# Raising the Bar for Instructional Quality

**Robert T. Hays,  David L. Ryan-Jones**
**Naval Air Systems Command, TSD**
**Orlando, FL**
robert.hays@navy.mil, david.ryan-jones@navy.mil

**Renée Stout**
**Joint ADL Co-Laboratory**
**Orlando, FL**
reneejstout@yahoo.com

## ABSTRACT

Quality is an important consideration for everyone involved in the acquisition or development of learning content. Most measures of quality have been developed for classroom instruction, often focusing on the ability of the instructor to get the message across to the student or to please the student.  However, the proliferation of web-based training approaches requires a more direct and intentional focus on the process of developing high quality instructional content.  Content acquired without quality assessment may be effective, but creates significant risk for the acquisition manager, and for the end-user who must learn from this content.  For this reason, it is essential to determine what quality is and is not with respect to instructional content, and to identify and establish objective measures for assessing quality early in the acquisition process.

The research and best practice literature regarding the factors that are associated with instructional quality was reviewed.  It was found that most evaluation checklists focus on academic instruction or are used by organizations that are paid to evaluate courses.  Therefore, we developed a more generic checklist with a set of objective criteria and specific measures for assessing the quality of instructional products developed for military training.   The evaluation criteria include assessments of:  1) the instructional content, 2) instructional activities, 3) performance assessment, 4) performance feedback, 5) navigation, 6) content presentation, 7) installation, and 8) registration. This paper has three primary purposes:  1) to provide the instructional quality checklist in a form that is  widely accessible to the military services to use as a tool to judge the quality of instructional products that are being developed or procured; 2) to provide information on how this checklist can be used; and 3) to describe plans for improving and using the checklist in the future.

## ABOUT THE AUTHORS

**Robert T. Hays, Ph.D.** is a Senior Research Psychologist in the Training  Technology Integration Branch at the Naval Air Systems Command Training Systems Division in Orlando, FL.  He also works with the Joint Advanced Distributed Learning Co-Laboratory and the Navy Human Performance Center in Orlando, FL.   He received a Ph.D. in general experimental psychology from Virginia Commonwealth University in 1979.  He has worked in the areas of advanced distributed learning, training applications of virtual reality, intelligent pedagogical agents, electronic performance support, and simulation-based training.  Dr. Hays is the author of numerous journal articles, technical reports, and other technical publications.

**David Ryan-Jones, Ph.D.** is a Senior Research Psychologist in the Training  Technology Development Branch at the Naval Air Systems Command Training Systems Division in Orlando, FL.   He received a Ph.D. in Experimental Psychology  from Florida State University in 1988.  Dr. Ryan-Jones previously worked with the Joint Advanced Distributed Learning Co-Laboratory in Orlando, FL on guidelines  for the design of browser-based instructional content.  He is currently  working with the Navy Human Performance Center in Orlando, FL on  the  application  of  the  science  of  learning  to  human performance improvement issues.

**Renée J. Stout, Ph.D.** holds a Ph.D. in Human Factors Psychology from the University of Central Florida and is currently a Psychological Consultant to the Joint Advanced Distributed Learning Co-Laboratory in Orlando, FL.  She has worked in the areas of training research, design, and development and human performance measurement for more than 15 years, including working in both the government and private sectors.  She has more than 100 publications/professional conference presentations in the areas of team training, performance measurement, and cognitive  factors underlying performance.  She was a past Program Chair for the Training Technical Group of the Human Factors and Ergonomics Society.  She was also a member of the Revision Action Committee for the ASTD ECC Standards, April 2003.

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reneejstout@yahoo.com

## INTRODUCTION

The Department of Defense (DoD), other Government agencies, academia, and private industry provide education and training on an increasingly varied and complex range of tasks and skills.  Especially in times of rapid change, we must rely upon well-trained personnel to effectively perform their jobs.   This requires high quality training.  Although instructional quality is usually a consideration, the proliferation of web-based courses requires a more direct and intentional focus on quality.  While this does not mean that content acquired without quality measurement is not good, it creates significant risk for the acquisition manager, and for the end-users who must learn from this content.   For this reason, it is essential to determine what quality is and is not with respect to instructional content, and to  identify and establish objective measures for assessing quality early in  the acquisition process.

