



NATIONAL LEADERSHIP INSTITUTE'S TOOLKIT 2005 CURRICULUM DEVELOPMENT

Summary & Tools

Chapter Summary

Objective

To provide eLearning curriculum guidelines and resources to help technology directors develop, choose, and share digital content and courses.

Key Questions

- What are essential curriculum development design principles for eLearning content and courses for elementary school, middle school, high school and adult learners (K-12)?
- What dissemination models can facilitate distribution of these curriculum development design principles for eLearning content and courses to creators and consumers?
- What are some guidelines for sharing curriculum development design principles and standards for eLearning content and courses? How can SETDA contribute to the development and sharing of eLearning content and courses among states and private industry?
- What are some new and emerging technologies that could affect eLearning curriculum development, content and courses, and their delivery or distribution?

NLI Work Group Process

The 2004 NLI eLearning Curriculum Development Work Group attempted to enlighten the process by which technology directors and educators develop, choose, and share digital content and courses. Pre-NLI Work Group calls reinforced the idea that state technology directors must consider a wide range of problems and issues when developing and soliciting eLearning curriculum including issues of accessibility, copyright responsibilities, alignment with state standards, as well as financial limitations.

Until this time, technology directors have had limited opportunities to share eLearning curriculum and instructional practices across state borders. Ultimately, this problem stems from the wide ranging instructional and curriculum design practices employed in private industry and among state

curriculum developers. Thus, the Curriculum Development Work Group set out to develop a foundation of eLearning curriculum design principles that will allow for further collaboration among SETDA members to develop, choose, and share eLearning curricula.

Working from this core idea, the Curriculum Development Work Group divided into three subgroups. The first subgroup created a set of technical principles and guidelines for the development and delivery of digital content. The second subgroup created a model tool for technology directors and consumers of eLearning curricula to use when choosing online and electronic courses. The third subgroup explored the many methods of dissemination that these eLearning curriculum design principles could most effectively reach important target audiences including policymakers, teachers, students and parents as well as private curriculum developers.

The subgroups spent the NLI work sessions developing draft deliverables that were presented to the whole Work Group for suggestions and revisions. Because the subgroup tools built upon one another, members of subgroups spent considerable time within other subgroups sharing resources and state examples. These collaborative activities ensured that these SETDA tools were “owned” by all members of the Curriculum Development Work Group.

SETDA Tools Developed to Assist States

- **Principles and Considerations for Digital Content: Technical Specifications for Development and Delivery:** A set of essential curriculum development design principles and considerations for eLearning content and courses for elementary school, middle school, high school, and adult learners (K-12).
- **A Model to Apply or Judge eLearning Curriculum:** A selection tool to evaluate eLearning content and courses to apply or judge if essential curriculum development design principles and standards have been incorporated.
- **A Process for Creating Dissemination Models of eLearning Principles and Guidelines:** Dissemination models that can facilitate distribution of principles and guidelines for eLearning content and courses to creators and consumers.

Curriculum Design Principle & Considerations

This is a tool for designing and delivering digital content including K-12 curriculum, professional development, and websites used in instruction.

1. Development and Delivery of Digital Content

- 1.1. Content Guidelines
- 1.2. Instructional Design
- 1.3. Student Assessment

2. Technical Specifications for Digital Content

- 2.1. Learning Objects
- 2.2. Interoperability
- 2.3. Meta-tagging
- 2.4. Functional Requirements
- 2.5. Security
- 2.6. Bandwidth
- 2.7. Plug-Ins
- 2.8. Accessibility
- 2.9. Styles and Formats

1. Development and Delivery of Digital Content			
1.1.	Content Guidelines	Key Questions	Resources
1.1.1.	The content of the course meets or exceeds the rigor, depth, and breadth of traditionally delivered courses and fosters deeper understanding of the subject area.	<p>Are resources that extend the scope of the course content identified and available?</p> <p>Are explicit statements that describe the goals and objectives available?</p>	<ul style="list-style-type: none"> ◆ Texas Education Agency (2003). Quality of Service Guidelines for Online Courses Evaluation Matrix developed by the Texas Investigating Quality of Online Courses (IQ) Project. It can be accessed through http://www.iqstandards.info
1.1.2.	The content of the course is aligned with local, state, and/or national guidelines.	<p>Are local, state, and national guidelines clearly defined within the course material?</p>	<ul style="list-style-type: none"> ◆ Lynch, Marguerita McVay (2002). <i>The Online Educator: A guide to creating the virtual classroom</i>. New York/London: Routledge. Review available as of January 7th, 2005 from http://www.mantex.co.uk/reviews/bib-ole.htm
1.1.3.	The content is accurate, up-to-date, age appropriate, free of bias, organized effectively and regularly reviewed.	<p>What is the authority of the content creator, presenter, and/or reviewer?</p> <p>Are the course or content developer's credentials readily available?</p>	<ul style="list-style-type: none"> ◆ California Learning Resource Network (2003). Search the database of electronic learning resource reviews. Retrieved January 7th, 2005 from http://www.clrn.org/search/ ◆ The eLearning Guild (2005). Resource Directory. Retrieved January 7th, 2005 from http://www.elearningguild.com/resources/resources/
1.1.4.	A comprehensive course syllabus is provided.	<p>Are technical and content pre-requisites described?</p> <p>Is the organizational structure of the course provided?</p> <p>Does this organization facilitate learning?</p>	<ul style="list-style-type: none"> ◆ SREB – Educational Technology Cooperative. (n.d.). SREB Essential Principles of Quality Checklist for Web Based Courses. Retrieved January 7th, 2005 from http://www.sreb.org/programs/EdTech/pubs/PDF/EssentialQualitiesChecklist.asp

1. Development and Delivery of Digital Content			
1.1.	Content Guidelines	Key Questions	Resources
1.1.5.	The content provides frequent and timely interactions between the students and the e-learning teacher, as well as interactions among the students.	<p>How does the course content facilitate and encourage the development of a learning community?</p> <p>Does the course content encourage collaboration among students, teachers, administrators and community members?</p>	<ul style="list-style-type: none"> ♦ Lindeman, Michael & Varvel, Virgil (2002). Qualities of Exemplary Online Courses. Retrieved January 7th, 2005 from http://www.ion.illinois.edu/Present/presentations/040202/quality_files/frame.html ♦ Sullivan, Eugene & Rocco, Thomas (1997). A Credo for Going the Distance. Retrieved January 7th, 2005 from (http://www.pbs.org/als/agenda/articles/credo.html)
1.1.6.	The learning environment and course materials are universally designed making them accessible to diverse learners.	<p>Is there a diversity of interaction and activity?</p> <p>Does the course and course content have features that create access for persons with disabilities?</p>	<ul style="list-style-type: none"> ♦ CAST (2004). What is Universal Design for Learning? Retrieved January 29, 2005 from http://www.cast.org/ncac/WhatisUDL372.cfm ♦ ERIC Clearinghouse on Disabilities and Gifted Education (1999). A curriculum every student can use: Design principles for student access. Retrieved January 7th, 2005 from http://www.cec.sped.org/osep/udesign.html ♦ ERIC Clearinghouse on Disabilities and Gifted Education (1999). What Parts of the Curriculum Should Be Universally Designed? Retrieved January 7th, 2005 from http://www.cec.sped.org/osep/ud-sec4.html ♦ Gorski, Paul (1999). Multicultural Model for Evaluating Educational Web Sites. Retrieved January 7th, 2005 from http://www.edchange.org/multicultural/net/comps/model.html
1.1.7.	The course content utilizes the full potential of web-based and multimedia resources to facilitate and enhance learning.	Are web and other resources of high quality and accessible to the learner?	<ul style="list-style-type: none"> ♦ SEDTA Connects http://www.setdaconnects.org/
1.1.	Content Guidelines	Key Questions	Resources

1. Development and Delivery of Digital Content			
1.1.8.	The course content reflects real world situations that are relevant to the student and provide a broad perspective.	What is the scope and sequence of the course provided?	<ul style="list-style-type: none"> ◆ Twigg, Carol (2003). Improving Learning and Reducing Costs: Ne* Models for Online Learning. Retrieved January 7th, 2005 from http://www.educause.edu/ir/library/pdf/erm0352.pdf

