Research Literature and Standards Sets Support for Quality Matters Review Standards

as of 12/5/05

NOTE: This research matrix attaches to the FY 05/06 Quality Matters™ Rubric.

Introduction

The purpose of this document is to provide supporting references from the distance education literature and among commonly accepted standards for the review standards used in the Quality Matters (QM) rubric and course review process. Most of the references in this compilation are based on empirical studies; however, a number of conceptual studies by recognized distance educators are included. (See Appendix 1 for a complete list of references.) In many cases the research support is relatively indirect. While the QM rubric focuses primarily on the quality of course design, much of the current research focuses on course delivery rather than course design.

The QM project views support from the research literature as highly important for informing the continuous improvement process and for justifying changes made to effect improvements. It is hoped that compiling the available research literature as it relates to the QM rubric will have the following beneficial effects:

- Identify 'gaps' where research support is lacking or insufficient for general or specific review standards;
- Suggest promising areas of research where additional empirical or conceptual support would improve the QM rubric and process specifically and advance the field in general;
- Uncover new areas or promising directions based on current research trends.

On the last point, the narrative of this document also indicates certain directions in which it would be useful for the QM rubric to evolve. We view this document as the next step of a work in progress and hope that it will serve as a departure point for other interested researchers and practitioners to share with us additional literature which might have been missed.

Appendix 2 lists the standards sets which have been mapped to specific review standards in the QM rubric. Some of them are a set of general principles and thus are very broad, while others are a listing of more specific practices and protocols. Appendix 2 also lists the abbreviations used to reference these to the QM specific review standards.

It is important to note that the QM course review process is at heart faculty-driven. The rubric and process are founded on the belief that peer course reviews should keep faculty at the center of the process. The QM process is an interactive approach of current teaching-learning practices, best practices standards, and research/conceptual literature guiding the review of a specific online course by peer/faculty.

It is our sincere hope that those using the QM rubric will resist the temptation to use it as a simple behavioral checklist and instead use it as a launching pad to constructivist peer discussion leading to course improvement for the specific course under review. This mirrors what much of the distance education literature suggests as the direction offered by the interactivity available with today's communication technologies (Saba, 2005).

John Sener, QM Project Evaluator, Sener Learning Services
Kay Shattuck, D.Ed., Director of Distance Learning, Carroll Community College

I. COURSE OVERVIEW AND INTRODUCTION

General Review Standard: The overall design of the course, navigational information, as well as course, instructor and student information are made transparent to the student at the beginning of the course.

Literature Support for the General Review Standard:

- Gunawardena & Zittle (1997) identified social presence ["The degree to which a person is perceived as a 'real person' in mediated communication" (p.9)] and reported correlation between perceptions of interaction and quality/quantity of learning.
- Anderson, Garrison, & Archer (2001) noted that social presence (the ability of learners to project themselves socially and affectively into a community) was shown to strongly predict learner satisfaction in online education and challenges the widely held assumption that face-to-face, non-verbal behaviors are necessary for establishing student and teacher rapport
- Roblyer & Ekhaml (2000); Roblyer & Wiencke (2003) included student self-introductions and evidence of instructor engagement at a basic level for building social rapport within distance learning designs.
- Williams (2000) identified thirteen roles and thirty general competencies necessary for quality distance education in higher education. Instructional competencies were found central to all roles including student support roles. Interpersonal and communication skills dominated the top of the general competencies.
- A literature review by Janicki and Liegle (2001) showed that course navigation was one of ten effective web-based design concepts that appeared repeatedly in the research literature.
- Swan (2001) cited clear and consistent course structure as one of three factors which "contribute significantly to the success of asynchronous online courses."
- Muirhead (2001) outlined the importance of a well-written syllabus.
- Youngblood, Trede, & DeCorpo (2001) identified a number of essential tasks for an effective teacher including welcoming students and clarifying expectations for contributing online
- Conrad (2002) found that learners judge instructors based on how clearly and completely online course materials present the details of the course. A well-organized course with a clear overview and introduction including a clear statement of expectations, explanation of the course outline, clear timelines, and well-written course notes helped learners feel that they were getting off to a good start in their course.
- Sims, Dobbs, & Hand (2002) pointed out the importance of students' prior experience therefore in online learning "learners must have the requisite skills to work effectively within this paradigm" and that "designers must spend more effort ensuring that learners are integrated into a narrative sequence of the learning process [that is necessary to achieve] engagement with the content through the interface" (p. 141). Additionally, they pointed out the connection between the "interface design" and "the different ways in which teachers and learners will communicate with each other and the course resources" (pp. 142-143). And although many students have excellent computer skills, it is their adaptation to the demands of online learning – independence, collaboration, peer work – that will have significant impact (p. 145).
- Hannafin et al (2003) suggested cognitive factors affecting success in distance learning: prior knowledge; metacognition; system knowledge and prior experiences; self-efficacy; learning styles; and motivation. Factors influencing learning include learning context, opportunities for active learning, resources, tools, and scaffolds.
- Shirathuddin, Hassan, & Landoni's (2003) critically reviewed four well-known guidelines for design usability in their pursuit for promoting content delivery in higher education courses. They identified seven factors of usability that should be considered: screen layout or appearance (information should be easy to find and effective); consistency (for example, navigation and page structure); accessibility ("Having good design and useful content are inadequate without considering the accessibility factors" (p. 122)); good navigation; media use to enhance information presentation; interactivity (for example feedback and searching for information); and useful and relevant content with depth and breadth.

Literature Support for Specific Review Standards:

Specific Review Standard (Pt. Value)	*Research Lit. Support*	*Standards Sets Support*
I.1 Navigational instructions make the organization of the course easy to understand. (3)	Janicki and Liegle (2001); Swan (2001); Shirathuddin, Hassan, & Landoni (2003)	SREB CEOC CC
I.2 There is a statement introducing the student to the course and to how student learning is structured. (3)	Williams (2000); Muirhead (2001); Conrad (2002); Youngblood, Trede, & DeCorpo (2001); Sims, Dobbs, & Hand (2002)	ACE LD 1 SREB CEOC CC
I.3 Netiquette expectations with regard to discussions and email communication are clarified. (2)	Sims, Dobbs, & Hand (2002); Johnson (2004)	
I.4 The self-introduction by the instructor is appropriate. (1)	Roblyer & Ekhaml (2000); Roblyer & Wiencke (2003)	
I.5 Students are requested to introduce themselves to the class. (1)	Gunawardena & Zittle (1997); Anderson, Garrison, & Archer (2001); Roblyer & Ekhaml (2000); Sims, Dobbs, & Hand (2002); Roblyer & Wiencke (2003)	
I.6 Minimum technology requirements, minimum student skills, and, if applicable, prerequisite knowledge in the discipline, are clearly stated. (1)	Sims, Dobbs, & Hand (2002); Hannafin et al. (2003)	

II. LEARNING OBJECTIVES (COMPETENCIES)

General Review Standard: Learning objectives are clearly defined and explained. They assist the student to focus learning activities.

Literature Support for the General Review Standard:

The value of learning objectives in describing measurable outcomes has long-standing support in the literature (e.g., Bloom, 1956; Mager, 1962, 1975). As the QM Rubric annotations note, "measurable learning objectives help teachers precisely describe what students are to gain from instruction" and "accurately assess student accomplishment." Because they are an outgrowth of behaviorist learning theory, learning objectives have been criticized as being excessively focused on behavioral outcomes and inadequate for specifying affective or cognitive outcomes. For this reason, the QM Rubric annotations also direct reviewers to "check for clear indications that the learning objective is meaningfully assessed" for cognitive or affective outcomes.

- The importance of developing critical thinking skills has wide acceptance in the field. It is deemed particularly important in adult education to the point of being considered a template for practice (Brookfield, 1997) but is also commonly stated as an institutional policy goal for many undergraduate and graduate programs. Garrison, Anderson, and Archer (2001) suggest that appropriate teaching and social presence in a computer-conference environment can create and support "cognitive presence" (i.e., critical, practical inquiry). Bruning (2005) describes one of many possible techniques for incorporating critical thinking skills into an online course.
- Gunawardena, Lowe, & Anderson (1998) identified phases of knowledge construction: including, cognitive activity, arguments, resources that explore arguments, supporting literature, data and dissenting ideas, and evidence of changes in understanding.

