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Dilani M. Perera-Diltz

Jeffry L. Moe
Old Dominion University, jmoe@odu.edu

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Abstract
Assessment is an integral part of both traditional and online education, especially when determining student learning outcomes. In the online learning environment, both formative and summative assessment practices require an understanding of the features and tools inherent to the electronic medium. Creating assessments for online education, either formative or summative, also requires application of constructivist learning principles to our collective understanding of the educational process and related goals. In this paper, we offer an overview of formative and summative assessment approaches suited to the online education environment.

Key Words
Formative assessment, summative assessment, online education

Formative and Summative Assessment in Online Education

Assessment is an integral part of education. Education is traditionally involved the action of learning by those defined as students and the imparting of knowledge by those defined as teachers. Currently, this construction of knowledge could involve three types of models of education: (a) the traditional banking model (Freire, 1970/2000) or teacher-led learning, (b) cognitive apprenticeship framework (Collins, Brown, & Newman, 1989) or collaborative construction of knowledge between students and teacher, and/or (c) legitimate peripheral participation in a situated learning framework (Lave & Wenger, 1991) or learning between or among students. The latter two types of education models are supported by knowledge that student learning improves through social interaction and collaboration (Lave & Wenger, 1991; Knowles, Holton, & Swanson, 1998). Within each of these three education frameworks, assessment is viewed as an essential component for learning (Hanson & Mohn, 2011) in terms of identifying and documenting increased knowledge, awareness, or skills.

An expansion from this original purpose of assessment has occurred recently with the rise of the accountability paradigm, including heightened scrutiny onto all aspects of the educational process by various internal (e.g., budget needs) and/or external (e.g., accreditation boards, national organizations) entities (Hanson & Mohn, 2011). Stakeholders expect the assessment of learning outcomes to occur more frequently and more rigorously, and to simultaneously be more transparent and accessible to non-expert reviewers and consumers (Hanson & Mohn, 2011). In this new era of heightened expectations for accountability, education professions also face the challenge of adapting to the online learning environment. Learners prefer both the flexibility and convenience of online education (Hewson, 2012), while also indicating expectations for personal achievement comparable to face-to-face learning environments (Stewart, Waight, Norwood, & Ezell, 2004). Despite the flexibility afforded by the online environment to students, instructors are expected to be more available, to provide more and quicker feedback, and to be otherwise proficient at establishing the basis for rapport with all students. With societal expectations for education and learning in all modalities increasing, it is important for educators to revisit basic concepts of assessment in order to both deepen and broaden their skills and thereby facilitate learner achievement. Reconceptualization of two important assessment themes, namely formative and summative assessment, in light of the capabilities and limitations of learning in online education, is discussed in this paper.

Formative and Summative Assessment

Assessment may occur in two forms (i.e., formative and summative) in the learning environment. Formative assessment provides on-going evaluation (Perera-Diltz, 2009) of a student's learning. This type of assessment requires evaluation of student learning outcomes several times during a semester and facilitates the evaluation of different content areas, skills, and the progress of learning within specific knowledge domains. Formative assessment could occur with repeated use of the same assessment form (e.g., a quiz four times in a semester) or with the use of multiple assessment forms (e.g., a quiz, an essay, and an experiential activity). Summative assessment is a measure of an end product (Perera-Diltz, 2009), and at best represents a holistic and qualitative appraisal of whether specified learning outcomes were achieved. Measures such as a capstone final project or a comprehensive final exam are examples of common summative assessment tools. However, there are times that formative assessment could serve summative purposes (Gikandi, Morrow, & Davis, 2011) when it informs stakeholders regarding a student's progress (Smith, 2007). Similarly, summative assessment can serve in a formative role when results are used for learning in subsequent units (Gikandi et al., 2011).