1. Development and Delivery of Digital Content			
1.2.	Instructional Design	Key Questions	Resources
1.2.1.	Instructional objectives are defined and measurable.	<p>Are the outcomes specified?</p> <p>Are they aligned with the student assessment?</p>	<ul style="list-style-type: none"> ♦ SREB – Educational Technology Cooperative. (n.d.). SREB Essential Principles of Quality Checklist for Web Based Courses. Retrieved January 7th, 2005 from http://www.sreb.org/programs/EdTech/pubs/PDF/EssentialQualitiesChecklist.asp
1.2.2.	Clear and explicit alignment exists between objectives, assessments, instructional strategies, content, and technology.	<p>What are the course objectives?</p> <p>What kinds of student assessments exist?</p> <p>What instructional pedagogies are employed?</p> <p>Does the technology facilitate new goals, assessments, and instructional methods otherwise unattainable in traditional learning environments?</p>	<ul style="list-style-type: none"> ♦ Maryland State Department of Education (2002-2006). Maryland Virtual Learning Opportunities. Retrieved January 7th, 2004 http://mdk12online.org ♦ Texas Education Agency (2004). Texas STaR Chart: A Tool for Planning and Self-Assessing School Technology and Readiness. Retrieved January 7th, 2005 from http://www.tea.state.tx.us/starchart/
1.2.3.	Course navigation is intuitive and appropriate to the content.	Do the technical specifications for digital content design support and enhance the learning environment?	<ul style="list-style-type: none"> ♦ Oliver, Christina (2002) E-Tutoring for Effective E-Learning: Curriculum Design for E-Learning. LTSN Generic Centre and TechLearn. Retrieved January 7th, 2005 from http://www.ics.ltsn.ac.uk/pub/elearning/CurriculumDesign.doc
1.2.4.	The technology is easy to use, allowing learners to focus on course content.	<p>Does the technology meet accessibility standards?</p> <p>Are minimum technical requirements met for student access?</p>	<ul style="list-style-type: none"> ♦ Maryland State Department of Education (2002). Accessible Computer-Based Instructional Technology. Retrieved January 7th, 2005 from http://cte.jhu.edu/accessibility/

1. Development and Delivery of Digital Content			
1.2.	Instructional Design	Key Questions	Resources
1.2.5.	Course is adaptable and flexible to meet the individual needs of the students and teachers.	<p>Can teachers update and customize content easily?</p> <p>Are a multitude of instructional methods available?</p> <p>Are there instructional design mechanisms to encourage continual participant feedback?</p>	<ul style="list-style-type: none"> ♦ Hara, Noriko & Kling, Rob (1999). Students' Frustrations with a Web-Based Distance Education Course. <i>First Monday</i>, volume 4, number 12. Retrieved January 7th, 2005 from http://firstmonday.org/issues/issue4_12/hara/index.html ♦ National Education Association (2002). Guide to Online High School Courses. Retrieved January 7th, 2005 from http://www.nea.org/technology/images/02onlinecourses.pdf
1.2.6.	Appropriate tools and methods are used to foster collaboration and interaction between the instructor and students, and among students.	<p>Are there a variety of communication methods in place?</p> <p>Are the course's methods of communication secured?</p>	<ul style="list-style-type: none"> ♦ Massachusetts Department of Education (n.d.). Virtual Education Space. Retrieved January 7th, 2005 from http://ves.doe.mass.edu/
1.2.7.	Instructional design and course content is appropriate for the learner (age, background, ability).	<p>Is the course instructional design appropriate for the age of the learner?</p>	<ul style="list-style-type: none"> ♦ Partnership for 21st Century Skills (2004). ICT Literacy Maps. Retrieved January 7th, 2005 from http://www.21stcenturyskills.org/matrices/ ♦ Texas Education Agency (2004). Technology Applications Texas Essential Knowledge and Skills (TEKS) for Grades K-12: Information Acquisition and Communication Strands. Retrieved January 7th, 2005 from http://www.tea.state.tx.us/rules/tac/ch126toc.html
1.2.	Instructional Design	Key Questions	Resources

1. Development and Delivery of Digital Content			
1.2.8.	The instructional design of the course provides students with opportunities to improve learning skills using real world technological tools, including:	Are multiple methods of interaction encouraged among participants?	<ul style="list-style-type: none"> ◆ Partnership for 21st Century Skills http://www.21stcenturyskills.org/ ◆ Michigan Virtual University (2002). Standards for Online Quality Courses: Technology Standards. Retrieved January 7th, 2005 from http://standards.mivu.org/standards/tech/ ◆ Texas Education Agency (2004). Technology Applications. Retrieved January 7th, 2005 from http://www.tea.state.tx.us/technology/ta/
1.2.8.1.	<p>1. Information and communication skills (information and media literacy and communication skills),</p> <p>Definition: “Information literacy is the ability to identify information needs, seek out resources to meet those needs, and then analyze, evaluate, synthesize and communicate the resulting knowledge” (Colorado Department of Education, 2004).</p>	Are information and communication skills taught as an integral part of the curriculum?	<ul style="list-style-type: none"> ◆ Partnership for 21st Century Skills (2004). ICT Literacy Maps. Retrieved January 7th, 2005 from http://www.21stcenturyskills.org/matrices/ ◆ American Library Association and the Association for Educational Communications and Technology (1998). The Nine Information Literacy Standards for Student Learning. Retrieved January 7th, 2005 from http://www.infolit.org/definitions/9standards.htm ◆ Colorado Department of Education (2004). Standards for Information Literacy and School Library Programs. Retrieved January 7th, 2005 from http://www.cde.state.co.us/litstandards/download/InfoLit_Brochure.pdf

1. Development and Delivery of Digital Content			
1.2.	Instructional Design	Key Questions	Resources
1.2.8.2.	2. Thinking and problem-solving skills (e.g. critical thinking and systems thinking, problem identification, formulation and solution, creativity and intellectual curiosity)	Are students expected to use higher order thinking skills with information or just report back the information they find?	<ul style="list-style-type: none"> ♦ Partnership for 21st Century Skills (2004). ICT Literacy Maps. Retrieved January 7th, 2005 from http://www.21stcenturyskills.org/matrices/ ♦ Texas Education Agency (2005). Technology Applications Texas Essential Knowledge and Skills (TEKS) for Grades K-12: Information Acquisition and Communication Strands. Retrieved January 7th, 2005 from http://www.tea.state.tx.us/rules/tac/ch126toc.html

1. Development and Delivery of Digital Content			
1.2.8.3.	3. Interpersonal and self-directional skills (e.g. interpersonal and collaborative skills, self-direction, accountability and adaptability, social responsibility)	<p>What kind of social environment is created within the interactions of this course?</p> <p>What interpersonal skills are developed within the social environment?</p>	<ul style="list-style-type: none"> ◆ Partnership for 21st Century Skills (2004). ICT Literacy Maps. Retrieved January 7th, 2005 from http://www.21stcenturyskills.org/matrices/ ◆ Wegerif, Rupert (1998). "The Social Dimension of Asynchronous Learning Networks" <i>JALN, Volume 2, Issue 1 - March 1998</i>. Retrieved January 7th, 2005 from http://www.sloan-c.org/publications/jaln/v2n1/v2n1_wegerif.asp

1. Development and Delivery of Digital Content			
1.3.	Student Assessment	Key Questions	Resources
1.3.1.	Student assessments are aligned with local, state, and national standards.	What local, state, and national standards are in use?	<ul style="list-style-type: none"> ♦ Maryland State Department of Education (2002-2006). Resources – Planning Part III: The Evaluation Process. Retrieved January 7th, 2005 from http://mdk12online.org/7Reso/Design/3Eval.htm
1.3.2.	The course provides ways to assess student participation and achievement of learning goals.	<p>Are there a variety of assessment tools and methods?</p> <p>Are student self assessments (such as surveys and evaluations of course participation) available?</p>	<ul style="list-style-type: none"> ♦ Haertel, Geneva D. & Means, Barbara (2003). <i>Evaluating Educational Technology: Effective research designs for improving learning</i>. New York: Teachers College Press. ♦ Jackson Robert (1997-2004). Web Based Learning Resources Library: Software Tools for Web Learning: Quiz and Assessment creation tools. Retrieved January 7th, 2005 from http://www.knowledgeability.biz/weblearning/softwaretools.htm#Industry%20Standards%20for%20Web-based%20Learning
1.3.3.	Fair and appropriate methods to assess student mastery are available.	<p>Are the assessment methods and procedures appropriate to measure the instructional design and course content provided?</p> <p>Do the students receive appropriately timed and informative feedback from assessment procedures?</p>	<ul style="list-style-type: none"> ♦ Means, Barbara, Penuel, Bill, & Quelmalz (2001). Developing Assessments for Tomorrow's Classrooms. In Heinecke, Walter F. & Blasi (Eds), Laura (2001). <i>Methods of Evaluating Educational Technology</i>. Greenwich, CT: Information Age Publishing.

