Course Development Guidelines
Integrating Learning Theory and Practice

The National Repository of Online Courses, a project of the Monterey Institute for Technology and Education, has established a framework for organizing course development guidelines to help direct the continual improvement of online courses for High School, Advance Placement© and College. Our framework and guidelines combine research on how people learn with state-of-practice and our extensive experience in multimedia course development. We have synthesized the best work in the field into principles, organized in ten significant domains that make up effective online learning.

Our objective is to provide a comprehensive framework and set of guiding principles that encompass what is known about effective online education, that have the flexibility to evolve as the marketplace of technologies, collaboration, investment, and learner and teacher experiences shift. The Guidelines are designed to help bridge the gap between what research tells us about learning, and the current state of the online learning marketplace.

The long-term goal of National Repository of Online Courses is to create a robust digital library of online course content, providing the best learning experiences possible for any institution, instructor or student who wants to use online courses to enhance learning and teaching.

Our short-term goal is to disseminate the NROC guidelines to facilitate collaboration in the course development community, in order to navigate down a pathway of continual improvement in the quality, interoperability and availability of complete online courses.

With these objectives in mind, we invite thought leaders in online learning, guideline and course development, to review the NROC framework and guidelines, and provide feedback, suggestions, references and examples.

These current NROC guidelines focus on content development, and the learning and teaching experiences, rather than technical guidelines. NROC has developed a set of technical guidelines that are a companion document to these content guidelines. They are available from our web site at **http://montereyinstitute.org**.

The role of the instructor, that is, a subject matter expert facilitating the online learner's experience, is addressed in a subsequent document, as is the unique characteristics of a successful online learner. (*Available January 2005*)

Guidelines Overview

LEARNING THEORY FRAMEWORK

There are many approaches to defining learning theories, philosophies and best practices. The various philosophies of learning have tended to create silos and camps, inspiring debates over which is most effective or essential to learners' achievement. We have found it most productive for our purposes to take a "systems approach" to learning and teaching in which the theories and philosophies, with their relevant applications and data, are integrated and aligned into a unified framework of learning. NROC guidelines have therefore been designed within a broad framework and set of principles that assume *alignment and reinforcement between theories of learning – as elements of an ecosystem that require reinforcing relationships between elements to succeed as a whole.*
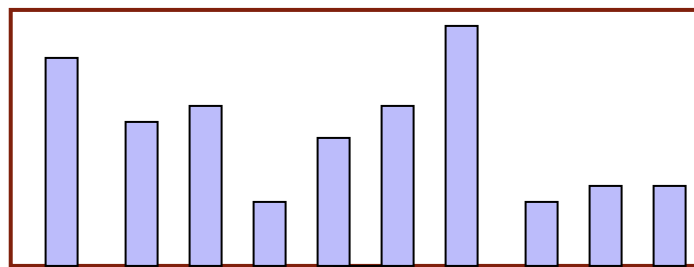
The NROC systems approach is an integration of learning theories focused around 4 major themes: learner centered, knowledge centered, assessment centered and community-centered approaches. (ref. *How People Learn*, The National Research Council). We have derived a list of some of the significant attributes under each approach to inform our guidelines. We are asserting that the best online learning experiences involve a mix of these attributes, and that they should reinforce and harmonize with one another. In our model, the application of these theories assumes the presence of an instructor facilitator for the most effective results.

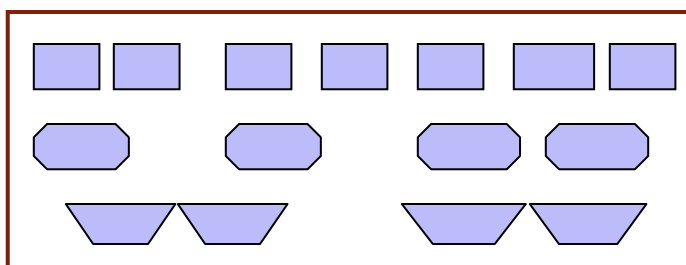| Learner Centered	Knowledge Centered
o multiple learning styles	o subject expertise
o metacognition	o concepts, principles
o feedback	o subject pedagogy
o interaction	o structure, scaffolding
o relevance	o applied, connected
Assessment Centered	**Community Centered**
o multiple types	o social context
o understanding	o cultural context
o concepts, principles	o real world connection
o problem solving	o relevance
o transfer	o interaction

