, UNC-CH, UNC-G, UNC-P, UNC-W
Netscape	Netscape	6	ASU, ECU, NCSU, UNC-CH, UNC-G, WCU
WebCT	WebCT	5	ASU, UNC-A, UNC-C, UNC-W, WCU
	Adobe	4	ECU, NCSU, UNC-CH, UNC-G
	Custom	4	ECU, NCSU, UNC-P, WSSU

UNC E-Learning Current State: Technology (Course Management Systems)

Course management systems are those systems that the campus uses to manage user navigation through a course and track through a product. Blackboard and WebCT are the leading applications on UNC campuses.

Blackboard and WebCT Are UNC's Preferred Course Management System Vendors:

Every UNC campus uses either WebCT or Blackboard as their preferred course management system..

Campuses Have Done Minimal Customization to These Applications:

Because campuses have done very little customization to the course management systems, it may be feasible to standardize this application across campuses.

Several Campuses Use More than One Content Delivery Vendor:

Several campuses use a second vendor. These campuses often use WebCT or Blackboard as their primary course management system that hosts most courses. The secondary system used for specific courses or programs.

Vendor	Application Now Used	Campus Penetration	Campuses
WebCT	WebCT	9	ASU, NCAT, NCSU, UNC A, UNC-C, UNC-CH, UNC G, UNCW, WCU
Bb Blackboard	Blackboard	8	ECU, ECSU, FSU, NCCU, NCSA, UNC-CH, UNC-P WSSU
	Custom	2	ECU, UNC-P
	Other	2	UNC-CH, UNC-G
eCollege	eCollege	1	WSSU
Cisco Systems	Cisco Leaming	1	ECU
	Jenzabar	1	ECU

UNC E-Learning Current State: Technology (Data Warehouse and Reporting System)

The data warehouse and reporting system allows users to pull data from multiple systems across the campus to create reports. At UNC, a majority of campuses use Information Builder's product Focus. Among those who do not, there is no clear preference.

IBI's Focus Product Is Used by the Majority of Campuses:

More than half of all campuses use Focus for reporting. Focus is used by campuses of all sizes. Half of all campuses who use IBI use it as a stand-alone data application system.

Microsoft Access Also Plays an Important Role on Some Campuses:

Microsoft Access is the only other data warehouse and reporting application used as a stand alone application.

Half of All Campuses Use More than One Vendor:

The SAS product is more likely to be used in coordination with another data warehouse product.

Vendor	Application Now Used	Campus Penetration	Campuses
Information Builders	Focus	12	ECSU, FSU, NCAT, NCCU, NCSA, UNC-A, UNC-C, UNC-CH, UNC-P, UNC-W, WCU, WSSU
SAS	SAS	3	NCCU, UNC-CH, UNC-P
CONNX	Connx	3	ASU, NCSA, WSSU
Microsoft	Access	3	ASU, NCAT, UNC-G
Brio Technology	Brio	1	ASU
	Sybase	1	NCSU
	Custom	1	ECU

UNC E-Learning Current State: Technology (Directory and Authentication Systems)

Directory and authentication systems are used to manage single sign on between multiple systems. Most campuses do not have a system that can span over all applications.

Most Campuses Do Not Have a Directory and Authentication System that Can Span Applications:

Most campuses have not yet invested in a robust authentication application. Most try to give the appearance of a single point log on by issuing the same password and log on ID across applications.

Campuses Who Report a Directory Services Application are Split Between Novell and Microsoft:

Over two-thirds of all campuses rely on Blackboard or WebCT to provide this functionality.

Vendor	Application Now Used	Campus Penetration	Campuses
Novell	Directory Services	5	NCCU, UNC-A, UNC-CH, UNC-P, WCU
Microsoft	Windows NT Authentication	4	ECU, FSU, UNC-CH, UNC-W
	None	4	ECSU, NCA&T, NCSA, UNC-C
	Other	4	ASU, NCSU, UNC-CH, WSSU
	Kerberos	3	NCCU, NCSU, UNC-CH
	Unix AFS	2	UNC-CH, UNC-G

UNC E-Learning Current State: Technology (E-Learning Portal)

An e-learning portal provides the user a tailored look and feel and seamless interface to the host of functionality supported by the e-learning infrastructure. Of those campuses who have an e-learning portal in place, they are more likely to rely on a custom-built application. Others have customized a software product that has not been explicitly designed to serve as a portal.

Almost One-Third of Campuses Have No E-Learning Portal in Place:

Both large and smaller campuses rank among those without an e-learning portal in place. ASU and UNC-C will implement their Campus Pipeline portals in 2002. While not in place now, NCSU and NCSA plan to implement an e-learning portal.

Many Campuses Have Built Their Own Portals:

Several medium-sized campuses have developed their own custom e-learning portals without relying on outside vendor applications.

Campus Pipeline and SCT Are the Leading E-Learning Portal Vendors:

Of those campuses relying on a commercial vendor application, most have turned to Campus Pipeline and SCT. This is due to the IT Strategy initiative which has enabled campuses to collaborate in their purchase of the software. In turn, campuses have leveraged these products to serve as e-learning tools.

Vendor	Application Now Used	Campus Penetration	Campuses
	Custom	5	ECU, ECSU, NCCU, UNC-W, NCSU
Campus Pipeline	Campus Pipeline	5	ASU, NCSA, UNC-C, UNC-W, WSSU
sct	Web for Students	4	FSU, NCSA, UNC-A, WCU
	Not Specified	3	UNC-CH, UNC-P, UNC-G
sct	Web for Faculty	3	FSU,UNC-A, WCU
Bb Blackboard	Blackboard	1	ECSU
eCollege	eCollege	1	NCAT

UNC E-Learning Current State: Technology (Learning Management System)

Learning management systems (LMS) are those systems that a campus will use to manage enrollments and the course catalog. UNC campuses use several different LMS's; there is no clearly preferred solution.

Customization of LMS Applications Varies Across Campuses:

More than half of all campuses have implemented their preferred LMS application with little or no customization while three campuses have developed 100% customized solutions.

Several Campuses Use More than One LMS Vendor:

Whether to enable faculty to choose a preferred vendor, to complement strengths of various applications, or as a result of a migration from one application to another, several campuses have more than one application in place.