## THE SEARCH FOR QUALITY: A PERENNIAL QUEST

Throughout history, people have sought to improve the quality of their lives and their products.  Before we can improve quality we must understand what the word means. One way to define quality is to identify some if its synonyms.  A brief list includes:  value, worth, goodness, and excellence.   The ancient Greeks struggled with the definition of the word arête (often translated as excellence).   Plato and Aristotle defined two extreme views of excellence or quality.   Plato believed that quality is an absolute factor that is discovered by the observer as it is reflected in  real-world objects.  On the other hand, Aristotle maintained that quality is a relative term and resides in the  specific characteristics of the object. Table 1 summarizes these opposing views.

As with most polar opposites, the definition of quality contains elements of both views.  It is defined by the observer of specific objects based upon his or her expectations about that object.  The search for higher quality instruction is thus, dependent on the expectations we set about instruction.

**Table 1:** Opposing Views of Quality

| Plato | Aristotle |
|---|---|
| Absolute | Relative |
| General | Specific |
| Observer | Object |

It is especially important that web-based instruction be of high quality (Stout, Slosser, & Hays, 2001).  This is because so many web-based courses do not have an instructor present to mitigate the potentially adverse learning effects of poorly designed instruction.

## INSTRUCTION OR INFORMATION?

Before beginning the discussion of instructional quality, it is necessary to understand the distinction between information and instruction.  This distinction is often ignored because some believe that any source of information (e.g., a web site) is also instruction (e.g., a web course).  Winner (as cited in Iseke-Barnes, 1996) distinguishes between information and knowledge.  He maintains that only when information is interpreted and related through critical thought and understanding does it become knowledge.  It is the processes of helping the student transform information into knowledge that constitutes instruction.   People can learn from information, but this learning is not instruction.   It is uncontrolled and unstructured learning, producing unpredictable results.  The control of the learning experience is an essential feature of instruction.  Without this control, we can't be sure that the student learned what is required from a given instructional product.

Instruction, as a minimum, must include the following four elements.  First, instruction must be designed to support specific instructional objectives, which are determined by job requirements.  Second, instruction must include the opportunity for a learner to interact with the instructional content in a meaningful way.  Third, the student's performance must be assessed to determine if he or she has learned what was intended.    Finally, the results of  the assessment must be presented to the student in a relevant and timely manner to either reinforce correct actions or to provide remediation for incorrect actions. If these four elements are not present, we are not dealing with instruction.

Merrill (1997) presents a slightly different categorization of instruction (i.e., knowledge structure, presentation, exploration, practice, and learner guidance), but makes essentially the same point.

## METHODS OF INSTRUCTIONAL DELIVERY

It should also be noted that instruction can be presented using a variety of methods. These may include classroom lectures, computer-based lessons, and web-based courses. Molenda (2000) provides a typology of eleven instructional methods. The specific method of delivery does not define the quality of the instruction; it is only a delivery tool (Berdine, Burleson, Case, Liaupsin, & Zabala, as cited in Case, Bauder, & Simmons, 2001; Merrill, 2003). Each tool has its uses and may be the most appropriate choice for a given situation (e.g., web-based instruction for delivery to large audiences in widely dispersed locations or one-on-one apprenticeship for training single individuals). However, any type of delivery method can provide either low or high quality instruction depending upon how it is designed and delivered. For example, the Quality Assurance Agency for Higher Education (2000) of the United Kingdom maintains that any distance learning application should be underpinned by principles relevant to other forms of higher education. Care was taken to ensure that our review of the quality evaluation literature included these principles of higher education.

## EVALUATING INSTRUCTIONAL QUALITY

Many individuals and organizations have developed evaluation criteria to determine the quality of instructional products. The authors conducted a review of the various evaluation approaches and the categories of evaluation criteria in order to synthesize the common elements into an easy-to-use quality checklist. The main sources used in this synthesis are summarized below.

Much of the literature on evaluation of online instruction used the *Seven Principles for Good Practice in Undergraduate Education* as their starting point. These principles were compiled in a 1987 study commissioned by the American Association of Higher Education, the Education Commission of the States, and the Johnson foundation (Chickering & Gamson, 1987). The authors of this study argued that good instructional practices must:
1. Encourage student-faculty contact
2. Encourage cooperation among students
3. Encourage active learning
4. Give prompt feedback
5. Emphasize time on task
6. Communicate high expectations, and
7. Respect diverse talents and ways of learning

These principles apply in an academic setting as is true for many of the other evaluation approaches reviewed.