- Phipps & Merisotis (2000) include analysis, synthesis, and evaluation activities as key activities that should be part of course requirements.
- Murphy, Mahoney, & Harvell (2000) found that students without clear direction can be easily confused about their obligations. Group goals especially require clear and achievable objectives.
- Spallek, Berthold, Shanley, & Attstrom (2000) surveyed dental professionals on quality assurance criteria for online courses. The importance of courses being scientifically based, regularly updated, easy to navigate, have defined educational objectives, stimulate learning, be created by appropriately qualified academics, and be at an appropriate level for the intended participants were deemed important.
- Shea et al. (2002) also found that students in online courses who reported that communicating clear expectations on how to succeed in the course correlated highly with levels of satisfaction and perceived learning.
- Sims, Dobbs, & Hand (2002) pointed out that "unit or course content should be considered in terms of the interaction with major design issues" (p. 138).
- Pawan, Paulus, Yalcin, & Chang (2003) pointed out that "it is important to first provide clear participant requirements in terms of length, content expectations, and timeliness" (cited in Garrison & Cleveland, 2005, p. 145).
- Lux & Davidson (2003) identified within the scientific literature best practices strategies for a "successful CBI [computer-based instruction] modules should contain, i.e., modules that are received favorably by students and which result in a demonstrated higher level of learning" (p. 125). They summarized the guiding principles for module design to include: Goal for users (teach a skill set); presentation (simple, clear straightforward); architecture (default path for novices, high degree of learner control for advanced users); navigation (direct access to all content); interface (intuitive with high level of interactivity); and design method (iterative, solicit feedback from both professionals and end-users) (p.127).
- Trigano & Pacurar-Giacomini (2004), building on the literature in human machine-interface, web ergonomic, pedagogical structure, and pedagogical environment, noted that "because of the non-linearity of the information representation in a digital support…(sequence)…the information in hypermedia should be based on **information-units** (emphasis in original) corresponding to computation-units…[so that the reader/learner will be able to identify] which is necessary and sufficient in order to understand a concept" (pp. 22-23).
- Stewart, Hong, & Strudler (2004) in preparing for quality evaluation of online courses highlighted Driscoll's 1998 and Khan's 1997 work on web-based instruction – "attention to education details (e.g., clear guidance and direction for each lesson, clear objectives, adequate practice, and meaningful feedback)" (p. 133) was among those considered important.
- Koszalka & Ganesan (2004) considered information, instruction, and learning design elements as identified in the web-based online learning literature and applied those to a course which was "initially a failure" (p. 243). Issues addressed were confusion of the learner when "haphazard integration" of CMS features "did not match course objectives"(Oliver, 1999; Kearsley, 1997; Collis, 1999; Grabowski & Small, 1997 were cited); "practice components were often weak or missing (Gilbert & Moore, 1998; Kidney & Puckett, 2003 were cited) (pp. 244-245) ; activities and resources did not closely match instructional purposes (Kidney & Puckett, 2003; Koszalka & Bianco, 2001; Simonson et al., 2003 cited); and "learners did not see a connection between the activities they were completing" and the overall objective (p. 251).

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	***Research Lit. Support***	***Standards Sets Support***
II.1 The learning objectives of the course describe outcomes that are measurable. (3)	Bloom (1956); Mager (1962, 1975); Spallek, Berthold, Shanley, & Attstrom (2000)	ACE LO 2 SREB CEOC CC
II.2 The learning objectives address content mastery, critical thinking skills, and core learning skills. (3)	Gunawardena, Lowe, & Anderson (1998); Garrison, Anderson, and Archer (2001); Bruning (2005)	ACE LD 6 ADEC Principle 1 NEA/IHEP CDB 3

II.3 The learning objectives of the course are clearly stated and understandable to the learner. (2)	Murphy, Mahoney, & Harvell (2000); Lux & Davidson (2003); Steward, Hong, & Strudler (2004); Koszalka & Ganesan (2004)	NEA/IHEP CSB 2 SREB CEOC CC
II.4 Instructions to students on how to meet the learning objectives are adequate and easy to understand. (2)	Murphy, Mahoney, & Harvell (2000); Shea at al. (2002); Pawan et al (2003); Steward, Hong, & Strudler (2004); Koszalka & Ganesan (2004)	
II.5 The learning objectives of the course are articulated and specified on the module/unit level (2)	Sims, Dobbs, & Hand (2002); Trigano & Pacurar-Giacomini (2004); Stewart, Hong, & Strudler (2004); Koszalka & Ganesan (2004)	

III. ASSESSMENT AND MEASUREMENT

General Review Standard: Assessment strategies use established ways to measure effective learning, assess student progress by reference to stated learning objectives, and are designed as essential to the learning process.

Literature Support for the General Review Standard:

- Eanes (2001) provided a "task-oriented question construction wheel based on Bloom's taxonomy" that provides support for well constructed online assessment.
- McLoughlin (2001) suggested that evaluation tasks be associated with both learning outcomes and teaching approaches in order for the numerous characteristics of pedagogy to be supported in a cross-cultural setting.
- Wisher, Curnow, & Seidel (2001) looked at knowledge retention in two distance learning course sections for the military and found it comparable with other classroom training. They conclude that distance education offers the potential of improving knowledge retention if frequent testing and spaced practice are incorporated.
- Youngblood, Trede, & DeCorpo (2001) identified a number of essential tasks for an effective teacher: make student welcome, clarify expectations for contributing online, clarify grading for the online participation, monitor participation in online discussion, keep discussion on track, contact students offline, bring closure to discussion, use questions to stimulate discussion, move discussion forward, stimulate reflection on students' comments, encourage students to build on others' contributions, and divide students into groups for specific tasks. Findings revealed that students felt clarification of grading and of expectations were most important.
- Tuzum, H. (n.d.) cited Friedrich & Armer (1999); Kuchinke, Aragon, & Bartlett (2001) and others regarding assessments in WBI (Web based instruction). He pointed out that assessments in WBI "should be different from traditional classroom techniques and include "authentic tasks as written reports" and should be "performance-based mode and should include fewer objective tests" (p. 364)
- McVayLynch (2002) noted the "dualistic debate over whether assessment should focus on accountability or improvement," and suggested that a misconnection in evaluation can still occur "because teachers or course designers fail to create a direct relationship between instructional objectives and assessment measures" (117-118).
- Macdonald & Twining (2002) looked at the relationship between assessment, student participation, and the development of skills. They suggested key issues for assessment of activity-based learning: assessment must reflect course philosophy, assessment is essential in creating learning opportunities at critical points, assessment provides a vital opportunity for feedback, helping to complete the reflective learning cycle.
- Lewis' (2002) dissertation found the importance of "in-course practice exercises are aligned with the final evaluation tests in terms of both the content and the style" (abstract). She looked at the efficacy of quizzes vs. discussions in online learning in regard to the impact on learning and concluded that students do better in the final assessment tests if in-course practice exercises aligned with content and style, that

intensity and frequency of a student's participation in group discussions also seems to have a possible influence on final performance.

- Thurmond et al. (2002) found that when students believe that their learning was being assessed in a variety of ways and that they were receiving timely feedback were among the strongest predictors of student satisfaction. The Annotations for Standard III.3 direct reviewers to look for evidence that students "receive frequent, meaningful, and rapid feedback" lists a variety of examples of how such feedback can be provided. This study supports the view that the online environment influences students' satisfaction rather than being solely a function of student characteristics.
- Shea et al. (2002) found that students in online courses who reported the highest levels of prompt, high quality, and constructive feedback from their instructor also reported the highest levels of satisfaction and perceived learning.
- Jensen, Self, & Rhymer (2002) tested for improved effectiveness of multimedia instructional modules in a basic engineering course at the US Air Force Academy. They discovered the importance of keeping the content in a module focused on the objectives (no extraneous material) and "emphasizing that the concepts will be tested on exams" (¶30).
- Hannon et al. (2002) used Gagne's & Laurillard's instructional models to design and evaluate five courses in an online curriculum. Gagne's model evolves from cognitive theory with an emphasis on "enhancing learner performance"; while Laurillard's model emphasizes teacher-learner interaction. Hannon, et al noted, "In contrast with Gagne, Laurillard's model of instruction was designed with interactive technology in mind" (¶3). See http://www.irrodl.org/content/v3.2/hannon7.png for table of Gagne & Laurillard instructional events. Students were generally satisfied with the online course, but students' perceptions of the teacher-learner relationship appeared to support the Laurillard approach to design.
- Hannafin et al. (2003) noted that "Assessment practices have largely been mapped over from traditional teaching-learning approaches, but may not provide either suitable evidence of student learning or may simply emphasize those aspects of learning that are easy to assess"
- Achtemeier, Morris & Finnegan (2003) found consensus among more than thirteen best practices instruments and the accompanying literature review that the text-based questions in online education should be worded clearly, simply, logical, not biased or leading, and each should stand-alone and address only one issue.
- Koszalka & Ganesan (2004) considered information, instruction, and learning design elements as identified in the web-based online learning literature and applied those to a course which was "initially a failure" (p. 243). Issues addressed were confusion of the learner when "haphazard integration" of CMS features "did not match course objectives"(Oliver, 1999; Kearsley, 1997; Collis, 1999; Grabowski & Small, 1997 were cited); "practice components were often weak or missing (Gilbert & Moore, 1998; Kidney & Puckett, 2003 were cited) (pp. 244-245) ; activities and resources did closely match instructional purposes (Kidney & Puckett, 2003; Koszalka & Bianco, 2001; Simonson et al., 2003 cited); and "learners did not see a connection between the activities they were completing" and the overall objective (p. 251).