Vendor	Application Now Used	Campus Penetration	Campuses
sct	Web for Students	9	ECSU, FSU, NCCU, UNC-A, UNC-G, UNC-P, UNC-W, WCU, WSSU
sct	Web for Faculty	8	ECSU, FSU, NCCU, UNC-A, UNC-P, UNC-W, WCU, WSSU
WebCT	WebCT	4	ASU, NCAT, NCSU, UNC-C
	Custom	3	ECU, NCSU, UNC-CH
Bb Blackboard	Blackboard	2	NCAT, NCSA
eCollege	eCollege	1	NCAT
	Not Specified	1	UNC-CH

UNC E-Learning Current State: Technology (Student Information System and Billing System)

Student Information Systems are used to manage student records and course activity. As a testament to the strength of the Alliance, SCT is the preferred Student Information System and Billing System.

Student Information System

SCT is the Preferred SIS System:

Due in large part to the success of the Alliance, SCT's SIS+ and Banner applications are used by the vast majority of campuses. The campuses who do not use it tend to rely on a custom application.

Vendor	Application Now Used	Campus Penetration	Campuses
sct	SIS+	12	ASU, ECSU, FSU, NCAT, NCCU, NCSA, UNCA, UNCC, UNC-P, UNC-W, WCU, WSSU
	Custom	3	ECU, NCSU, UNC-CH
sct	Banner	1	UNC-G
	Not Specified	1	UNC-CH

Billing System

SCT is the Preferred Billing System:

The Alliance has also driven the implementation of SCT as the preferred billing system in more than two-thirds of all UNC campuses.

Vendor	Application Now Used	Campus Penetration	Campuses
sct	SIS+	11	ASU, ECSU, FSU, NCCU, NCSA, UNCA, UNCC, UNC-P, UNC-W, WCU, WSSU
	Custom	2	ECU, UNC-CH
sct	Banner	1	UNC-G
PeopleSoft	PS Financials	1	NCSU
sct	FRS	1	NCAT
	Not Specified	1	UNC-CH

UNC E-Learning Current State: Support Services

While some support services for faculty and students are in place at almost every campus, the level and quality of support varies significantly across the campuses. While campuses see a need to provide high-quality support for faculty and students, many do not have the resources to do so.

Inconsistent Level of Support Across Campuses:

There is no clear and appropriate support standard in place university-wide. As a result, students and faculty experience a different level of support depending upon where they teach or enroll in a course. For example, some campuses offer teachers intensive workshops to learn how to teach an online course, others offer an afternoon seminar or an online tutorial.

Many Campus Support Service Functions Are Under-Resourced:

While all campuses offer faculty and students some level of support, most do not have access to the resources required to offer a more comprehensive array of services. For example, campuses are unable to offer robust faculty or student software and connectivity support.

Faculty Have Expressed a Need for Pedagogical Support:

While almost all faculty have access to some hardware, software and connectivity support, few have access to pedagogical assistance when developing online courses. Faculty, trained to teach in classrooms in an in-person environment, are unsure of the most effective tools to use when teaching online. A few campuses have offered faculty access to this level of support, but most have neither the resources or expertise available. Faculty have expressed a specific need for instructional design experts who have expertise that is subject-specific (e.g. English, Education, Health Sciences).

UNC E-Learning Current State: Support Services (Students)

Campuses provide limited support services to their online students. In large part, the availability of support levels for online students are constrained by resources and the diversity of hardware and connectivity providers used by students.

Most Campuses Offer Students a Variety of E-Learning Support Services:

Most campuses offer students assistance for their hardware, software, connectivity and site navigation questions.

Actual Support Is Very Limited:

While campuses offer support on a range of issues, the depth of that support is limited. Campuses are unable to devote resources to manage all student support issues effectively. As a result, only the course delivery software tends to be well supported.

Generally, sources of support for students include the software vendor, their ISP, or the TLT Center.

Type of Support	Campus Presence	Campuses	Description
Hardware	14	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	• Limited troubleshooting • Many support only university hardware
Software	14	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	• Very limited • Most through software vendor
Connectivity	14	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	• Very limited • Through faculty or TLT or ISP
Referrals	14	ASU, ECU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-P, UNC-W, WCU, WSSU	• Referrals to faculty or help desk
Site Navigation	13	ASU, ECU, FSU, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	• Some campuses offer student orientation • Through help desk or vendor

UNC E-Learning Current State: Support Services (Administration)

On most campuses, online students are able to apply, request student aid and register online. They are less likely to be able to take a skills assessment or receive program advising online.

Most Campuses Have Some Admissions and Registration Functions Online:

Campuses have developed an online "face" to most admissions and registration functions. The back end systems remain manual.

Few Campuses Offer Skills Assessments for Online Students:

Campuses offer few skills assessments beyond Math.

Program Advising Services Are Less Likely To Be Online:

Because program advising is generally a department-based function, few campuses have invested in developing a robust online presence. Online advising is not available for most prospective students before they are accepted to an online program and know a departmental advisor they can contact. E-learning students can receive some advising via e-mail.

Type of Support	Campus Presence	Campuses	Description
Admissions	12	ASU, ECU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-W, WCU, WSSU	• Student can apply online • Processing is done manually
Student Aid	14	ASU, ECU, ECSU, FSU, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-P, UNC-W, WCU, WSSU	• Federal process is online • Most processing done manually
Registration	11	ASU, ECU, ECSU, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-W, WCU, WSSU	• About half require no manual processing
Skills Assessment	3	ECU, UNC-CH, UNC-G	• Many campuses have limited skills assessments either online or in person
Program Advising	7	ASU, ECU, NCCU, UNC-C, UNC-G, UNC-W, WCU,	• On many campuses this is a department-based function

UNC E-Learning Current State: Support Services (Faculty)

Faculty have access to a range of support services at their campuses. Nonetheless the level of support varies significantly across campuses. Most faculty do not have access to pedagogical support designed to assist them in developing effective online courses.

Most Campuses Offer a Broad Range of Faculty Support:

Almost every campus offers faculty hardware, software, connectivity, content development and course delivery support. The support is provided by at least one FTE from 8-6 PM Monday through Friday on almost all campuses.

Source of Support Varies Across Campuses:

Faculty support is hosted in several places: academic computing, TLT Centers or with the software vendor.

