



Designing a Tool to Evaluate the Validity of Formative and Summative Evaluations in E- Learning

AUTHOR

Deyab Almaleki, Ph.D.
Associate Professor, Evaluation Measurement & Research
Umm Al-Qura University, Saudi Arabia.

Corresponding Author
E: damaleki@uqu.edu.sa

Abstract:

Formative and summative evaluations are essential components of e-learning programs, as they help instructors and designers assess student-learning outcomes and make data-driven decisions about course design and delivery. However, assessing the validity of these evaluations is crucial to ensuring that they are effective and accurate. This study aimed to assess the validity of formative and summative evaluations in e-learning environments by examining the perceptions and experiences of both instructors and students.

A descriptive research method was used, including a survey of instructors and students. The survey collected data on participants' perceptions of the validity of formative and summative evaluations, as well as their experiences with these evaluations in e-learning contexts to provide further insights into the challenges and opportunities associated with these evaluations.

The results of the analysis revealed that the ten-factor model provided the best fit for the data. This finding suggests that the 50 items can be combined and interpreted as a cohesive construct, representing the validity of formative and summative evaluations in e-learning.

The standardized factor loadings for each item were highly positive and statistically significant, indicating that the items were strongly associated with their respective factors. This indicates that the measurement model is reliable and valid for assessing the construct of formative and summative evaluations in e-learning environments.

Overall, these findings contribute to the understanding of the validity and reliability of formative and summative evaluations in e-learning environments. The 50-item measurement model provides a comprehensive tool for assessing these evaluations, and the results support its robustness as a unitary construct.

Keywords: e-learning, formative evaluation, summative evaluation, validity, reliability, student-learning outcomes.

Introduction:

E-learning has become an increasingly popular mode of education, as it offers flexibility and convenience to learners, allowing them to access educational content from anywhere and at any time (Smith, 2019). However, e-learning also presents unique challenges, such as the need to ensure that students are effectively learning and achieving their learning outcomes (Johnson & Adams, 2020). Formative and summative evaluations are essential components of e-learning programs, as they help instructors and designers assess student-learning outcomes and make data-driven decisions about course design and delivery (Brown & Green, 2018).

Formative evaluation refers to the ongoing assessment of student-learning throughout a course, while summative evaluation refers to the assessment of student-learning at the end of a course (Black & Wiliam, 1998). Both types of evaluations are important for assessing student-learning outcomes, but they differ in their purposes and approaches. Formative evaluation is used to provide feedback to students and instructors throughout the course, while summative evaluation is used to assess student-learning outcomes at the end of the course (Taras, 2005).

Assessing the validity and reliability of formative and summative evaluations is essential to ensure that they are effective and accurate measures of student-learning outcomes (Messick, 1995). Validity refers to the extent to which an assessment accurately measures what it is intended to measure, while reliability refers to the extent to which an assessment produces consistent results over time and across different raters or evaluators (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014).

In the context of e-learning environments, ensuring the validity and reliability of formative and summative evaluations can be challenging due to the unique characteristics of these environments (Kuhfeld et al., 2020). For example, e-learning environments may involve asynchronous learning, where students learn at their own pace and on their own schedule, which can make it difficult to ensure that all students are being assessed in a consistent and equitable manner (Jaggars & Xu, 2016).

One way to ensure the validity and reliability of formative and summative evaluations in e-learning environments is to establish clear assessment criteria and ensure that these criteria are aligned with course

objectives and learning outcomes (Boud, 1995). This can help to ensure that assessments are measuring the appropriate knowledge and skills that students are expected to acquire in the course (Biggs & Tang, 2011).

Another way to ensure the validity and reliability of formative and summative evaluations is to use multiple evaluators or raters to assess student work (Van den Berghe et al., 2013). This can help to ensure that the results are consistent across different evaluators and that the assessments are not biased towards any particular evaluator's subjective opinion (Kane, 2006).

In addition to establishing clear assessment criteria and using multiple evaluators, it is also important to ensure that the assessments are administered in a fair and consistent manner (Angelo & Cross, 1993). This may involve providing students with clear instructions and guidelines for completing the assessments and ensuring that all students have equal access to the necessary technology and resources (Kuh, Kinzie, Schuh, & Whitt, 2005).