The National Education Association (2000) commissioned a survey of higher education faculty on their opinions of web-based courses. Faculty members rated web-based courses higher than traditional courses on meeting five goals:
- Giving the students access to information
- Providing the students with high quality course material
- Helping students master subject matter
- Assessing the educational effectiveness of the course
- Addressing a variety of student learning styles

Unfortunately, this report does not provide guidance for how to design a course or how to evaluate the quality of the instruction provided in a course. It also does not explain how to quantify the subjective determinations of, for example, what is "high quality course material."

Penn State University in association with Lincoln University and Cheyney University (Innovations in Distance Education, 1998) developed a set of principles and practices for designing effective distance education programs. These principles are organized into five categories:
- Learning goals & content presentation
- Interactions (between students and content and between students and other students)
- Assessment & measurement
- Instructional media & tools
- Learner services & support

The principles are stated in general terms, but are useful in focusing instructional evaluations on areas that can improve quality.

The ASTD Certification Institute of the American Society for Training Development (ASTD) has established a draft set of standards for certification of e-learning courseware (ASTD Certification Institute, 2001-2002). The standards (Hartley, 2003) are intended to:
- Improve the overall quality of e-learning courseware
- Facilitate buying decisions
- Support suppliers who develop courses

The nineteen standards are organized into four clusters:
- Interface standards
- Compatibility standards
- Production quality standards
- Instructional design standards

This is one of the most thorough compilations of evaluation criteria reviewed. ASTD has been using these criteria to evaluate instructional products primarily from industry.

GeoLearning, an e-learning development company, developed a workbook to help organizations make decisions to effectively implement e-learning systems (GeoLearning, 2001). Many of the questions in this workbook deal with organizational issues (e.g., identifying the problems the e-learning solution will address; identifying the individuals in the organization who will make decisions; determining the extent of the technology infrastructure that will support the system). Although these issues are beyond the scope of an instructional quality evaluation, the workbook also contains a courseware evaluation checklist, which was used in our synthesis effort. This checklist clusters evaluation criteria into four sections:

> Usability/feasibility
> Quality of content & coverage
> Instructional design/overall quality
> Desired results

Brandon Hall, an e-learning consultant, presents an annual online training award. The criteria (listed in Condone, 2001) for these awards include:

> Content (Is the right amount and quality of information included?)
> Instructional design (Will the users actually learn?)
> Interactivity (Is the user engaged and given the opportunity for input?)
> Navigation (Is a course map accessible? Is an exit option available? Can users determine their own way through the course?)
> Others (i.e., motivational components, use of media, evaluation, aesthetics, record-keeping, and tone)

Most of these criteria were incorporated into our checklist.

Gillis (2000) recommended that criteria like those of Brandon Hall be applied in a four-stage quality evaluation process:

1. Match courses to organizational needs
2. Conduct a content review
3. Conduct a usability review
4. Conduct an instructional design review

Our checklist covers stages 2 through 4.

Several state educational systems have developed guidelines and checklists to evaluate the quality of online courses (e.g., Texas Education Agency). These checklists were also reviewed and any relevant items not covered in other sources were included in our checklist.

O'Neil (2003) and his colleagues at the University of Southern California presented a set of guidelines for developing distance learning. These guidelines range from very general (e.g., "design distance learning taking into consideration learner characteristics," p.118)

to very specific (e.g., when developing multimedia "eliminate words, pictures, and sounds that are not directly relevant to the explanation," p. 33). The general guidelines were used to help select the major sections of our quality checklist and the specific items will be used to develop more detailed versions of the checklist in the future.

Garzotto, Mainetti, and Paolini (1995) used a "design-oriented evaluation," as opposed to usability testing, to evaluate hypermedia applications. Their approach, if adapted to instructional evaluation would assess:

> Content (the pieces of information included in the course)
> Structure (the content's organization)
> Presentation (how the content and functions are shown to the user)
> Dynamics (how users control the playing of media)
> Interaction (how users operate on the content – often considered a blending of dynamics and presentation)

This information was included in our synthesis to create our checklist.

Reiser and Kegelmann (1994) summarized a variety of methods used by evaluators. They concluded that most methods required evaluators to judge features, such as instructional design, ease of use, and perceived utility. Our checklist only assesses criteria on the first two of these methods because perceived utility is an assessment of student reactions to the course rather than an assessment from the perspective of developers or project managers.