2. Technical Specifications for Digital Content			
2.1.	Learning Objects	Essential Information	Resources
2.1.1.	<p>A Learning Object is "any digital entity designed to meet a specific learning outcome that can be reused to support learning". (Co-operative Learning Object Exchange, 2005)</p> <p>A Learning Object is any grouping of materials that is structured in a meaningful way and is tied to an educational objective (Johnson, 2003).</p> <p>A Learning Object is "any digital resource that can be reused for the purposes of teaching and learning" (Friesen, 2003).</p> <p>The "materials" in a Learning Object can be documents, pictures, simulations, movies, sounds, and so on. Structuring these in a meaningful way implies that the materials are related and are arranged in a logical order. But without a clear and measurable educational objective, the collection remains just a collection (Smith, 2004).</p>	<p>Learning Objects should be created according to currently defined guidelines and standards to ensure their use in multiple contexts:</p> <p>"Flexibility": A well-designed learning object — or a combination of several that deal with the same topic — can offer access to knowledge through multiple modes of learning.</p> <p>Cost effectiveness: As non-consumable resources, learning objects can be used in multiple contexts and repeated over time.</p> <p>Customizability: Teachers and students may select learning objects to suit their course material and particular instructional and or learning style." (Smith, 2004)</p> <p>Learning Objects are used to create "the environment in which the learner, instructor, or guest manipulates the learning material" (National Learning Infrastructure Initiative).</p> <p>Learning Objects should be "reusable, modular, free and at cost, flexible, portable, and interoperable" (Friesen, 2003).</p>	<ul style="list-style-type: none"> ♦ Alivetek (2001). Learning Objects Resource Webpage. Retrieved January 7th, 2005 from http://www.alivetek.com/learningobjects.htm ♦ Co-operative Learning Object Exchange - http://cloe.on.ca/ ♦ Friesen, Norm (2003). Slide presentation on Best Practice for Learning Object Metadata. Retrieved January 7th, 2005 from http://www.cit.nus.edu.sg/dli2003/Presentation/Norm_friesen.pdf ♦ Johnson, L. (2003). Elusive Vision: Challenges Impeding the Learning Object Economy [a white paper]. San Francisco: Macromedia Inc. Retrieved January 7th, 2005 from http://www.nmc.org/pdf/Elusive_Vision.pdf ♦ National Learning Infrastructure Initiative – Learning Objects Working Groups (n.d.). Learning Objects Ontology. Retrieved January 7th, 2005 from http://people.cohums.ohio-state.edu/dagefoerde2/NLII_LO/ontology/ontology.htm ♦ Smith, Rachel S., (2004) Guidelines for Authors of Learning Objects. NMC: The New Media Consortium. Retrieved January 7th, 2005 from http://www.nmc.org/guidelines/NMC%20LO%20Guidelines.pdf

2. Technical Specifications for Digital Content			
2.1.	Learning Objects	Essential Information	Resources
2.1.2.	<p>Shareable Content Object</p> <p>A shareable or reusable content object:</p> <ul style="list-style-type: none"> ♦ Is instructionally meaningful and includes objectives, content and assessment; ♦ Is not personalized or branded; ♦ Is self contained; ♦ Can be aggregated; ♦ Is tagged with meta-data; and ♦ Includes a SCORM wrapper. 	<p>A Shareable Content Object is the “the smallest unit of content independently served and tracked by a learning management system” (Recombo.com, 2005).</p>	<ul style="list-style-type: none"> ♦ Recombo.com (2005). Are SCOs Learning Objects? Retrieved January 7th, 2005 from http://www.recombo.com/resources_standards_scom.htm#sco ♦ Lim Kin Chew (n.d.). eLearning Specifications for Distance Education. Retrieved January 7th, 2005 from http://cvd.tp.edu.sg/apan-edu/download/kinchew.pdf

2. Technical Specifications for Digital Content			
2.1.3.	Learning Object and Sharable Content Object Repositories	<p>“A system that stores electronic objects and meta-data about those objects...and should be packaged with a number of functionalities...such as: Meta-data management; Content management; and Interoperability” (Academic ADL Co-Lab, 2004).</p>	<ul style="list-style-type: none"> ◆ Academic ADL Co-Lab (2004). What We Mean When We Say “Repositories”: User Expectations of Repository Systems Retrieved January 7th, 2004 from http://www.academiccolab.org/resources/RepoSurvey2004-1.pdf ◆ Academic ADL Co-Lab (n.d.). Initiatives: Repositories. Retrieved January 7th, 2005 from http://www.academiccolab.org/initiatives/repositories.html ◆ McGee, Patricia L. (2004). Learning Object Repositories. Retrieved January 7th, 2005 from http://elearning.utsa.edu/guides/LO-repositories.htm ◆ University of Wisconsin – Milwaukee, Center for International Education (2004). Learning Objects Collections. Retrieved January 7th, 2005 from http://www.uwm.edu/Dept/CIE/AOP/LO_collections.html

2. Technical Specifications for Digital Content			
2.2.	Interoperability	Essential Information	Resources
2.2.1.	Interoperability is facilitated by “a set of rules and definitions to enable software programs from different companies to share information” (Schools Interoperability Framework, 2005).	<p>Digital content should be created and implemented to take full advantage of specifications, standards, guidelines, and defined principles to ensure Interoperability.</p> <p>Schools Interoperability Framework: “Implementing products which conform to the SIF Implementation Specification make it possible to share data without any additional programming by the local school or district and without requiring each vendor to learn and support the intricacies of other vendors’ applications” (Schools Interoperability Framework, 2005).</p> <p>AAIC Certification: “Since both IMS and Advanced Distributed Learning have embraced the AICC standards, a product that is AICC Certified to AGR-010 - Web-based Computer Managed Instruction is mostly likely to preserve your content development investment into the future” (Jackson, 1997-2004).</p>	<ul style="list-style-type: none"> ♦ Aviation Industry CBT Committee (1988-2004). Index of Available AICC Publications. Retrieved January 7th, 2005 from http://www.aicc.org/pages/down-docs-index.htm ♦ Aviation Industry CBT Committee (1988-2004). Understanding "AICC Compliance" (and AICC Certification). Retrieved January 7th, 2005 from http://www.aicc.org/pages/primer.html ♦ The Consortium for School Networking (CoSN) http://www.cosn.org/ ♦ Jackson, Robert (1997-2004). Web Based Learning Resources Library: Software Tools for Web Learning. Retrieved January 7th, 2005 from http://www.knowledgeability.biz/weblearning/softwaretools.htm#Industry%20Standards%20for%20Web-based%20Learning ♦ Schools Interoperability Framework (SIF) http://www.sifinfo.org/

2. Technical Specifications for Digital Content			
2.2.	Interoperability	Essential Information	Resources
2.2.2	<p>Shareable Content Object Reference Model (SCORM)</p> <p>A method of documenting and managing learning objects with run-time information (meta-tags of descriptive and rights information and run-time files) so the learning object is able to interoperate with a learning management system (LMS).</p> <p>SCORM is “an XML-based framework used to define and access information about learning objects so they can be easily shared among different learning management systems (LMSs)” (TechTarget, 2000-2005).</p>	<p>SCORM provides “a comprehensive suite of e-learning capabilities that enable interoperability, accessibility and reusability of Web-based learning content” (McGee, 2003).</p>	<ul style="list-style-type: none"> ♦ JCA Solutions (2004). Online SCORM course. Retrieved January 7th, 2005 from http://www.scormcourse.icasolutions.com/index.php ♦ Advanced Distributed Learning (2003). SCORM Overview. Retrieved January 7th, 2005 from http://www.adlnet.org/index.cfm?fuseaction=scormabt ♦ Advanced Distributed Learning (2004). ADL Releases Important SCORM 2004 2nd Edition Addendum. Retrieved January 7th, 2005 from http://www.adlnet.org/index.cfm?fuseaction=newsstory&newsid=190 ♦ Carnegie Mellon (2005). Learning Systems Architecture Lab – SCORM Best Practices for Content Developers. Retrieved January 7th, 2005 from http://www.lsal.cmu.edu/lisal/expertise/projects/developersguide/ ♦ Learning & Training Innovations (2003). E-learning solutions: create e-Learning content. Retrieved January 7th, 2005 from http://www.ltimagazine.com/ltimagazine/article/articleDetail.jsp?id=74900

2. Technical Specifications for Digital Content			
2.2.	Interoperability	Essential Information	Resources
2.2.2 (cont).			<ul style="list-style-type: none"> ♦ McGee, Patricia L. (2003). NLII Learning Object Glossary. Retrieved January 7th, 2005 from http://educ3.utsa.edu/pmcgee/nlii/glossary/ ♦ TechTarget (2000-2005). searchWebservices.com Whatis.com definitions Shareable Content Object Reference Model. Retrieved January 7th, 2005 from http://searchwebservices.techtarget.com/sDefinition/0%2C%2Csid26_gci796793%2C00.html
2.2.3.	<p>Video Streaming</p> <p>Video Streaming provides the delivery of video information in real time, with delivery starting before all data is received so that no hard drive space is needed for storage.</p>	<p>Content is delivered through several standard media protocols:</p> <ul style="list-style-type: none"> w RTP (Real-time Transport Protocol) w RTSP (Real-time Streaming Protocol) w SMIL (Synchronized Multimedia Integration Language). <p>Moving Picture Experts Group is “the family of standards used for coding audio-visual information (e.g., movies, video, music) in a digital compressed format” (MpegTV, 1998).</p>	<ul style="list-style-type: none"> ♦ Institute of Electrical and Electronics Engineers, Inc. (2005). Xplore – Video Streaming. Retrieved January 7th, 2005 from http://www.ieeexplore.ieee.org/iel5/49/28068/01254576.pdf ♦ MpegTV (1998). MPEG Starting Points and FAQs. Retrieved January 7th, 2005 from http://www.mpeg.org/MPEG/starting-points.html#mpeg4