Overall, assessing the validity of formative and summative evaluations in e-learning environments is essential to ensure that these evaluations are effective and accurate measures of student-learning outcomes (Bennett, 2011). By doing so, instructors and designers can make data-driven decisions about course design and delivery, which can lead to improved student-learning outcomes (Allen & Seaman, 2017). This study aimed to design a tool to assess the validity of formative and summative evaluations in e-learning environments by examining the perceptions and experiences of both instructors and students (Smith et al., 2022).

Literature review

The literature on the validity and reliability of assessing formative and summative evaluations in e-learning highlights the importance of designing effective assessments that align with course objectives and measure the desired learning outcomes (Al-Fraihat et al., 2020; Khan, 2018). This requires careful planning and attention to detail, including the use of clear assessment criteria, rubrics or scoring guides, and multiple evaluators to ensure consistency and accuracy in assessment results (Reeves & Hedberg, 2018).

Assessment formats play a key role in measuring student-learning outcomes in e-learning environments. The literature suggests that

different assessment formats, such as multiple-choice questions, essay questions, and project-based assessments, can be effective in measuring student-learning outcomes (Schmid et al., 2014; Wolf & Stevens, 2007). However, the assessment formats should be selected based on the desired learning outcomes and the level of student engagement and motivation. Reliability and validity are critical factors in designing effective assessments in e-learning environments. Assessments should be designed to provide consistent and accurate measures of student-learning outcomes (Al-Fraihat et al., 2020). This can be achieved by using consistent evaluation processes, piloting assessments before implementation, and using multiple evaluators to ensure consistency in assessment results (Khan, 2018). Additionally, assessments should be designed to measure what they are intended to measure and provide a valid measure of student-learning.

Inclusivity is another important consideration in designing effective assessments in e-learning environments. Assessments should be designed to accommodate diverse student populations, such as non-native English speakers or students with disabilities (Pachler et al., 2013). This can be achieved by using inclusive language and examples, providing appropriate accommodations, and using accessible assessment technology.

Assessment technology can support the administration and scoring of assessments in e-learning environments. Additionally, assessment feedback can provide valuable insights into student-learning outcomes and inform future course design and assessment practices (Schmid et al., 2014).

Overall, the literature suggests that designing effective assessments in e-learning environments requires a comprehensive approach that takes into account a range of factors, including alignment with learning outcomes, assessment formats, reliability and validity, inclusivity, assessment technology, and feedback (Khan, 2018; Wiliam, 2018). By designing assessments that meet these criteria, instructors and designers can ensure that their assessments provide valid and reliable measures of student-learning outcomes.

In addition to the factors mentioned above, the literature also highlights the importance of considering the timing of assessments in e-learning environments. Formative assessments, which are designed to monitor student progress over time and provide ongoing feedback, can be particularly effective in promoting student-learning outcomes (Wiliam,

2018). Summative assessments, which are typically administered at the end of a course or unit, can provide a final measure of student-learning outcomes and inform grading decisions.

The literature also emphasizes the need to provide assessment feedback that is both useful and actionable. Feedback should be timely, clear, and specific, and it should provide students with guidance on how to improve their performance (Al-Fraihat et al., 2020; Reeves & Hedberg, 2018). In addition, feedback should be provided to instructors and designers to inform future course design and assessment practices.

Instructors and designers should also receive training and support in assessment design and implementation. Training should cover topics such as assessment design, scoring, and feedback, as well as the use of assessment technology (Khan, 2018). In addition, instructors and designers should have access to resources and support to help them design and implement effective assessments in e-learning environments (Pachler et al., 2013).

Common mistakes to avoid when designing assessments

Designing effective assessments is a critical component of e-learning environments (Al-Fraihat et al., 2020; Khan, 2018). Assessments help instructors and designers to measure student-learning outcomes and make data-driven decisions about course design and delivery (Schmid et al., 2014; Wolf & Stevens, 2007). However, designing effective assessments requires careful planning and attention to detail (Khan, 2018), and there are several common mistakes that instructors and designers should avoid (Reeves & Hedberg, 2018).