There are benefits and limitations to both types of assessment, which are sometimes based on such factors beyond the actual assessment as a sense of virtual community created (Glassmeyer, Dibbs, & Jensen, 2011) by the assessment task. Formative assessment has been articulated as the preferred assessment mode in online education, but full implementation of formative assessments requires careful design, monitoring, and the communication of feedback to learners in a clear and meaningful timeframe (Rovai, Ponton, Derrick, & Davis, 2006) to augment their overall education experience (Glassmeyer et al., 2011). Formative assessment provides the advantage of students' being able to demonstrate knowledge gained in small sections, which may be easier to master and express. Formative assessment also allows students to fail an assignment (e.g., 1 of 5 quiz scores), learn from mistakes, and subsequently not suffer penalty in the form of a poor final grade (Oosterhof, Conrad, & Ely, 2008; Vonderwell, Liang, & Alderman, 2007). Formative assessment, however, does require students to continuously demonstrate learning and engagement with the ongoing process of evaluation. The assessment of continuous improvement can be stressful for students and instructors alike. On the contrary, summative assessment has the benefit of being a potentially one-time, holistic, and integrated evaluation. If a student is unable to perform at his or her peak on the chosen summative assessment format (e.g., final projector test), then student learning is not accurately assessed and students' feelings of engagement and empowerment with the learning process may be diminished.

The New Era of Learning: Online/Blended Learning

The practice of teaching in higher education's including counselor education, with the ascendency of the Internet in the early 1990s, is increasingly facilitated either in whole or in part with communications technology (Naughton, Smeed, & Roder, 2011). Along with the rise in the use of technology to improve or provide educational experiences, movements in the theoretical and philosophical foundations of teaching and learning coincide with public expectations for increased access, flexibility, and participation in the co-construction of learning, including evaluation methods and protocols (Leppisaari, Vainio, Herrington, & Im, 2011). Proponents of constructivist education echo advocates for online learning (Williams, 2006) calling for instruction that is dynamic, authentic, and practical, and that engages the skills and lived

experiences of an empowered and technologically capable learner community (Herrington & Standen, 2000).

While online and blended education presupposes reliable access to appropriate communications technologies, a condition that makes this practice more adaptable to Western(-ized) or developed societies, the potential to reach an ever more globalized and diverse population of students is another motivating factor in the widespread adoption of online learning as a standard offering for higher and continuing education providers in the United States and around the globe (Leppisaari et al., 2011). For the purposes of this paper, fully web-based and blended learning will be referred to as online education that involves education facilitated either in whole or in part by a web-based learning management system (e.g., Blackboard) via access through both desktop and laptop computers, smart phones, e-tablets, or other Internet-capable devices (Perera-Diltz & Moe, 2012).

Eagerness to utilize a potentially dynamic new way of teaching and learning, coupled with valid concerns over quality assurance and fairness in access to technology, have remained central to professional dialogue on best practices in online education since its emergence as a widespread phenomenon in the mid to late 1990s (Bonk & Cummings, 1998). At best, online learning becomes a space where the principles of constructivist, learner-centered, authenticity-based, and adult education can be synthesized by instructors to produce meaningful and valid educational experiences (Lesnick, Cesaitis, Jagtiani, & Miller, 2004) similar to the cognitive apprentice model (Collins et al., 1989). A key principle of the constructivist learning framework is that human beings learn best in collaboration and interaction with others (Herrington & Standen, 2000) or through what is sometimes referred to as legitimate peripheral participation (Lave & Wenger, 1991). In comparison, behaviorist or instructivist education is based on rote memorization and on-demand, individual articulation of expert-imparted knowledge content (Herrington & Standen, 2000). Such teacher-led instruction, also referred to as the banking model (Freire, 1979/2000), is unsuitable in the online medium, as the learner becomes uninvolved in and disengaged from learning. Conversely, constructivist education that is learner-centered relies on the auto-didactic capacity inherent in all people and seeks to engage individuals in the active co-construction of their own learning experience (Eyal, 2012). In this way, knowledge becomes emergent as individual learners interact and synthesize previous learning with both novel experiences and ways of knowing cherished by local communities of learning and practice (Lepisaari et al., 2011). Hence, online education involves more than placement of all of or some of the material from a traditional face-to-face course onto the web.