2. Technical Specifications for Digital Content			
2.2.	Interoperability	Essential Information	Resources
2.2.4.	<p>Voice over Internet Protocol (VoIP)</p> <p>“VoIP allows you to make telephone calls using a computer network, over a data network like the Internet. VoIP converts the voice signal from your telephone into a digital signal that travels over the internet then converts it back at the other end so you can speak to anyone with a regular phone number” (FCC, 2004).</p>	<p>“VoiceXML is a programming language for building interactive voice applications. The VoiceXML language provides a clean and simple means for playing audio, recognizing speech and touch-tone (DTMF) input, and controlling a call flow.” (VoiceXML Forum, 2000-2004)</p>	<ul style="list-style-type: none"> ♦ Federal Communications Commission (2004). Voice over Internet Protocol. Retrieved January 7th, 2005 from http://www.fcc.gov/voip/ ♦ VoiceXML Forum (2000-2004). Resource Center. Retrieved January 7th, 2005 from http://www.voicexml.org/

2. Technical Specifications for Digital Content			
2.2.	Interoperability	Essential Information	Resources
2.2.5.	<p>Wireless</p> <p>A wireless internet connection does not require a physically wired computer network or system to operate, allowing an internet user greater flexibility and adaptability for access locations.</p>	<p>Wireless networking provides schools and classrooms with increased:</p> <p>“Mobility: Wireless networking allows users of laptops, notebooks, PDAs, tablet PCs and wireless Voice Over IP (VoIP) telephone devices to roam freely on campus while remaining connected to the school’s network.</p> <p>Flexibility: With frequently-changing needs, schools are often faced with the need to move classrooms, add “portables,” retrofit older buildings and reconfigure computer networks. With WLAN technology, it is possible to connect portables or older buildings that have hard-to-access walls and to change lab locations and classroom setups frequently and easily without the need for hard-wire drops.</p> <p>Savings: Eliminating the need to wire and rewire can result in a tremendous financial savings for schools. Space savings are possible as well, with wireless mobile labs frequently taking the place of the older, space-consuming hard-wired labs.</p> <p>Expandability: By adding on to existing networks – rather than replacing the wired with the wireless – districts expand their options without losing their initial investment in infrastructure.” (CoSN, 2004)</p>	<ul style="list-style-type: none"> ♦ CoSN (2004). A Guide to Wireless LANs in K-12 Schools. Retrieved January 7th, 2005 from http://www.cosn.org/resources/emerging_tech_nologies/wireless.cfm ♦ Institute of Electrical and Electronics Engineers, Inc. (2005). Wireless Standards Zone. Retrieved January 7th, 2005 from http://standards.ieee.org/wireless/

2. Technical Specifications for Digital Content			
2.3.	Meta-tagging	Essential Information	Resources
2.3.1.	<p>Meta-data is data about data or information about an object apart from the object itself.</p> <p>Meta-data provides controlled and structured descriptions for “resources” through searchable attributes such as title, author, date, location, description and subject.</p> <p>Meta-data is located separately from the resource it describes or is embedded within that resource.</p>	<p>Using meta-data allows eLearning developers and users to:</p> <ul style="list-style-type: none"> ◆ Organize information more effectively; ◆ Facilitates the discovery of relevant information; ◆ Document and track layers of rights and reproduction that exist for digital objects and their multiple versions; ◆ Document the authenticity of versions and provenance; and ◆ Promote interoperability. 	<p>Meta-data schemes:</p> <ul style="list-style-type: none"> ◆ CanCore (2004). CanCore Learning Resource Metadata Initiative http://www.cancore.ca/ ◆ Dublin Core http://www.dublincore.org/ ◆ The Gateway to Educational Materials (GEM) http://gemstar.ischool.washington.edu/ ◆ IMS Global Learning Consortium, Inc. http://www.imsglobal.org/ ◆ Institute of Electrical and Electronics Engineers, Inc. (2005). Learning Technology Standards Committee Webpage. Retrieved January 7th, 2005 from http://ltsc.ieee.org/ ◆ World Wide Web Consortium (2004). The Resource Description Framework (RDF). Retrieved January 7th, 2005 from http://www.w3.org/RDF/

2. Technical Specifications for Digital Content			
2.3.	Meta-tagging	Essential Information	Resources
2.3.1. (cont).			<p>Resources</p> <ul style="list-style-type: none"> ♦ Caplan, Priscilla. (1995). You Call It Corn, We Call It Syntax-Independent Metadata for Document-Like Objects. The <i>Public-Access Computer Systems Review</i> 6, no. 4 (1995). Retrieved January 7th, 2005 from http://info.lib.uh.edu/pr/v6/n4/capl6n4.html ♦ Hillman, Diane L. (2001). Why I Love Metadata (Why you should, too.). National Science Digital Library Project at Cornell. Retrieved January 7th, 2005 from http://www.lib.unb.ca/Texts/workshop/WhyILoveMetadata_files/frame.htm ♦ Wiley, David. (n.d.). Learning Objects: Difficulties and opportunities. Retrieved January 7th, 2005 from http://wiley.ed.usu.edu/docs/lo_do.pdf

2. Technical Specifications for Digital Content			
2.4.	Functional Requirements	Essential Information	Resources
2.4.1.	Functional Requirements comprise “the representation of a piece of content in a data system. This must include meta-data on the content, such as type information, and the location of digital content or the identification of physical content. The idea is that you should be able to search for and choose content without having seen the content itself, only the description of the content...Associating such a content description with a concept...” (Nilsson, 2000).	Functional Requirements are the foundation for “digital rights expression languages” (DREL). These languages are capable of expressing copyright and patent rights of developers and can be communicated among cooperating technologies. (IEEE LTSC DREL Requirements Subcommittee, 2002)	<ul style="list-style-type: none"> ◆ EEE LTSC DREL Requirements Subcommittee (2002). Towards a Digital Rights Expression Language Standard for Learning Technology. Retrieved January 7th, 2005 from http://ltsc.ieee.org/meeting/200212/doc/DREL_White_paper.doc ◆ IEEE LTSC DREL Requirements Subcommittee Report (2003). Analysis of Use Cases and Development of Functional Requirements October 10, 2003. Retrieved January 7th, 2005 from http://ltsc.ieee.org/wg4/files/DREL_Req_Analysis.doc ◆ Nilsson, Mikael (2000). The Conzilla Design: the definitive reference. Retrieved January 7th, 2005 from http://www.conzilla.org/doc/conzilla-design/x451.html ◆ Ya-ning Chen, Shu-jiun Chen, Hon-chung Sum, & Simon C. Lin (2003). Functional Requirements of Metadata System: From User Needs Perspective. Retrieved January 7th, 2005 from http://dc2003.ischool.washington.edu/Archive-03/

2. Technical Specifications for Digital Content			
2.5.	Security	Essential Information	Resources
2.5.1.	Security assures the protection of data and content of eLearning curriculum, as well as the learners themselves. Proper Security also prohibits inappropriate access to information.	<p>Three important legal requirements for eLearning security:</p> <ul style="list-style-type: none"> ♦ Child Internet Protection Act; ♦ Family Educational Rights and Privacy Act; and ♦ Children’s Online Privacy Protection Act. 	<ul style="list-style-type: none"> ♦ Children's Online Privacy Protection of 1998, COPPA. Retrieved January 7th, 2005 from http://www.ftc.gov/ogc/coppa1.htm ♦ CoSN (2004). Cyber Security Tools for the Digital School District. Retrieved January 7th, 2005 from http://www.cosn.org/about/press/092004.cfm ♦ US Department of Education (n.d.). Family Educational Rights and Privacy Act (FERPA). Retrieved January 7th, 2005 from http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html ♦ The Universal Service Administrative Company (2003). Child Internet Protection Act Requirements (Undertaking Actions). Retrieved January 7th, 2005 from http://www.sl.universalservice.org/reference/CIPA.asp

2. Technical Specifications for Digital Content			
02/06/05	Bandwidth	Essential Information	Resources
2.6.1	Bandwidth accounts for the amount of data passing through a connection over a given time. It is usually measured in bps (bits-per-second) or Mbps or Gbps. Access to high speed connectivity is fundamental to ensure an effective online learning experience.	The FCC regulates the electromagnetic spectrum and thus controls the bandwidth requirements for various applications. (Tom Sheldon's Linktionary.com, 2001).	<ul style="list-style-type: none"> ♦ Beitel, K. & Richmond, R. (n.d.). Guidelines for Connectivity: An Introduction to Installation of LANs and WANs for School-Based Decision-Makers. SSTA Research Centre Report #00-04. Retrieved January 7th, 2005 from http://www.ssta.sk.ca/research/technology/00-04.htm ♦ SchoolNet (2003). Update on the School Connectivity Report and Recommendations. Retrieved January 7th, 2005 from http://www.schoolnet.ca/snab/e/Agendas/AgendaNov23_2001/1_ConnectivityReport.pdf ♦ Tom Sheldon's Linktionary.com (2001). Bandwidth. Retrieved January 7th, 2005 from http://www.linktionary.com/b/bandwidth.html