Robustness of Support Varies Across Campuses:

Hours of service are limited at most campuses. Additionally, few campuses offer faculty in-depth assistance for designing and delivering a pedagogically sound course.

Type of Support	Campus Presence	Campuses	Description
Hardware	15	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-P, UNC-W, WCU, WSSU	• Limited help desk availability • Few campuses offer orientation
Software	15	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-P, UNC-W, WCU, WSSU	• Limited availability • Few campuses offer orientation •
Connectivity	14	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	
Content Development	15	ASU, ECU, ECSU, FSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-P, UNC-W, WCU, WSSU	• Offered by vendor or TLT • More technical than pedagogical
Course Delivery	13	ASU, ECU, ECSU, NCAT, NCCU, NCSU, UNC-A, UNC-CH, UNC-C, UNC-G, UNC-W, WCU, WSSU	• Level of support varies • Can be in-person or help desk

UNC E-Learning Current State: Campus Interest in a Cooperative E-Learning Model

Over the past several years, campuses along with the Office of the President have participated in successful cross-campus collaborative efforts in the development of e-learning programs and building a common technical infrastructure.

There Have Been Several Successful Cross-Campus E-Learning Programs Developed:

Over the past several years, campuses have worked together to develop a handful of e-learning curricula including programs in engineering, industrial technology, and speech pathology. The UNC Office of the President distributed $1.3 million in Spring 2001 to fund 27 e-learning projects involving multiple UNC institutions resulting in the development of a number of online courses and planned collaborations.

One example of this collaboration is UNC's cross-campus initiative to address teacher shortages. The Office of the President has leveraged successful efforts such as NC Teach and NC Rise that have, in the past, facilitated collaboration between and among the Teacher Education departments at UNC campuses to standardize curriculum and expand access to teacher licensure programs, by jointly developing an online curriculum that will be offered by a consortium of faculty from multiple campuses. The Office of the President contracted with a private consultant to work with 11 participating campuses to jointly develop a full licensure program, incorporating the best parts of each campuses' curriculum to form a high quality online program. The faculty that teach these courses will receive ongoing training and faculty and staff will have access to a 1-800 help desk for ongoing support. The program will be run and operated out of the Office of the President but hosted by the 11 campuses.

The Teaching and Learning with Technology (TLT) Collaborative Has Been an Information Resource for Faculty and Staff across the University:

The TLT Collaborative (TLTC) is charged with promoting the productive application of technology for teaching and learning within the UNC system. The mission of the TLTC includes providing professional development opportunities for both faculty and IT staff members. Working with a board that draws its members from each of the 16 campuses, the Collaborative has developed the Professional Development Portal, which is designed to be a one-stop information source on TLT. In addition, the Collaborative sponsors various system-wide professional development activities each year.

UNC E-Learning Current State: Campus Interest in a Cooperative E-Learning Model

The UNC Shared Services Alliance Has Enabled Campuses to Leverage Economies of Scale in Software Development and Acquisition:

The UNC Shared Services Alliance is led by a board comprised of one representative from each of the 16 campuses. Its mission is to serve as a forum for exploring technology-related opportunities for collaboration among Alliance institutions, such as providing member institutions with common administrative baseline services including online admissions, registration and financial aid information. Its objective is to leverage the economies of scale implicit in a large university system to allow campuses to make software and hardware acquisitions they would not otherwise be able to. Now in its second year of existence, it has:

- Provided the technology to implement about 23 of the 53 web-enabled student services agreed upon as baseline for all campuses to improve services to students.
- Purchased licenses for several software applications, including SCT's Web for Students, Web for Faculty and Web for ADS, Campus Pipeline, Brass Ring software, and TouchNet's Enterprise Payment Gateway Solution.

It is also in the process of custom-building an innovative prospective student portal (PSP) that will lead prospects through the steps required for enrollment as entering freshmen and transfer students. UNC campuses that choose to implement the PSP will be able to customize the portal to meet unique needs.

The UNC Collaborative IT Procurement Program has enabled the University as a whole to gain savings in the purchase of software and hardware:

The Collaborative IT Procurement (CITP) program has concentrated on developing closer, more strategic relationships with IT companies. It worked with the Alliance to secure Campus Pipeline's direct license model which has resulted in 12 campuses receiving a 65% discount for a savings of $900,000.

While there are pockets of innovation across the University, overall there has been minimal coordination and integration of e-learning programs. However, these pockets of innovation do indicate that cross campus collaboration is feasible and can improve student access to high quality online programs.

UNC E-Learning Current State: Campus Interest in a Cooperative E-Learning Model

There is little demand for a greatly expanded cooperative effort. Campuses believe that most functions should remain campus-based. A coordinating entity may showcase best practices and some campuses express a need for a coordinated approach in the provision of basic faculty and student support.

Most See Development of Courses as a Campus Function:

There is a widespread belief that course development is a primary responsibility of faculty members and departments on campus. Most campuses do not see a large role for a coordinating entity in this area. Many do express an interest in a coordinating entity showcasing best practices or providing a library of content that the faculty can draw on as they are developing their courses. Some campus representatives thought a coordinating entity could promote collaboration across campuses for some targeted programs.

Coordinating Entity May Be Able to Offer General Faculty and Student Support:

Campuses agree that a coordinating entity may be able to offer faculty and students some level of basic advisement on hardware, software and connectivity support. They underscored the need for some faculty and student support to remain at campuses to ensure personalized services tailored to the needs and culture of their campuses.

Responsibility Center	Course Development	Faculty Support	Student Support
Campuses	• Develop and deliver courses	• Personalized support	• Personalized advising • Some in-person technical assistance
Coordinating Entity	• Showcase best practices • Promote collaboration	• Tier one technical help • Provide training for and facilitate cross-campus communication for on campus support staff.	• Tier one technical help • General advising

UNC E-Learning Current State: Campus Interest in a Cooperative E-Learning Model

Campuses Believe that Most Academic Policies Should Remain Campus-Based; They Do Report an Interest in a Coordinating Entity Providing Leadership in Key Areas:

While a coordinating entity may showcase best practices for creating, delivering and continually improving an online course, campuses strongly believe that admissions, conferring degrees and quality control issues should remain campus-based issues. Campuses do express widespread need for leadership to resolve significant funding policy issues for e-learning programs and address faculty workload issues.

