Instructors' Perceptions of Assessment Types and Strategies Used in Online Courses in Higher Education

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Abstract
Limited research has focused specifically on the effectiveness of assessments in online learning environments. Using the assessment dimension of the IDEAS Framework for Teaching Online, this study used a survey methodology to investigate instructors' perception of the effectiveness of assessment types and strategies used by online instructors in higher education. Instructors at two universities and one professional organization were invited to participate in the study. One hundred and four individuals completed the survey. Results showed that instructors considered design and multimedia projects as the most effective assessment types. Instructor-graded and individual student assignments were considered the most effective strategies by online instructors. Results indicated non-proctored exams and ungraded assignments were considered the least effective assessment type and strategy. Most instructors used text-based feedback and provided feedback on assignments within a week. Significant correlations were found between instructors' characteristics and preference for certain assessment types and strategies. Results are discussed in the context of the literature.

Keywords: Higher education; online assessment; assessment types; assessment strategies

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Introduction

Assessment is an important element in online teaching and learning (Kearns, 2012; Moore & Kearsley, 2012). Assessment "provides evidence of the outcome in any outcomes-based approach to education" (Conrad & Openo, 2018, p. 5). It also provides information to students regarding their learning and performance and can impact learner motivation (Rovai et al., 2008). Assessment assists the faculty and administrators to measure and monitor students' progress and performance (Sewell et al., 2010).

Conrad and Openo (2018) pointed out that assessment in online environments "adds another level of complexity" (p. 3). Gaytan and McEwen (2007) emphasized that "using effective assessment techniques is an essential part of effective teaching and learning in the electronic environment" (p. 118). It is essential to align assessments with learning activities and learning objectives (Dabbagh & Bannan-Ritland, 2005; Ko & Rossen, 2010; McKeachie & Svinicki, 2006). Feedback, a part of the assessment cycle, is essential and critical to student learning. Good feedback identifies achievement gaps, and learners may use feedback to improve their performance (Henderson et al., 2021; Hooda et al., 2022).

Robles and Braathen (2002) raised interesting questions regarding online assessments. How do we measure learning outcomes, and which assessments are necessary? According to Conrad and Openo (2018), conducting assessments in online environments makes the process more complex. There is limited research on the effectiveness of assessments in online learning environments, particularly research that focuses on online instructors' perceptions of the effectiveness of assessment activities and strategies, and feedback in online learning environments. The purpose of the study was to investigate perceptions of online instructors in higher education pertaining to the effectiveness of different online assessment types and strategies.

Literature Review

There are a variety of learner assessments that can be integrated in online courses and or programs. Reeves (2000) pointed out that instructors who teach online courses focused too much on the assessment of learners' retention of knowledge in the past instead of the application of newly acquired knowledge. The focus, he suggested, should not be on retention but on higher-order educational objectives in the cognitive domain identified by Bloom (1956), like application, analysis, synthesis, and evaluation.

Instead of using more traditional assessments to test learners' retention and understanding of knowledge, alternative assessments can be used to evaluate high-order skills. The use of alternative assessment has the potential to improve student learning in online environments in higher education. Reeves (2000) mentioned three approaches for integrating alternative assessment: cognitive, performance, and portfolio assessment. Cognitive assessment refers to the assessment of higher-order thinking and communication skills and attitudes. The learner's demonstration of applying knowledge through participating in activities or creating products refers to performance assessment. Portfolio assessment allows learners to archive products they created over time to provide evidence of learning and their process of knowledge and skills

acquisition. These products can also be used for reflection pertaining to the learner's engagement, experience, and progress (Conrad & Openo, 2018).

Important characteristics of assessments include criteria and standards that communicate expectations to learners (Conrad & Openo, 2018). Melo et al. (2022) studied learners' preferences for assessment formats or types. Additionally, they classified several assessment attributes. Results showed that the three preferred assessment attributes by learners were driving, realistic, and pertinent, whereas the least important attributes were fast, strategic, and safe.

Conceptual Framework

The IDEAS Framework for Teaching Online includes assessment as one of the dimensions (Martin & Ritzhaupt, 2023). Other dimensions in this framework are Design, Engagement, Evaluation, Support, and Inclusion. Figure 1 includes the various aspects to consider when designing and implementing assessments in online courses. This framework along with the review of literature was used to guide us in the design of the survey on assessment types, strategies, and feedback.

Figure 1

Assessment in Online Courses

IDEAS Framework for Teaching Online—Assessment Dimension

- Gauging Prior Knowledge, Skills, and Attitudes
- Formative and Summative Assessments
- Participation Credit for On-Task Behaviors
- Traditional and Authentic Assessments
- Provide Tailored Feedback
- Automated Assessments

Assessment Types

Rovai et al. (2008) points out that many assessments that can be integrated in campus-based courses can also be used in online courses. "Assessment type refers to the implemented task of the assessment" (Heil & Ifenthaler, 2023, p. 190), such as quizzes and essays. Gaytan and McEwen (2007) stressed that a variety of well-explained assessments should be used regularly in online courses because it provides instructors with an opportunity to become familiar with students' work, increases levels of interactions, and provides learners with frequent feedback. Morgan and O'Reilly (1999) suggested a variety of online assessment methods based on eight different learning activities: critical thinking, problem solving, demonstrating procedures, managing oneself, accessing and managing information, demonstrating understanding, designing or creating a product, and communicating.