DASHBOARD

The second feature of the NROC guidelines involves a "Dashboard" for each course that goes into the library. The Dashboard provides a snapshot of the courses features, as they related to the guidelines, thus providing administrators and instructors a way to see the whole feature set of a course, and how far it goes towards an ideal execution and integration of the guidelines. It also provides parameters to the instructor for use in customizing the course to suit his or her teaching style, and most effectively meet the needs of students.
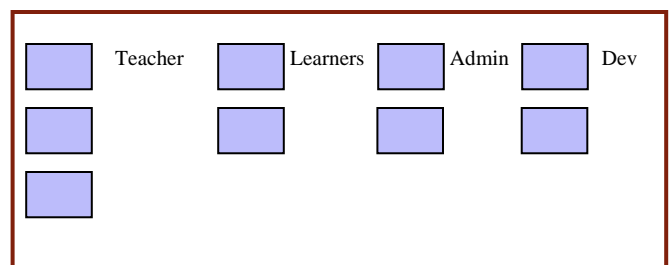
The Dashboard is thus intended to be a means of "navigating" towards a better full featured course experience, and can be used to systematically improve a course by developers and instructors as needs, time and investments allow. The three panels of the Dashboard include 1) a course rating with the ten guideline domains, 2) a content and features map that is a visual guide to the topic coverage, assignments and assessments contained in the course, and 3) optional support resources that accompany the course to enhance the instructor and student experience. Thumbnails of the visual schemes are presented below. Details of each panel follow in this document.

Significant Domains

We have defined ten significant domains, or dimensions, within which principles for effective development and execution of online courses are organized. These domains were chosen by synthesizing the literature on learning theories, current practices and experiences, and vetting them with the real world issues of current available standard technologies, how education is managed and delivered, the experiences of teachers, and expectations of learners. These ten domains include the following.

1. **Technology**
2. **Content**
3. **Media**
4. **Design**
5. **Pedagogy**
6. **Interaction**
7. **Assignments**
8. **Assessments**
9. **Access**
10. **Support**

The domain principles and rating rubric for each is covered in detail later in this paper (pp 8-13).

Guideline Principles

The principles for each guideline were derived by applying the four theories to learning wherever appropriate, and aligning the current research and data relevant in each domain. We use the concept of "principles" here because the detailed applications, examples and data will change and continually improve as this field matures, but the guiding principles should stay fairly stable. We hope the principles are comprehensive enough to provide significant guidance for online course developers, yet flexible enough to hold the best current best thinking, and the future growth in research and practice. (See Course Guidelines pp 8-13). For each of these guidelines, there are consequences for the instructor's and student's changing roles.

Course Rating

Determining a clear, simple, yet rigorous ratings rubric is always a challenge. As we derived the significant dimensions and their principles, it became clear that a simple scheme of rating courses as "inadequate, adequate, good, and excellent," or "bronze, silver and gold" did not capture the complexity and potential mix of the current practices nor the promise of the NROC guidelines. So we have chosen to give a rating of 1-4 across each of the ten domains, based on their use of the guiding principles. In this way, there is flexibility in the rating system, which provides administrators and instructors options to choose the profile of course they believe appropriate for their school and students, as well as provide ideas for where instructors may want to customize the course for their students.

References

A table of references is attached (pp 19-21). These are the papers, articles, and books that most influenced the derivation of the NROC guidelines. Dozens of other sources informed

our thinking, including the Monterey Institutes for Technology and Education (MITE) team's decades of combined experience in multimedia education development. We are currently "dissecting" articles and papers about online learning to create a database organized by domain and principles. We welcome all recommendations, and hope to find a means of sharing the building of the database with the NROC developer community in the future. Our primers on teaching and learning online are due out in January 2006 and also contain numerous references to current literature on these topics, as they relate to the NROC guidelines.