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	***Research Lit. Support***	***Standards Sets Support***
III.1 The types of assessments selected measure the stated learning objectives are consistent with course activities and resources. (3)	McLoughlin (2001); McVay Lynch (2002); Macdonald & Twining (2002); Jensen, Self, & Rhymer (2002); Lewis (2002); Garrison & Anderson (2003); Koszalka & Ganesan (2004); Garrison & Cleveland-Innes (2005);	ACE LD 1, 2; LO 5 SREB PCP EA 2
III.2 The grading policy is transparent and easy to understand. (3)	Youngblood, Trede, & DeCorpo (2001)	SREB CEOC TI
III.3 Assessment and measurement strategies are designed to provide feedback to the student. (3)	Thurmond et al. (2002); Macdonald & Twining (2002); Shea et al. (2002); Hannon et al. (2003)	NEA/IHEP T/LB 2 SREB CEOC TI WICHE/MSC 2e

III.4	The types of assessments selected and the methods used for submitting assessments are appropriate for the distance learning environment. (2)	Eanes (2001); McLoughlin (2001); Tuzun (2001); Lewis (2002); Achtemeier, Morris & Finnegan (2003); Hannon et al. (2003); Koszalka & Ganesan (2004)	ACE LO 5 SREB CEOC SS WICHE/MSC 5c
III.5	"Self-check" or practice types of assignments are provided for quick learner feedback. (1)	Wisher, Curnow, & Seidel (2001); Thurmond et al. (2002); Lewis (2002); Koszalka & Ganesan (2004)	

IV. LEARNING RESOURCES AND MATERIALS

General Review Standard: Instructional materials are sufficiently comprehensive to achieve announced objectives and learning outcomes and are prepared by qualified persons competent in their fields (Materials, other than standard textbooks produced by recognized publishers, are prepared by the instructor or distance educators skilled in preparing materials for distance learning.)

Literature Support for the General Review Standard:

Course content is more than just an aggregation of learning resources and materials; the design of course content is an essential aspect of courses, particularly online courses. This is an issue because, as Kanuka, Collett & Caswell (2002) found, some "experienced distance education instructors tend not to design their courses with a great deal of flexibility - even though they acknowledge that Internet communication technologies can support it" (p. 166). However, the literature provides conceptual support for the importance of this standard as well as some studies which illustrate successful examples of practice:

- Liu & Ginther (1999) suggested that designers should base content on a diversity of learning styles; teachers should match course materials and assessments to those same learning styles. For example, visual images and diagrams should be used for analytical, visual learners; cooperative activities for field dependent learners, and individual projects for field independent learners.
- Oliver (1999/2002) cited content as one of three critical elements teachers and designers need to consider when designing online courses.
- Swan, Shea, Fredericksen, Pickett, & Pelz (2000) investigated the relationship between student perceptions and course design factors and found that consistency in course design was one of the key factors.
- Spallek, Berthold, Shanley, & Attstrom (2000) surveyed dental professionals on quality assurance criteria for online courses. The importance of courses being scientifically based, regularly updated, easy to navigate, have defined educational objectives, stimulate learning, be created by appropriately qualified academics, and be at an appropriate level for the intended participants were deemed important.
- In one well-accepted conceptual framework (Rourke et al., 2001; Garrison, Anderson, & Archer, 2001) learner-content interaction is one of three principal types of interaction, corresponding to one of the overlapping elements ("cognitive presence") which need to be considered in designing an online course focused on critical inquiry.
- Sonwalkar (2001) describes "pedagogically driven design principles for online education." Among those he suggests that course content is seen as "a set of simulations that support discovery-based learning"; taking advantage of "media assets" to allow for "learner's cognitive preferences"; consider "technological constraints" (¶22-25) of user bandwidth. Additionally, he alerts the important role of experts in content, as well as instructional and web design and the necessity of obtaining copyright permissions.
- Conrad (2002) found that learners judge instructors based on how clearly and completely online course materials present the details of the course. A well-organized course with a clear overview and introduction including a clear statement of expectations, explanation of the course outline, clear timelines, and well-written course notes helped learners feel that they were getting off to a good start in their course.

- Perrin & Mayhew (2002) analyzed data, including learning outcomes from two online distance courses and concluded that online educators need to know more than course content, design issues are crucial.
- Sims, Dobbs, & Hand (2002) pointed out that "unit or course content should be considered in terms of the interaction with major design issues and their impact on the learning community" (p. 138); that the learning design "requires careful thinking about the learner and the options provided for interacting with the content and their learning partners" (p. 140).
- Shirathuddin, Hassan, & Landoni (2003) based on a critical reviewed of four well-known usability design guidelines identified seven factors of usability that should be considered in preparing content for electronically delivery in higher education courses: useful and relevant content with depth and breadth was one of the factors. They pointed out "unnecessary media should be avoided to present long downloading time:" (p. 119).
- Koszalka & Ganesan (2004) considered information, instruction, and learning design elements as identified in the web-based online learning literature and applied those to a course which was "initially a failure" (p. 243). Issues addressed were confusion of the learner when "haphazard integration" of CMS features "did not match course objectives"(Oliver, 1999; Kearsley, 1997; Collis, 1999; Grabowski & Small, 1997 were cited); "practice components were often weak or missing (Gilbert & Moore, 1998; Kidney & Puckett, 2003 were cited) (pp. 244-245) ; activities and resources did not closely match instructional purposes (Kidney & Puckett, 2003; Koszalka & Bianco, 2001; Simonson et al., 2003 cited); and "learners did not see a connection between the activities they were completing" and the overall objective (p. 251).
- Garrison & Cleveland-Innes (2005) found "defining clear expectations and selecting manageable content, structuring appropriate activities (collaborative and individual), and conducting assessment congruent with intended goals" foster a deep approach to learning (p. 145). Reconfirmed that, "The goal in deep learning is to move discussion from exploration to integration and then to resolution (Garrison & Anderson, 2003)" (p.145).
- Nicol, Littlejohn, & Grierson (2005) found that well-structured learning resources facilitated team collaboration and the learning of engineering design. Students in the course were positive about the value of a well-structured (accessible, easy to use) shared workspace to support their collaborative learning projects in engineering design courses.
- Zhang (2005) noted that simply converting "paper-based multimedia instruction into its digital equivalent and making it available on the Internet will not lead to effective learning due to a lack of an appropriate mix of content richness, interaction, and engagement" (p. 160)

Standard IV.5 is not a research-based standard, but rather a practical one designed to address the issues of intellectual property and copyright.

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	***Research Lit. Support***	***Standards Sets Support***
IV.1 The instructional materials have sufficient depth in content and are sufficiently comprehensive for the student to learn the subject. (3)	Spallek, Berthold, Shanley, & Attstrom (2000); Sims, Dobbs, & Hand (2002); Shirathuddin, Hassan, & Landoni (2003); Garrison & Anderson (2003); Garrison & Cleveland-Innes (2005)	
IV.2 Instructional materials are presented in a format appropriate to the online environment, and are easily accessible to and usable by the student. (3)	Spallek, Berthold, Shanley, & Attstrom (2000); Conrad (2002); Sims, Dobbs, & Hand (2002); Lux & Davidson (2003); Shirathuddin, Hassin, & Landoni (2003); Koszalka & Ganesan (2004); Nicol, Littlejohn, & Grierson (2005); Zhang (2005)	SREB PCP RL 1
IV.3 The purpose of the course elements (content, instructional methods, technologies, and course materials) is evident. (2)	Conrad (2002); Trigano & Pacurar-Giacomini (2004); Koszalka & Ganesan (2004); Jensen, Self, & Rhymer (2002)	ACE LD 1

IV.4 The instructional materials, including supporting materials - such as manuals, videos, CD ROMs, and computer software – are consistent in organization. (1)	Swan, et al. (2000); Trigano & Pacurar-Giacomini (2004); Koszalka & Ganesan (2004)	
IV.5 All resources and materials used in the online course are appropriately cited. (1)	Sonwalkar (2001)	

V. LEARNER INTERACTION

General Review Standard: The effective design of instructor-student interaction, meaningful student cooperation, and student-content interaction is essential to student motivation, intellectual commitment and personal development.

Literature Support for the General Review Standard:

The QM rubric reflects the research findings that several types of learner interaction are important:

- Moore (1989) identified three types of interaction – student/teacher; student/student; and student/content.
- Anderson (2002, 2003) suggested an expansion of interaction possibilities to include teacher/teacher; teacher/content; content/content.
- Others, coming from an instructional technology perspective, suggested learner/interface interaction (Hillman, Willis, & Gunawardena; 1994) and learner/the virtual world interaction should be considered (Chase, Macfadyen, Reeder, & Roche; 2002).