One of the most common assessments in online higher education are written assignments (Sewell et al., 2010; Swan, 2001). These types can test learners' higher-order thinking skills such as analysis and synthesis and may include essays, reports of fieldwork or statistical analysis,

statistical write ups, plans (lesson plans, business plans), summaries, and literature reviews or annotated bibliographies (Kearns, 2012; Heil & Ifenthaler, 2023; McVey, 2016). Another assessment that allows learners to demonstrate skills in these cognitive domains is a case study analysis, where learners break a case into parts and provide solutions and recommendations (Kearns, 2012; Melo et al., 2022; Sewell et al., 2010).

Swan (2001) found that the most common assessments in online courses were tests, quizzes or examinations and other experts mention them in the literature (Gaytan & McEwen, 2007; Kearns, 2012; Melo et al., 2022; Robles & Braathen, 2002; Sewell et al., 2010; Xiong & Suen, 2018). Questions on quizzes and examinations solicit either a select- or construct-response from a learner. A select-response question requires learners to choose a response such as multiple-choice, true/false, match items, whereas a constructed-response question asks learners to create their own answers to open-ended-questions, scenarios, essays, etc., in order to assess a learner's ability to think critically (McVey, 2016; Rovai et al., 2008; Sewell et al., 2010; Xiong & Suen, 2018). These assessments may be timed or monitored (Gaytan & McEwen, 2007). Some exams that are part of a professional certification may be remotely proctored or monitored on an on-site testing center for security purposes (Melo et al., 2022; Sewell et al., 2010; Xiong & Suen, 2018).

There are several types of deliverables associated with assessment (Rovai, 2008), and Melo et al. (2022) make the distinction between product versus non-product producing assessments. Some of the types included in a variety of assessments are project-based assignments (Gaytan & McEwen, 2007; Marquis, 2021; Melo et al., 2022; Sewell et al., 2010). These can be authentic assessments that apply to real-world situations or scenarios where learners apply newly acquired skills to work with clients, either individually or in teams, in order to create a product. Examples are multimedia projects where learners produce digital files such as audio or video or design projects where learners engage in the instructional design process to produce instructional units, learning content, or digital artwork (Heil & Ifenthaler, 2023). Learners may be tasked to deliver write-ups of statistical analyses for research projects or collect artifacts they created over time to develop portfolios.

One assessment type that has become popular over the years are electronic portfolios or ePortfolios. Individual learners create assignments or artifacts over time, collect them, and store them electronically for review by other learners and instructors to demonstrate knowledge, skills, and abilities. They may also be used by learners as self-reflection tools pertaining to how learning occurred and the amount of knowledge or number of skills acquired over time (Gaytan & McEwen, 2007; Heil & Ifenthaler, 2023; Marquis, 2021; Melo et al., 2022). Bolliger and Shepherd (2010) found the majority (67.5%) of students valued the integration of ePortfolios in an online graduate program.

Reflections lend themselves well to online learning because most of the course content is text-based and learners can think more deeply due to the time factor involved. Educators may use written assignments (e.g., journals, papers) for critical reflections pertaining to processes such as knowledge building, personal growth, group work, and so forth. These assignments may be shared with the instructor and with peers (Conrad & Openo, 2018; Sewell et al., 2010).

Simulations and virtual laboratories are instructional tools for learners to engage with learning content actively, and Gaytan and McEwen (2007) found they were considered effective assessment techniques by instructors and students. Assignments may be completed individually or in groups. These environments may be a good choice for learners to acquire technical skills visually and test their comprehension and application of subject matter; however, the design of these environments is sophisticated and requires learners to have adequate computer systems and good infrastructures (Melo et al., 2022; Rovai et al., 2018; Sewell et al., 2010).

In order to facilitate discourse, engage learners, and build community in online courses, many instructors implement participation activities in the form of online discussions (Chen et al., 2021; Gaytan & McEwen, 2007; Kearns, 2012; McVey, 2016; Melo et al., 2022; Robles & Braathen, 2002; Sewell et al., 2010; Xiong & Suen, 2018). Discussions may be structured or unstructured, and instructors may choose to use small group or whole class discussions, or a combination of both (Fehrman & Watson, 2021; Kearns, 2012).

Self-assessment exercises are typically not graded such as self quizzes or practice tests (Bolliger & Martin, 2021; Chen et al., 2021; Gaytan & McEwen, 2007; Robles & Braathen, 2002; Sewell et al., 2010). These assessments can include (Whitworth & Wright, 2015) drill and practice or real-time quizzes (Chen et al., 2021), and question and answer sessions (Xiong & Suen, 2018).