Assessment of student learning in online education, similarly, cannot be merely transferred from a traditional face-to-face classroom, but must be re-conceptualized to account for the benefits and drawbacks of the given communication medium (Perera-Diltz & Moe, 2012), especially given the asynchronous nature of interactivity among the participants (Vonderwell et al., 2007). The issues of validity, reliability, and dishonesty related to assessment (Hargreaves, 2007) needs to be carefully considered in the design (Oosterhof et al., 2008) and management phases of online education (Gikandi et al., 2011). Online communication technology allows a number of assessment tools, such as discussion boards, model answers, electronic feedback systems, reflections, and online small group discussions (Escudier, Newton, Cox, Reynolds, & Odell, 2011; Thelwall, 2000), which can all be modified into formative or summative assessments to document student learning based on the purpose and needs of a course. The creation of meaningful and effective assessment, both formative and summative, is achievable through deep familiarity with and use of online education tools. The following is a closer look at

the available literature on the validity of formative and summative assessments in online education. We also provide an overview of common assessment tools for online learning, including adapted tools such as examinations, as well as such tools unique to online education as discussion boards or wikis. A chart that demonstrates the type of assessment involved with the various assessment tools is provided in Table 1.

Table 1. *Categories of Formative Assessments Available*

Assessment	Type	Peer Assessment	Co-Assessment (Instructor-Student)	Self-Assessment	Instructor Assessment
Rubrics	F or S	Yes	Yes	Yes	Yes
Netfolio	F or S	Yes	–	Yes	Yes
Student generated MCQ and concept maps	F or S	Yes	–	–	Yes
Reflection Journals and Papers	F or S	–	Yes	Yes	Yes
Comprehensive final exams	S	–	–	–	Yes
Assessment	Type	Peer Assessment	Co-Assessment (Instructor-Student)	Self- Assessment	Instructor Assessment
Comprehensive final exams	S	–	–	–	Yes
Research Projects and Reports	F or S	_	–	–	Yes
Case Study Analysis and Report	F or S	Yes	–	Yes	Yes
Wikis or blogs	F or S	Yes	Yes	Yes	Yes

Note: F = Formative; S = Summative

Formative Assessment Tools

The intent of formative assessment is to promote student development *during* a learning process through active engagement of the student with various assessment means. Feedback from formative assessment, when appropriately utilized in the online environment, has been found to promote learning (Pachler, Daly, Mor, & Mellar, 2010; Wang, Wang, & Huang, 2008) not only through monitoring progress toward learning outcomes but also by crystalizing learning strategies in students (Gikandi et al., 2011). As mentioned elsewhere, issues of validity, reliability, and dishonesty need to be addressed (Gikandi et al., 2011; Hargreaves, 2007) in

formative assessment, and this entails a prior consideration of both processes and products of learning (Vonderwell et al., 2007). According to Gikandi et al. (2011), characteristics of validity in formative assessment include (a) authenticity of assessment activity (i.e, engage student in decision making and problem solving relevant to real world situations), (b) effective formative feedback (i.e., useful, timely, ongoing, and easy to understand feedback to student), (c) multidimensional perspectives (i.e., diverse opportunities for the student), and (d) student support (i.e., mentoring role of the teacher). Reliability characteristics of formative assessment (Gikandi et al., 2011) include: (a) opportunities for documenting and monitoring evidence of learning by teacher and student, (b) multiple evidences of learning while guiding students to manage tasks without being frustrated (Smith, 2007), and (c) explicit clarity of learning goals and shared meaning of rubrics (Gikandi et al., 2011). Finally, dishonesty relates to the ability to verify ownership of work to a specific student (Gikandi et al., 2011) which Oosterhof et al. (2008) observed may not become an issue in formative assessment if students are provided with scoring rubrics and model products with assessments. Formative assessments are multifaceted and could be in the form of peer assessment, co-assessment, self-assessment, and/or feedback from the instructor. Such formative assessment is said to achieve autonomous and independent learning (Nicol, 2007).

