ON-LINE DELIVERY OF COURSES: WHAT COMPONENTS ARE IMPORTANT TO STUDENTS?

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Increasingly popular, on-line courses have seen enrollments double within a five year period to 3.94 million students in 2007.[1] Thus, it is important for educators to monitor courses to understand which course components enhance or detract from the on-line learning experience and to understand the delivery features and mechanisms that are important to students. Measurements of student perceptions about such features and mechanisms provide indicators that can aid educators in the design of effective and high-quality on-line course experiences.

In order to assess effectiveness of on-line educational offerings, numerous frameworks for analyzing the quality of on-line education exist, including the Quality Matters (QM) Program, the Institute for Higher Education Policy (IHEP), the Western Interstate Commission for Higher Education Cooperative (WCET) best practices, the E-Learning Maturity Model (eMM), and others. These frameworks identify factors important to the quality of on-line delivery. The frameworks possess similarities and repeated themes. Among the common themes are learning objectives, instructional resources and materials, learner engagement, and course technology. This study ties some of the quality factors present in the frameworks directly to student opinion.

In order to better understand some factors identified in quality frameworks, faculty developed a survey to measure student perceptions related to factors of interest that directly affect students. Factors considered include learning objectives, resources and materials, and engagement and interaction. The survey was administered to 106 students enrolled in five distinct courses in three different formats (traditional lecture, online, and hybrid). The courses spanned subjects, with a research course, two consumer science courses, and two information technology courses. The survey did not address issues related to the course through which the respondent was accessing the survey, but rather, issues related to the student's experience with on-line learning in general. The selection of courses served to provide a cross-section of students by level and major with varying degrees of experience with online and hybrid modes of instruction. The survey was administered on-line and results were analyzed.

This paper addresses the following issues.

1. Major frameworks for assessing on-line and distance courses are presented and summarized. The components examined with this analysis are identified and discussed.
2. Student perceptions of course components (e.g. the use of teams, on-line lectures, discussion boards, etc.) as measured by the developed survey are summarized and presented.
3. General student perceptions of on-line delivery, as measured by the survey instrument, are presented in summary form.
4. Results are analyzed and implications for on-line delivery of courses are presented.

Quality Assurance Frameworks for On-Line Education

After the World Wide Web emerged in the early 1990s, educators imagined and developed on-line courses. Since then, on-line instruction has grown as a strong and viable instructional approach. In higher education, on-line enrollments doubled from 2002 to 2007[1], and the 2007-08 academic year saw 1.03 million K-12 public school students engaged in some form of on-line class.[2] The phenomenal growth focused the attention of researchers and practitioners to the problem of understanding issues that reflect quality in on-line education. Progress in the area is marked by the emergence of quality frameworks, best practices,

and benchmarks that have been established to support quality assessment and improvement efforts for on-line education.[3] The frameworks provide guidelines that an institution can use to build their own quality management system.

Without a reference framework, localized quality assurance and improvement initiatives often begin with identifying areas of quality concern, stating goals for each area, identifying indicators of goal achievement, and planning measurements for the indicators.[4] Developed quality frameworks support this overall process and are adaptable, as opposed to prescriptive. As an example, a set of guidelines was developed by the Sloan Consortium (Sloan-C), an organization whose purpose is to help e-learning organizations continually improve the quality of their offerings.[5] Sloan-C guidelines identify "five pillars" of quality in on-line education. These pillars are learning effectiveness, cost effectiveness and institutional commitment, access, faculty satisfaction, and student satisfaction. The intent of the Sloan-C framework is to allow each organization to develop its own standards within each pillar of quality. Thus, each organization would determine indicators of student satisfaction, specify measurements for each indicator, and identify acceptable standards for each measure. The organization would then proceed to systematically measure and review in order to spawn improvement. The adaptability of Sloan-C reflects that quality is a subjective concept that is context-dependent; it has many and varied stakeholders who often view quality from different perspectives.