Assessment Strategies

Rovai (2008) categorized two categories of assignments: independent work where learners are responsible for completing assignments by themselves (Melo et al., 2022), and collaborative assignments where teams or groups of students are contributing to the assignment (Altinay, 2017; Bolliger & Martin, 2021; Marquis, 2021; Melo et al., 2022). Assessments can be formative or summative. Formative feedback provides instructors with the ability to have more frequent interaction with learners and more opportunities to widely disseminate feedback to students. It allows learners to improve their performance over time (Bolliger & Martin, 2021; Chen et al., 2021; Halupa & Bolliger, 2013; Heil & Ifenthaler, 2023; McVey, 2016; Melo et al., 2022; Rovai et al., 2008; Sewell et al., 2010). In contrast, summative assessments are administered at the end of an instructional period. Summative assessments are considered high stakes testing because they are associated with the assignment of grades (Bolliger & Martin, 2021; McVey, 2016; Melo et al., 2022; Rovai et al., 2008; Sewell et al., 2010). Additionally, assessments may be either formal (or graded) or informal (not graded). Like with formative assessments, instructors who integrate informal assessments can identify learners' weaknesses and allow them to improve their performance (Rovai et al., 2008).

Differentiated assessments in online courses involve tailoring or personalizing them to meet the needs and preferences of diverse students. This assists students who take online courses with varying prior knowledge, goals, and learning pathways. Differentiation could be varied such as choice in assessments and assessment topics (Martin & Bolliger, 2018; Pinchot & Paullet, 2021), adaptive learning paths (Cai, 2018; Cordova, 2023), and flexible assignments (Rideout, 2017).

Instructors may also use open-book exams to evaluate learners' application of newly acquired knowledge (Melo et al., 2022) or may allow multiple attempts. Lee et al. (2021) who focused on self-directed learning in their research found the majority of students who were able to take online tests with multiple-choice questions multiple times did not guess answers to the questions; instead, they showed interest in learning. Brazhkin and Strakos (2023) found that students in management courses who had to enter quantitative answers preferred three attempts.

Another online assessment strategy is the use of peer review (Marquis, 2021; McVey, 2016). This strategy allows learners to provide and receive feedback and get exposed to other learners' ideas and writing styles. Peer assessments allow learners to learn about criteria for assignments, observe their peers' performance, and improve their own work (Van Popta et al., 2017; Van der Pol et al., 2008). However, learners should be provided with structure and information on how to provide effective feedback to other students. Kearns (2012) suggested providing learners with a grading rubric to provide their peers with clear and consistent feedback. Marquis (2021) pointed out that online annotation tools such as Google Docs can be used to provide learners with a more dynamic exchange of feedback by all course participants. When collaborative assessments are used in online courses, peer evaluations may be useful to determine individual efforts of team members (Gaytan & McEwen, 2007; Melo et al., 2022; Rovai et al., 2008).

Another commonly used strategy is the use of grading rubrics (Bolliger & Martin, 2021; Conrad & Obeno, 2018; Gaytan & McEwen, 2007). Instructors may use grading rubrics that include the purpose of the assessment, learning objectives, and criteria/standards (Conrad & Obeno, 2018) as an internal tool for grading student work consistently. Instructors may also post them to communicate expectations to learners. Often, this strategy results in fewer questions from learners pertaining to course assignments, therefore reducing the instructor's workload (Ko & Rossen, 2010).

Feedback

Feedback plays a vital role in the student learning process in online courses, and promotes learners' engagement, reflection, and growth. It may be corrective or elaborative (Heil & Ifenthaler, 2023). Feedback on assignments can be provided through different mechanisms. Different modes can include computer -assisted or automated, and instructor or peer feedback; self-assessments; and feedback generated by artificial intelligence (Heil & Ifenthaler, 2023; Hooda et al., 2022; Ogange et al., 2018; Rovai et al., 2008). Some instructors have also used peer assessment that can be formative or summative (Altinay, 2017; Kearns, 2012; Xiong & Suen, 2018). Rovai et al. (2008) pointed out that peer feedback may either be blinded or unblinded.

As previously mentioned, feedback is an important consideration in effective teaching and learning. Gaytan and McEwen (2007) point out that feedback should be timely and meaningful. Weekly assignments such as quizzes are a good type of assessment to provide immediate feedback to learners. The majority of instructors and students who participated in a study conducted by Gaytan and McEwen (2007) thought that continuous, immediate, and detailed feedback was an important consideration in quality online teaching. There are also different kinds of feedback modalities. Feedback may be given via video (Ketchum et al., 2022), audio or text (Hooda et al., 2022).