Rubrics: Discussion Boards

Rubrics can be utilized to evaluate any assignment by the instructor, peers, or the combination of the two. Brookes and Lin (2010) discussed a formative assessment rubric created for an online course to guide student learning and provide formative evaluation on learning of concepts and feedback on how to improve. The rubric was created with four broad concept points horizontally, which are then broken down to as many sub-abilities as needed to assess. In their rubric, Brookes and Lin used "ability to evaluate models, equations, solutions, and claims" (p. 6) as their broader concepts. On the vertical scale, Brookes and Lin used columns labeled "missing, inadequate, needs improvement, and adequate" (p. 6).

This rubric concept can be applied to the evaluation of discussion board posts. Usually, an online asynchronous discussion board has discussion questions posted by the instructor. Consideration of and reflection upon these questions facilitates engagement with a larger concept or concepts, which in turn represent important learning outcomes. For instance, the broader concepts for school counseling services delivery are advisement, guidance curriculum, responsive services, and support systems (ASCA, 2005). Under these four broader concepts, sub-abilities that can be evaluated are "student is able identify individual advisement needs" or "student is able to identify appropriate topics for guidance." Instructors can adapt the four grading scales suggested by Brookes and Lin (2010) to their own assignment rubrics. Indicating in the form of formative assessment rubrics if the student met or did not meet the concepts and sub-abilities as the learning occurs, provides the opportunity for the student to understand any knowledge gaps related to a specific content area. Such evaluation using a rubric can be conducted by instructor alone or by instructor and/or peers. Awareness gained from such continuous feedback can lead to further learning of those areas and possible future competency in those areas. Without such formative evaluation, students would move forward until a summative assessment is conducted. It may be too late at that point to gain missing knowledge and provide proof of such knowledge to an instructor for grading purposes.

Journals

Reflective journaling, where learners articulate knowledge from their reading, collaboration in discussion, and personal experiences, is one method of formative assessment (Naughton et al., 2011). The content of this reflection can be requested to include not only text but exploring of websites and blogging the information with peers, inclusion of interactive video and other media sources. Concerns for learner privacy are naturally heightened when communicating online, and the scope and depth of journal entries should be carefully demarcated by instructors in order to facilitate learner disclosure and ensure that the online classroom is a supportive environment. Electronic journal entries shared directly and only with instructors may be more unbounded, and principles of etiquette should be explained, regardless, in syllabi and other locations, to promote collegiality whenever peer review and collaboration are linked to the assessment of reflective journals.

Netfolio

The use of an e-portfolio, which aims for metacognition, authentic tasks, contextual feedback, and student responsibility (Black & Williams, 1998), aims to depict student abilities developed during a learning process and is a summative assessment. Netfolio is derived from this e-portfolio concept, in that it is a "set of e-portfolios produced by different students" (Barbera, 2009, p. 344) that offer students the opportunity to better understand learning objectives as well as to revise self-portfolios through participation of assessment of and feedback to other students' portfolios (Barbera, 2009). At set intervals, peers provide new content and different perspectives through online communication. The netfolio is evaluated in a manner similar to the e-portfolio, with attention given to the presentation of ideas, competency evidenced in communications, and learner's ability to engage in self- and other-reflection. The advantages in using a netfolio assessment are: (a) It promotes collaboration between instructor and learner as well as among leaners (Barbera, 2009); (b) it provides quick and explicit feedback (Barbera, 2009); (c) it mitigates feelings of isolation through creating a sense of a virtual community (Glassmeyer et al., 2011); and (d) it allows learners to view exemplary work samples of other students (Barbera, 2009), improving one's own work through self-reflection (Wang, 2010). Therefore, netfolio provides a student opportunity for continuous improvement through reflection on others' work and feedback on one's own work (Barbera, 2009).