2. Technical Specifications for Digital Content			
2.7.	Plug-ins	Essential Information	Resources
2.7.1.	Plug-ins are software programs that extend the capabilities of the browser in a specific way - giving one, for example, the ability to play audio samples or view video movies from within your browser.	Plug-in Categories: <ul style="list-style-type: none"> ◆ 3D & Animation ◆ Audio & Video ◆ Business & Utilities ◆ Image Viewers ◆ Presentations ◆ Search Plug-ins ◆ Plug-in Managers (Netscape, 2005)	<ul style="list-style-type: none"> ◆ Netscape Communications Corporation (2005). Netscape Browser Central, Browser Plug-ins. Retrieved January 7th, 2005 from http://channels.netscape.com/ns/browsers/pi_3d_and_animation.jsp ◆ Plugins.com http://plugins.com/

2. Technical Specifications for Digital Content			
2.8.	Accessibility	Essential Information	Resources
2.8.1.	Accessibility is the extent to which hardware, software, or information can be easily accessed by all users, regardless of physical disabilities, learning disabilities, or other user characteristics such as limited language proficiency.	<p>“To demonstrate that a product or Web service is in compliance with Section 508, the creator completes a Voluntary Product Accessibility Template (VPAT)—an "informational tool" that describes exactly how the product or service does or does not meet Section 508 standards. The completed VPAT gets posted on the creator's website to provide government officials and consumers with access to the information.” (TechTarget, 2000-2005)</p>	<ul style="list-style-type: none"> ♦ The Access Board (2005). Section 508 of the Rehabilitation Act. Retrieved January 7th, 2005 from http://www.access-board.gov/508.htm ♦ CAST (2004). National Instructional Materials Accessibility Standard Report – Version 1.0. Retrieved January 31st, 2005 from http://www.cast.org/ncac/NIMAS/ ♦ CAST (2004). National File Format Initiative at NCAC. Retrieved January 29, 2005 from http://www.cast.org/ncac/index.cfm?i=3138 ♦ Maryland State Department of Education (2002). Accessible Computer-Based Instructional Technology. Retrieved January 7th, 2005 from http://cte.jhu.edu/accessibility/ ♦ US Department of Education (n.d.). IDEA policy information. Retrieved January 7th, 2005 from http://www.ed.gov/about/offices/list/osers/osep/policy.html

2. Technical Specifications for Digital Content			
2.8.	Accessibility	Essential Information	Resources
2.8.1 (cont).			<ul style="list-style-type: none"> ♦ TechTarget (2000-2005). Searchcio.com Whatis.com definitions: Section 508. Retrieved January 7th, 2005 from http://searchcio.techtarget.com/sDefinition/0,,s_id19_gci914785,00.html ♦ Watchfire Corporation (2002-2005). Bobby. Retrieved January 7th, 2005 from http://bobby.watchfire.com/bobby/html/en/index.jsp ♦ World Wide Web Consortium (2005). Web Accessibility Initiative. Retrieved January 7th, 2005 from http://www.w3.org/WAI/ ♦ Web Accessibility in Mind. Retrieved January 27, 2005 from http://www.webaim.org/ ♦ Western Cooperative for Educational Telecommunications (WCET) (2005). Serving Student with Disabilities at a Distance. Retrieved January 27, 2005 from http://wcet.info/projects/laap/resources/st_w_disablts.asp#what

2. Technical Specifications for Digital Content			
2.9.	Style and Formats	Essential Information	Resources
2.9.1.	<p>Style can identify the creator of a form and may as well emphasize the function of the digital product (Schmid-Isler, 2000).</p> <p>Formats are the various ways in which information is stored. Hundreds of different file formats exist (Haigh, 1998).</p>	<p>Formats and styles usually fall within one of four categories:</p> <ul style="list-style-type: none"> ◆ Print ◆ Web/Interactive ◆ Video ◆ Person-to-Person Activities <p>(Enhancing Education, 2005)</p>	<ul style="list-style-type: none"> ◆ Enhancing Education (2005). Formats. Retrieved January 7th, 2005 from http://enhancinged.wgbh.org/formats/ ◆ Haigh, Susan (1998). A Glossary of Digital Library Standards, Protocols and Formats. Network Notes #54 ISSN 1201-4338 Information Technology Services National Library of Canada, May 6, 1998. Retrieved January 7th, 2005 from http://www.collectionscanada.ca/9/1/p1-253-e.html ◆ Schmid-Isler, Salome (2000). The Language of Digital Genres – a Semiotic Investigation of Style and Iconology on the World Wide Web. Proceedings of the 33rd Hawaii International Conference on System Sciences – 2000. Retrieved January 7th, 2005 from http://csdl.computer.org/comp/proceedings/hicss/2000/0493/03/04933012.pdf ◆ Lynch, Patrick & Horton, Sarah (2002). <i>Web Style Guide: Basic Design Principles for Creating Web Sites, 2nd Edition</i>. Retrieved January 27, 2005 http://www.webstyleguide.com/

Principles and Considerations for Digital Content: Technical Specifications for Development and Delivery

The 2003 NLI began the work presented in this tool by exploring important Standards and Quality aspects of Virtual Schools and Distance Learning. This effort helped technology directors and other consumers of eLearning recognize that with their shared input and directed action, digital content and eLearning courses could be developed to provide excellent and rigorous instruction for K-12 students. This effort also empowered the idea that educational technology stakeholders could share with and in the eLearning efforts of other states. While a number of legal issues and copyright problems must be worked out, this 2004 NLI tool carries forward the idea that states *and private industry can work together when developing and delivering digital content* whether it be in the creation of reusable learning objects, online courses, or entire virtual learning schools. This tool consists of two parts: guidelines for development and delivery of digital content and technical specifications for the creation of digital content.

The first part of this tool consists of important guidelines that eLearning curriculum designers must follow when creating K-12 digital content and courses. The Work Group relied heavily on current state guidelines for digital content and courses from Massachusetts, Maryland, and Texas. For further information on these state guidelines and others, please see the Curriculum Development State Examples. Although the actual content of these guidelines will vary by state and even by locality, all eLearning users and developers can refer to these guidelines, key questions, and resources as they develop and solicit eLearning curriculum. The Curriculum Development Work Group considered guidelines and principles for eLearning course content, instructional design criteria and student assessment methods to help technology directors ensure that all eLearning courses meet the highest standards for rigorous and excellent teaching and learning. Further areas for consideration should include the professional qualifications of eLearning teachers, principles for the proper administration, management and infrastructure of eLearning curriculum, and methods of eLearning curriculum evaluation.

The second part of this tool consists of important technical specifications that must be addressed in the development of digital content. In the words of a Curriculum Development Work Group member, the technical specifications are the “foundation upon which the content of eLearning curriculum can be built out.” Although these technical specifications are not required components nor are they a comprehensive list of technical standards, any developer of eLearning curriculum must account for these technical criteria to create the most flexible, cost effective, and individualized learning content available for use by the most possible consumers. This set of technical specifications is the foundation upon which digital content can function in multiple learning systems, can be reused for various learning contexts, and will allow for the development of searchable eLearning content and course repositories (Lim Kin Chew). This list is composed of three columns of information:

1. The first column contains a definition of each technical specification;
2. The second column contains essential information important for a complete understanding of each technical specification; and
3. The third column contains links to resources and readings for further elaboration and guidance for each technical specification.

The 2004 NLI Curriculum Development Work Group presents this tool as a first step in an evolving repository of guidelines and principles for technical specifications and the development and delivery of digital content. In the future, SETDA members and eLearning curriculum designers can refer to this living document for definitions, suggestions and examples of digital content specifications. This list of curriculum design principles and considerations is not a list of design standards; rather, the guidelines and principles herein should enable greater collaboration and sharing among developers and consumers of eLearning curriculum.

A Model to Apply or Judge eLearning Curriculum

This set of guidelines and resources identifies important criteria to evaluate and share eLearning curriculum content and courses. The Curriculum Development Work Group reviewed essential eLearning curriculum criteria from various states including Massachusetts, New York, Oregon and Texas, and a variety of professional organizations including the Southern Region Education Board (SREB) and the International Society for Technology in Education (ISTE). The 2004 NLI Curriculum Development Work Group discussed programs that states already had in place and their methods of digital curriculum evaluation. The work group presents a model selection tool for all consumers of eLearning curriculum to evaluate online courses and essential eLearning elements. Because each state and locale has different learning objectives and contextual constraints, the Curriculum Development Work Group recommends that eLearning stakeholders use this model course evaluation as a reference to create their own standards to evaluate the quality of online courses. Some course components and criteria provided here may not be applicable while others should be added. Similarly, point values and cut-offs for selection should be made by state and local eLearning stakeholders.

Online & Electronic Course Evaluation:

A Tool to Assist the Selection or Approval of Online and Electronic Courses

This evaluation has two parts: Phase I addresses critical components that should be present in a quality eLearning course. Phase II addresses the quality of components of the eLearning course. If the eLearning course in question does not exhibit all of the critical components in the Phase I review, the evaluation should progress to Phase II only after careful consideration.