Examples

You can view examples of our principles applied to a set of courses that make up the first generation of NROC courses. These courses were first developed by The University of California's College Prep program, and were subsequently revised by MITE for inclusion in the National Repository of Online Courses. These courses are now available for barter and licensing. To view samples online, go to http://montereyinstitute.org/courses.

CONTENT MAP

The idea behind the Content and Features Map is to provide a visualization of what makes up the course content, assignments and assessments. Because online courses are all "bits and bytes," it is often difficult to see what you will be encountering. We are all familiar with looking at a textbook to see how many pages it has and picking it up to see what it weighs! A classroom experience is measured by seat time. But an online course is in many ways a "black hole," where you don't know the pathways and dimensions for proceeding through the course as either an instructor or student. The content map is a means to see the "whole" and to be able to drill down into more details. (See example p. 14-17.)

OPTIONAL RESOURCES

And then there are all the other supportive resources that enhance online teaching and learning experiences, and the administration and development of online courses. NROC is committed to providing a variety of support documents and links, primarily for students and instructors, in addition to administrators and developers. These documents and links will include additional content, such as links to career profiles and additional resources on online instruction and learning.

Learning and teaching support also includes such things as how to learn online, how to understand and use your learning style and skills to your advantage, how to effectively create and participate in online discussions and virtual group projects. We hope to continually collect good tips, examples and references from instructors using the NROC courses. Some of these resources will be available with each course, others will be hosted an NROC community web site and published in primers for instructors and students. (See below, p. 18.)

The following pages provide details and examples for each of the topics introduced above.

NROC
Integrated Learning Theory Approach

Learner Centered
- multiple learning styles
- metacognition
- feedback
- interaction
- relevance

Knowledge Centered
- subject expertise
- concepts, principles
- subject pedagogy
- structure, scaffolding
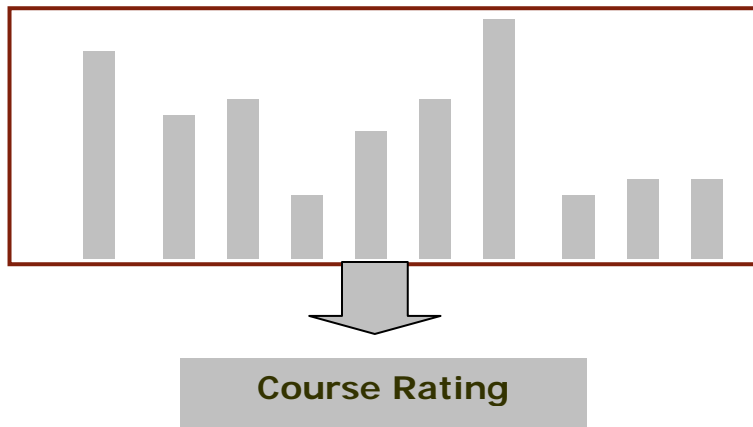- applied, connected

Assessment Centered
- multiple types
- understanding
- concepts, principles
- problem solving
- transfer

Community Centered
- social context
- cultural context
- real world connection
- relevance
- interaction

NROC GUIDELINES

(Each bar linked to a set of guiding principles and rating rubric)

MODEL

ESSENTIAL DOMAIN:

Description: role of element in learning experience.

Principles: quality guidelines for effective use of element.

Rating: (1-4) score for assessing element.

TECHNOLOGY

Description: technology environment and tools proving student and instructor access to online course content and experience.

Principles: Uses standard technologies, bug free, runs perfectly. Interoperable with common learning management systems. Provides interaction options between learner's content, peers, teacher, external information and examples. Clean navigational structure, pathways, organizational hierarchy and feedback functionality.

Rating: (1-4) 4 Interoperable, full featured, 3: Missing major feature, 2: Limited interoperability and limited features, 1: Does not take advantage of CMS interaction features/lacks good structure, and or limited in features, hard to use.

CONTENT

Description: Breadth, depth, approach appropriate for course level and subject coverage.