Because of the intense interest in the role of interpersonal interaction in online learning, there is a substantial amount of conceptual and empirical research supporting this review standard:

- Gunawardena & Zittle (1997) identified social presence ["The degree to which a person is perceived as a 'real person' in mediated communication" (p.9)] and reported correlation between perceptions of interaction and quality/quantity of learning.
- Vrasidas & McIsaac (1999) found interaction in an online course was related to structure of the course, class size, feedback, and prior experience with computer-mediated communication interaction. Socially constructed meanings from the students' perspectives were emphasized.
- Fredericksen et al. (2000) found that instructor-student interaction was the most significant contributor to perceived learning.
- Anderson, Garrison, & Archer (2001) noted that social presence (the ability of learners to project themselves socially and affectively into a community) was shown to strongly predict learner satisfaction in online education and challenges the widely held assumption that face-to-face, non-verbal behaviors are necessary for establishing student and teacher rapport. Social presence was found to support cognitive presence [critical thinking].
- Sims (1999) listed functions of interactions: allowing learners control, facilitating program adaptation based on learner input, allowing various forms of participation and communication, and aiding the development of meaningful learning
- McIsaac, Blocher, Mahes, & Vrasidas (1999) found that teacher in online course appeared to be more concerned about encouraging student participation than in traditional, classroom based courses. Instructors perceived more effectiveness of their personal interactions to individual student messages in enhancing learning.
- Hislop (2000) reported that a substantial proportion of working professionals in a graduate degree program felt that they interacted more with their instructor in their online courses and that these learners

achieved comparable grades to those in traditional classroom courses, even after controlling for variance by instructor.

- Roblyer & Ekhaml (2000); Roblyer & Wiencke (2003) present a rubric to determine the interaction levels in an online course. The model is based in learning theories, instructional theories, instructional design models, and instructional delivery systems.
- Berge (1999), Liaw & Huang (2000), Weller (1988) pointed out the necessity of closing the communication loop.
- Murphy, Machoney, & Harvell (2000) investigated the use of contract in promoting learner-centered project-based learning in a web course. They concluded with a suggested list of instructor responsibilities to facilitate this form of active learning.
- Muirhead (2000) provided six types of interactive activities that might encourage learner-learner interaction: sharing of relevant personal experiences, reference to appropriate materials (besides assigned readings), comments on the opinions of others, introduction of new issues for discussion, questions posed to the group by students, instructor acting as guide and facilitator.
- Jung, Choi, Lim, & Leem (2002) investigated the effects of different types of interaction (academic, collaborative, and social) on learning achievement, satisfaction and participation in web-based instruction. Results indicated that the social interaction group outperformed the other groups; the collaborative interaction group expressed the highest level of satisfaction with their learning experiences; the collaborative and social interaction groups participated more actively in posting their opinions that the academic interaction group.
- Tu & McIsaac (2002) revealed that social presence is complicated by the social context of the learners' and learning environment, by the nature of online communication [including keyboarding and language skills], and interactivity [for example, response time to messages, communication styles, group size].
- Anderson (2003, 2002) pointed out that increased learner control, ability to tailor courses to learners' needs based on their input, as well as opportunities for meaningful collaboration among learners is a result of increased interactive possibilities in online education.
- Belanish, Wisher, and Orvis (2004) found that use of a collaborative question-generation tool produced a 7% increase in the comprehension of course material.
- Vandergrift (2002) identified the concept of a faculty member's 'restrained presence' in an effort to facilitate students' personal responsibility for their own learning and for community building in an online learning environment." Restrained presence of the instructor might encourage self-directed learning.

There is significant support in the research literature that correlates instructor-student interaction with perceived student learning and satisfaction, for example:

- Swan (2001) cited "an instructor that interacts frequently and productively with students" as one of three factors which "contribute significantly to the success of asynchronous online courses."
- Studies conducted by the SUNY Learning Network have repeatedly found that students' positive perception of interaction with their instructors correlates strongly with perceived learning and satisfaction (Fredericksen et al., 2000; Shea et al., 2001; Shea et al., 2002).
- Richardson and Swan (2000) also reported a significant correlation between students' perceived learning and satisfaction levels with their instructors, while Jiang and Ting (2001) also found correlations between perceived learning and perceived interactions with instructors.
- Hannon et al. (2002) used Gagne's & Laurillard's instructional models to design and evaluate five courses in an online curriculum. Gagne's model evolves from cognitive theory with an emphasis on "enhancing learner performance"; while Laurillard's model emphasizes teacher-learner interaction. Hannon, et al. noted, "In contrast with Gagne, Laurillard's model of instruction was designed with interactive technology in mind" (¶3). See http://www.irrodl.org/content/v3.2/hannon7.png for table of Gagne & Laurillard instructional events. Students were generally satisfied with the online course, but students' perceptions of the teacher-learner relationship appeared to support the Laurillard approach to design.
- Chang (2003) identified five types of online facilitation by using content analysis of students' threaded messages: (1) assignments and grades (for example, questions about due dates, instructor's expectation, grading criteria), (2) network access (for example, questions about online course materials in the course site), (3) online discussion (for example, questions about clarification, reflections), (4) group activities (questions about those activities), and (5) other course materials access (such as textbook, study guides, the university, and local libraries) (pp. 496-497).

There is also significant support in the research literature that requiring student-student interaction can result in improved perceived student learning and satisfaction, for example:

- Beaudin's (1999) survey from 135 online instructors regarding how to keep asynchronous online discussions on topic revealed (1) questions must be carefully design, (2) guidelines must be provided to students, (3) questions might need "reworded when responses are going in the wrong direction," and (4) regularly provided summaries of the discussions by the instructor (p.41).
- Swan (2001) cited "a constructive and dynamic discussion between students and their peers" as one of three factors which "contribute significantly to the success of asynchronous online courses."
- Wu and Hiltz (2004) found that required asynchronous online discussions improved students' perceived learning.
- The SUNY Learning Network studies also have repeatedly found that students in online courses who reported the highest levels of interaction with their coursemates also reported the highest levels of satisfaction and perceived learning (Fredericksen et al., 2000; Shea et al., 2001; Shea et al., 2002).
- Jeong (2003) took on the challenge of quantifying "how message sequence and group processes affect subsequent discussion and cognitive outcome" (p. 26) and found that "interactions involving conflicting viewpoints promoted more discussion and critical thinking, and the evaluation of arguments was more likely to occur as conclusions were being drawn-not as arguments were being presented" (p. 25).

However, there is also significant support in the research literature for online course designs which do not require student-student interaction, for example:

- Indiana University's Learning to Teach with Technology Studio (LTTS) effectively uses a self-paced, one-on-one mentored format for courses designed to serve K-12 teacher professional development needs (Duffy and del Valle, 2005; Malopinsky, Kirkley, & Duffy, 2002).
- Anderson (2003) suggests that deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience.
- Sener (2001) reported case studies which utilized a "tutorial model" of instruction featuring strong reliance on tutor-like instructor-learner interaction without requiring learner-learner interaction.
- Ragoonaden & Bordeleau (2000) found that two problems emerge from blanket designs for collaborative interaction: technical and interpersonal. Highly independent learners often prefer to work alone, especially when group members worked at a different pace.
- Kramarae (2003), Cook (1989), & May (1993) suggested "more is not necessarily better" and warned of potential dangers resulting from imposed interaction as it might interfere with student autonomy in managing time, place, and pace of learning. This is also consistent with the American Council on Education's Distance Learning Principles, which state that "the learning experience [should be] organized to increase learner control over the time, place, and pace of instruction" (Learning Design Subprinciple 5).

For this reason, the QM rubric directs reviewers to look for evidence of course design which supports student-student interaction **as appropriate**, recognizing that required or even optional student-student interaction is not necessary for all online courses.

A word of caution: as Swan (2003) notes, while the research results to date establish indirect connections between learner interaction and perceived learning, direct connections between instructor-learner interaction (and by extension, student-student interaction) and learning outcomes have not yet been documented.

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	***Research Lit. Support***	***Standards Sets Support***
V.1 The learning activities promote the achievement of stated objectives and learning outcomes. (3)	Trigano & Pacurar-Giacomini (2004)	ACE LD 2

V.2 Learning activities foster instructor-student, content-student, and if appropriate to this course, student-student interaction. (3)	Beaudin (1999); Fredericksen et al. (2000);Shea et al. (2001); Anderson et al. (2001); Swan (2001); Shea et al. (2002);Jeong (2003); Wu and Hiltz (2004)	NEA/IHEP T/LB 1 SREB PCP CI 2 SREB CEOC TS WICHE/MSC 2e
V.3 Clear standards are set for instructor response and availability (turn-around time for email, grades posted etc.) (3)	Swan (2001), Conrad (2002) and others imply this indirectly, though not directly; Hannon et al; (2002)	NEA/IHEP CSB 4
V.4 The requirements for course interaction are clearly articulated. (2)	Swan (2001), Conrad (2002) and others imply this indirectly, though not directly; Hannon et al. (2002)	
V.5 The course design prompts the instructor to be present, active, and engaged with the students. (2)	Vandergrift (2002) cites the importance of "restrained presence"; Hannon et al. (2003); Chang (2003)	

VI. COURSE TECHNOLOGY

General Review Standard: To enhance student learning, course technology enriches instruction and fosters student interactivity.