Campuses See a Need for Quality Market Research as a Guide for Program Planning:

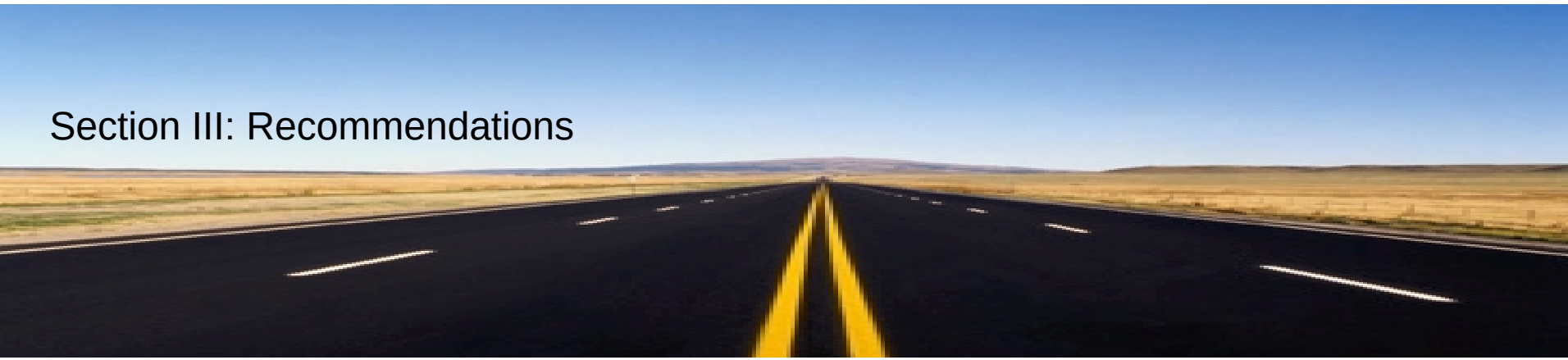
While campuses would like to maintain control of selecting courses and programs to offer, they express a general need for aggregated market research to assist them as they determine key target markets.

Many Campuses See a Limited Role for a Coordinating Entity in the Development and Support of the IT Infrastructure:

While campuses express a need to maintain much of the control of the IT infrastructure, many express an interest in a coordinating entity meeting several needs, including: developing a portal that serves as a clearinghouse for online courses at the University, setting technical standards for campuses, and perhaps hosting and supporting multiple CMS's.

Responsibility Center	Academic Policies	Program Planning	IT Infrastructure
Campuses	• Admissions • Conferring Degrees • Overseeing academic quality, ensure have plan that ensure principles of quality are realized.	• Initiate new programs and courses	• Select appropriate CMS • Option of hosting CMS
Coordinating Entity	• Leadership in determining funding policies • Leadership in assisting campuses develop e-learning related faculty workload issues	• Provide market research	• Host/support multiple CMS's • E-Learning Portal • Develop standards

Section III: Recommendations



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Recommendations: Introduction/Section Summary

This section provides our recommendations for implementation of a successful cooperative model including a technical platform and support services.

Technology Recommendation: UNC Should Move Toward a More Coordinated Technical Architecture by Implementing either a Centralized or Distributed Architecture:

Based on our analysis, UNC would benefit significantly in moving towards a more coordinated technical architecture. Not only would UNC reduce costs in the long term, but it would also increase standardization which would in turn increase the feasibility of increased program coordination. We recommend two possible models: a centralized technical architecture and a distributed technical architecture. Both centralize the learning management systems and course management systems, thereby enabling the implementation of technical standards across campuses, and enhanced student and faculty technical support.

Support Services Recommendation: UNC Should Form an E-Learning Cooperative and Charge It with Several Key Short-Term Initiatives:

Based on our analysis of organizational trends at state universities, there are three best-practice organizational models. Based on these models and given our assessment of UNC's current state, we recommend the implementation of an E-learning Cooperative. The objective of this Cooperative is to leverage the breadth and size of the system while respecting the academic integrity and unique character of each campus. Campus membership in the Cooperative will be voluntary. Early initiatives of the Cooperative will be focused on enhancing support services, making critical technology decisions and leading the development of a web-based clearinghouse of university-wide e-learning programs and courses.

Recommendations: Technology

Best practices among larger colleges and universities suggest that technology architecture decisions be driven by several best practices.

Most State Universities Have Developed Service Models for Information Technology that Consist of Both Centralized and Decentralized Services:

Understanding the tension between in-house capacity and desired control, universities have begun to centralize technical resources (hardware and software) while decentralizing the management and content authoring activities. This approach allows the university to leverage economies of scale while allowing faculty to maintain close ownership of actual course development and delivery.

The Architecture Should Be Designed to Effectively Provide Services To Students, Faculty and Administrators:

A large universe of college and university stakeholders are served by e-learning applications. Universities have found that a more coordinated approach, including the implementation of technical and content standards, will ease the experience of students taking e-learning courses from more than one campus, and improve the availability of technical support for all stakeholders.

The Architecture Should Enable Integration:

E-learning applications generally interface with several complementary on-campus systems, including: a centralized user directory, HR or student information systems. In addition, e-learning applications typically have numerous constituent applications. The cost of integrating with each of these systems can be substantial. Universities have found that a coordinated approach reduces the number and type of systems thereby reducing integration costs.

The Architecture Should Leverage Current Investments:

As universities expand their e-learning programs they should build on their current investments. Not only does this reduce hardware and software costs, but it also improves manageability and assures resources are available to support the architecture in the longer term.

Based on these best practices, we recommend that UNC develop a more coordinated technical architecture. We recommend UNC consider two alternatives: The Centralized Architecture and the Distributed Architecture.

Recommendations: Technology

Based on industry best practices and in an effort to improve overall coordination and more effectively leverage economies of scale, we recommended UNC implement a more coordinated technical architecture.The E-Learning Centralized Architecture and the Distributed Architecture are two viable alternatives for UNC. A Centralized Architecture will coordinate all of the architecture requirements except the content authoring tools. A Distributed Architecture will coordinate only the learning management system and the course management system.