Principles: Clear presentation of major principles, concepts, framework and thinking processes of subject. Incorporates real world examples, applications, additional sources and a variety of information types. Learning objectives reflect building knowledge, critical thinking, and transfer. Content organized in units with topics and subtopics. Transparent content framework that shows learning chunks, subject structure and associated activities. Coverage maps to depth and breadth of generally accepted standards for target course (such as established by AP guidelines & textbook contents). Includes current, socially and culturally relevant context and connections. Writing tone, level and style clear, informal and accessible to learners.

Rating: (1-4) 4: Complete course content online, 3: Majority of course content, linked supplemental content, 2: Areas of weak coverage, 1: Textbook dependent more than 1/2 content.

MEDIA

Description: use of multiple media types to present content, provide activities and interactions.

Principles: Multi-modal media used to help present, and work with, key concepts, examples, applications. Provide for varied learning style and skill approaches: text, graphics, photos, animation, simulation, video, audio as appropriate for conveying subject. Engaging, motivating. Coherent arrangement of media types designed to link to and reinforce each other. Learner navigation and controls available and consistent.

Rating: (1-4) 4: Good design and pedagogical use of 4+ media types, 3: Good pedagogical use of 3 or fewer media types, 2: Weak use of media, 1: Limited media, and/or poor use.

DESIGN

Description: Overall course construction, content presentation, navigation, use of visual elements, technical features.

Principles: Course navigation is intuitive, provides logical and varied paths through material. Helps to reveal context and connections of topics. Well-used mix of media for content presentation to scaffold new understanding, different learning modes and perspectives. Elements proportional, harmonious, uncluttered and restrained. Control of navigation and media consistent, clear and available to learner.

Rating: (1-4) 4: Well executed instructional, information, and media design, 3: Design weakness can be augmented by customization, 2. Contains design flaws/does not enhance experience, 1: Design hampers learner experience.

PEDAGOGY

Description: Application of universal and subject specific learning theories that enable effective learning and teacher.

Principles: Integration and alignment of 1) learner, 2) knowledge, 3) assessment and 4) community centered pedagogical approaches. Incorporation of subject specific pedagogy, when relevant to teaching and learning subject. Encourage learner metacognition – reflection on learning process and progress. Learner as driver, teacher as facilitator, guide, mentor. Multiple interaction types, safe and encouraging environment. Experience designed for learning subject framework and thinking processes.

Rating: (1-4) 4: Multiple approaches integrated and aligned to provide rich learning and teaching environment, 3: At least three well executed pedagogical approaches, 2: Lacking learner and community centered approaches, 1: Lacks coherent pedagogical approach.

INTERACTION

Description: Interaction types to include learners with content, other learners, teacher and outside experts/information through use of technology, course design and activities.

Principles: Interactions integrated throughout, providing multiple opportunities to construct meaning, reflect, examine assumptions, critique, question, and transfer knowledge, initially using own language, scaffolding to use of subject language and thought processes while advancing. Learning community of social interactions between peers, with teacher, (most motivational learning environment, best opportunities to

construct understanding). Students and teachers create activities using communication tools. Performance expectations, and instructor presence and availability explicit.

Rating: (1-4) 4: Learning activities provide multiple opportunities for reflection and critical thinking expressed in interactions with content, peers, instructor and external examples, flexible, adaptable by instructor 3: Some strong use of learner centered interactions with peers and instructor, 2: Weak opportunities for learner centered interactions, 1: No use of social interaction in learning activities or assessments.

ASSIGNMENTS

Description: A variety of activities provided for students to interact with, use, apply, reflect upon, and build content.

Principles: Active learning opportunities with varied assignments consistent with content presentation, learning objectives, and assessment. Provide motivation, encouragement and empowerment to work with content. Relevant and accurate. Clear instructions. Appropriate to course level and subject. Provide opportunities for practice, building conceptual frameworks, knowledge, critical thinking, reflection, understanding, transfer and exploring alternative approaches and perspectives. Different learning styles and skills required, using mixed media and communication tools. Expectations transparent to learners. Collaborative assignments available for peer teaching and assessment. Adaptable by learner and instructor.