A number of additional documents were reviewed to develop and crosscheck the evaluation items included in our quality checklist (Army Training and Doctrine Command, 2001; Bostock, 2003; Camber Corporation; 1998; Frydenberg, 2002; Kumar & Kumar, 1995; Nicholson, 1997; Sabiston & Loube, 2003; The Institute for Higher Education Policy, 2000; and Weusi-Puryear, 1997). The authors realize that other evaluation sources may have been omitted. Monitoring of the literature will continue and additional sources will be incorporated in future versions of the checklist.

Because the primary purpose of our checklist is to evaluate asynchronous, self-contained courseware that is usually delivered without an instructor, those criteria that deal with student-instructor interactions or other criteria focused on the academic setting are not included. Furthermore, since our goal is to evaluate instructional quality, those criteria that are concerned with technological issues (e.g., does the student have access to a server or does the student's internet

connection have sufficient bandwidth) are also excluded.

## QUALITY CHECKLIST

The checklist that resulted from the above review and synthesis is shown in Table 2. It is provided as a no-cost tool that can be used throughout the military services. It includes two subsections: instructional features evaluation and user interface evaluation. The instructional features section captures the instructionally relevant criteria from the above sources and the authors' experiences.

No matter how well instruction is designed, the student still has to access it. As Boling and Sousa (cited in Henke, 2001) explained, "If people cannot use what is being delivered to them…the promise of technology is subverted before it can be fulfilled…training groups with direct responsibility for learning outcomes can not afford to lose a measure of learner motivation to poor interface decisions" (p. 6). Thus, the user interface section includes criteria that focus on removing any obstacles or distractions from the instructional experience.

Both the instructional features and user interface areas are essential for quality instruction, as are each criterion within these sections of the checklist. For a given course, each criterion is rated on a three-point scale. If the criterion is not supported, it is given a rating of one. If the criterion is met, the course receives two points. Finally, a course that exceeds a criterion, receives three points. For example, a course that does not state the instructional objectives would receive a one on this criterion (1.b). If the course simply lists the instructional objectives, it would receive two points. However, a course that explained why the instructional objectives are important would receive three points. The scores on each criterion are added to generate a subtotal for each subsection and these subtotals are summed to generate a total quality score for the course.

## USING THE CHECKLIST

As an aid to persons wishing to use the checklist, this section rates an existing web-based course using several criteria from the checklist. The course is titled "Modeling and Simulation Basics." It was a conversion of a lecture-based course to a web-enabled format and was built under the ADL Co-Laboratory Prototype program during FY 2000-2001. All of the authors were, to some degree, involved with its production. When it was originally completed, some finding sponsors regarded it as an improvement over existing courses. However, the authors maintain that there are several specific factors that can improve the quality of the course. We also realize that many variables contribute to the characteristics of a final instructional product, including funding constraints, time constraints, and organizational support. Therefore, the following evaluation of the "M&S Basics" course should not be taken as a criticism of the hard work of each member of the development team.

The illustrative ratings do not address every one of the criteria on the Instructional Quality Checklist. Rather, ratings and explanations are provided on only one or two criteria in each of the main sections under Instructional Features and User Interface to illustrate how one might use the checklist to evaluate a course. Please note that these examples are the opinions of the authors and empirical data are needed to validate these opinions.

### Instructional Features Evaluation

It is very important that learners understand why they are taking a course. Thus, the first criterion under "Instructional Content" asks if the purpose of the course is clearly stated (1.a). "M&S Basics" receives a rating of one (does not meet) on this criterion because there is no clear statement of purpose.

Another important criterion used to determine the quality of instructional content is whether the "authority" for the content is clearly stated (1.f). This is important because it provides the student with confidence that the instructional content is correct and can be relied upon. "M&S Basics" receives a rating of one (does not meet) because no references or other sources are provided to help the learner develop this confidence.