The Quality MattersTM Program (QM) provides a widely recognized set of standards for measuring the quality of on-line instruction and course design.[6] QM is a course-level evaluation scheme based on best practices and instructional design research.[7] Through a rubric, courses are peer-reviewed and assessed on 40 elements distributed across eight broad standards (areas of quality concern). The eight standards with approximate indicators are as follows:

1. *Course overview and introduction* – "getting started" instructions, purpose, prerequisites.
2. *Learning objectives* – clear, measurable, aligned with course activities.
3. *Assessment and measurement* – appropriate, aligned with learning materials.
4. *Resources and materials* – appropriate instructional materials linked to objectives.
5. *Learner engagement* – encourage instructor-student, content-student, and student-student interaction; clear expectations for involvement.
6. *Course technology* – effective use of ICTs to support content delivery and engagement; efficient navigation.
7. *Learner support* – clear instructions for technical support and/or learning support.
8. *Learner support Accessibility* – compliance with ADA (*Department of Justice ADA Standards for Accessible Design*, 1994) and institutional policies for courses.[8]

The nonprofit Institute for Higher Education Policy (IHEP) strives to influence public policy regarding postsecondary education by providing research results to decision makers.[9] IHEP published twenty-four benchmark criteria for use in determining whether an e-learning program can be recognized as a quality program.[10] The benchmarks are organized into seven categories (areas of quality concern) which are referred to as standards. The seven standards with approximate indicators are as follows:

1. *Institutional support* - institutional policies, people that support technologies and infrastructure
2. *Course development*- outcomes as drivers, institutional minimum standards, design for student engagement.
3. *Teaching/learning* – instructor-student, content-student, and student-student interaction; timely feedback.
4. *Course structure* – objectives, sufficient library access, stated expectations
5. *Student support* – orientation such as books, testing, and technical assistance.
6. *Faculty support* – technical support for course development and instructional support for transforming a course.
7. *Evaluation and assessment* – a process that uses multiple measures; data on costs, enrollments; review of learning outcomes.

The Western Interstate Commission for Higher Education Cooperative for Educational Technologies (WCET) publishes best practices for electronically offered degree and certificate programs.[11] These practices consist of 27 principles across 5l activities and they map to areas of quality that appear in other institutional-level evaluation frameworks, including IHEP. The five institutional activities are 1) institutional commitment, 2) well structured curricula and effective instruction, 3) faculty support, 4) student support, and 5) evaluation and assessment of on-line offerings. The best practices were designed to bridge a gap between electronic learning environments and regional accreditation standards for fulfilling institutional effectiveness goals.[3]

Some quality assurance frameworks for educational settings have been adapted from frameworks that originated in industrial or business settings. The Malcolm Baldrige National Quality Award (MBNQA) education criteria originated in a business setting.[12,13] It identifies seven categories of quality concern including: 1) leadership; 2) strategic planning; 3) customer focus; 4) measurement, analysis, and knowledge management; 5) workforce focus; 6) process management, and 7) results. Another framework of interest is adapted from the Capability Maturity Model and SPICE project from the software development industry.[14,15] It is the E-Learning Maturity Model (eMM).[16] eMM focuses on the process nature of on-line education at an institutional level. Through this framework, institutions assess their capability to develop, deploy, and support e-learning. The emphasis of eMM is on-going improvement of e-learning processes. The eMM framework defines the following levels of capability with respect to an institution's e-learning initiatives.

1. Initial Level – no formal processes, institutional ad-hoc approach to e-learning.
2. Planned Level – deliberate processes, institutional planned approach to e-learning.
3. Defined Level – structured processes integrated with traditional university teaching, institutional strategic approach to e-learning including, possibly, an e-learning vision.
4. Managed Level – organizational approach with institutional criteria for evaluating e-learning in terms of improved student outcomes (beyond just student perception).
5. Optimized Level – continuous improvement processes, institutional program for regularly auditing the educational effectiveness of e-learning.