1. Focusing on memorization of facts instead of critical thinking: Assessments that are focused on memorization of facts do not necessarily measure higher-order thinking skills, such as analysis, synthesis, and evaluation. It is important to design assessments that require students to apply their learning to real-world scenarios and to think critically about the material.
2. Using assessment items that are too easy or too difficult: Assessments that are too easy do not provide an accurate measure of student-learning outcomes, while assessments that are too difficult can be demotivating and lead to low scores. It is important to design

assessments that are appropriately challenging and measure the desired learning outcomes.

3. Not aligning assessments with course objectives: Assessments should be aligned with course objectives and learning outcomes. If assessments do not align with these objectives, they may not accurately measure student-learning outcomes and may not contribute to improved student-learning outcomes.

4. Not providing clear instructions: Clear and concise instructions are essential for ensuring that students understand what is expected of them and can perform to the best of their abilities. If instructions are unclear or confusing, students may not perform as well on the assessment as they could have.

5. Not providing adequate feedback: Feedback is essential for helping students understand their strengths and weaknesses and for improving their learning outcomes. If assessments do not provide adequate feedback, students may not be able to identify areas where they need improvement and may not be motivated to continue learning.

6. Not using a variety of assessment formats: Assessments that use only one format, such as multiple-choice questions, may not provide an accurate measure of student-learning outcomes. It is important to use a variety of assessment formats, such as essays, projects, and portfolios, to provide a comprehensive measure of student-learning outcomes.

Overall, designing effective assessments requires careful planning and attention to detail. By avoiding these common mistakes and designing assessments that are focused on critical thinking, appropriately challenging, aligned with course objectives, provide clear instructions and feedback, and use a variety of assessment formats, instructors and designers can create assessments that effectively measure student-learning outcomes and contribute to improved student-learning outcomes.

Student feedback be used to improve assessments.

Student feedback can be a valuable tool for improving assessments in e-learning environments (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006). By soliciting feedback from students on their experiences with assessments, instructors and designers can gain insights into the strengths and weaknesses of the assessments and make adjustments to

improve their validity and reliability (Boud & Molloy, 2013; Carless, 2006)

Here are some ways in which student feedback can be used to improve assessments:

1. Identify areas of confusion or difficulty: Student feedback can provide insights into areas of the assessment that students found confusing or difficult. This can help instructors and designers to identify areas where the assessment may need to be revised or clarified to improve its validity and reliability.
2. Improve clarity of instructions and assessment items: Student feedback can also help instructors and designers to identify areas where the instructions or assessment items were unclear or confusing. By revising these materials to improve their clarity, instructors and designers can improve the validity and reliability of the assessment.
3. Ensure alignment with course objectives: Student feedback can also be used to ensure that the assessment is aligned with the course objectives and learning outcomes. If students are not seeing the connection between the assessment and the course objectives, instructors and designers can revise the assessment to make this connection clearer.
4. Gauge student engagement and motivation: Student feedback can also provide insights into student engagement and motivation with the assessment. If students are not motivated to complete the assessment or do not feel that it is relevant to their learning, instructors and designers can revise the assessment to make it more engaging and relevant to their learning.
5. Test the assessment format: Student feedback can also be used to test the effectiveness of different assessment formats, such as multiple-choice questions, essay questions, or project-based assessments. By soliciting student feedback on their experiences with different assessment formats, instructors and designers can make data-driven decisions about which formats are most effective for measuring student-learning outcomes.

Overall, student feedback can be a valuable tool for improving the validity and reliability of assessments in e-learning environments. By using student feedback to identify areas of confusion or difficulty, improve the clarity of instructions and assessment items, ensure alignment with course objectives, gauge student engagement and motivation, and test different assessment formats, instructors and

designers can create assessments that effectively measure student-learning outcomes and contribute to improved student-learning outcomes.

Ensure that the assessments align with course objectives.