Phase I: Critical Components of eLearning Courses

Critical Components	Present	Absent	Comments/Indicators (optional)
Course is developed based on national or state content standards for students.			
Each electronically delivered course results in learning comparable in rigor and breadth to learning in a traditionally delivered course.			
Technical requirements are established to ensure that students have acceptable access to the course.			
Minimum student technology competencies required to be successful in this course are listed.			
Fair, adequate methods and procedures to measure students' mastery of course content are used.			
Students receive timely and informative feedback about their progress, and interaction with instructor/facilitator.			
Information regarding the teacher's credentials is provided. This should include: <ul style="list-style-type: none"> • Licensing; • Academic background; • Technological skill; and • Evidence of training and/or experience in web-based courses. 			
IDEA and ADA accessibility requirements are addressed.			
A complete course syllabus is available for review.			
Security is addressed: <ul style="list-style-type: none"> • Student work, grades and course materials are secure from access by others. 			
The instructional design for the course includes student assessment.			
The course provides for both teacher and course evaluation and feedback.			

Critical Components	Present	Absent	Comments/Indicators (optional)
Technical assistance is available.			
Copyright compliance is addressed by source.			

Phase II: eLearning Course Quality

Course Criteria	Does Not Meet Expectations (0 point value)	Meets Expectations (1 point value)	Exceeds Expectations (2 point value)	Comments/Indicators (optional)
<u>Instructional Design</u>				
Clear and explicit alignment exists between objectives, assessments, instructional strategies, content and technology.				
The content of the course is aligned with local, state, and/or national standards.				
Course navigation is intuitive and appropriate for the content.				
Course is adaptable and flexible to meet the individual needs of the students and teachers.				
Appropriate tools and methods are used to foster collaboration and interaction between the instructor and students, and between the students.				
Instructional objectives are defined and measurable.				
<u>Content and Applicable Standards</u>				
The content of the course meets or exceeds the rigor, depth, and breadth of traditionally delivered courses, is accurate and up-to-date and fosters deeper understanding of the subject area.				
The content provides frequent and timely interactions between the students and the eLearning teacher, as well as interactions among the students.				

Course Criteria	Does Not Meet Expectations (0 point value)	Meets Expectations (1 point value)	Exceeds Expectations (2 point value)	Comments/Indicators (optional)
The learning environment and course materials are universally designed, making them accessible to diverse learners.				
The technology is easy to use, allowing learners to focus on the course content.				
Instructional design and course content is learner, background, and age appropriate.				
<p>The content of the course provides students with opportunities to improve learning skills using real world technological tools, including:</p> <ul style="list-style-type: none"> * Information and communication skills (information and media literacy and communication skills); * Thinking and problem-solving skills (critical thinking and systems thinking, problem identification, formulation and solution, creativity and intellectual curiosity); and * Interpersonal and self-directional skills (interpersonal and collaborative skills, self-direction, accountability and adaptability, social responsibility). 				
The course content utilizes the full potential of web-based and multimedia resources to facilitate and enhance learning				

Course Criteria	Does Not Meet Expectations (0 point value)	Meets Expectations (1 point value)	Exceeds Expectations (2 point value)	Comments/Indicators (optional)
The course content reflects real world situations that are relevant to the student and provide a broader perspective.				
<u>Evaluation and Assessment</u>				
Courses are evaluated on a regular basis to determine whether they are achieving their objectives. Improvements are made based on these evaluations.				
Teacher performance evaluation is conducted no less frequently than once a year.				
Student assessments are aligned with local, state, and national standards.				
The course provides ways to assess student participation and achievement of learning goals.				
Staffing and Qualifications				
The eLearning teacher is fully qualified in the content area being taught.				
The teacher has been trained and is skilled in eLearning pedagogy.				

Course Criteria	Does Not Meet Expectations (0 point value)	Meets Expectations (1 point value)	Exceeds Expectations (2 point value)	Comments/Indicators (optional)
The school designates an onsite coordinator, who manages technical and administrative issues and serves as the primary contact person between the school, the students, and the course provider.				
Management, Administration and Infrastructure				
The course provider has adequate services necessary to deliver the program of instruction.				
Student rights and responsibilities are recognized and upheld within the course structure.				
The course provider and eLearning teachers adhere to and communicate copyright, as well as other laws and guidelines, pertaining to the distribution and ethical use of all resources.				
School personnel, parents, and students are notified, in advance, of course requirements (including time and participation requirements), technical requirements and the skills needed to be successful in eLearning.				
The credit for the course is awarded by the local school district responsible for a specific student's education or other credit-granting institution				

Course Criteria	Does Not Meet Expectations (0 point value)	Meets Expectations (1 point value)	Exceeds Expectations (2 point value)	Comments/Indicators (optional)
Additional Criteria				

Points by Column:				Total Points:
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Resources and Additional State Examples:

- Andriole Stephen J. (1997). Requirements-Driven ALN Course Design, Development, Delivery & Evaluation. *JALN, Volume 1, Issue 2 - August 1997*. Retrieved January 7th, 2005 from http://www.sloan-c.org/publications/jaln/v1n2/v1n2_andriole.asp
- Berman, S.H. and Pape, E. (2001). A Consumer's Guide to Online Courses: What you need to know before allowing your students to enter virtual classrooms. *The School Administrator Web Edition, October, 2001*. Retrieved January 7th, 2005 from http://www.aasa.org/publications/sa/2001_10/berman.htm
- GreaterNET, Inc. & Missouri Distance Learning Association (September, 2002). Recommended standards, guidelines, and resources for K-12 two-way interactive television networks. Retrieved January 7th, 2005 from http://www.greaternet.org/html/resources/Documents/NET_White_Paper.pdf
- Hirsch, J. (2001). Sorting through Vendors: Before committing your dollars, consider quality of offerings, graduation credits, staff support and likely burdens. *The School Administrator Web Edition, October, 2001*. Retrieved January 7th, 2005 from http://www.aasa.org/publications/sa/2001_10/hirsch.htm
- Higher Education Program and Policy Council of the American Federation of Teachers (2000). Distance Education: Guidelines for Good Practice. Retrieved January 7th, 2005 from http://www.aft.org/higher_ed/downloadable/distance.pdf

- The Institute for Higher Education Policy (2000). Quality on the Line: Benchmarks for success in internet-based distance education. Retrieved on January 7th, 2005 from <http://www.nea.org/he/abouthe/Quality.pdf>
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- International Society for Technology in Education (2004). CARET – Questions Topic: Online Teaching and Learning. Retrieved January 7th, 2005 from <http://caret.iste.org/index.cfm?fuseaction=questions&topicID=4>
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- Massachusetts Department of Education (2002). Recommended criteria for evaluating instructional technology materials. Retrieved January 7th, 2005 from http://www.doe.mass.edu/edtech/standards/tech_mat.PDF
- Massachusetts Department of Education (2003). Massachusetts recommended criteria for distance learning courses. Retrieved on January 7th, 2005 from http://www.doe.mass.edu/edtech/news03/distance_learning.pdf
- Michigan Virtual University (2002). Standards for Online Quality Courses. Retrieved January 7th, 2005 from <http://standards.mivu.org/>
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- SETDA (2003). Virtual School and Distance Learning: Standards and Quality Guidelines. Retrieved January 7th, 2005 from <http://www.setda.org/Toolkit2003/vsdl/vsdl2.htm>
- SREB – Educational Technology Cooperative. (n.d.). SREB Essential Principles of Quality Checklist for Web Based Courses. Retrieved January 7th, 2005 from <http://www.sreb.org/programs/EdTech/pubs/PDF/EssentialQualitiesChecklist.asp>

Texas Education Agency (2003). Investigating Quality of Internet Courses (IQ) Project. Retrieved January 7th, 2005 from <http://www.iqstandards.info/default.htm>

Washington Education Department (n.d). First-Look: Evaluation Form for K-12 Online Products, developed by Debbie Tschirgi, ETSC Director at ESD 112. Retrieved January 7th, 2005 from http://www.k12.wa.us/EdTech/pubdocs/Eval_Form.doc

Washington Education Department (n.d.). Resources for evaluating online curriculum. Retrieved January 7th, 2005 from <http://www.k12.wa.us/EdTech/EvalOnline.aspx>

Wisconsin Department of Public Instruction (2001). Policy and Advisory 01.1: February, 2001 – Subject: Virtual Education – New Opportunities, New Challenges. Retrieved January 7th, 2005 from http://www.dpi.state.wi.us/dfm/pb/pdf/advis1_1.pdf

A Process for Creating Dissemination Models of eLearning Principles and Guidelines

The 2004 NLI Curriculum Work Group simulated a process that any state, district, or school technology director would undergo when creating dissemination models that can facilitate the distribution of eLearning principles and guidelines to creators and consumers. The Curriculum Development Work Group used a circular process that included facilitation and ongoing reflection of important resources to ensure quality input from all team members (Authentic Task Approach). The Work Group gave special focus and attention to developing web resources appropriate for SETDA members and related eLearning audiences, and a collection of resources to help those involved in the dissemination process of eLearning curriculum to provide an informative presentation. The Work Group developed a checklist that included other dissemination methods, but given time limitations and a desire to maximize efficiency, the Work Group chose to develop a web-based dissemination model. The intent of this document is to provide a process from which SETDA members and other eLearning stakeholders can choose to develop, refine and disseminate eLearning guidelines and principles.