Instructor Characteristics and Context

Gaytan and McEwen's (2007) who conducted a study pertaining to online instructors' perception of effective assessment strategies found that most participants were female, regular faculty members, and many were at least 50 years of age. Additionally, instructors were well-experienced teachers in both the higher education setting and the online teaching environment. In a study conducted by Inan and Bolliger (2024), results showed that instructors with constructivist pedagogical beliefs chose to use more student-centered learning activities than instructors with more traditional beliefs. However, there is limited information on how instructor characteristics may influence assessment practices.

Other experts (Ko & Rossen, 2010; McKeachie & Svinicki, 2006) provided guidance on how to facilitate and assess student learning in classes of different sizes. In large classes, for example, instructors may use automated grading, student presentations, small group projects, peer evaluations, and so forth. Additionally, instructors may use different assessment types and strategies based on course level (undergraduate vs. graduate). According to Enright and Gitomer (1989), "goals of graduate education include training of researchers, teachers, and practitioners" (p. 4). Graduate programs prepare learners for professions and should train learners to identify problems; write proposals, papers, and reports; and provide constructive feedback to peers. These tasks are aligned with higher-order thinking skills that may require the development of learning objectives different from undergraduate-level courses.

Purpose of the Study and Research Questions

This study investigates online instructors' perspectives on the effectiveness of different assessment types and strategies. While assessments have long been part of teaching and learning, limited research has focused specifically on the effectiveness of assessments in online learning environments. By considering varied assessment types, strategies for implementation, and contextual factors such as course level (undergraduate vs. graduate) and class size (small vs. large), this study contributes new insights to the field. It also examines the role of feedback—both in terms of modality and frequency—as a key element of successful online courses.

This study answers the following research questions:

1. What are effective assessment types and strategies used by instructors in online courses in higher education?
2. How do instructors vary their assessment strategies based on context (e.g., class size and course level) in online courses?
3. What modality and frequency do instructors use to provide feedback in online courses?
4. Are assessment types and strategies correlated with instructor characteristics in online courses?

Methods

Participants

One hundred and four instructors who taught online courses completed the survey. Seven instructors did not complete demographic information. There were 63.6% instructors (n = 68)

who identified as female, 26.2 % as male (*n* = 28), three preferred not to say, and one person reported *other*. For discipline, 36.4% of instructors were from Arts and Sciences and 28% were from Education. The respondents had different ranks: professors (17.8%), associate professors (15.9%), lecturers (15%), and assistant professors (13.1%). Respondents taught undergraduate (36.4%), graduate (21.5%), and a combination of both graduate and undergraduate (34.6%) courses. Their average age was 52.06. In terms of teaching experience, they had taught an average of 15.83 years in higher education and an average of 8.19 years online teaching experience. Only one participant reported being a novice instructor (1.0%), and eight instructors were advanced beginners (7.7%). Most participants indicated that they were competent (*n* = 27; 26.0%), proficient (*n* = 36; 34.6%), or expert (*n* = 24; 24.0%) in online teaching, whereas only a limited number of participants reported themselves as novice (*n* = 1; 1.0%) or advanced beginners (*n* = 8; 7.7%).

Survey

The research team conducted a thorough literature review to develop a survey with assessment types and strategies that instructors who teach online courses at higher education institutions use. The survey underwent a review of eight individuals who were instructed to review the categories and items, check items for clarity and appropriateness, and add or delete items. Expert panel participants included two research methodologists, two expert online instructors, and two senior instructional designers with several years of experience in higher education. Additionally, two advanced doctoral students provided feedback after reviewing the survey. The expert panel's feedback resulted in revisions of the rating scale, several scale items, and some demographic questions. The final survey had four sections with 43 questions.

The two categories included assessment types and assessment strategies, with 15 and 13 items, respectively. Items used a 5-point Likert-type scale with 1 = *not effective* to 5 = *extremely effective*. These items also included a *not used* response. Each category had an open-ended response question about other types and strategies used by respondents that were not listed. The third section included three questions pertaining to instructor feedback to students, and the fourth section included 10 questions on instructors' backgrounds and demographic information. One of those questions is an open-ended question asking instructors how their assessment strategies change based on course type (e.g., undergraduate vs. graduate; small class-size vs. large class-size).

Data Collection

Data was collected through two universities and one professional organization after institutional review board approvals were received at the researchers' participating institutions. Online surveys were distributed at one doctoral extensive and one doctoral intensive institution in the southeastern U.S. using internal email lists. Invitations for members of the professional organization were distributed through an email list and message boards. In total, 104 instructors completed the survey.

Data Analysis

Descriptive statistics including the mean and standard deviation were examined to answer the first and second research questions. Additionally, a frequency distribution was inspected to

grasp the overall tendency of the use of assessments and strategies used by instructors. The Spearman correlation coefficient was calculated to address the last research question, investigating the relationship between assessment types and strategies used by instructors and their characteristics. The instructors' demographic variables examined included: years of teaching in higher education, years of teaching online courses, age, and typical class size.