Literature Support for the General Review Standard:

While there is plenty of research related to the concepts of active learning and learner interactivity (also see General Standard V), the QM team has uncovered scant research to date which pertains directly to the link between active learning and/or learner interactivity and course technology:

- Sonwalkar (2001) describes "pedagogically driven design principles for online education." Among those he suggests that course content is seen as "a set of simulations that support discovery-based learning"; taking advantage of "media assets" to allow for "learner's cognitive preferences"; consider "technological constraints" (¶22-25) of user bandwidth. Additionally, he alerts the important role of experts in content, as well as instructional and web design and the necessity of obtaining copyright permissions.
- Sims (2003) found that study participants were able to identify that interactivity ("the inherent quality of the medium and learning environment" (p. 87) included engagement, control, communication, design, the individual, and learning. Those "nodes" can be connected directly to theoretical literature as "providing benefits to learning" (p. 101).
- Shirathuddin, Hassan, & Landoni (2003) based on a critical reviewed of four well-known usability design guidelines identified seven factors of usability that should be considered in preparing content for electronically delivery in higher education courses: They pointed out "unnecessary media should be avoided to present long downloading time: (p. 119).
- Johnson (2004) found that faculty generally "decide to implement tools based on whether they believe students can easily use them" (¶18) and therefore information on their use needs to be considered.
- Nicol, Littlejohn, & Grierson (2005) found that well-structured learning resources facilitated team collaboration and the learning of engineering design. Students in the course were positive about the value of a well-structured (accessible, easy to use) shared workspace to support their collaborative learning projects in engineering design courses.

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	*Research Lit. Support*	*Standards Sets Support*
VI.1 The tools and media support the learning objectives of the course and are integrated with texts and lesson assignments. (3)	Trigano & Pacurar-Giacomini (2004)	ACE LD 2, 3; LO 4
VI.2 The tools and media enhance student interactivity and guide the student to become a more active learner. (2)	Sonwalkar (2001); Sims (2003); Nicol, Littlejohn, and Grierson (2005)	ACE T 2
VI.3 Technologies required for this course are either provided or easily downloadable. (2)	Trigano & Pacurar-Giacomini (2004)	
VI.4 Tools and media are compatible with existing standards of delivery modes. (1)	Sonwalkar (2001)	
VI.5 Instructions on how to access resources at a distance are sufficient and easy to understand. (1)	Johnson (2004)	
VI.6 Course technologies take advantage of existing economies and efficiencies of delivery. (1)	Sonwalkar (2001)	

VII. LEARNER SUPPORT

General Review Standard: Courses are effectively supported for student through fully accessible modes of delivery, resources, and student support.

Literature Support for the General Review Standard:

Many of the previously-cited literature references about the importance of clear descriptions also pertain directly or indirectly to the need for clear descriptions of technical support offerings.

- Shin (2001) found that the perceptions of psychological presence a distance student holds in relation with teachers, peer students, and institution can be significant predictors of learning outcomes. An institution's transactional presence may be relatively more important than teachers' and peer students' transactional presence (the degree to which a distance student perceives the availability of, and connectedness with, other parties involved in a given distance education setting" (2002, p.121).
- As Ludwig-Hardman and Dunlap (2003) note, "the positive influence advising can have on distance learners' ability to successfully fulfill their educational goals has been well documented (Feasley, 1983; Hezel and Dirr, 1991; Paulet, 1988; Thompson, 1989)."
- Visser and Visser (2000) noted a general lack of empirical research regarding the effectiveness of student support services in distance education. However, Krauth and Carbajal (1999) provide a comprehensive guide to developing online student services, including evidence that provision of one-on-one access to advisors is an essential student support service.
- Chang (2003) identified students wanted access to other course materials access (such as textbook, study guides, the university, and local libraries) (p. 497).
- Johnson's (2004) case study indicated that unfortunately providing information to learners about the CMS's [course management systems] was "typically neglected… [it was] "often assumed that students will figure out CMS skills on their own" (¶18).

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	*Research Lit. Support*	*Standards Sets Support*
VII.1 The course instructions articulate or link to a clear description of the technical support offered. (2)	Johnson (2004)	SREB CEOC SS
VII.2 Course instructions articulate or link to an explanation as to how the institution's academic support system can assist the learner in effectively using the resources provided. (2)	Krauth and Carbajal (1999); Ludwig-Hardman & Dunlap (2003); Johnson (2004)	NEA/IHEP CSB 3
VII.3 Course instructions articulate or link to an explanation of how the institution's student support services can assist the learner in effectively using the resources provided. (1)	Krauth and Carbajal (1999); Ludwig-Hardman & Dunlap (2003)	
VII.4 Course instructions articulate or link to tutorials and resources that answer basic questions related to research, writing, technology etc. (1)	Chang (2003)	

VIII. ACCESSIBILITY

General Review Standard: The course is accessible to all students.

Literature Support for the General Review Standard:

This General Review Standard has recently been revised to be more encompassing (accessibility vs. ADA compliance), so additional review of the research literature is necessary. Literature references which supply such support include the following:

- Coombs and Banks (2000) suggested that when designers and teachers are preparing an online course they should step back and try to access the material and move through it as a student who is blind.
- Shirathuddin, Hassan, & Landoni (2003) considered four well-known for guidelines of web design usability design guidelines to look at implementing good course design in higher education courses and noted: "Having good design and useful content are inadequate without considering the accessibility factors" (p. 122).
- Schwartz (2004) looks at using internet audio to enhance online accessibility and credited Rowland, Burgsthaler, Smith, & Coombs (2004) with calling attention to the "under-utilization of DE program by disabled students, possibly due to the failure of those programs to adapt to their needs" (¶2). Nielsen (2000) and Zaborowski (Shattuck, 2004) commented "accessible features can result in enhanced learning for all student" (¶3).
- Dr. Zaborowski, director of Special Programs for the National Federation of the Blind, described Section 508 of the Rehabilitation Act (http://www.section508.gov) as a better piece for online designers to consider because ADA "does not directly deal with the access issue….Section 508 will really help you understand what you have to do with links and frames and radio buttons and forms and all the different components of an online education [course]" (Shattuck, 2004, p. 261).
- Kinash, Crichton, & Kim-Rupnow (2004) reviewed literature that concentrated on disability and online learning published from 2000 through 2003. They noted 22 pieces were didactic; 12 were descriptive pieces; three were opinion pieces; and only five were research studies. Importantly they noted that this literature was often found only within the disability journals and not the distance learning journals. They urged further study with questions such as, "How can we promote universal design of the online

environment, with particular emphasis on complementing the visual with the auditory interface?" (p. 12) and suggest "the potential of multimedia to support multiple learning styles and needs" (p. 13).

- Edmonds (2004) called attention to "first-generation" and "second-generation" issues of access. He pointed out that first-generation access issues revolve around HTML accessibility and are usually addressed by developers of courseware and Web designers. Second-generation issues revolve around the non-HTML applications, such as non-text elements used with Word and PowerPoint. These are "generally in the hands of the faculty member creating the course- that is, a person without the technical background to provide accessibility" (p. 59). He provides directions to make PowerPoint presentations into HTML which are accessible. Edmonds noted two studies (Rowland, 2000; Schmetzke, 2002) which found that only a small percentage of distance learning providers and organizations provided accessible.
- Weir (2005) "collected observations and anecdotal information to gain insight into the experiences of special-needs students who take online courses" (p. 30). As a result she developed a set of guidelines for developing accessible online courses, including instructional strategies and course design considerations.
- See http://www.access-board.gov/508.htm; http://www.webaim.org for design recommendations (Moore & Kearsley, 2005, p. 119).

Learning style is of great interest to those interested in distance education with some reporting a learning preference of visual learning, but most support Hannafin's position that learning style is not a good predictor of whether a student will succeed. Neuhauser (2002) compared face-to-face and online sections of the same course and found there was no evidence that either learning style or type (e.g. visual, auditory, or kinesthetic/tactile) is a good predictor of educational success. Aragon, Johnson, & Shaik (2002) found there were significant differences in learning style preferences between online learners and face-to-face students, but those differences were no significant when success factors were controlled. Thus these studies support the notion that learning style is a less significant accessibility issue.