The International Association for K-12 Online Learning (iNACOL) publishes the National Standards for Quality Online Teaching. These standards are designed to provide a set of quality guidelines for on-line teaching and instructional design.[17]The focus is on whether or not the teacher does the following:

1. Meets state professional standards or has appropriate academic credentials
2. Possesses technology skills necessary to teach on-line
3. Plans, designs, and implements on-line strategies that encourage active learning, interaction, participation, and collaboration
4. Promotes student success with regular feedback, prompt response, and clear expectations
5. Models, guides, and encourages legal, ethical, and safe technology use
6. Has experienced on-line learning from the perspective of a student
7. Is responsive to on-line students with special needs
8. Creates and implements on-line student assessment strategies that assure validity and reliability of instruments and procedures
9. Develops and delivers assessments, projects, and assignments that assess student learning progress toward learning goals
10. Competently uses data and findings from assessments and other sources to modify instructional methods and content and to guide student learning
11. Employs frequent prompts to enable students to complete self- and pre-assessments
12. Collaborates with colleagues
13. Arranges media and content to optimize teacher-student- transfer of knowledge on-line

Through the review of numerous existing frameworks for quality of on-line education, it was revealed that each can be classified as to the level of its focus, for example, institutional, course, or teacher level, and higher education, K-12, or any level. The review also revealed that the many frameworks possess similarities and repeated themes, including strong institutional commitment, adequate curriculum and instruction, sufficient faculty support, ample student support, and consistent learning outcome assessment.[18] The similarities indicate a common perception throughout the U.S. of what quality in on-line/distance education means.[19] This observation was confirmed by a U.S. Department of Education study which found that, despite the variation among standards and assessment techniques, accreditation reviewers demonstrate consistency about indicators of quality and the evaluation of on-line programs.[20]

Factors Influencing Student Perceptions

To assure quality *and* consumer satisfaction, institutions and their faculty must pay close attention not only to frameworks for assuring quality in e-learning, but also to their students' perceptions of and satisfaction with their on-line course offerings and programs.[21] Most students evaluate the quality of a course based on personal perception. This section examines some of the research that addresses the quality of the e-learning experience from a student's perspective.

Several factors that affect a student's perception of quality have been identified in the research. These factors include course design, strength of the on-line learning community, timely and frequent interactions between learners and instructors, realistic and achievable outcomes, adequate and easy instructions on how to meet the course outcomes, and fairness of exams and grading.[22] Because the last three factors are not considered in the study reported here, only the first three are substantiated in this review.

When course design is poor in e-learning, students may become frustrated, which can lead to poor learning outcomes.[23] A well-designed course, on the other hand, can improve students' use of different on-line strategies and assignments. Course design encompasses organization, accessibility, structure, and pedagogy. It also encompasses processes by which on-line communications and interaction are integrated into class structure.[24] Nath and Ralston-Berg found that students place a high value on materials being well organized.[25] Important aspects of course organization are organizing the course around goals; organizing for student-centeredness; organizing for flexibility in terms of pace, activities, and time commitment; organizing for timely feedback on assignments and assessments; and providing unambiguous statements of expectations and clear procedures.[24] In addition, the study by Young and Norgard found that students preferred consistent design across courses to support ease of navigation.[21]

The strength of the on-line learning community has been associated with higher levels of student satisfaction.[26-31] An on-line learning community is a group of learners that include the professor and the students, who share a common learning goal and who collaborate to achieve that goal.[32] The role of the professor is to select and structure information for the students. The professor also provides questions and tasks that promote critical thinking, facilitates on-line discussions, and coaches and mentors students as they work together to learn.[23] An on-line community is often considered to match the constructivist view of learning, where students construct personal meaning of content by engaging with the content.[24,33] The participation of the instructor is key to the development of a feeling of connectivity within an on-line learning community.

The number and quality of interaction events between and among learners and instructors is another factor often cited as important to on-line learning environments. Three types of critical interactions are discussed broadly in the literature: learner-instructor, learner-learner, and learner-content. Kanuka and Anderson found that social interaction between learners and instructors contributes to learner satisfaction[29], and Brodke and Mruk found the same.[27] Young and Norgard determined that student-to-student interaction was also important to student satisfaction.[21] One study linked student

dissatisfaction with insufficient opportunities for learner-learner interaction.[33] Recent research found that an on-line course with highly structured content could be as satisfying as a highly interactive course with little content structure, demonstrating that different types of courses are capable of producing satisfied students.[34]

Instructors who teach on-line courses must use a greater range of communication technologies than those teaching face-to-face courses. A primary method used by students to contact an instructor (and vice-versa) is e-mail. The on-line instructor needs to check e-mail at least daily, if not more often, to be effective.[35,36] Student perception about the timely response to questions by instructors has been found to be a significant predictor of learner satisfaction.[37,38] Students in other studies felt isolated and unsure whether their efforts were correct when instructors did not respond in a timely manner.[21,23]

Current Study Background

Frameworks for quality assurance of e-learning are useful for establishing, implementing, and maintaining quality assessment processes in support of continuous improvement, accreditation, and benchmarking. With one or more frameworks structuring the effort, quality processes are often undertaken formally at an institutional or program level. In addition, individual faculty members use informal processes for improving the quality of their courses. The question remains as to whether or not formal and informal improvement initiatives based on frameworks (or otherwise) help create quality in e-learning from a student's perspective.