The three open-ended questions about assessment types and strategies, and context-based strategies were analyzed using open coding (Creswell, 2014; Creswell & Poth, 2018; Patton, 2015). Frequencies were used to develop categories based on codes that emerged. One of the researchers conducted the initial round of coding, using an inductive, manual approach to analyze responses to all three open-ended questions on assessment types, strategies and strategies based on context (course level and class size). When multiple codes emerged, categories were formed. The initial categories were presented and discussed with the other researchers in a collaborative team meeting. The team provided critical feedback which was used to refine category definitions. This iterative process strengthened the coding process.

Results

Effectiveness of Assessment Types

Participants were asked how effective a list of online types of assessments were to evaluate student learning. Table 1 shows the means and standard deviations of the studied types of assessment. The descriptive statistics are presented for each group—instructors primarily teaching undergraduates, graduates, and both—separately along with the entire sample group. For each group, the last column (*N*) indicates the number of participants responding to the effectiveness scale; the rest of the participants indicated they did not use that particular assessment type in their classes. As can be seen in Table 1, participants rated design projects, multimedia projects, and case study analysis consistently as very effective regardless of the level of courses they teach. However, it is worth noting that design projects were used by fewer than half of the participants ($n = 48$). By contrast, participating instructors tended to perceive self-directed assessments such as non-proctored exams ($M = 2.72$) and self-assessments ($M = 2.74$) least effective. It is interesting to note that quizzes were the most frequently used assessment tool ($n = 93$) but were not perceived to be very effective ($M = 2.99$), compared to the other types of assessments.

Table 1

Assessment Types (N = 104)

	Total		*Undergrad*		*Grad*		*Mix*	
Type of assessment	*M (SD)*	*N*	*M (SD)*	*n*	*M (SD)*	*n*	*M (SD)*	*n*
Writing assignments	3.68 (0.96)	92	3.64 (1.03)	33	3.84 (0.96)	19	3.69 (0.96)	35
Case study analysis	3.94 (0.78)	77	4.11 (0.64)	27	3.93 (0.70)	15	3.87 (0.86)	30
Quizzes	2.99 (0.98)	93	3.13 (0.91)	38	2.64 (1.28)	14	2.91 (0.95)	33
Exam (non-proctored)	2.72 (1.19)	74	2.93 (1.13)	29	2.75 (1.42)	12	2.41 (1.15)	27
Exam (proctored)	3.22 (1.33)	59	3.72 (1.18)	18	3.29 (1.70)	7	2.89 (1.22)	27

Multimedia project	4.03 (0.91)	79	4.00 (0.90)	28	3.94 (1.09)	17	4.27 (0.64)	30
Electronic portfolio	3.67 (1.11)	58	3.47 (1.36)	15	3.67 (1.29)	15	3.95 (0.84)	22
Design project	4.10 (0.83)	48	4.15 (0.69)	13	3.93 (1.21)	14	4.29 (0.47)	17
Student presentation	3.77 (0.88)	84	3.72 (1.00)	29	3.61 (0.98)	18	3.97 (0.74)	32
Reflection	3.23 (1.00)	69	3.17 (0.89)	23	3.63 (1.15)	16	3.12 (0.99)	26
Simulation	3.49 (1.14)	43	3.57 (1.02)	14	3.11 (1.76)	9	3.75 (0.86)	16
Educational online game	3.12 (1.06)	42	3.13 (0.96)	16	3.57 (1.13)	7	3.29 (0.99)	14
Self-assessment	2.74 (1.05)	61	3.21 (1.10)	24	2.50 (1.18)	10	2.38 (0.81)	21
Asynchronous participation	3.00 (1.08)	87	3.44 (1.08)	32	2.67 (0.84)	18	2.90 (1.11)	31
Synchronous participation	3.12 (1.10)	74	3.38 (1.17)	26	2.75 (1.14)	12	3.23 (0.94)	30

Note. The scale items range from 1 = *not effective* to 5 = *extremely effective*.

Other Effective Assessment Types

Participants were asked to respond to an open-ended question pertaining to effective types of online assessments they had used not listed in the survey. Fifty-five instructors completed this question. Eleven individuals indicated "none" or "not applicable," whereas some listed types of assessment included in the survey. However, other respondents listed hands-on labs or at-home labs that students received via mail, ungraded checkpoints where students submit projects in stages, video analysis, discussion boards, interviews of professionals in the field, homework, computer-based homework, assessments through outside agencies, interactive polling, and oral exams.

Effectiveness of Assessment Strategies

Table 2 shows the means and standard deviations of the assessment strategies. Instructor-graded assignments ($M = 4.03$) and individual student assignments ($M = 4.02$) were the most common assessment strategies used and believed to be the most effective. Instructor-graded assignments were rated as most effective by instructors who teach only undergraduate courses and a combination of undergraduate and graduate courses, whereas individual student assignments were rated the most effective by instructors who teach only graduate students. Similar to assessment types, self-directed assignments such as ungraded assignments ($M = 2.53$) and peer feedback ($M = 2.89$) received the lowest ratings in terms of effectiveness.