Shattuck (2005) noted that culture plays a part in making education fully accessible since many cultures emphasize different dimensions of teaching and learning (Collis & Remmer, 1997; Robinson, 1999; Robbins, 1997; Chen, Mashhadi, Ang & Harkrider, 1999; Chen & Mashhadi 1998a, 1998b; McLoughlin, 1999; Chase, Macfadyen, Reeder & Roche, 2002; Tu, 2001; Gunawardena, Nolla, Wilson, Lopez-Islas, Ramirez-Angel & Megchun-Alpizar, 2000; Sanchez & Gunawardena, 1998; Gunawardena, Wilson & Nolla, 2003). Study participants (all identifying as coming from non-Western cultures) could describe tensions (with teacher-student roles, with course structure, with cross-cultural nuances and real communication) when working within their "Western" online distance education environments.

Literature Support for Specific Review Standards:

Specific Review Standard (Point Value)	***Research Lit. Support***	***Standards Sets Support***
VIII.1 The course acknowledges the importance of ADA requirements. (3)	Shirathuddin, Hassan, & Landoni (2003); Kinash, Crichton, & Kim-Rupnow (2004); Shattuck (2004); Edmonds (2004); Schwartz (2004)	SREB CEOC SS
VIII.2 Web pages provide equivalent alternatives to auditory and visual content. (1)	Edmonds (2004); Kinash, Crichton, & Kim-Rupnow (2004); Shattuck (2004)	
VIII.3 Web pages have links that are self-describing and meaningful. (1)	Shirathuddin, Hassan, & Landoni (2003); Edmonds (2004); Weir (2005)	
VIII.4 The course demonstrates sensitivity to readability issues. (1)	Edmonds (2004); Kinash, Crichton, & Kim-Rupnow (2004)	

APPENDIX 1: References

This is a list of references which were consulted for the Review of Literature in MATRIX OF REVIEW STANDARDS for the Quality Matters project.

Achtemeier, S. D., Morris, L. V., & Finnegan, C. L. (February 2003). Considerations for developing evaluations of online courses. *Journal of Asynchronous Learning Network*, 7(1). Retrieved November 6, 2003, from http://www.aln.org/publications/jaln/v7n1/pdf/v7n1_achtemeier.pdf

Alley, L. R. & Jansak, K. E. (2001). The ten keys to quality assurance and assessment in online learning. *Journal of Interactive Instruction Development, 13*(3), 3-18.

Anderson, T. (October 2003). Getting the mix right again: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning*, 4(2).

Anderson, T. (2002). An updated and theoretical rationale for interaction. Retrieved March 20, 2003, from http://it.coe.uga.edu/itforum/paper63/paper63.htm

Baker, R. (2003, summer). A framework for design and evaluation of internet-based distance learning courses : Phase one-framework justification, design and evaluation. *Online Journal of Distance Learning Administration, 6*(2). Retrived December 9, 2003, from http://www.westga.edu/~distnace/ojdla/summer62/baker62.html

Beaudin, B. P. (1999). Keeping online asynchronous discussions on topic. *Jounal of Asynchronous Learning Network, 3*(2), 41-53. Available at http://www.aln.org/alnweb/journal/jaln-vol3issue2.htm

Belanish, J., Wisher, R., and Orvis, K. (2004). A Question-Collaboration Approach to Web-Based Learning. *American Journal of Distance Education*, 18(3), 169-18..

Bloom B., ed. (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook 1: Cognitive Domain. New York: McKay,

Brookfield, S. D. (1997). Assessing critical thinking. In A. Rose & M. Leahy (Ed.), Assessing adult learning in diverse settings: Current issues and approaches, (pp. 17-29). New directions for adult and continuing education, 75, San Francisco: Jossey-Bass.

Brown, A. R. & Voltz, B. D. (2005). Elements of effective e-learning design. *International Review of Research in Open and Distance Learning,6*(1). Retrieved April 21, 2005, from http://www.irrodl.org/content/v6.1/brown_voltz.html

Bruning, K. (May 2005). The Role of Critical Thinking in the Online Learning Environment. *International Journal of Instructional Technology and Distance Learning*, 2(5). Retrieved May 20, 2005 from: http://www.itdl.org/Journal/May_05/article03.htm.

Chang, S. L. (2003). What types of online facilitation do students need? ERIC ED470183 from Annual Proceedings of Selected Research and Development: Practice Papers presented at the National Convention of the Association for Educational Communications and Technology (Atlanta, GA, November, 2001) Retrieved November 21, 2003 from http://www.eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/27/b5/66.pdf

Conrad, D. (2002). Engagement, Excitement, Anxiety and Fear: Learners' Experiences of Starting an Online Course. *American Journal of Distance Education*, 16(4), 205-226.

Coombs, N. & Banks, R. (2000). *Distance learning and students with disabilities: Easy tips for teachers* Paper presented at Technology and Persons with Disabilities: Where Assistive Technology Meets the

Information Age. Retrieved May 3, 2002, from http://www.csun.edu/cod/conf2000/proceedings/0119Coombs.html

Duffy, T., and del Valle, R. (2005). LTTS: A course management system for online inquiry learning. Presentation at the 21st Annual Conference on Distance Teaching & Learning, Madison, WI. Retrieved September 28, 2005 from: http://www.uwex.edu/disted/conference/Resource_library/handouts/05_1805P.pdf

Deubel, P. (2003). Learning from reflections – Issues in building quality online courses. *Online Journal of Distance Learning Administration, 4*(3). Retrieved November 17, 2003, from http://www.westga.edu/~distance/ojdla/fall63/deubel63.htm

Edmonds, C. D. (2004). Providing access to students with disabilities in online distance education: Legal and technical concerns for higher education. *The American Journal of Distance Education, 18*(1), 51-62.

Fredericksen, E., Pickett, A., Pelz, W., Swan, K., and Shea, P. (2000). Student satisfaction and perceived learning with on-line courses: principles and examples from the SUNY learning network. In Bourne, J. (Ed.), On-Line Education, Volume 1: Learning Effectiveness and Faculty Satisfaction. (pp.7-36). Nashville, TN: Center for Asynchronous Learning Networks.

Gagné, B., Briggs, L. & Wager, W. (1992). *Principles of instructional design (4th ed.).* NY: Harcourt Brace Jovanovich.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.

Garrison, D. R. & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education, 19*(3), 133-148.

Garrison, D. R. & Anderson, T. (2003). *E-Learning in the 21st century: A framework for research and practice.* London: Routledge Falmer.

Gunawardena, C. & Zittle, F. (1997). Social Presence as a Predictor of Satisfaction within a Computer-Mediated Conferencing Environment. American Journal of Distance Education, 11(3), 8-26.

Gunawardena, C., Lowe, C, & Anderson, T. (1998). Transcript analysis of computer-mediated conferences as a tool for testing constructivist and social-constructivist learning theories. In: Distance Learning '98. Proceedings of the Annual Conference on Distance Teaching & Learning (14th, Madison, WI, August 5-7, 1998). ERIC Document Reproduction Service ED422854.

Hannafin, M., Hill, J. R., Oliver, K., Glazer, E. & Sharma, P. (2003). Cognitive and learning factors in web-based distance learning environments. In M. Moore & W. Anderson (Eds.), Handbook for Distance Education. (pp. 245-260). Mahwah, NJ; Lawrence Erlbaum Associates.

Hannon, P.A., Umble, K.E., Alexander, L., Francisco, D., Steckler, A., Tudor, B., et al. (2002). Gagne and Laurillard's models of instruction applied to distance education: A theoretically driven evaluation of an online curriculum in public health. *International Review of Research in Open and Distance Learning, 3*(2). Retrieved December 9, 2002, from http://www.irrodl.org/content/v3.2/hannon.html

Hislop, G. (2000). Working professionals as part-time on-line learners. In Bourne, J. (Ed.), On-Line Education, Volume 1: Learning Effectiveness and Faculty Satisfaction. (pp.71-84). Nashville, TN: Center for Asynchronous Learning Networks.

Huitt, W. (2000). Bloom et al.'s taxonomy of cognitive domain. Retireved November 20, 2005 from http://chiron.valdosta.edu/whuitt/col/cogsys/bloom.html

Inglis, A. (2005). Quality improvement, quality assurance, and benchmarking: Comparing two frameworks for managing quality processes in open and distance learning. *The International Review of Research in Open and Distance Learning,6*(1), Retrieved November 22, 2005, from http://www.irrodl.org/content/v6.1/inglis.html

Janicki and Liegle (2001). Development and evaluation of a framework for creating web-based learning modules: a pedagogical and systems perspective. *Journal of Asynchronous Learning Networks*, 5(1). Retrieved May 3, 2005 from http://www.sloan-c.org/publications/jaln/v5n1/v5n1_janicki.asp

Jeong, A. C. (2003). The sequential analysis of group interaction and critical thinking in online threaded discussions. *The American Journal of Distance Education, 17*(1), 25-43.