Do e-learning quality frameworks, in fact, reflect the desires and needs of students? This question should be readily answered by locating the empirical and theoretical studies that formed the creation of each framework element, but such a quest turns out to be difficult rather than simple. The frameworks were built partly on empirical evidence, partly on theoretical postulating, and partly on the basis of experience and informal observation by dedicated expert educators.[39] In addition, the frameworks attempt to capture something extremely complex and multi-faceted, namely, the quality of the learning experience. Quality of traditional learning experiences is not so well defined that there exists a single prescription for the perfect course/teacher/learner /subject matter combination; and on-line learning experiences are no less complex. This understanding motivated the current study.

Study Procedures

In order to obtain a clearer understanding of how certain instructional components contribute to students' perceptions of quality in on-line course offerings, 106 students were surveyed in April 2010 at the University of Houston. Participating students were registered in one of five courses chosen for distribution of the study survey. The courses varied in subject, level and delivery mode as shown in Table 1.

In order to complete the survey, students logged on to an on-line learning management system that housed course materials and other course elements. Completion of the survey was voluntary, and all responses were anonymous. Using this system, responses were downloaded for analysis into a spreadsheet, with each response record identified by a number assigned to the response record by the learning management system's assessment module.

Table 1: Courses Used for Survey Administration.

Course	Level	Delivery Mode
Internet Application Development	Lower division (sophomore)	Hybrid
Enterprise Applications Development	Upper division (senior)	Traditional lecture
Research Concepts	Upper division (senior)	On-line
Consumer Science	Upper division (junior)	On-line
Visual Merchandising	Upper division (senior)	On-line

To facilitate the goals of this research, rather than using or adapting a more general existing survey instrument, a tool was designed that targeted the specific items of inquiry for the project. This survey instrument consisted of twenty-two items. Items 1 through 8 addressed student demographics including: 1) student classification, 2) number of on-line courses completed by the student, 3) enrollment status (mostly full-time or mostly part-time), 4) gender, 5) age, 6) estimated overall GPA, 7) distance from the student's home to the campus and 8) employment status.

The second part of the survey (items 9-14) was concerned with instructional components of on-line courses. Components were selected for investigation based on (1) the researchers' collective experience with the particular components which are widely used in on-line courses and (2) the mapping of the instructional components to one or more elements of at least one quality framework or to factors identified as influential with respect to student perception of quality. The components selected were team projects, discussion board assignments, lectures (made available via any viable on-line format including audio-only, voice with presentation slides, video, and synchronous on-line delivery via a web-conferencing tool), student access to a complete set of learning objectives, instructor response time, and ease of course navigation. Figure 1 shows the mapping of these instructional components to framework elements and perception factors.

A semantic differential scale was used to measure students' perception of whether the feature was or was not valuable to the student's learning experience. Students chose a value from 1 through 7, where 1 reflected a course component that was not valuable and 7 reflected a valuable component with a continuum between these two extremes.

The third part of the survey (items 15-20) focused on delivery features of on-line courses and perceived quality/learning when compared to face-to face courses. Features included: need to proctor exams, value of lectures, level of difficulty of on-line learning as compared to face-to-face, success of on-line learning as compared to face-to-face, and instructor response. A semantic differential scale (as described in the preceding paragraph) was used to measure students' perception of whether the feature was valuable to the student learning experience or not.

The fourth part of the survey was open-ended. Students were asked to list strengths and weaknesses of on-line courses.

Item responses were tabulated, and descriptive measures are used to present the results. The open-ended responses are categorized by the type of instructional component or delivery feature.

Study Results

The analysis was designed to consider the following issues.