Table 2

Assessment Strategies

	Total		*Undergrad*		*Grad*		*Mix*	
Assessment strategy	*M (SD)*	*N*	*M (SD)*	*n*	*M (SD)*	*n*	*M (SD)*	*n*
Individual student assignments	4.02 (0.70)	98	3.86 (0.68)	36	4.43 (0.68)	21	3.92 (0.65)	36

Group/collaborative project	3.02 (1.01)	89	3.13 (1.06)	31	3.00 (1.12)	20	2.94 (0.89)	34
Formative assessment	3.56 (0.92)	81	3.52 (1.00)	31	3.81 (1.17)	16	3.40 (0.89)	30
Summative assessment	3.58 (0.77)	86	3.45 (0.96)	31	3.78 (0.88)	18	3.63 (0.61)	32
Instructor graded assignment	4.03 (0.73)	101	3.92 (0.71)	38	4.10 (0.94)	21	4.11 (0.62)	36
Ungraded assignment	2.53 (1.22)	83	2.81 (1.64)	32	2.72 (1.07)	18	2.04 (1.06)	27
Automated graded assignment	3.13 (1.17)	79	2.94 (1.29)	33	3.08 (1.44)	13	3.29 (1.24)	28
Open book/notes assessments	3.35 (1.12)	78	3.18 (1.71)	28	3.67 (1.23)	15	3.40 (1.10)	30
Differentiated assignment	3.62 (1.01)	50	3.53 (1.26)	15	3.69 (0.95)	13	3.56 (0.92)	18
Peer feedback	2.89 (1.13)	74	2.75 (1.15)	24	3.00 (1.11)	19	2.89 (1.12)	27
Peer evaluations for collaborative assignment	2.97 (1.24)	65	2.95 (1.12)	21	3.06 (1.48)	18	2.95 (1.13)	22
Grading rubrics/criteria	3.75 (1.06)	93	3.71 (0.87)	34	3.90 (1.21)	20	3.79 (1.15)	34
Multiple attempts/ submissions	3.44 (1.20)	80	3.42 (1.06)	33	3.94 (1.03)	17	3.12 (1.36)	25

Note. The scale items range from 1 = *not effective* to 5 = *extremely effective*.

Other Effective Assessment Strategies

The second open-ended question asked respondents to share other online assessments strategies used—not listed in the survey—that were effective. Only four instructors completed this question. Other participants reported they used flexible due dates, time-limited multiple choice exams, demonstrations, collaborative chats, and collaborative research assignments. Strategies that were erroneously listed by respondents as assessment types in the first open-ended question included: assignments following synchronous sessions, gamification, and problem-based learning.

Assessment Strategies Based on Context

The last open-ended question asked online instructors to provide details on how their online assessment strategies change based on context (e.g., course level, class-size). Of participating instructors, 86 responded to this question. For 11 individuals this question was not applicable because they only taught either undergraduate or graduate courses and either small or

large-sized courses. Five instructors made no changes based on either course level or class size. Tables 3 and 4 display the changes instructors make in their online courses based on context.

Table 3

Reported Strategy Changes Based on Course Level

Undergraduate-level courses	**Graduate-level courses**
Activities with formative feedback	Application-type assignments
Automated/auto-graded quizzes	Authentic assessments
Constant reminders	Choice in topics
Individual assessment	Co-design final products
More feedback sessions	Differentiation based on project goal/course type
More frequent assignments	Fewer assignments
More group work/projects	Fewer feedback sessions
More lower-stakes assignments	Fewer or no low-stake assignments
More scaffolding activities	Formative feedback
More smaller assessments	More experiential assignments
Reflections	More peer feedback
Vigilant about cheating: Use of Respondus Monitor and LockDown Browser	More written assignments
Worksheets	Open-ended assignments
	Peer help
	Peer reviews
	Portfolio-based assessments
	Practice
	Project-based assignments
	Quizzes
	Rich, detailed, direct feedback
	Rubric modification
	Scaffolded projects
	Small assignments within a project
	Take-home exams

Table 4

Reported Strategy Changes Based on Class Size

Large classes	Small classes
Additional faculty to provide open-ended feedback	Deeper assessments with nuanced feedback
Assignments graded by preceptor and instructor	Discussion boards
Automated assessment forms	Fewer group projects
Change of numbers of problems assigned in class	Individual assessments
Discussion boards	Larger assessments
Comprehension activities	Low-stakes formative assessments
Group assignments/projects/activities	More assessments
Fewer essays	More grading by professor
Fewer large assignments	More in-depth writing assignments
Forum-based questions	More manual feedback
Less individualized/personalized feedback	More written assignments
Low stakes grading of written assignments	Projects with individualized feedback
More automated feedback	Scaffolded course project with feedback 3–4 times
More automated grading	Show critical thinking
More collaborative assignments	Written assignments with meaningful feedback
More online grading	
Random in-depth grading	
Smaller assignments with less feedback	
Small groups	
Whole-class or generalized feedback	

Modality and Frequency of Feedback

Table 5 presents the distributions of the modality and frequency of instructors' feedback. The majority of the participants used texts to provide feedback (n = 95; 88.8%). Approximately one fifth of instructors used audio as the feedback modality (n = 21; 19.6%). In terms of the frequency of the feedback, over two thirds of the participants indicated that they provide feedback within a week (n = 78; 72.9%).