Infrastructure Requirement	Distributed Architecture	Centralized Architecture
Learning Management System	Coordinated	Coordinated
Course Management System	Coordinated	Coordinated
Content Authoring Tools	Campus-Based	Campus-Based
Data Warehousing and Reporting System	Campus-Based	Coordinated
Directory and Authentication Services	Campus-Based	Coordinated
Student Administration System	Campus-Based	Coordinated
E-Learning Portal	Campus-Based	Coordinated
Application Services	Campus-Based	Coordinated

See Appendices C and D for the architecture diagrams

Recommendations: Technology

There are strengths and weaknesses to both approaches. Either approach would enable UNC to reduce some e-learning infrastructure costs and reduce some potential integration costs. The Distributed Architecture will enable campuses to have more control, but will decrease some benefits to the user. A check indicates a correlation between the approach and the criteria. A check plus indicates a relatively greater correlation between the two.

	Distributed Architecture	Centralized Architecture
Reduction in management costs	✔	✔+
Reduction in hardware costs	✔	✔+
Reduction in licensing fees	✔	✔+
Standardization of content delivery	✔	✔
Standardization of e-learning services		✔
Central integration point for external service providers		✔+
Improves feasibility of content sharing	✔	✔
High level of customization required		✔
Leverage current investments	✔	✔+
Reduced total cost		✔

Recommendations: Technology

The technical platform reflects the implementation of the technical architecture and is tied to the design of the application and the interface. The following factors drove our evaluation of the preferred technical platform:

Business Requirements: The processes and outputs required so that UNC is able to operate effectively.

Functional Requirements: What UNC requires the system to do.

Service Level Requirements:

- Uptime—the amount of time an application needs to be up and running to support end users. Load Handling—the maximum number of end users and how their usage will be distributed throughout the day. How many people use the system? When are people most likely to use the system?
- Concurrency—planning for maximum number of end users at any given time.

Current Investments: Investment that campuses or the Office of the President have made in hardware and software applications.

Availability of Support Resources: The availability of people who are familiar with various software applications for support, design and delivery.

Total Cost of Ownership: The total cost for resources, hardware, software to operate the system.

Interfaces with Legacy Systems: An evaluation of the "openness" of the architectures of legacy systems. How easy is it to interface with those systems?

Maintainability: An assessment of the ease with which an application can be maintained. How many resources are required to maintain the application, are skill sets difficult to find?

Extensibility: An evaluation of the ability of the application to perform other functions or requirements.

Usability: An assessment of the ease with which end users can use the system. Is it a "sticky" application? Does it encourage people to return and use it again?

Recommendations: Technology

Based on the data collected during the eLRA, the driver and industry best practices, we have developed a recommendation for the technical platform and standards. This recommendation leverages many of the software applications currently in use on the campuses.

Technical Platform Requirement	Recommendation	Analysis
Operating System	Windows 2000 Server	Because this product is in place at most campuses, licenses and support resources are already in place. In addition, it is a solid performer, is scaleable, and the total cost of ownership is lower than a UNIX based platform.
Web Servers	IIS 5.0	As part of Windows 2000, procuring IIS 5.0 will not create an additional expense. It is scaleable, and easy to manage. While there are documented security risks, these risks can be mitigated by hardening the web server and operating system.
Learning Management System	WebCT Campus Edition 3.6	Because this product is installed at many campuses, support resources are already in place. In addition, WebCT has a fairly large feature set, and the product is scaleable. WebCT agreements with SCT and Campus Pipeline will enable easy integration with most campus back office systems.
	Blackboard	Blackboard is being used at many campuses, offers a full set of features, and is an industry standard in this space. It integrates a SOCAD component, and runs on IIS. It does not offer out-of- the-box integration with SCT.
Directory Services	Microsoft Active Directory	Because it is a core piece of Windows 2000, there is no additional cost to procure this package. It is infinitely scaleable, and it is relatively easy to learn how to use it.
	iPlanet Directory Server	iPlanet is used at most campuses; support resources are in place.
	Novell Directory Server	Novell is an enterprise-level application, a proven technology, reliable, and an industry standard.
	Netegrity SiteMinder	Netegrity is an industry standard for Internet security. It is reliable, and a proven technology.

Recommendations: Technology

Technical Platform Requirement	Recommendation	Analysis
E-Learning Portal	Campus Pipeline	Campus Pipeline licenses have been purchased for 13 campuses and is in the process of being implemented. It also offers out-of-the-box integration with Web CT and SCT.
	Custom	This alternative offers campuses more flexibility; it should be considered if the business requirements at a given campus demand it.
Content Authoring System	Macromedia E-Learning Studio	It offers a complete set of authoring tools that are standards based.

Recommendations: Support Services

Large universities across the country have weighed alternative organizational options for their e-learning programs. Ultimately the organizational approach is driven by culture, e-learning vision, and campus capacities around several key decisions:

Determination of Where Academic Decisions Should Lie:

Universities must determine the appropriate center of responsibility for academic decisions, as well as the source of instructional content and delivery.

Identification of Appropriate Investment Levels:

Universities must identify the appropriate level of investment in e-learning programs and courses given available resources. In general, an organization with less available capital will have to develop an organizational model that supports very strategic investments throughout the university.

Determination of Strategic Priorities:

A university must decide upon its strategic priorities. What learner market does it want to target initially? Should the university target that market as a unified entity?

Identification of the Level and Sponsor of Support for Distance Learning Technical Infrastructure, Academic Support, and Student Services:

Universities must identify the baseline of e-learning student and faculty support, determine the acceptable level of variation of that support across campuses, and decide the appropriate center of responsibility for hosting much of that support.

Based on our best practice research, there are three overarching organizational models currently in use by large colleges and universities: The Technical Service Model, the Comprehensive Service Model and the E-Learning Delivery Model. See Appendix B for a description of those models.

Recommendations: Support Services

Based on our analysis of the best practice organizational models and with an eye towards leveraging the success of the TLT Collaborative and Alliance initiatives, we recommend the formation of an E-learning Cooperative. Membership in the Cooperative will be voluntary. The Cooperative will be governed by a Council. Initially that Council will consider technical standards, and service standards. Based on campus response and its effectiveness, the role of the Council may grow over time.