- What does the data indicate regarding students' perceptions of the value of selected on-line course delivery components to their overall educational experience?
- What are students' perceptions regarding the value of selected instructional features to their overall educational experience?
- Based on their own observations, how do students view the difficulty and learning levels of on-line versus face-to face courses?

Ninety percent of the students were classified as juniors or seniors and thus, they were experienced students. The students were also experienced with on-line courses; 60% of them had completed at least four on-line courses, and only 16% had zero or one on-line course. The students were otherwise characterized as female (66%), mostly full-time (90%) and under 26 years of age (75%). Most lived in the Houston region (89%), at least 10 miles from campus (58%). Seventy-eight percent of the students were employed, either in a full-time or part-time position.

A review of the data on the perceptions of course components (items 9 through 14) is presented in Table 2. In order to determine those components that were perceived as essential or unimportant and those situations that were perceived as presenting s ome ambiguity, responses were

categorized into one of three collapsed areas: Essential, Neutral, or Unimportant. The tabulated and illustrated (in Figure 2) summarized data present the item concepts in abbreviated form.

A review of the data on the perceptions of course features and learning is presented in Tables 3 and 4 and corresponding Figures. In order to determine those situations that were perceived as essential or unimportant and those situations that were ambiguously perceived, responses were again categorized into one of three collapsed areas: Essential, Neutral, or Unimportant. The tabulated and illustrated summarized data present the item concepts in abbreviated form.

Figure 1: Mapping of Survey Items to Frameworks and Student Perception Factors.

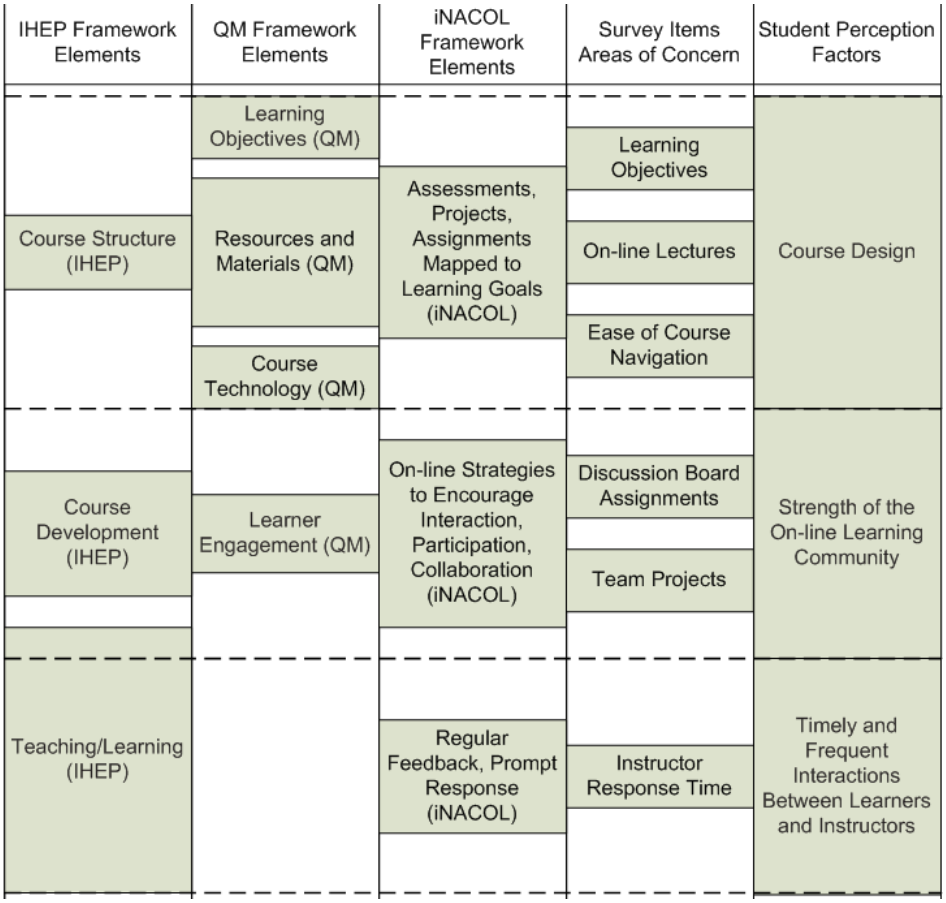

Table 2: Student Perceptions of On-line Course Delivery Components.