Table 5

Modality and Frequency of Feedback

Variable	*n* (%)
Modality for feedback	
Text	95 (88.8%)
Audio	21 (19.6%)
Video	17 (15.9%)
Feedback frequency	
Within one month	1 (0.9%)
Within one week	78 (72.9%)
Within one day	17 (15.9%)
Immediately	6 (5.6%)
Missing	5 (4.7%)

Instructors' Characteristics

The Spearman correlations showed a significant negative relationship between instructors' years of teaching in higher education and multiple attempts/submission strategy (r = -0.249, p = .030, n = 76). By contrast, instructors with more online teaching experience perceived peer evaluations for collaborative assignments as more effective, r = 0.271, p = .33, n = 62.

Age was found to be one of the factors that are associated with various types of assessments. Age showed positive relationships with writing assignments (r = 0.328, p = .002, n = 86), non-proctored exams (r = 0.286, p = .013, n = 67), proctored exams (r = 0.347, p = .013, n = 51), multimedia project (r = 0.258, p = .026, n = 75), and student presentations (r = 0.223, p = .043, n = 78). Finally, class size was negatively correlated with individual student assignments, r = -0.300, p = .004, n = 90).

Discussion

This study examines online instructors' perception of the effectiveness of various assessment types and strategies. Although many of these assessments have been used for decades, only few studies have investigated the effectiveness of various types of assessments and strategies in online courses. Additionally, examining assessment strategies based on context such as course level (undergraduate vs. graduate) and class size (small vs. large) adds valuable insights to the literature on online learning. The study also addresses feedback modalities and frequency, both of which are critical components of effective online teaching. Finally, analyzing the relationship between instructor characteristics and assessment types and strategies offers guidance to online instructors. Overall, the study offers practical implications for improving assessment practices in online education.

Most Effective Assessments

Our respondents perceived design projects and multimedia projects as most effective among the assessment types regardless of level of courses they taught. Authentic assessments such as design and multimedia projects apply to real-world situations or scenarios where learners create a product or artifact, therefore demonstrating their knowledge and abilities in new situations, scenarios or problems (Dabbagh & Bannan-Ritland, 2005). It is interesting to note, however, that design projects were used by fewer than half of the participants. Other types that were rated highly were case study analysis and student presentations. These types of assessments allow students to actively analyze and evaluate newly acquired knowledge and apply it to a practical situation.

Online instructors perceived instructor-graded assignments and individual student assignments to be the most effective assessment strategies. Instructor graded assignments were rated the highest by instructors who teach undergraduate courses and combination of undergraduate and graduate students in comparison to ungraded and automated-graded assignments. This shows that instructors believe students value the grading they perform. Also, individual student assignments were rated the most effective by instructors who teach graduate students. Graduate students are usually working adults with families and busy schedules and consider it less difficult to work on assignments individually rather than in a team due to the challenges group assignments may present (LaBeouf et al., 2016).

Least Effective Assessments

In this study, online instructors tended to perceive self- assessments and non-proctored exams to be least effective. Students in online courses tend to complete more graded activities compared to self-assessments because they may not have sufficient time to work on non-graded assignments. Moskal (2010) pointed out that when self-assessments are administered in isolation it is incomplete. Additionally, online instructors perceived non-proctored exams to be less effective compared to proctored exams. Instructors may perceive that non-proctored exams may not be valid when learners are allowed to use notes or other resources to demonstrate their knowledge or skill.

Results indicate that respondents perceived ungraded assignments and peer feedback as not very effective strategies. Similarly to self-assessments, learners may not take the time to complete ungraded assignments because these assessments have no impact on their grades. Some instructors may not use peer feedback because they do not see value in peers providing feedback to others. It is also possible that learners are not adequately prepared to provide meaningful feedback to other learners. Peer feedback only adds value when there is structure and students are trained on how to provide meaningful feedback in the peer review process (Kearns, 2012).

Assessment Strategies Based on Context

Many of our participants taught a mix of undergraduate and graduate courses, in addition to small and large classes. This is likely the case for many instructors who teach at higher education institutions. Some instructors chose not to make adjustments when teaching different course types; however, many instructors who taught graduate courses or small classes used strategies to provide scaffolding such as formative feedback or more detailed feedback. Others used differentiation strategies such as more open-ended assignments, portfolios or they gave

learners the option of choosing topics. Some also involved peers in the feedback cycle, such as peer help, reviews, and feedback. Lydel (2008) pointed out that ongoing reform in graduate education includes issues such as quality measures, student-centered approaches, and learner empowerment. Other strategies provided included reducing the number of assignments and integrating authentic or application-based assessments.