UNC E-Learning Cooperative	
Objective	Through its leadership will promote a more collaborative approach to the development and delivery of e-learning courses and programs across all campuses. The purpose of the coordination is to leverage the breadth and size of the system while respecting the academic integrity and unique character of each campus.
E-Learning Council Role/Description	• Update state-wide, long term strategic plan for e-learning. • Identify short term and long term initiatives that support the strategic plan. Make key e-learning policy decisions. Establish standards. Direct Staff. • Composed of representatives from each campus. • Participation is voluntary, but campus representatives must establish an e-learning governance body on their own campuses, which they represent.
Staffing	• Executive Director to oversee cooperative, interface with other Office of the President initiatives, facilitate communication among campuses. • Staff positions (may be realigned GA staff) to lead marketing, vendor relationship efforts, best practice research and dissemination

Recommendations: Support Services

We have identified several early initiatives for the Cooperative. Longer term initiatives will be determined by the Cooperative Council and the Office of the President.

The Cooperative Should Work with the TLT Collaborative to Enhance Faculty Support:

The eLRA identified widespread need for increased pedagogical support for faculty who are in the process of developing an online course. Because of its expert understanding of the issues and nuances of teaching with technology, the Cooperative should partner with the TLT Collaborative to develop an approach to enhancing faculty support at campuses.

The Cooperative Should Develop Baseline Faculty and Student Technical Support Standards:

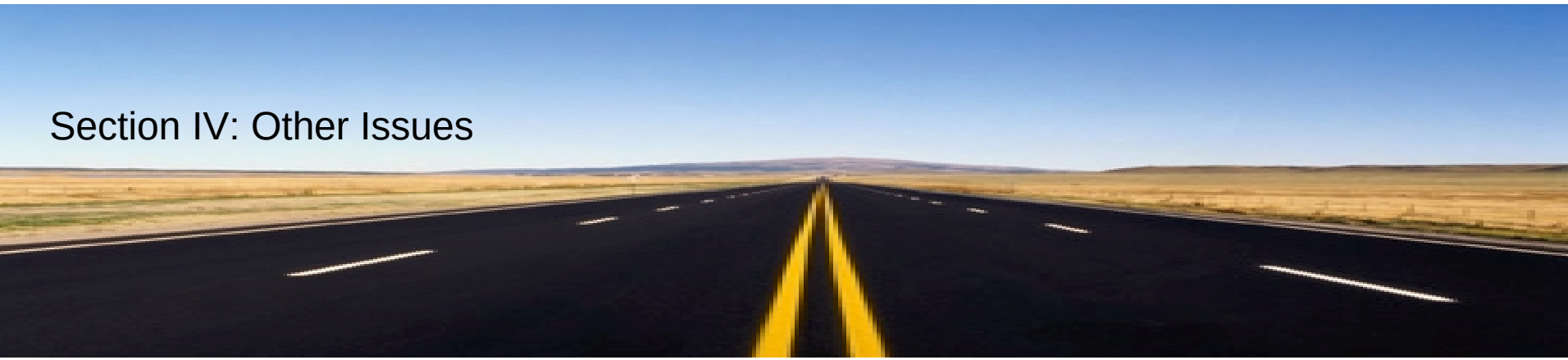
The eLRA identified a variety of levels of student and faculty support at the campuses. Help desk best practices suggest that a first-stop, tier one help desk should be able to answer 80% of all calls. Therefore, given the unique nature of each academic program and course, a coordinated help desk is not feasible. Nonetheless, the Cooperative should develop baseline faculty and student support standards and provide technical assistance to campuses to ensure that their technical support services meet UNC standards. As UNC moves to a more coordinated technical architecture, it is possible that some technical support will also be able to be centralized.

The Cooperative Should Recommend and Implement an E-Learning Architecture:

The eLRA highlighted some of the weaknesses of the current e-learning infrastructure: siloed approach, cost inefficiencies, and high integration costs. The Cooperative should consider several e-learning architecture alternatives and recommend and oversee implementation of a preferred approach.

The Cooperative Should Lead the Development of a Web Clearinghouse of E-Learning Courses:

The eLRA highlighted a campus-identified need for a UNC-wide Web clearinghouse of e-learning courses. This clearinghouse would initially serve as an easy-to-access, user-friendly, single repository of current e-learning courses. Prospective students will be able to identify a preferred course and easily click through to the constituent campus offering the course. Over time the Cooperative should assess opportunities to expand the services available to prospective students through the clearinghouse.



Section IV: Other Issues

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Other Issues: Introduction/Section Summary

During this project PwC visited each of the sixteen campuses as well as the Office of the President and UNC-TV. As a result we met with hundreds of faculty and staff each of whom expressed their thoughts, and concerns about their ongoing participation in e-learning. In this section we will mention those issues that, while critical, were out of the scope of this project.

There Are Several Technology Issues Facing UNC that Were Not Specifically Part of this Project's Scope:

This project was focused on assessing e-learning technologies and making recommendations for a university-wide approach. Based on discussions during campus visits and our assessment of the data, we identified several technology issues out of the scope of this project including: the need to develop a central directory of users, the opportunity the university has to become more cost effective in its overall approach to technology, and the existence of significant intra-campus technical issues related to e-learning.

Several Key Academic Policy Issues Related to E-Learning Should Be Addressed:

While this project was focused specifically on technology-related issues, in many of our interviews staff, faculty and administrators expressed concern over academic issues related to e-learning, including: funding issues, quality assurance, and faculty workload. Other academic-related issues include the need for regularly updated market research to assess demand, and the potential of leveraging the UNC-TV as a course development resource.

Other Issues: Technology

Technology issues unrelated to this project include the importance of developing a central directory and the cost inefficiencies of the current technology approach across each of the 16 UNC campuses.

Developing a Central Directory of Users Is Critical to Support a More Coordinated Technology Approach:

When undertaking Enterprise Application Integration projects (e.g., centralizing e-learning initiatives), it is generally “best practice” to have a centralized data store, in most cases an enterprise directory, of user information. All future application development should authenticate and authorize the user based on the data in the central directory. Initially, populating the directory will require data conversion (for example pulling student information from SIS+); however, moving forward, populating the directory should be a part of the student/faculty provisioning process.

Current Approach to Technology Is Not Cost-Effective:

All campuses are currently operating separate technical infrastructures. For example, each school is operating their own e-learning environment. This approach can be very costly from many perspectives including (1) support resources, (2) under utilized hardware, (3) duplicate licensing fees and (4) duplicate integration efforts. A more cost effective approach would be to have all operations and administration centralized, but management decentralized.