	Perception (%)		
	Essential	Neutral	Unimportant
Teams	23	34	43
Discussion Board	31	53	16
Lectures	46	42	12
Objectves	83	15	2
Immediate Response	83	16	1
Navigation	86	12	2

Figure 2: Student Perceptions of On-line Course Delivery Components.

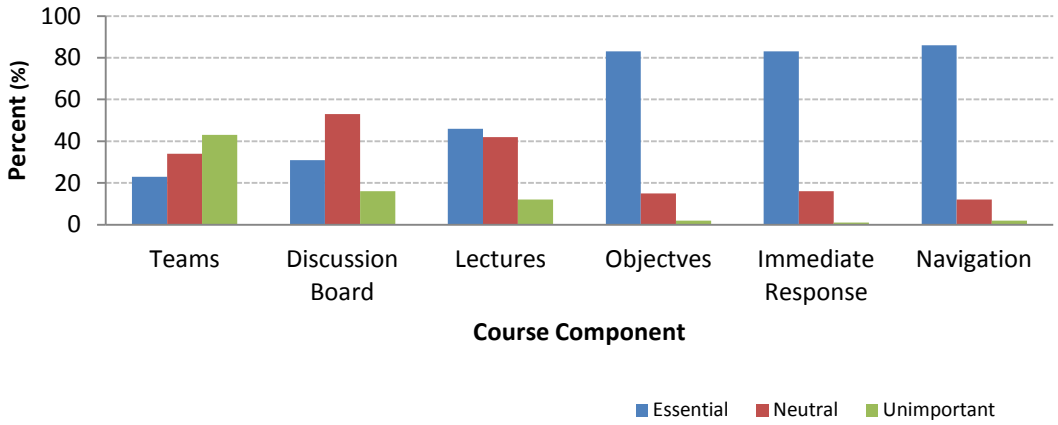

Table 3: Student Perceptions of Course Instructional Features.

	Perception (%)		
	Completely Agree	Neutral	Completely Disgree
Proctored Exams	7	40	54
Info Sources ->Replace Lectures	48	41	11

Figure 3: Student Perceptions of Course Instructional Features.

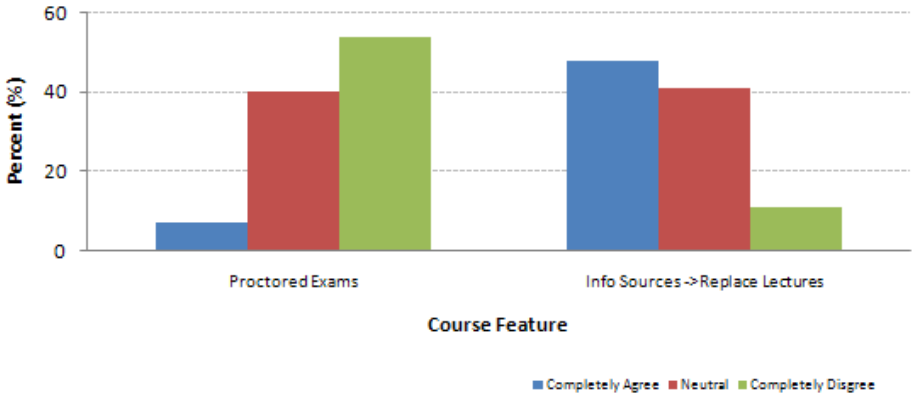

Table 4: Student Perceptions of Learning: OL vs. F-to-F.

	Perception (%)		
	Completely Agree	Neutral	Completely Disgree
On Line Classes - More Difficult	21	58	22
Learning Greater in On-line	15	55	30

Figure 4: Student Perceptions of Learning: OL vs. F-to-F.