Rating: (1-4) 4: Rich and varied use of individual and group activities to build subject framework, enhance practice and critical thinking, transfer, expression and reflection on learning process, 3: Individual and group modes for practice, application and critical thinking, 2: Requires enhancement of activities for learner centered experience, 1: Lacks assignments requiring reflecting on learning process, critical thinking and learner expression of content.

ASSESSMENT

Description: A variety of assessment types providing sufficient testing and feedback throughout the course to show knowledge acquisition, application and transfer.

Principles: Assessment strategies varied and consistent with content presentation, learning objectives and activities. Formative and summative. Relevant and accurate. Clear instructions. Feedback from quizzes and problems provided to learner throughout course to enable self-monitoring of progress. Appropriate to course level and subject. Show critical thinking, reflection, connections, understanding and transfer. Expectations and grading rubric transparent to learners.

Rating: (1-4) 4: Varied, well spaced assessment strategies, multiple learning, styles, immediate feedback on learning process and progress reflects mastery of learning objectives, 3: Varied strategies, sufficient feedback, mapped to learning objectives, 2: Limited assessment options, need supplementing to be effective, 1: Lacks sufficient assessment to measure progress towards learning objectives.

ACCESS

Description: Ability of students with some learning challenges to access content, including through alternative presentation methods and supports

Principles: Acknowledgement of need. Effort made for access to special needs learners. Alternatives to auditory and visual content are available. Consideration for navigation by motor challenged. Color conveying meaning is available without color.

Rating: (1-4) 4: Rich content and learning experience supplemented by alternative, parallel content mode accessible to auditory, visually, or motor challenged, 3: Content presentation accessible to visually *or* auditory *or* motor challenged 2: Some content not available, but can be supplemented, 1: Of limited value to learning challenged.
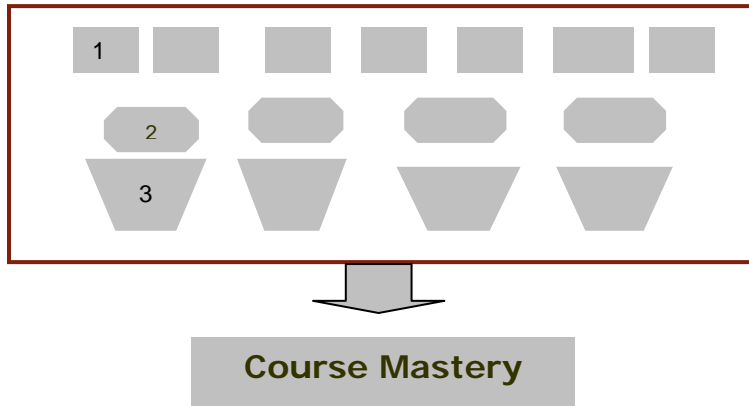
SUPPORT

Description: Information provided to learners and teachers to most effectively use, facilitate, support, and design the online course experience.

Principles: **Student.** Orientation to course and online learning, introduction to course structure, guide to "experiencing the subject," complete syllabus, participation expectations, assignments, grading policy, skills required, prerequisites. How to succeed online and work with peers links to outside resources. **Teacher**. Guidelines for how to teach online, create and guide collaborative learning activities, group projects, peer-to-peer interactions and customize available online resources to best meet student needs. How to create a safe and encouraging experience, facilitate and guide students to construct, control and share their learning experiences. Complete instructors' manual with assignment and assessment suggestions. How to assess discussions and group projects. Link to tips and examples.

Rating: (1-4) 4: Complete set of learner and teacher support guidelines, orientation, examples and external resources for successful online learning and teaching experience, 3: Essential learner and teacher support materials: orientation and guidelines for interaction, 2: Support material needs supplementing, 1: insufficient support material for learning or teaching orientation and guidance on how to succeed in an online course environment.

CONTENT MAP

(Each block linked to text details. Example below.)