Many Larger Campuses Face Intra Campus Technical Issues Related to E-Learning:

Many larger campuses are struggling with e-learning infrastructure issues related to their respective campuses. These include issues around developing a central directory and single point authentication, creating technical standards for the campus, and implementing a standard LMS.

Other Issues: Policy

Campuses expressed concern about a range of policy issues facing e-learning, including the current funding structure, articulation, faculty workload issues, market research and leveraging UNC-TV.

Current Funding of E-Learning Programs Is Problematic for Several Reasons:

In our meetings, most campuses cited the classification of online courses as 107 courses or distance education courses as problematic. The fees that can be assessed for these courses are much less than a face-to-face course, though it costs a similar amount to deliver these courses. This creates several problems:

- On campus students may take online courses to save money
- The student information system is not set up to handle these different fee structures creating a lot of manual tracking and data entry
- It creates a negative incentive for schools to invest in online courses (there is a better return in investing in face-to-face courses)
- It does not cover true cost of delivering an online course

In addition, because distance learning and campus-based students have been segmented due to historical funding policies, many campuses are struggling with a strategy for approaching the considerable overlap and parallel issues for e-learning classes that are campus based. Continued segmentation of these groups, especially in light of the recommendations of this report, could create a situation where campuses must deal with additional duplication of effort if parallel DE and on campus-based systems must be maintained.

Quality Assurance Remains an Important Concern when Addressing Articulation Issues:

A barrier for campuses in forming articulation agreements for jointly offered online degree programs is the fear that there is some variation in the quality of online courses offered across campuses. Each campus is concerned about quality and wants to ensure that its online courses are highly interactive, personalized, and have the same requirements for student participation as a face-to-face course. Where campuses have worked together, the school deans tend to know one another and some of the faculty are familiar and comfortable with the other campuses' courses. This type of trust-building seems imperative to ensuring campuses are comfortable with the quality of courses offered at other schools.

Other Issues: Policy

Faculty Workload and Compensation/Recognition Issues Related to E-Learning Continue to be Problematic for Many Campuses:

Campuses are facing a number of faculty workload issues related to e-learning, including:

- Many campuses report that there is a perception that professors have to work much harder to teach e-learning courses. Therefore, many faculty are reluctant to teach online courses. Stipends have helped to increase faculty interest, but there are no resources or long term structures for rewarding faculty for the additional workload required to deliver the courses and continually upgrade them.
- Some campuses treat online courses as “overload” courses. Faculty are appropriately compensated for the additional teaching load. While many faculty appreciate this approach, department heads are concerned about the overall impact of such an approach.
- The current faculty reward structure provides few incentives to teach online courses. E-learning course development and delivery are not tied to faculty promotion or tenure policies.

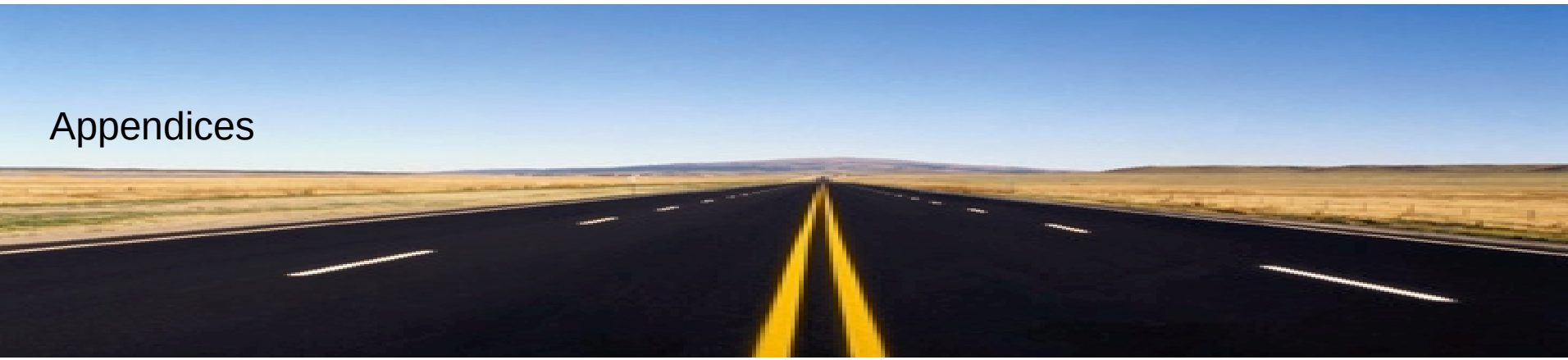
Campuses Have Expressed a Need for Regularly Updated Aggregated Market Research to Guide Program Planning:

Demand is, in part, driving the expansion of e-learning programs and courses. The eLRA identified a need for market research to ensure that courses are developed to capture that demand. Many campuses expressed an explicit interest in a coordinating entity providing such a service. The Office of the President may be able to leverage market research already conducted and should package and communicate it to campuses in a user-friendly format.

UNC-TV May Be an Important Source of Supplementary Content for Faculty Developing E-Learning Courses:

UNC-TV has production expertise and digitized content that could greatly enhance faculty developed courses. It may be appropriate to consider them as a resource as campuses create more dynamic course content. In addition, the Cooperative may assess the feasibility of leveraging UNC-TV’s bandwidth as a delivery mechanism for some e-learning courses and programs.

Appendices



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Appendix A: Course Content Design Standards

AICC

- www.aicc.org
- The Aviation Industry CBT Committee guidelines apply to the development, delivery and evaluation of learning content that are delivered via technologies.

IEEE/LTSC

- ltsc.ieee.org
- The purpose of the Learning Technology Standards Committee is to develop technical standards, recommended practices, and guides for software components, tools, technologies and design methods that facilitate the development, deployment, maintenance and interoperation of computer implementations of education and training components and systems.

SCORM

- www.adlnet.org
- Shareable Courseware Object Reference Model is as a set of standards that, when applied to course content, produces small, reusable learning objects. SCORM-complient course-ware elements can be easily merged with other compliant elements to produce a highly modular repository of learning content.

IMS

- www.imsproject.org
- The Instructional Management Systems is a set of technical specifications defining how learning content will be exchanged over the Internet and how organizations and individuals learners will use the content.

Appendix B: Cooperative Models

The Technical Service Model offers campuses the greatest level of autonomy in developing and delivering their e-learning programs. This model enables campuses to make most e-learning related academic, investment, strategic and support decisions. The coordinating entity will set standards, and facilitate the communication of best practices.