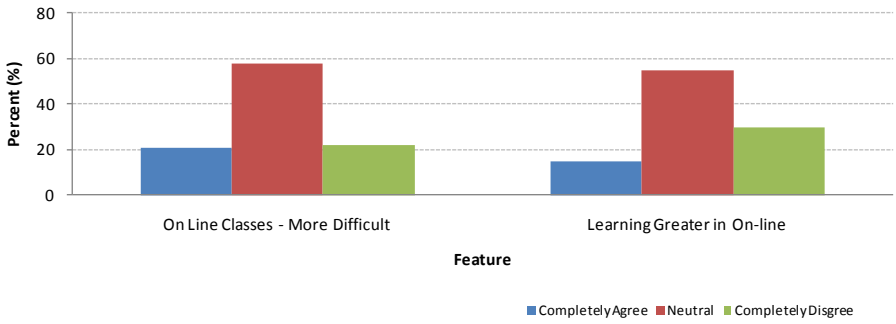

Table 5: Student Perceptions of On-Line Course Strengths and Weaknesses.

	n	%
Noted Strengths		
Time/Convenience/Access	59	57
Content/Information	26	25
Planning/Organization/Self-Management	18	17
	103	
Noted Weakness		
Communication/Face-to-Face	40	47
Content	19	22
Self/Motivation	16	19
Technical	5	6
Time	4	5
Other	1	1
	85	

The data indicated that navigation, instructor immediate response, and clearly stated objectives are clearly viewed as essential. Although students seemed to be more ambivalent about teams, discussion boards, and e-lectures, the data seemed to suggest that they were at least somewhat important to many students. Their perception of replacing lectures with other information sources seemed to contradict the previous item. Perhaps the term "lecture" was confusing; for example, in some classes PowerPoint slides that contain only words and images are referred to as "lectures" even though they don't have any audio component. Students may have been saying that they needed content and the means of getting that content was not as important as having the content.

In comparing on-line courses with face-to-face courses, the students seemed to be consistent. The data suggested that both delivery modes were perceived as comparable in terms of level of difficulty and level of learning

Responses to the open-ended questions revealed puzzling data. Comments related to strengths were clustered into three groups including: convenience, content, and personal management. Comments related to weaknesses were clustered into five groups including communications, content, motivation, technology, and time, A summary of responses can be found in Table 5. (Note that the categorization is subjective and open to interpretation.)

Review of the summarized open-ended comment data revealed the following.

- Time/convenience/access was the number one reported strength of on-line offerings.
- Difficulty or lack of face-to-face communication was the number one reported weakness.
- Students did not seem to experience difficulty with the technical aspects of on-line course delivery.
- Development of personal management skills emerged as a strength, which was an unexpected result. It is an area that will be explored in a future study.

Summary and Discussion

This paper reviewed and presented major frameworks for assessing on-line courses and noted commonalities among the components of the frameworks. Common components were selected and mapped or compared to student perceptions of quality in on-line courses, yielding bases for continued and improved course design for on-line delivery.

Navigation, instructor immediate response, and clearly stated objectives were viewed as essential course components. Although students seemed to be more ambivalent about teams, discussion boards, and e-lectures, they were viewed as somewhat important to a majority of students. The finding that student perceptions of lecture value were ambivalent suggests that students may feel they need content, but the means of getting that content is not as important as having ready access to clear course material in any appropriate format. In comparing on-line courses with face-to-face courses, the students indicated that both on-line and face-to-face delivery modes are comparable in terms of level of difficulty and level of learning.

The qualitative and quantitative data provided supportive information indicating that convenience was a strength of on-line offerings and lack of face-to-face communication was a weakness. Students did not seem to experience difficulty with the technical aspects of on-line course delivery. Development of personal management skills also emerged as a strength. In fact, on-line courses may serve as tools for the development of personal management and lifelong learning skills. It is an area that should be explored in a future study.

The experience from this study suggests that many frameworks and standards exist to encourage quality in on-line courses and that commonality exists in the features, components, and environments encouraged by these guides. In concert with these guides, a clear understanding of the needs of students is desirable, even critical, to create quality educational environments on-line. This study confirmed that important features included in many of the frameworks were the same features perceived as desirable by students. This finding should encourage focused attention by course designers, administrators, and faculty to consideration and inclusion of these key course features. Future investigations to clarify and refine understanding of student needs and the further development of course features and attributes would be beneficial. As on-line course delivery continues to mature as an educational mode it is imperative that students' perceptions of need and course quality be given careful consideration in designing and assessing online courses.

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