Jensen, Self, & Rhymer (2002). A rocky journey toward effective assessment of visualization modules for learning enhancement in engineering mechanics. *Educational Technology & Society, 5*(3). Retrieved November 18, 2005, from http://www.ifets.info/jounrlas/5_3/jensen.html

Jiang, M., and Ting, E. (2000). A study of factors influencing students' perceived learning in a web-based course environment. *International Journal of Educational Telecommunications*, 6(4), 317-338.

Johnson. D. (2004). A planning and assessment model for developing effective DMS support. *Journal of Distance Learning Administration, 7*(1). Available at http://www.westga.edu/%7Edistance/ojdla/spring71/johnson71.html

Jonassen, D., Davidson, M., Collins, M., & Haag, B. (1995). Constructivism and computer-mediated communication in distance education. American Journal of Distance Education, 9(2), 7-26.

Kanuka, Collett, & Caswell (2002). University instructor perceptions of the use of asynchronous text-based discussion in distance courses. *The American Journal of Distance Education*, 16 (3), 151-168.

Kinash, S., Crichton, S., & Kim-Rupnow, W. S. (2004). A review of 2000-2003 literature at the intersection of online learning and disability. *The American Journal of Distance Education, 18*(1), 5-19.

Koszalka, T. A. & Ganesan, R. (2004). Designing online courses: A taxonomy to guide strategic use of features available in course management systems (CMS) in distance education. *Distance Education, 25*(2), 243-256.

Kramarae, C. (2003). Gender equity online, when there is no door to knock on. In M. Moore & W. Anderson (Eds.), Handbook for Distance Education. (pp. 261-272). Mahwah, NJ; Lawrence Erlbaum Associates.

Krauth, B. and Carbajal, J. (1999). *Guide to developing online student services.* Retrieved May 3, 2005 from http://www.wiche.edu/telecom/resources/publications/guide/guide.htm.

Lewis, B. A. (2002). Learning effectiveness: Efficacy of quizzes vs. discussions in on-line learning. *Dissertation International Abstracts*, 63(03), 911A.

Liu, Y. & Ginther, D. (1999). Cognitive styles and distance education. Online Journal of Distance Learning Administration, 2 (3). Retrieved from the World Wide Web Nov. 26, 2002: http://www.westga.edu/~distance/liu23.html

Ludwig-Hardman, S., and Dunlap, J. (2003). Learner Support Services for Online Students: Scaffolding for Success. *International Review of Research in Open and Distance Learning*, 4(1). Retrieved May 3, 2005 from http://www.irrodl.org/content/v4.1/dunlap.html.

Lux, J.R., & Davidson, B. D. (2003). Guidelines for the development of computer-based instruction modules for science and engineering. *Educational Technology & Society, 6*(4), 125-133. Available at http://ifets.ieee.org/periodical/6_4/12.pdf

Macdonald, J. & Twining, P. (2002). Assessing activity-based learning for a networked course. *British Journal of Educational Technology 33*(5), 603-618

Mager, R. (1962). Preparing Instructional Objectives. Palo Alto, CA: Fearon Publishers, Inc.

Mager, R. (1975). Preparing Instructional Objectives: Second Edition. Belmont, CA: Fearon-Pitman Publishers, Inc.

Malopinsky, L., Kirkley, J. R., Duffy, T. (2002). Building Performance Support Systems to Assist preK-12 Teachers in Designing Online, Inquiry-Based Professional Development Instruction. Paper presented at the Annual Meeting of American Educational Research Association, New Orleans, LA.

May, S. (1993). Collaborative learning: More is not necessarily better. *American Journal of Distance Education*, 7 (3), 39-49.

McIsaac, M., Blocher, J., Mahes, V., & Vrasidas, C. (1999). Student and teacher perceptions of interaction in online computer-mediated communication. *Educational Media International, 36*(2), 121-132.

McVay Lynch, M. (1998). Constructivism in instructional design for distance education. Retrieved July 16, 2001, from Portland State University, Computing Resources Web site: http://web.pdx.edu/~mmlynch/constructivist.html

Miller, M. D., Rainer, R. K. & Coley, J. K. (2003). Predictors of engagement and participation in an on-line course. *The Online Journal of Distance Learning Administration, 6*(1). Retrieved November 20, 2005, from http://www.westga.edu/~distance/ojdla/spring61/miller61.htm

Moore, M. G. & Kearsley, G. *Distance education: A systems view* (2nd ed). Belmont, CA: Thomson Wadsworth.

Muirhead, B. (2000). Enhancing Social Interaction in Computer-Mediated Distance Education. Educational Technology & Society, 3 (4) [Online]. Retrieved December 20, 2002 from the World Wide Web: http://ifets.ieee.org/periodical/vol_4_2000/discuss_august2000.pdf

Muirhead, B. (200?). Practical strategies for teaching computer-mediated classes. *US Distance Learning Association Journal*, 15 (5). Retrieved November 8, 2003 from http://www.usdla.org/html/journal/May01_Issue/article02.html

Murphy, K., Mahoney, S. & Harvell, T. (2000). Role of Contracts in Enhancing Community Building in Web Courses. *Educational Technology & Society*, 3 (3) [Electronic version]. Retrieved December 20, 2002 from http://ifets.ieee.org/periodical/vol_3_2000/e03.pdf

Neuhauser, C. (2002). Learning style and effectiveness of online and face-to-face instruction. *American Journal of Distance Education*, 16(2), 99-113.

Nicol, D., Littlejohn, A., and Grierson, H. (2005). The importance of structuring information and resources within shared workspaces during collaborative design learning. *Open Learning*, 20(1), 31-49.

Nielsen, J. (2000). Designing accessibility: the pragmatic approach. *JakobNielsen's Alertbox*. Retrieved November 22, 2005, from http://www.useit.com/alertbox/990613.html

Pawan, F., Paulus, T. M., Yalcin, S., & Chang. C. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning and Technology, 7*(3), 119-140.

Perrin, K. M.& Mayhew, D.(2002, Winter). The reality of designing and implementing an Internet-based course. *Journal of Distance Learning Administration, 3* (4).

Phipps, R. & Merisotis, J. (2000, April). Quality on the line: Benchmarks for success in Internet-based distance education. Report from The Institute for Higher Education Policy, Washington, D.C. Retrieved September 2000, from http://www.ihep.com/Pubs/PDF/Quality.pdf

Poscente, K. R. & Fahy, P. J. (2003). Investigating triggers in CMC text transcripts. *International Review of Research in Open and Distance Learning,* 4(2). Retrieved April 21, 2005, from http://www.irrodl.org/content/v4.2/poscente_fahy.html

Ragoonaden, K. & Bordeleau, P. (2000). Collaborative Learning via the Internet. Educational Technology & Society, 3 (3) [Online]. Retrieved 12/20/2002 from the World Wide Web: http://ifets.ieee.org/periodical/vol_3_2000/d11.pdf

Richardson, J., and Swan, K. (2001). An examination of social presence in online learning: students' perceived learning and satisfaction. Seattle, WA: Paper presented at the annual meeting of the American Educational Research Association, 2001.

Roblyer, M. D. &. Ekhaml, L. (2000, Spring). How interactive are YOUR distance courses? A rubric for assessing interaction in distance learning. Online Journal of Distance Education Administration, 3(2). Retrieved October 25, 2000, from http://www.westga.edu/~distance/roblyer32.html.

Roblyer, M. D. & Wiencke, W. R. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *The American Journal of Distance Education, 17*(2), 77-98.

Rogers, J. (2000). Communities of Practice: A framework for fostering coherence in virtual learning communities. Educational Technology & Society, 3 (3) [Online]. Retrieved 12/20/2002 from the World Wide Web: http://ifets.ieee.org/periodical/vol_3_2000/e01.pdf

Rourke, L., Anderson, T., Garrison, D. R. & Archer,W. (2001). Assessing Social Presence in Asynchronous Text-based Computer Conferencing. *Journal of Distance Education*, 14(2), 50-71. Retrieved December 20, 2002 from the World Wide Web: http://cade.athabascau.ca/vol14.2/rourke_et_al.html

Rowland, C., Burgstahler, S., Smith, J., & Coombs, N. (2004). Issues in accessing distance education technologies for individuals with disabilities. *White paper for National Summit on Disability & Distance Education,* Washington, DC, May 11-12. Retrieved November 22, 2005 from http://www.ncdae.org/activities/papers/technology.htm

Saba, F. (2005). Critical issues in distance education: A report from the United States. *Distance Education, 26*(2), 255-272.

Schwartz, L. M. (2004). XXXII: Using internet audio to enhance online accessibility. *International Review of Research in Open and Distance Learning, 5*(2). Retrieved April 21, 2005 from http://www.irrodl.org/content/v5.2/technote2.html

Sener, J. (2001). Bringing ALN into the mainstream: NVCC case studies. In Bourne, J., and Moore, J. (Eds.), On-Line Education, Volume 2: Learning Effectiveness, Faculty Satisfaction, and Cost Effectiveness. (pp.7-29). Needham, MA: Sloan Center for OnLine Education.