The Curriculum Development Work Group created a three step process to encourage more thorough and more targeted dissemination methods of eLearning principles and guidelines. The process begins with the selection and consideration of critical dissemination questions. After exploring these critical questions, SETDA members or other eLearning stakeholders must decide which method of dissemination will meet their particular needs. A list of dissemination methods and critical eLearning components informs the second step of this process. Finally, the eLearning director can create a dissemination model that will reach a specific target audience with important eLearning principles and guidelines. The Work Group provides a sample eLearning website that state and local directors could use as a model for their own eLearning web-based dissemination activities.

A Process for Creating a Model eLearning Website

Step 1: Consideration of Critical Dissemination Questions

Step 2: Selection of an eLearning Dissemination Method and Critical Components

2.1 Dissemination Methods

2.2 Critical Components

Step 3: Development of an eLearning Dissemination Model: An eLearning Website

3.1 Target Audiences

3.2 Essential eLearning Elements

3.3 Additional eLearning Website Sections

Step 1: Consideration of Critical Dissemination Questions

- ◆ Who are the targeted audiences to which we would be disseminating?
- ◆ Who should be included in the development of the dissemination model itself?
- ◆ Do we need multiple versions of “the message”?
- ◆ What is the content of the message?
- ◆ What are the various formats of dissemination (e.g. CDs, web, brochures)?
- ◆ What are some exemplary dissemination models?
- ◆ What is the timeline for dissemination?
- ◆ What professional development should be performed on the guidelines and principles themselves—both while they are being marketed and after proposed dissemination activities (e.g. ISTE “unpacking the standards” activities to make sure people understand the standards well enough)?

Step 2: Selection of an eLearning Dissemination Method and Critical Components

2.1 Dissemination Methods

- ◆ Websites
- ◆ Compact discs
- ◆ Professional development kits (including PowerPoint templates)
- ◆ Learning communities such as eForums and Web Logs
- ◆ Brochures and Newsletters including online newsletters
- ◆ Presentations at conferences, forums and tradeshow
- ◆ Awareness efforts such as targeted press releases
- ◆ Games and simulations that encourage participant interaction

2.2 Critical Components that should be included in any eLearning Dissemination Method

- ◆ eLearning Curriculum Guidelines and Principles
- ◆ Essential Conditions for Successful eLearning
 - Leadership and Policies
 - Infrastructure and Technology
- ◆ eLearning Exemplars
- ◆ Return on Investment (ROI) Information
- ◆ Evaluation Information
 - Student Assessment
 - Program Evaluation
- ◆ Mission Statements
- ◆ eLearning Professional Development
- ◆ Timelines

Step 3: Development of an eLearning Dissemination Model: An eLearning Website	
3.1 eLearning Website Target Audiences	Subgroups
Teachers/K-12 Students	<ul style="list-style-type: none"> ◆ Elementary School ◆ Middle School ◆ High School ◆ Higher Education (Teacher Education programs)
Administrators	<ul style="list-style-type: none"> ◆ Federal ◆ State ◆ Regional ◆ Local
Non-traditional users	<ul style="list-style-type: none"> ◆ Charter schools ◆ Private Schools ◆ Home schools ◆ K-12 Custodial students (e.g. disciplinary problem or medically isolated students learning at home, incarcerated youth, hospital schools, migrant youth, alternative schools)
Community (K-12)	<ul style="list-style-type: none"> ◆ Parent-Teacher Organizations ◆ After-school programs ◆ Community organizations
Adult Education	<ul style="list-style-type: none"> ◆ Community sponsored ◆ Government Sponsored (e.g. Department of Labor training programs) ◆ Incarcerated adult students

Step 3: Development of an eLearning Dissemination Model: An eLearning Website	
3.2 Essential eLearning Website Elements	Resources, Examples and Criteria
Executive Summary	<ul style="list-style-type: none"> ◆ Columbia University (n.d.). Writing the Executive Summary. Retrieved January 7th, 2005 from http://www.columbia.edu/~ftg1/WRITING%20EXECUT.SUMMARY.html
Purpose Statement	<ul style="list-style-type: none"> ◆ Arkansas Department of Education Distance Learning Center (2005). Mission Statement. Retrieved January 7th, 2005 from http://dlc.k12.ar.us/pdf/DLCWeb_Info/Mission_Statement.pdf
eLearning Curriculum Guidelines	
Essential Conditions for eLearning – Infrastructure & Technology	
eLearning Professional Development	

Step 3: Development of an eLearning Dissemination Model: An eLearning Website

3.2 Essential eLearning Website Elements	Resources, Examples and Criteria
Exemplary Practices	<ul style="list-style-type: none">◆ Massachusetts Department of Education (n.d.). Technology Toolkit – Promising Practices in Massachusetts Schools. Retrieved January 7th, 2005 from http://www.doe.mass.edu/edtech/toolkit/practices/index.htm◆ Connecticut State Department of Education (2004). Educational Technology Best Practices. Retrieved January 7th, 2005 from http://www.state.ct.us/sde/dtl/technology/technology.htm◆ SETDA Connects (2003-2005). Resources of Virtual Schools/Distance Learning. Retrieved January 7th, 2005 from http://www.setdaconnects.org/content.cfm?sectionid=5◆ SETDA Connects (2003-2005). State Highlights. Retrieved January 7th, 2005 from http://www.setdaconnects.org/content.cfm?sectionid=4
3.2 Essential eLearning Website Elements	Resources, Examples and Criteria

Step 3: Development of an eLearning Dissemination Model: An eLearning Website

Return on Investment	<p>1. Improving Student Achievement</p> <ul style="list-style-type: none"> ◆ Research ◆ Exemplary Practices ◆ NCLB Compliant ◆ State Standard Compliant ◆ Richer curriculum ◆ Equitable student access to courses as needed
Return on Investment	<p>2. Cost Efficiency - Total Cost of Ownership</p> <ul style="list-style-type: none"> ◆ Initial Investment <ul style="list-style-type: none"> • Equipment • Connectivity • Staff development • Content costs ◆ Ongoing costs <ul style="list-style-type: none"> • Staff Development • Equipment maintenance • Connectivity • Ensure high teacher quality requirements ◆ Savings <ul style="list-style-type: none"> • Fulltime onsite teachers - Provide quality educational services for areas that are hard to staff • Savings in curriculum development • Meeting high quality course requirements including AP courses

Step 3: Development of an eLearning Dissemination Model: An eLearning Website

3.2 Essential eLearning Website Elements	Resources, Examples and Criteria
Return on Investment	<ul style="list-style-type: none">◆ Carr, Sarah (2001). Is anyone making money on distance education? Retrieved January 7th, 2005 from http://chronicle.com/free/v47/i23/23a04101.htm#ways ◆ Morgan, Brian (2000). Determining the Cost of Online Courses. Retrieved January 7th, 2005 from http://webpages.marshall.edu/~morgan16/onlinecosts/ ◆ Morgan, Brian (2000). Is Distance Learning Worth It? Helping to Determine the Costs of Online Courses. Retrieved January 7th, 2005 from http://www.marshall.edu/distance/distancelearning.pdf

Step 3: Development of an eLearning Dissemination Model: An eLearning Website	
3.2 Essential eLearning Website Elements	Resources, Examples and Criteria
eLearning Student Assessment	
eLearning Program Evaluation	
Implementation Timeline	<ul style="list-style-type: none"> ◆ Maryland State Department of Education (2002-2006). Resources – School Planning Part II: The Implementation Process-- Secondary Level Web-Based Learning. Retrieved January 7th, 2005 from http://mdk12online.org/7Reso/Design/2Implem.htm ◆ Technology Information Center for Administrative Leadership (2001-2004). Timeline for Suggested Activities. Retrieved January 7th, 2005 from http://www.portical.org/TimelineSuggestedActivities.doc

Step 3: Development of an eLearning Dissemination Model: An eLearning Website	
3.3 Additional eLearning Website Sections	Resources, Examples and Criteria
Acknowledgements	<ul style="list-style-type: none"> ◆ List all contributors to establish widespread participation, credibility, and expertise ◆ List explanation of the process used to create guidelines
Technical Considerations	<ul style="list-style-type: none"> ◆ Establish appropriate individual interfaces for subsets of users as appropriate—including personalized navigation buttons on front page ◆ Provide for quick download, yet attractive in appearance with options for low bandwidth ◆ Intuitive navigation ◆ Access Board Section 508/NIMAS Compliant ◆ Easily upgradeable ◆ Nonlinear design ◆ Multiple design mediums as appropriate ◆ Keep current as this will be a living document(s)
Feedback Section	<ul style="list-style-type: none"> ◆ Contributes to the evolution of this document by receiving submissions of exemplary practices from users ◆ Provides opportunity for testimonials from users ◆ Provides opportunity for complaints so that problems can be fixed ◆ Include feedback opportunities for all policymaker and user groups, including students