Multiple-Choice Examinations: Student-Generated Questions and Concept Maps

Multiple-choice quizzes (MCQs) are a more traditional form of assessments that has been criticized for not facilitating active learning due to its lack of justification of the answer (Arthur, 2006). Despite these concerns, the primary advantages of online MCQs include time efficiency, fairness, and quality assurance. Online MCQs provide reduced marking time, elimination of the need to verify personal error, rapid analysis of data and item analysis, verification of reliability, validity across years, elimination of teacher bias, and portability (Escudier et al., 2011). Some learning management systems permit the design of MCQs so that feedback is provided to the student while in the process of completing the quiz, while others may provide options for branching and extended multiple-choice questions (Escudier et al., 2011). Pittenger and Lounsbery (2011) recommended student-generated MCQs as an effective form of assessment, mitigating the lack of engaged learning, as it fosters student engagement with course content, metacognitive skills, and ownership of learning experience. Berry and Chew (2008) reported

"improved exam performance and presumably learning" (p. 310) when students generated their questions with a positive correlation with the number of questions generated by a student. Concept maps (Berry & Chew, 2008) were another method recommended that improved student performance on MCQs. Another option is to provide long- and short-answer quizzes or exams. However, this eliminates some of the aforementioned advantages. Finally, the equivalency of online- versus paper-based MCQs may be another consideration with online tests and examinations. Researchers Escudier et al. (2011) and Hewson (2012) found that student performance in online versus traditional forms of MCQ format was similar.

Wikis

An assessment tool unique to the online environment is the wiki. It is a space in which a group of students can be assigned to create a case study, a treatment plan, or a lesson plan. Each student can be directed to utilize a different font color with their name within parenthesis for easy identification of contribution by peers and instructor. This assessment can be designed to be graded by a combination of peers and/or instructor, and it can be repeated over the course of a semester or quarter, allowing a student to improve performance through participation, peer feedback, and self-reflection. Grading of this assignment can be designed as one time at the end of the term, as more of a summative assessment, or else as a fraction (e.g., 3 of 5 times).

Summative Assessment Tools

Summative evaluation in education is simultaneously more familiar to those involved in the instructional process (e.g., students, teachers, administrators) and a potentially under-theorized practice in regards to online learning. Readers may be familiar with the use of so-called high-stakes testing, where a summative evaluation is used as the primary or sole indicator to determine if learners have achieved educational objectives (Escudier et al., 2011). This use of summative evaluation, in the form of a mid-term and final exam only, though common in higher education, is discouraged when planning and implementing assessment of a learner's experience and achievement in online educational environments (Stewart et al., 2004). Just as formative assessment provides in-process benchmarking of learner achievement, summative assessment at best seeks to comprehensively document and richly depict the emergent process of learning that occurred over a given time-bounded learning experience, e.g., over a semester or a quarter (Naughton et al., 2011).

Upon first consideration, the principles of constructivist, learner-centered, and authentic education may seem difficult to thread into the design of meaningful summative assessments. Recalling that the principles of authentic education include a focus on problem-solving, learner-decision making, and applicability to situations outside of the educational context, it becomes reasonable to ask whether instructors can engage students in sufficient time and at a valid level of participation to co-create summative evaluation protocols in an online education environment. Lesnick et al. (2004) suggested that re-appropriation of the goals of assignments in online education should serve as the foundation for design, instruction, and assessment. Proponents of online education (Eyal, 2012; Lesnick et al., 2004; Russell, Elton, Swinglehurst, & Greenhalgh, 2006) asserted that, due to the interactive, instant archiving of text and communication availabilities in standard learning management systems, the separation between activities designed to promote learning and the assessment of said activities is diffused. A commitment to the goals of constructivist and authentic education, coupled with deep familiarity with the tools available in learning management systems, supports re-conceptualization of how summative

assessments are created, what they are designed to assess, and why a given set of assessment practices is valid in terms of supporting over-arching learning themes or objectives.

Summative assessment in online education needs to be based on facilitating and documenting the learner's abilities to synthesize his or her own perspective and personal experiences with novel texts, media content, and other knowledge artifacts. The depiction of achievement, rather than the appraisal of learners' capacity for rote memorization and recitation, involves optimizing the use of assessment tools that focus on problem-solving, critical analysis of media sources, and articulation of the learner's voice as an engaged co-creator of the educational experience. A basic design for summative assessment in online education would represent the instructor's ability to competently use learning management systems to approximate face-to-face assessment strategies, such as a comprehensive exam or final paper. An advanced design for summative assessment would maximize the potential for learning management systems to engage learners and facilitate the co-design of capstone projects and assignments based on learners' input (Levia & Quiring, 2008). As collaboration is commonly identified as an ideal to incorporate throughout the online learning process (Eyal, 2012; Lesnick et al., 2004; Swan, Shen, & Hiltz, 2006), embedding an interactive, peer-based feedback and revision process is considered to be a best practice in the design and implementation of either formative or summative assessments.