Shattuck, K. 2002. Speaking personally-with Betsy A. Zaborowski. *The American Journal of Distance Education, 16*(4), 259-263.

Shattuck, K. (2005). Glimpses of the global coral gardens: Insights of international adult learners on the interactions of cultures in online distance education. (Doctoral dissertation, The Pennsylvania State University, 2005).

Shea, P., Fredericksen, E., Pickett, A., Pelz, W., and Swan, K.. (2001). Measures of learning effectiveness in the SUNY learning network. In Bourne, J., and Moore, J. (Eds.), On-Line Education, Volume 2: Learning Effectiveness, Faculty Satisfaction, and Cost Effectiveness. (pp.31-54). Needham, MA: Sloan Center for OnLine Education.

Shea, P., Swan, K., Fredericksen, E., and Pickett, A. (2002). Student satisfaction and reported learning in the SUNY learning network. In Bourne, J., and Moore, J. (Eds.), Elements of Quality Online Education. (pp.145-56). Needham, MA: Sloan Center for OnLine Education.

Shin, N. (2001). Beyond interaction: transactional presence and distance learning Unpublished doctoral dissertation, Pennsylvania State University.

Shin, N. (2002). Beyond interaction: the relational construct of 'Transactional Presence.' *Open Learning, 17*(2), 121-137.

Sims, R. (2003). Promises of interactivity: Aligning learner perceptions and expectations with strategies for flexible and online learning. *Distance Education, 24*(1), 87-103.

Sims, R., Dobbs, G., & Hand, T. (2002). Enhancing quality in online learning: Scaffolding planning and design through proactive evaluation. *Distance Education, 23*(2), 135-148.

Shiratuddin N., Hassan, S., Landoni, M. (2003). A usability study for promoting eContent in higher education. *Educational Technology & Society, 6*(4), 112-124. Available at http://ifets.ieee.org/periodical/6_4/11.pdf

Sonwalkar, N. (2001, December). The sharp edge of the cube: Pedagogically driven instructional design for online education. *Syllabus.* Retrieved June 13, 2002, from http://www.syllabus.com/syllabusmagazine/article.asp?id=5858

Spallek, H., Berthold, P, Shanley, D. B., & Attstrom, R. (2000). Distance education for dentists: Improving the quality of online instruction. *The American Journal of Distance Education, 14*(2), 49-59.

Stewart, I., Hong, E., & Strudler, N. (2004). Development and validation of an instrument for student evaluation of the quality of web-based instruction. *The American Journal of Distance Education, 18*(3), 131-150.

Swan, K. (2001). Virtual interactivity: design factors affecting student satisfaction and perceived learning in asynchronous online courses. Distance Education, 22, (2), 306-331. (R)

Swan, K., (2003). Learning effectiveness: what the research tells us. In Bourne, J., and Moore, J. (Eds.), Elements of Quality Online Education: Practice and Direction. (pp.13-46). Needham, MA: Sloan-C.

Swan, K., Shea, P., Fredericksen, E.E., Pickett, A.M. & Pelz, W.E. (2000). Course Design Factors Influencing the Success of Online Learning. Retrieved June 13, 2003, from www.ericit.org/fulltext/IR020523.pdf

Thurmond, V., Wambach, K., Connors, H., and Frey, B. (2002). Evaluation of student satisfaction: determining the impact of a web-based environment by controlling for student characteristics. *The American Journal of Distance Education*, 16 (3), 169-89.

Trigano, P. C. & Pacurar-Giacomino, E. (2004). Toward a web based environment for evaluation and design of pedagogical hypermedia. *Educational Technology & Society, 7*(3), 21-37.

Tuzum, H. (n.d.). *Guidelines for converting existing courses into web-based format.* ERIC Clearinghourse on Inforamtion and Technology. Retrieved April 25, 2003, from www.distanc-education.com/dnews/?name=News&file=article&sid=8924

Vandergrift, K. (2002, July). The anatomy of a distance education course: a case study analysis, *Journal of Asynchronous Learning Networks*, 6 (1). Retrieved October 15, 2002, from http://www.aln.org/publications/jaln/v6n1/v6n1_vandergrift.asp

Visser, L. & Visser, Y. L. (2000). Perceived and actual student support needs in distance education. *The Quarterly Review of Distance Education*, 1 (2), 109-117.

Vrasidas, C. & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education*, 13 (3), 2-35.

Weir, L. (2005, May). Raising the awareness of online accessibility. *THE: Journal*, 30 – 33.

Williams, P. E. (2000). Defining distance education roles and competencies for higher education institutions: A computer-mediated delphi study [Electronic Version] (Doctoral Dissertation, Texas A & M, 2000) *Dissertation Abstracts International* (UMI No. AAT9969029).

Wisher, R. A., Curnow, C. K., & Seidel, R.,J. (2001). Knowledge retention as a latent outcome measure in distance learning. *The American Journal of Distance Education, 15*(3), 20-35.

Wu, D., &Hiltz, S. (2004). Predicting learning from asynchronous online discussions. *Journal of Asynchronous Learning Networks*, 8(2). Retrieved May 3, 2005 from http://www.sloan-c.org/publications/jaln/v8n2/v8n2_wu.asp.

Yeung, D. (2002 ,summer). Toward and effective quality assurance model of web-based learning: The perspective of academic staff. *Online Journal of Distance Learning Administration, 5* (2). Retrieved March 19, 2003, from http://www.westga.edu/~distance/ojdla/summer52/yeung52.htm

Youngblood, P., Trede, F., & DeCorpo, S. (2001). Facilitating online learning: A descriptive study. *Distance Education, 22*(2), 264-284.

Zhang, D. (2005). Interactive multimedia-based e-learning: A study of effectiveness. *The American Journal of Distance Education, 19*(3), 149-162.

Appendix 2. Standards Sets Referenced to QM Rubric Specific Review Standards

American Council on Education (ACE) Distance Learning Principles
No longer available online, but available from ACE in book form – see http://www.acenet.edu/bookstore/pubInfo.cfm?pubID=110, retrieved May 20, 2005.)
The ACE Distance Learning Principles are very broad statements of five principles; each of which is detailed by a set of "sub-principles." Principles in three areas, Learning Design (LD), Learning Outcomes (LO), and Technology (T), are referenced to the QM rubric.

Example reference: ACE LD 6 = Learning Design Principle, Sub-principle 6 ("Learning outcomes address both content mastery and increased learning skills.")

American Distance Education Consortium (ADEC) Guiding Principles for Distance Learning (http://www.adec.edu/admin/papers/distance-learning_principles.html). Four very broadly worded statements comprise the ADEC Guiding Principles for Distance Learning. The first principle, "Design for active and effective learning," is referenced to the QM rubric.

Example reference: ADEC Principle 1

NEA/IHEP Quality Benchmarks as found in the report "Quality On the Line: Benchmarks for Success in Internet-Based Distance Education" http://www.ihep.org/Pubs/PDF/Quality.pdf. This report contains a set of 24 quality benchmarks related to various areas of providing quality online education. Several Course Development Benchmarks (CDB), Teaching/Learning Benchmarks (T/LB), and Course Structure Benchmarks (CSB) are referenced to the QM rubric.

Example reference: NEA/IHEP T/LB 2 = the second Teaching/Learning Benchmark listed ("Feedback to student assignments and questions is constructive and provided in a timely manner.")

Southern Regional Educational Board (SREB) Electronic Campus Principles of Good Practice (PGP) (http://www.electroniccampus.org/student/srecinfo/publications/principles.asp) Broad set of principles adopted from ones originally developed by WICHE. Principles related to Curriculum and Instruction (CI), Resources for Learning (RL), and Evaluation and Assessment (EA) are referenced to the QM rubric.

Example reference: SREB PGP RL 1 = the first Resources for Learning principle listed ("The program or course ensures that appropriate learning resources are available to students.")

SREB Criteria for Evaluating Online Courses (http://www.evalutech.sreb.org/criteria/online.asp). SREB also has a list of criteria for evaluating online courses. Although geared to the K-12 environment, many of the criteria related to Teaching Site (TS), Student Site (SS), Course Content (CC), and Teacher Interaction (TI) are relevant to higher education online courses and thus referenced to the QM rubric.

Example reference: SREB CEOC CC = one or more criteria related to Course Content (e.g., "Assignments are clear and understandable to the student […].")

Western Interstate Commission on Higher Education (WICHE) Best Practices for Electronically Offered Degree and Certificate Programs (download at http://www.wiche.edu/Telecom/Article1.htm) Also adapted by the **Middle States Commission** (MSC). Two components (Component 2e and 5f) are referenced to the QM rubric.

Example reference: WICHE/MSC 2e