Example: US History

1. Lesson Presentations

Unit 1: **Exploration and Colonial America**

Chapter 1: Discovery and Settlement of the New World, 1400 – 1500
- o Lesson 1: The First Americans
- o Lesson 2: Europe and the Impulse for Exploration
- o Lesson 3: Spanish and French Exploration

Chapter 2: English Colonies, 1600 – 1650
- o Lesson 4: The First English Settlements
- o Lesson 5: The Northern Colonies
- o Lesson 6: The Middle, Chesapeake, and Southern Colonies

2. Activities

READINGS

Chapter 1 Required Readings:
- o *The American Pageant*, Chapter 1

Chapter 2 Required Readings:
- o *The American Pageant*, Chapters 2-3

ASSIGNMENTS

- Essay Question – (2002, Part B, page 7, question #2,
  http://apcentral.collegeboard.com/repository/ushist_frq_02_10359.pdf
  Compare the ways in which religion shaped the development of colonial society (to 1740) in TWO of the following regions:
  New England
  Chesapeake
  Middle Atlantic
- Chapter 1 Map – refer to Appendix D
- Chapter 2 Map – refer to Appendix D
- Chapter 1 Writing Assignment – refer to Appendix A
- Chapter 2 Writing Assignment – refer to Appendix A

DISCUSSION QUESTION(S)

See Appendix B for detailed Discussion Points and Redirect Questions

- Chapter 1: How did political, economic, and technological developments in Europe between the sixteenth and seventeenth centuries influence exploration and eventual conquest of the New World? Compare and contrast how the European and New World cultures influenced one another.

- Chapter 2: Why did the English migrate to the New World?

ADDITIONAL READING (optional)

Chapter 1 Additional Reading
Lies My Teacher Told Me, by Loewen
  o Introduction: Something Has Gone Very Wrong
  o Chapter 2: 1493: The True Importance of Christopher Columbus
A People's History, by Howard Zinn
  o Chapter 1: Columbus, the Indians, and Human Progress
After the Fact, by Davidson and Lytle
  o Prologue: The Strange Death of Silas Deane
     Taking Sides, Volume 1, by Madaras and SoRelle
  o Part 1, Issue 2: Was Columbus in Imperialist?
Chapter 2 Additional Readings:
Lies My Teacher Told Me, by Loewen
  o Chapter 3: The Truth about the First Thanksgiving
After the Fact, by Davidson and Lytle
  o Chapter 1: Serving Time in Virginia

3. Assessments

ASSESSMENTS
- Chapter 1 Multiple Choice Exam – refer to Appendix F
- Chapter 2 Multiple Choice Exam – refer to Appendix F

Assessment Options: Additional Activities

KEY TERMS
As students complete each week, they should keep note cards that highlight the key terms from that week. You can provide them with a few to get them started (see below), and then ask them to identify others that are important to know. Each note card should contain the key term on the front and then a definition of that key term and its historical significance on the back. These will be due on the day of the Chapter Assessment.

Chapter 1
1. Christopher Columbus
2. Conquistadors
3. Jacque Cartier
4. Samuel de Champlain
5. Hernan Cortés
6. Encomienda
7. Treaty of Tordesillas
8. Mayas, Incas, Aztecs
9. Marco Polo
10. Balboa

Chapter 2
1. John Smith
2. House of Burgesses
3. Roger Williams
4. Puritan
5. Mayflower Compact
6. Anne Hutchinson
7. Jamestown, Virginia
8. John Rolfe
9. Massachusetts Bay Colony
10. John Winthrop
11. Antinomianism
12. Separatists

TIMELINE
Have students construct a formal timeline of each chapter as they study that includes dates, people, events, acts, etc. Tell them not to use the timeline given at the end of the chapter in the book, but to construct their own timeline according to their own study habits. This will be due on the day of the Chapter Assessment.