Rubrics: Case Studies

The use of case studies to assess and depict actual learning encapsulates the principles of authentic, learner-centered education by focusing on problem-solving and decision-making skills, the textual construction of the learner's perspective and engagement with course material, and the chance to blend the lived experiences of learners with concepts cherished by professional/academic communities (Williams, 2006). Instructors are encouraged to incorporate the advantages and potential power of the online medium when using case study analysis as a comprehensive or summative assessment tool (Bonk & Cummings, 1998), including the expectation that learners are able to review a wider breadth of resources and media to inform their ability to critically analyze case material. Case material can be presented by the instructor with web-links to scholarship, press releases, and other news sources; video documentation of case-related events; and either fictional or non-fictional media (e.g., books, interviews, films). Learners in turn can be encouraged to provide a similar array of texts and media to support their analysis, including learner-generated videos and images.

In the spirit of subverting the use of summative assessment as a high-stakes evaluation tool (Stewart et al., 2004), rubrics for evaluating learner-generated content should be based equally on valuing the learner's perspective and voice (Lesnick et al., 2004), rather than solely upon appraising learner performance (Williams, 2006). This encourages instructors to devise evaluation protocols with attention to learners' process of learning, including collaborating with others and the adoption of authoritative positions within a given learning discourse (Lesnick et al., 2004). Eyal (2012) recommends that summative assessments be broken down into smaller, constituent elements that either can be used as formative assessments or can be presented to learners for their consideration and comment. The deconstruction of a larger capstone project, such as a case study analysis, can lead to the identification of related learning components and form the basis of evaluation rubrics.

A grading or evaluation rubric incorporates two key dimensions, one being identification of discrete learning components or themes related to overall learning objectives, and the other being a point-system hierarchy to represent degree of learner achievement (Swan et al., 2006).

Elements in an authentic evaluation rubric for case study analysis could include (a) the richness (in both breadth and depth) of resources upon which analysis is based; (b) the ability to identify salient and divergent perspectives in best practices relative to presented case material; (c) articulation of a clear process of analysis that appears to incorporate consideration of alternative perspectives; and (d) authoritative and or innovative synthesis of all elements of the learning process into a coherent viewpoint. Case study reports can be designed as interactive and collaborative assessments, with time periods for peer and instructor commentary (and subsequent revision of submitted work) incorporated into the design and implementation of this form of assignment. Degree and quality of collaboration and the ability to integrate critical feedback then can become another component in the evaluation rubric.

Tests and Examinations

Tests or exams are commonly used to measure academic achievement (Eyal, 2012), and issues of fairness, validity, authentic depiction of learning, and optimal use of resources are important for both face-to-face and online education (Williams, 2006). The literature base in general supports the use of exams to document learner performance in online environments (Hewson, 2012). In a comparative study, Escudier et al. (2011) found that dental school students performed equally well on face-to-face or web-based versions of an important high-stakes test. The authors concluded that using web-based assessment does not disadvantage learners, though it should be noted this study focused on the outcomes of learning and not on depicting learners' experience of the educational process. On the topic of student expectations, Stewart et al. (2004) found that positive expectations for learning were high in a participant sample of students in online classes during a college semester. Students identified positive expectations for meeting educational goals, having a meaningful experience, and being supported by instructors and staff throughout the course (Stewart et al., 2004). Students rated the actual experience of learning less favorably, though a majority of participants still rated the overall experience as positive (Stewart et al., 2004).