**Table 2:** Quality Evaluation Checklist

Course Name: _____

| Instructional Features Evaluation | | | |
|---|---|---|---|
| **Evaluation Criteria** | **Does Not Meet (1)** | **Meets (2)** | **Exceeds (3)** |
| **1. Instructional Content** | | | |
| 1.a. The purpose of the course is clearly stated. | | | |
| 1.b. The instructional objectives are clearly stated (e.g., in terms of skills & knowledge). | | | |
| 1.c. The content supports each & every instructional objective. | | | |
| 1.d. The content is accurate. | | | |
| 1.e. The content is job-relevant. | | | |
| 1.f. The "authority" for content is clearly stated. | | | |
| 1.g. The content is presented in a logical manner (e.g., builds on prerequisites, shows interrelationships). | | | |
| 1.h. There are clear indications of prerequisites. | | | |
| 1.i. There are clear indications of completed topics. | | | |
| 1.j. Sources for additional information are available. | | | |
| **2. Instructional Activities** | | | |
| 2.a. The learner is required to interact with content (e.g., use content in some activity). | | | |
| 2.b. Includes varied instructional methods for presentations & demonstrations (lecture, exhibition, expert testimonials, recalling previous modules, etc.). | | | |
| 2.c. Activities are relevant (e.g., linked to objectives). | | | |
| 2.d. Instruction is engaging (e.g., uses humor, novelty, 3-D graphics, music, storytelling, etc.). | | | |
| 2.e. Instructional media directly support learning activities. | | | |
| **3. Performance Assessment** | | | |
| 3.a. Assessments are logical. | | | |
| 3.b. Assessments are relevant (e.g., linked to objectives). | | | |
| 3.c. Assessments are varied (e.g., simulations, role-play, quizzes, exercises, etc.). | | | |
| **4. Performance Feedback** | | | |
| 4.a. Feedback is timely (e.g., provided immediately or soon after assessment). | | | |
| 4.b. Feedback is meaningful (e.g., related to objectives). | | | |
| 4.c. Positive reinforcement is provided for correct responses. | | | |
| 4.d. Remediation is provided for incorrect responses. | | | |
| | | | |
| **Instructional Features Subtotals** | | | |

**Table 2:** (continued)

Course Name: _____

| User Interface Evaluation | | | |
|---|---|---|---|
| **Evaluation Criteria** | **Does Not Meet (1)** | **Meets (2)** | **Exceeds (3)** |
| **5. Navigation** | | | |
| 5.a.  Tutorial and/or help available to explain navigation features. | | | |
| 5.b.  Includes all required features (start, exit, forward, backward, pause, return to main menu, bookmark). | | | |
| 5.c.  Features are clearly labeled. | | | |
| 5.d.  Features are located in consistent place. | | | |
| 5.e.  Features operate consistently. | | | |
| 5.f.  Learner always knows location in course. | | | |
| 5.g.  Learner always knows how he/she arrived at location. | | | |
| 5.h.  Learner knows estimated time required for each module. | | | |
| **6.  Content Presentation** | | | |
| 6.a.  There are no sensory conflicts (e.g., audio & text present the same information). | | | |
| 6.b. Media (e.g., graphics/videos) are clear/sharp. | | | |
| 6.c.  Uses only readable fonts. | | | |
| 6.d.  Text minimized (ANSI/ADA courseware spec 1001). | | | |
| 6.e.  No complex backgrounds obscure text. | | | |
| 6.f.  Multi-modal presentation of content is used. | | | |
| 6.g.   Multi-media presentation of content is used. | | | |
| 6.h.  Media are easy to use. | | | |
| **7. Installation** | | | |
| 7.a.  Course does not require installation or learners can install the course without assistance. | | | |
| 7.b.  Course installs in timely manner (if applicable). | | | |
| 7.c.  Minimal "plug-ins" are required. | | | |
| 7.d.  "Optimization" test is available. | | | |
| 7.e.  Technical support is available. | | | |
| **8. Registration** | | | |
| 8.a. Registration is simple & straightforward. | | | |
| | | | |
| **User Interface Subtotals** | | | |
| **Instructional Features Subtotals (from previous page)** | | | |
| | | | |
| **Column  Subtotals** | | | |
| **Total Quality Score (sum of column subtotals)** | | | |

As mentioned above, quality instruction provides opportunities for the student to interact with the instructional content.  These interactions are very important and, if designed correctly, they allow the student to organize the instructional content into a form that is relevant to his or her job requirements. Thus, the first criterion under "Instructional Activities" is a rating on student interaction with the content (2.a).

"M&S Basics" receives a rating of two (meets) because there is some level of interaction during the short quizzes found in the course.  This is a very minimal level of interaction.  To receive a rating of three on this criterion (exceeds), the course would have to include a variety of interaction opportunities beyond merely answering factual questions (multiple choice, matching, fill-in-the-blank).  For example, the student

might engage in a role-playing exercise that would require the integration of learned content and the use of this information to make some type of decision. This level of interaction is very related to the criteria under the "Performance Assessment" and "Feedback" sections of the checklist.