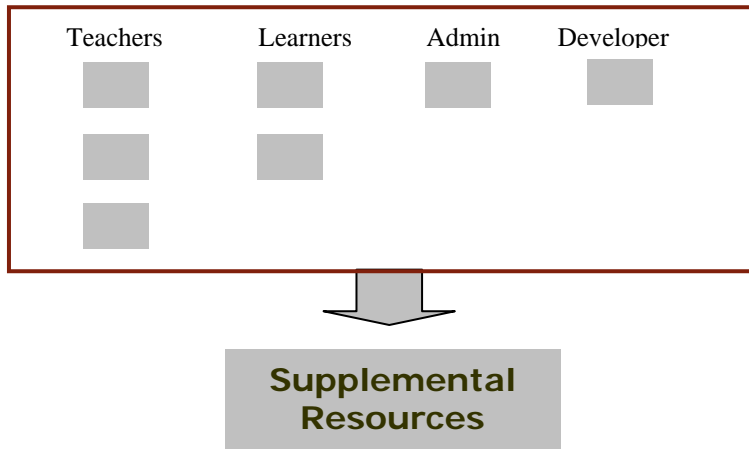## LINKS: for use in group projects, research, writing assignments

Chapter 1: Discovery and Settlement of the New World

- **http://www.nypl.org/research/chss/grd/resguides/columbus/index.html** -- New York Public Library: Christopher Columbus and Early European Exploration
- **http://www.nmai.si.edu/** National Museum of the American Indian
- **http://www.pbs.org/conquistadors/index.html** -- PBS: Conquistadors
- **http://www.mnh.si.edu/exhibits/vikings/home.html** -- National Museum of Natural History: Viking Exploration
- **http://www.mymission.org/** -- California Missions

Chapter 2: English Colonies

- *http://www.nps.gov/fora/roanokerev.htm* -- National Park Service, Heritage Education Program: Fort Raleigh National Historic Site, Roanoke Revisited
- **http://www.apva.org/jr.html** -- American Preservation of Virginia: Jamestown Rediscovery
- **http://www.history.org/** -- Colonial Williamsburg Foundation: Colonial Williamsburg
- **http://lcweb.loc.gov/exhibits/religion/** -- Library of Congress: Religion and the Founding of the American Republic
- **http://www.pilgrimhall.org/** -- Pilgrim Hall Museum
- **http://www.pbs.org/wgbh/amex/kids/civilrights/features_hutchison.html** -- PBS, American Experience: The Trial of Anne Hutchinson
- **http://lcweb.loc.gov/exhibits/religion/** -- Library of Congress: Religion and the Founding of the American Republic
- **http://www.learner.org/biographyofamerica/prog02/index.html** -- Annenberg/CPB, Biography of America: English Settlement

OPTIONAL SUPPORT

Teachers	Learners	Admin	Developer

Supplemental Resources

Teacher
- **Instructors Manual**
- **Examples and guidelines for activities**
- **Guidelines for assessing types of activities**
- **How to teach online:**
    - **Links to resources for teaching online**
    - **Links to subject resource sites**

Student
- **Orientation**
- **Syllabus**
- **How to succeed online**
- **How to communication and collaborate online**
- **Links to help for learning online**
- **Links to assess learning style**
- **Links to additional subject sites**

Administrator
- **Dashboard**
- **Guidelines**
- *Under consideration*

Developer
- **Developer guidelines**
- *Under consideration*

GUIDELINE SOURCE REFERENCES

Advancing the Boundaries of Higher Education in Arizona Using the World Wide Web, Maryanne Fox & Paul Helford Northern, Office for Teaching and Learning Effectiveness, Arizona University, 1999

An Introduction to Quality Matters: Inter-Institutional Quality Assurance in Online Learning, a project of MarylandOnline, and the Fund for the Improvement of Postsecondary Education (FIPSE), Web: www.QualityMatters.org

Best Online Instructional Practices: Report of Phase I Ongoing Study, Morris T. Keeton Senior Scholar University of Maryland University College, JALN Volume 8, Issues 2 - April 2004, p 75

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Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy, Utah State University, Digital Learning Environments Research Group, The Edumetrics Institute, Emma Eccles Jones Education 227

Criteria for Evaluating the Quality of Online Courses, Clayton R. Wright, wrightc@macewan.ca, Instructional Media and Design, Grant MacEwan College, Edmonton, Alberta T5J 4S2

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