Williams (2006) suggested that an open-book, open-media format for administering exams in online education is preferred to the more common closed-book, proctored exam typical of education that is facilitated in primarily face-to-face education. If security of exam procedures is the chief concern, software such as a lock-down web-browser or a text comparison tool (that permits evaluation of submitted material for plagiarism) can be deployed. Williams and Wong (2009) identified that a sample of students, when comparing online versus face-to-face exams, viewed both formats as equally conducive (or restrictive, depending) to academic dishonesty or cheating. Students in the same study significantly preferred online, open-resource, and asynchronous examinations, as opposed to time-bound, face-to-face, and closed-resource (i.e., book) examinations, mostly due to the convenience of the former (Williams & Wong, 2009). Most learning management systems allow the use of time-limited, synchronous, and single-attempt submissions of exams, though this format may reduce the potential of exams as authentic summative assessment tools (Eyal, 2012; Levia & Quiring, 2008; Williams, 2006).

Journals, Blogs, and WIKIS

Applying the principles of authentic and constructivist education to online education encourages instructors to place the voice and experiences of the learners at the center of the assessment and evaluation process (Herrington & Standen, 2000; Russell et al., 2006). Reflective journals, where learners are prompted to articulate their own perspective relative to key educational themes, are

one way to enrich the assessment process in both a formative and summative sense (Naughton et al., 2011). Adapting the concept of the reflective journal to the online, collaborative learning environment, students can be asked to create web links in text to pertinent resources, images, streaming videos, or other media that help to underscore and contextualize learners' awareness and reflection upon their own learning process. Another adaptation would be to frame the journal, which implies either student-to-instructor or student-to-self-only communication, as a web-log (i.e., blog) designed for commentary and review by other students (Eyal, 2012). A rubric for evaluating the blog could be shared with all students, in order for student peer evaluations then to be incorporated in the overall/summative assessment of student and class-wide learning. If learners expected to augment their skills at scholarly and critical writing, instructors can assign students to create collaborative web-pages or wikis (Eyal, 2012). Wikis, as web-based knowledge resources, typically require detailed referencing and a comprehensive overview of covered topics. Many elements used to evaluate final term papers can be adapted to evaluate wikis, with the addition of assessing elements such as other web-based multimedia, timeliness of revisions, and the professionalism of collaborators and peer reviewers.

Conclusion

In this article, we have provided an overview of formative and summative tools available in the literature and some of our own ideas that can be adapted for the online education environment, along with the philosophical foundation for design and evaluation of the now-ubiquitous practice of online learning. However, due to the speed at which technology advances, it is necessary to be deliberate in learning about newly available tools. In the digital world, one is limited only by how far the imagination can stretch. Digital literacy is a key skill for instructors committed to learner success in online education (Bonk & Cummings, 1998; Eyal, 2012; Herrington & Standen, 2000), and professional educators in the 21st century need to augment and attend to their own digital literacy, both individually and by expecting educational institutions to provide opportunities to develop and maintain this crucial skill set. Along with cultivating digital literacy, educators need to re-conceptualize commonplace or mundane features of such online communication as email, in light of these features' potential to enrich the learning process beyond what can be expected of even traditional, face-to-face instruction (Lesnick et al., 2004). Constructivist education practices, such as encouraging collaborative learning and feedback (Russell et al., 2006), basing assessment on the progressive problem-solving and decision-making capabilities of learners (Williams, 2006), and authentic depiction of the emergent learning process (Naughton et al., 2011) are facilitated by deep familiarity with the capabilities of online learning management systems. One note of caution is that some electronic devices other than laptop and desktop computers limit the accessibility of all features available on a web-based learning management system. More empirically based literature on counselor educator digital literacy, including consideration of the constructive nature of the education process and best methods of both formative and summative assessments, may contribute to accurately, efficiently, and productively assess learner knowledge, awareness, and/or skills in online counselor education.

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About the Authors

Dilani M. Perera-Diltz
PhD, Associate Professor of Counselor Education
Department of Counseling, Administration, Supervision, and Adult Learning
College of Education
Cleveland State University
Cleveland, OH
Email: d.pereradiltz@csuohio.edu
Research interests: counselor education practice, school counselor practice, assessment

Jeffry L. Moe
PhD, Assistant Professor of Counseling
Department of Counseling & Human Services, Darden College of Education

Old Dominion University
Norfolk, VA
Email: jmoe@odu.edu
Research interests: LGBTQ issues in counseling, consultation, counselor education practice, marginalized populations