Another criterion that is important for web-based instruction is 2.d, which rates the course on whether the instruction is "engaging." Unlike lecture-based instruction where the instructor is present and can help maintain the students' attention, web-based asynchronous instruction must rely on the presentation of the content to engage and motivate the student. A variety of techniques can be used to present content in an interesting and engaging manner. The "M&S Basics" course receives a one (does not meet) on this criterion. Although some graphics and video clips were included in the course, the majority of the content is a textual presentation of "facts." There is no explanation why the "facts" are important and the student is likely to become bored or lose focus on what needs to be remembered about the "facts."

Performance assessment and feedback are critical to instructional quality. If we do not assess the performance of students, we have no way of knowing if they have learned the material presented in the course. Furthermore, if the students do not receive feedback on their performance, they will likely fail to attend to additional instructional content. Therefore the third and fourth sections of the Instructional Features Evaluation section of the checklist are "Performance Assessment" and "Performance Feedback."

Criterion 3.b rates the course on whether the performance assessments are relevant. In other words, are the assessments linked to the instructional objectives of the course? "M&S Basics" is rated one (does not meet) on this criterion. Since the instructional objectives are not clearly stated, it is impossible to determine if they are actually assessed by the "quiz" items in the course. The assessments merely test the students' recall of factual information using multiple-choice and matching strategies. Using only these types of "quizzes" fails to meet or exceed criterion 3.c, which rates the course on whether the assessments are varied.

Criterion 4.d rates the course on whether remediation is provided when the student gives an incorrect response. "M&S Basics" can be given a rating of two (meets) on this criterion. However, this is a generous rating because the level of remediation for incorrect responses is simply to state the correct answer. A higher quality instructional approach to remediation might explain why the student's answer was wrong, provide the correct answer, and then present the content again from a slightly different perspective. This way the student may gain a fuller understanding of the content and really "learn" from his or her mistake.

**User Interface Evaluation**

It is through the user interface that the student is presented the instructional content. No matter how innovative and engaging the instructional approach, the student may become distracted by a dysfunctional user interface and not attend to critical elements of the instruction. The purpose of the User Interface Evaluation is to help developers reduce or eliminate these distractions.

Under the "Navigation" section, criterion 5.a rates the course on whether a tutorial or help function is available. "M&S Basics" receives a one (does not meet) rating on this criterion. The course contains neither a tutorial nor a help function. This is often the case in web-enabled courses. Some courses require the student to try several "buttons" before finding the correct one to activate the desired function.

Often the developers of web-enabled courses attempt to reinforce the presentation of content through a multi-modal approach. The idea is to present the content to the student through multiple sense modalities (e.g., audio and visual). However, some courses present one version of the content in text and a different version in an audio presentation. Some courses even present different content in these two sensory modes. The "M&S Basics" course does not make this mistake and thus, is rated a two (meets) on criterion 6.a. However, the content is presented in primarily one sensory mode (visual) so it receives only a one (does not meet) rating on criterion 6.f (multi-modal presentation of content).

The "M&S Basics" course was not rated on the criteria in the last two "User Interface" sections, "Installation" and "Registration," because the course was developed as a prototype and was never fully implemented such that students could take it for credit.

**PLANS FOR IMPROVING THE CHECKLIST**

Plans for future versions of the checklist include development of anchored rating scales with illustrative examples for each item. The examples will allow evaluators to more easily determine the degree that each criterion is implemented in a given course. The rating scales can also be designed in a 5- or 7-point Likert format, which will expand the assessment range for each criterion.

The current criteria can also be broken down into sub-elements for more detailed evaluations. For example, criterion 5.b includes examples of several navigation features. Future versions of the checklist will include separate sub-criteria for each of these features. Also, criterion 6.b will separate graphics and video into sub-criteria so that they can be separately rated.

In addition, a "User's Guide" will be developed to help raters understand the criteria and improve the reliability of the checklist.

Finally, the authors plan to empirically assess the reliability and validity of the checklist.

## SUMMARY

The importance of high-quality instruction is constantly growing as tasks become more complex and important. This paper provides an easy-to-use checklist that can help instructional developers and project managers determine the level of instructional quality in a course. The rationale for the evaluation criteria and brief illustrations of the rating process were also provided. Future improvements of the checklist will include the development of a user's guide, anchored rating scales, and additional illustrative examples to assist the rater. The ability of courseware developers and buyers to determine the level of instructional quality will help the training and education community to raise the bar on the quality of the instruction being provided today and in the future. The current checklist is an initial tool to help reach this goal.

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