Instructors who taught primarily undergraduate courses or large classes used more frequent, smaller, and low-stakes assessments. Moore and Kearsley (2012) point out that learners are more likely to finish an online course when they complete assignments more frequently. Instructors used automated grading of quizzes and tests to provide immediate feedback to students, a strategy mentioned by Simonson et al. (2012). To reduce their workload, they increased the number of group projects as suggested by Dunlap (2007). Additionally, they used more reminders and feedback sessions to scaffold student learning.

Instructor Feedback

Most respondents used text to provide feedback whereas one-fifth of instructors used audio as the feedback modality. Cavanaugh and Song (2014) point out that most online instructors use text to provide feedback to learners. Results of their study showed that most instructors preferred providing written feedback due to technical issues and concerns about clarity of their feedback. Mulliner and Tucker (2017) found that 92% thought typed feedback was either *very* or *quite* effective, whereas 61% of participating instructors rated audio feedback to individual students as effective.

In terms of the frequency of the feedback, over two-thirds of the participants indicated that they provide feedback within a week, whereas about one-tenth of the participants reported providing feedback within a day. Exemplary or award-winning online instructors who were interviewed provided grades and feedback within two to five days (Lewis & Abdul-Hamid, 2006; Martin et al., 2019). Timeliness is an important aspect of the feedback process according to the literature. Prompt feedback is not only important for student learning but also to demonstrate instructor presence, facilitate interaction, and increase learner satisfaction (Chickering & Gamson, 1987; Gaytan & McEwen, 2007; Lee, 2014; Lewis & Abdul-Hamid, 2006; Martin et al., 2019).

Instructor Characteristics

Results show that instructors' teaching experience in higher education resulted in a negative correlation with multiple submission attempts. This suggests that as instructors gain more teaching experience, they tend to see the multiple attempts/submission strategy less effective. Davis et al. (2020) found that an unlimited number of attempts on quizzes improved students' outcomes on exams overall. However, students who were provided with formative feedback on essays did not have significantly higher grades. Hence, the effectiveness of this strategy is questionable, particularly because it can be time consuming for instructors (Crisp, 2007). It is possible that instructors become disillusioned with this strategy over time because they may not believe that students use their feedback.

In contrast, online teaching experience was positively correlated with peer evaluations for collaborative assignments. As online teaching experience increases, instructors find peer

evaluations more effective. Some instructors, however, question the quality and effectiveness of peer evaluations. Sprague et al. (2019) found that most students agreed with the scores they provided for group members, and these results support the use of peer evaluations. Instructors may see the relevance of peer evaluation use as they gain online teaching experience.

Limitations

The reader should be aware of some limitations. First, the study was geographically limited. Second, the majority of respondents taught in either arts and sciences or education. Future research may focus on instructors who teach in other disciplines. Third, the sample size was relatively small. Fourth, the data is self-reported due to the nature of the study. Fifth, some participants may not have been as forthcoming as others about their assessment practices due to social desirability. Last, those who completed the survey were volunteers who may have held views differently from those individuals who did not participate in the study.

Implications for Research and Practice

Future research may be conducted by selecting research sites in multiple states, regions, or countries. The study may be replicated by including multiple sites in the data collection plan. Researchers could also examine learners' perceptions of effectiveness of online assessments, particularly attitudes and opinions pertaining to individual and group assignments, peer feedback and review, and authentic assessments.

The findings from this study also have implications for practitioners. Online instructors can review the various assessment types and strategies and adopt the ones that might be more effective for the student level and class size they teach. Similarly, instructional designers can provide guidance to instructors regarding assessment types, strategies, and feedback mechanisms. Overall, students will benefit when their instructors use varied assessment types and strategies that are appropriate for the courses they teach.

Conclusion

The purpose of the study was to investigate higher education instructors' perceptions of effectiveness of assessment types and strategies in online learning environments. Participants rated assessment types and strategies from not effective to very effective in addition to providing readers with types and strategies not included in the survey. Additionally, participating instructors revealed how they change their strategies based on context and how they provide feedback in terms of frequency and modality. Results of this study can provide practitioners, administrators, and researchers with an understanding of how online instructors currently assess student learning and performance. They also give a broad overview of assessment types and strategies that may be used in online environments by instructors.

Learners should have an opportunity to demonstrate their newly acquired knowledge and/or skills in multiple formats (Gaytan & McEwen, 2007). Educators and administrators need to ask themselves what assessments are necessary, how to measure learning outcomes effectively and fairly, and how to assess critical thinking and problem solving in different environments and

contexts (Robles & Braathen, 2002). This becomes an even more important issue as more learners in higher education study in online learning environments.

Declarations

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics Approval

The authors assert that approval was obtained from the ethics review boards at North Carolina State University and the University of North Carolina at Charlotte.

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