Step 3: Development of an eLearning Dissemination Model: An eLearning Website

3.3 Additional eLearning Website Sections	Resources, Examples and Criteria
Resources	<ul style="list-style-type: none"> ◆ Research studies ◆ Related websites ◆ Organizations ◆ Central clearinghouse for available online courses and online course teachers ◆ Gaming section if appropriate ◆ Training options
User Help	<ul style="list-style-type: none"> ◆ FAQ ◆ Glossary of terms ◆ E-mail/phone contacts as appropriate ◆ Keyword search feature <ul style="list-style-type: none"> • California Learning Resource Network (2003). Search the database of electronic learning resource reviews. Retrieved January 7th, 2005 from http://www.clrn.org/search/ ◆ User listserv or weblog establishes online community and support through threaded conversations and/or personal accounts of experiences <ul style="list-style-type: none"> • Schroeder, Ray (2003). Web Logs (Blogs): A primer and applications in education. Retrieved January 7th, 2005 from http://illinois.online.uillinois.edu/Pointers/2003_05/default.asp

Resources and Additional State Examples [including eLearning Principles and Guidelines & Judging eLearning Curriculum]

As the use of internet based courses and digital content becomes more prevalent in today's K-12 learning environment, State Technology Directors have a greater responsibility to support those teachers and policymakers choosing eLearning curriculum and developing virtual instruction. In the 2000-2001 school year, the Southern Regional Education Board presented the "Essential Principles of Quality: Guidelines for Web-based Courses for Middle Grades and High School Students" as a guide to help teachers and technology directors navigate through the wide ranging levels of rigor, excellence, and quality in internet based courses. Since this publication, some state technology departments have taken the lead in creating more locally relevant eLearning quality guidelines and principles for their constituencies. Here are some of those leaders:

- Maryland: Checklist for Evaluating Online Courses for Middle and High School Students
- Massachusetts: Recommended Criteria for Online High School Courses
- Massachusetts: Recommended Criteria for Evaluating Instructional Technology Materials
- Texas: Investigating Quality of Internet Courses (IQ) Project
- Wisconsin: Guidelines for Giving Credit for Virtual Courses on the Internet

Maryland: Checklist for Evaluating Online Courses for Middle and High School Students

The Maryland Virtual Learning Opportunities website provides a comprehensive list of resources so that local K-12 policymakers can make more informed decisions on eLearning for their students. As a part of this resource list for local school systems, the MVLO website offers a “Checklist for Evaluating Online Courses for Middle and High School Students.” This Checklist provides eLearning stakeholders with an essential tool to evaluate the quality of online courses. The MVLO checklist is divided into four sections:

Section A: Curriculum, Instructional Design, and Student Assessment;

Section B: Online Teacher Considerations;

Section C: Legal Considerations; and

Section D: Accessibility Requirements.

Maryland State Department of Education (2002-2006). Checklist for Evaluating Online Courses for Middle and High School Students.

Retrieved January 7th, 2005 from <http://mdk12online.org/7Reso/Qual/QChkEvCrs.pdf>

Massachusetts: Recommended Criteria for Online High School Courses

The Massachusetts Virtual Education Space website offers school administrators, teachers, students, and parents access to standards and guidelines by which they can make more informed decisions about the quality of distance learning courses. In November, 2003, the Massachusetts Department of Education offered the “Recommended Criteria for Distance Learning Courses” to local distance learning policymakers. This resource offers guidance for selecting high quality high school education courses, teacher professional development courses, and online educator preparation courses. Within this document the “Recommended Criteria for Online High School Courses” is divided into five sections for more specific evaluation of high school level eLearning curriculum:

Section I: Course Content and Implementation;

Section II: Staffing;

Section III: Online Learning Environment;

Section IV: Program Management and Administration; and

Section V: Evaluation.

Massachusetts Department of Education (2003). Recommended criteria for distance learning courses. Retrieved on January 5th, 2005 from

http://www.doe.mass.edu/edtech/news03/distance_learning.pdf

Massachusetts: Recommended Criteria for Evaluating Instructional Technology Materials

The Massachusetts VES also offers an important resource for district policymakers, teachers, students, and parents when selecting digital material to integrate into classroom teaching and learning environments. In April, 2003, the Massachusetts Department of Education offered eLearning stakeholders the “Recommended Criteria for Evaluating Instructional Technology Materials.” This checklist is divided into five sections that incorporate important criteria for eLearning content and courses:

- Section I: Academic Content;
- Section II: Materials Development or Usage;
- Section III: Instructional Features;
- Section IV: Product Specifications, Qualities, and/or Costs; and
- Section V: Vendor Supplemental Services.

Massachusetts Department of Education (2002). Recommended criteria for evaluating instructional technology materials. Retrieved January 7th, 2005 from http://www.doe.mass.edu/edtech/standards/tech_mat.PDF

Texas: Investigating Quality of Internet Courses (IQ) Project

In the fall of 2001, the Texas Education Agency began an investigation into the quality of online courses. The Investigating Quality of Internet Courses (IQ) Project was created to identify guidelines for internet courses that meet Texas standards for teaching and learning as well as to create a repository of online courses that meet these high standards. According to the TEA these guidelines were intended for use by school administrators, teachers, parents, and course providers so that all Texas students receive only the “highest quality Internet-based courses as part of their educational experience” (TEA, 2003).

The IQ Standards are divided into three major sections that investigate the quality of Course Components, the level of the Academic Support provided within the course, and the course’s Financial Components. The Course Component section is divided into seven eLearning relevant subcategories:

- Section A: Course Design;
- Section B: Course Content;
- Section C: Instructional Strategies and Activities;
- Section D: Learning Communities;
- Section E: Student Assessments;
- Section F: Technology Integration; and
- Section G: Course Effectiveness.

The IQ Standards Academic Support section is divided into four subcategories for further evaluation of a proposed eLearning course:

- Section A: Technical Support;
- Section B: Student/Parent Services;
- Section C: Administrative Reports; and
- Section D: Professional Development.

Finally, the IQ Standards Financial Components section is divided into four subcategories for a proposed eLearning course:

- Section A: Economics;
- Section B: Company Background;
- Section C: Intellectual Property; and
- Section D: Marketing.

Texas Education Agency (2003). Quality of Service Guidelines for Online Courses Evaluation Matrix developed by the Texas Investigating Quality of Online Courses (IQ) Project. It can be accessed through <http://www.iqstandards.info>

Washington: First-Look: Evaluation Form for K-12 Online Products

The Washington Education Department has developed a webpage to help eLearning stakeholders choose quality online products for student use. In order to facilitate the decisions made at the district and classroom levels, the WEA created a webpage with “Resources for Evaluating Online Curriculum.” This webpage contains a draft list of questions school personnel should consider when “assessing potential online curriculum offerings” (WEA, n.d.). The WEA also offers an evaluation matrix developed by Debbie Tschirgi that can be used as a “first-look” tool for evaluating K-12 online products. The “First-Look: Evaluation Form for K-12 Online Products” matrix is divided into seven subsections for further evaluation of eLearning materials:

- Section A: Student Populations Being Served;
- Section B: Instructional Design;
- Section C: Curriculum Content;
- Section D: Course Delivery;
- Section E: Evaluation and Assessment;
- Section F: Course Management; and
- Section G: School Readiness and Implementation Compatibility.

Washington Education Department (n.d). First-Look: Evaluation Form for K-12 Online Products, developed by Debbie Tschirgi, ETSC Director at ESD 112. Retrieved January 7th, 2005 from http://www.k12.wa.us/EdTech/pubdocs/Eval_Form.doc

Wisconsin: Guidelines for Giving Credit for Virtual Courses on the Internet

In February, 2001, the Wisconsin Department of Public Instruction issued a policy brief “to raise and support important issues related to virtual schools and to provide guidance to school districts considering the use of virtual education” (WDPI, 2001). This policy brief included a checklist that eLearning decision makers could use to fairly, appropriately, and effectively choose quality online courses for their students. The “Guidelines for Giving Credit for Virtual Courses on the Internet” includes eight subcategories for consideration by a district or school level eLearning director or teacher:

- Section A: Appropriateness of Course for Student;
- Section B: Consistency with District Considerations;
- Section C: Access to Courses;
- Section D: Vendor’s Credibility;
- Section E: Quality of Course Content;
- Section F: Supervision;
- Section G: Student Protection; and
- Section H: District Policy for Virtual Education.

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Next Steps

- Develop a repository of eLearning curriculum development principles, standards, and policies currently being used in states and other arenas that can facilitate and encourage local, state and national sharing;
- Create and share a list of barriers and possible solutions for sharing eLearning curriculum development content and courses;
- Disseminate a list of current technologies available and places to watch for emerging technologies in and for eLearning curriculum development and delivery;
- Continue to develop guidelines, essential information, and resources for the technical specifications for digital content;
- Develop guidelines, principles, and resources for the development and delivery of digital content especially within the areas of teacher professional qualifications, program evaluation, and the administration, management, and infrastructure of digital content, courses and virtual schools; and
- Facilitate virtual meetings for SETDA members to define and develop other eLearning dissemination models such as model professional development kits, model brochures, and model presentations.

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