Model Name	Goal					
Technical Service Model	To retain institutional autonomy for all e-learning development, delivery and support while leveraging technical resources across the system. Underlying this goal is the assumption that the individual institutions understand the e-learning needs of their constituents and are most qualified to make informed decisions about what courses and programs should be developed and delivered in an e-learning delivery mode and where resources should be targeted for e-learning .					
	Course Development	Faculty Support	Student Support	Academic Policies	Program Planning	IT Infrastructure
Campuses	✔	✔	✔	✔	✔	✔
Coordinating Entity		Limited	Limited	Set Standards		Set Standards

Appendix B: Cooperative Models

The Comprehensive Service Model enables the university to leverage economies of scale in the procurement of software applications, hardware and ongoing support services by shifting overall responsibility for those functions to the coordinating entity.

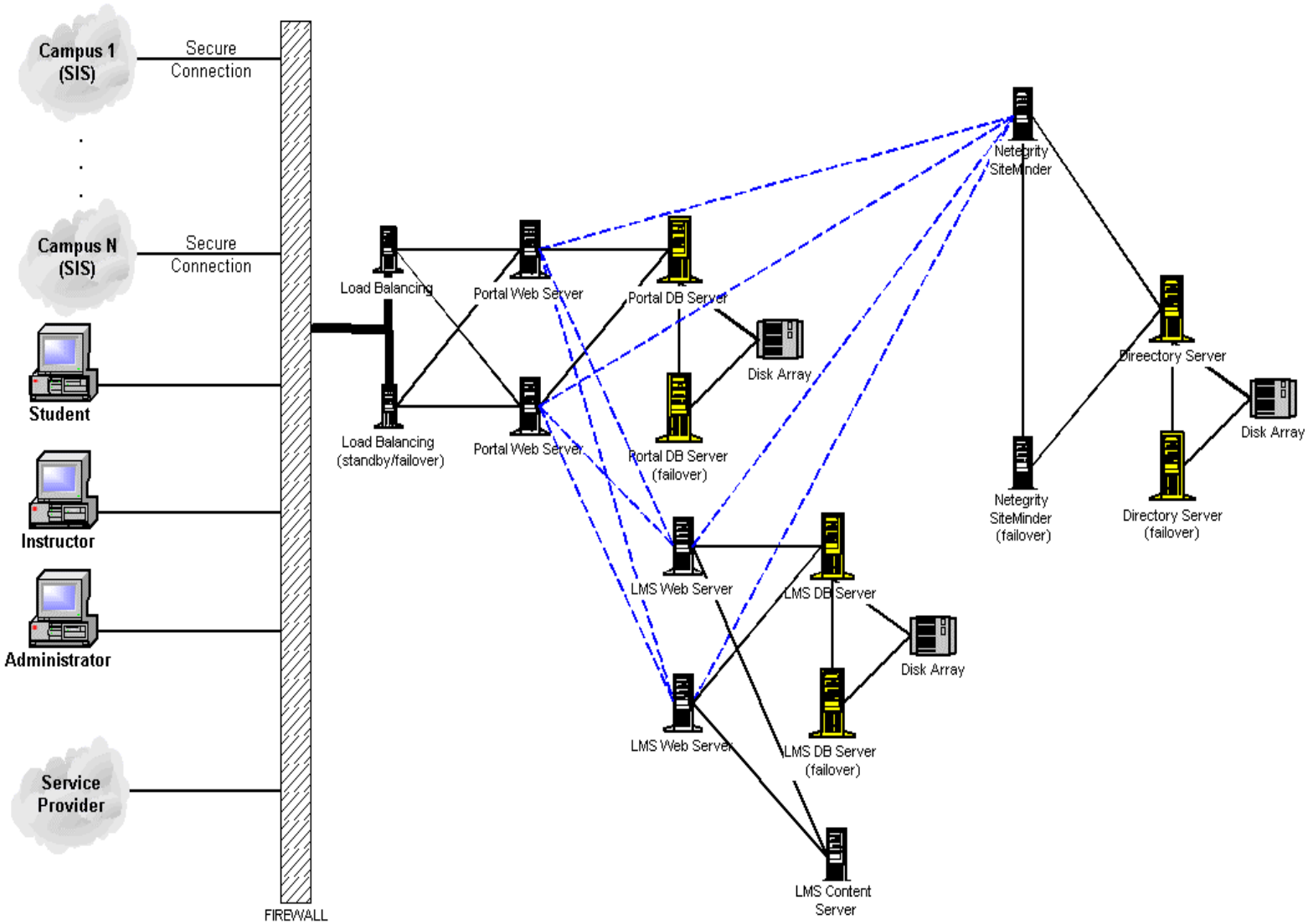
Model Name	Goal					
Comprehensive Service Center Delivery Model	To provide a seamless interface of e-learning support services for students and faculty. Underlying this goal is the assumption that the core competencies needed to deliver e-learning programs are within the purview of the institutions, but that economies of scale and more effective e-learning support services for both students and faculty can be realized by creating a system-wide service center to coordinate and/or deliver many of the support functions of distance learning. .					
	Course Development	Faculty Support	Student Support	Academic Policies	Program Planning	IT Infrastructure
Campuses	✔		Admissions, program advising	✔	✔	
Coordinating Entity		✔	✔	Set Standards		✔

Appendix B: Cooperative Models

The E-Learning Delivery Model moves all non-academic functions, including course conversion, marketing, support and IT infrastructure decisions away from the campuses and to the coordinating entity. In doing so, campuses are able to focus on their core competency: academics.

Model Name	Goal					
E-Learning Delivery Model	To promote development and delivery of e-learning courses and programs across all colleges, leveraging the breadth and size of the system. Underlying this goal is the assumption that the core competencies needed to deliver e-learning are distinct from those of traditional colleges and that the most effective means for developing and promoting delivery of e-learning courses and programs is by establishing a System-level structure.					
	Course Development	Faculty Support	Student Support	Academic Policies	Program Planning	IT Infrastructure
Campuses	Develop content		Admissions, some advising	✔		
Coordinating Entity	Convert content	✔	✔		✔	✔

Appendix C: Centralized Technical Architecture



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Appendix D: Decentralized Technical Architecture