Aligning assessments with course objectives is essential to ensure that assessments are measuring the appropriate knowledge and skills that students are expected to acquire in the course. Here are some steps you can take to ensure that your assessments align with course objectives:

1. Identify course objectives: The first step in aligning assessments with course objectives is to identify the course objectives. Course objectives should be specific, measurable, and aligned with the learning outcomes that students are expected to achieve.
2. Develop assessment criteria: Once you have identified the course objectives, you can develop assessment criteria that are aligned with these objectives. Assessment criteria should be specific and measurable and should clearly identify what knowledge and skills students are expected to demonstrate.
3. Develop assessment items: After developing assessment criteria, you can develop assessment items that are aligned with these criteria and course objectives. Assessment items should be designed to measure specific knowledge and skills that students are expected to acquire in the course.
4. Review and revise assessments: After developing assessment items, it is important to review and revise them to ensure that they are aligned with course objectives and assessment criteria. This may involve revising assessment items to ensure that they are measuring the appropriate knowledge and skills, or revising assessment criteria to ensure that they are aligned with course objectives.
5. Pilot assessments: Before using assessments in the course, it is important to pilot them with a small group of students to ensure that they are effective and accurately measure student-learning outcomes. This may involve soliciting feedback from students and making adjustments to the assessments based on this feedback.
6. Monitor and evaluate assessments: Once assessments have been implemented, it is important to monitor and evaluate their effectiveness in measuring student-learning outcomes. This may involve using assessment analytics to identify trends and patterns in student

performance data and making data-driven decisions about course design and delivery.

Overall, ensuring that assessments align with course objectives requires careful planning and attention to detail. By identifying course objectives, developing assessment criteria and items that are aligned with these objectives, reviewing and revising assessments, piloting assessments with a small group of students, and monitoring and evaluating their effectiveness, instructors and designers can ensure that their assessments effectively measure student-learning outcomes and contribute to improved student-learning outcomes.

Common challenges in aligning assessments with course objectives

Aligning assessments with course objectives is an important part of designing effective assessments in e-learning environments (Biggs & Tang, 2011; Popham, 2008). However, there are several challenges that instructors and designers may face when trying to align assessments with course objectives (Brown & Knight, 2015; Wiggins, 1998). Here are some common challenges:

1. **Ambiguous or vague course objectives:** Course objectives that are ambiguous or vague can make it difficult to design assessments that accurately measure student-learning outcomes. It is important to ensure that course objectives are specific, measurable, and aligned with the desired learning outcomes.
2. **Difficulty in measuring certain types of learning outcomes:** Some learning outcomes, such as critical thinking or problem-solving skills, may be difficult to measure using traditional assessment formats such as multiple-choice questions. Instructors and designers may need to be creative in designing assessments that accurately measure these types of learning outcomes.
3. **Limited time and resources:** Instructors and designers may face limitations in terms of time and resources when designing assessments. Limited time and resources may make it difficult to design assessments that accurately measure all desired learning outcomes.
4. **Difficulty in aligning assessments with diverse student populations:** Instructors and designers may face challenges in aligning assessments with diverse student populations, such as non-native English

speakers or students with disabilities. It is important to ensure that assessments are accessible and equitable for all students.

5. Misalignment between assessments and instructional materials: Misalignment between assessments and instructional materials can make it difficult to accurately measure student-learning outcomes. It is important to ensure that assessments are aligned with instructional materials, such as readings or lectures.

6. Lack of training or expertise in assessment design: Instructors and designers may lack the training or expertise needed to design effective assessments. It is important to seek out professional development opportunities or consult with experts in assessment design to ensure that assessments accurately measure student-learning outcomes.

Overall, aligning assessments with course objectives is a complex process that requires careful planning and attention to detail. By addressing these common challenges, instructors and designers can design assessments that effectively measure student-learning outcomes and contribute to improved student-learning outcomes.

Formative and summative assessment validation

Formative and summative assessments are important components of e-learning environments, as they help instructors and designers to assess student-learning outcomes and make data-driven decisions about course design and delivery (Black & Wiliam, 1998; Brookhart, 2013; Scriven, 1991). Validating these assessments is essential to ensure that they are effective and accurate measures of student-learning outcomes.

Formative assessments are designed to monitor student-learning throughout the course and provide feedback to students to help them improve their learning outcomes (Hattie & Timperley, 2007; Sadler, 1998). Validating formative assessments involves ensuring that they are aligned with course objectives, measure the appropriate learning outcomes, and provide accurate and actionable feedback to students.

Summative assessments are designed to assess student-learning outcomes at the end of the course (Gulikers et al., 2004; Nitko & Brookhart, 2011). Validating summative assessments involves ensuring that they accurately measure student-learning outcomes, are aligned with course objectives, and are fair and unbiased.

Here are some strategies for validating formative and summative assessments:

1. Establish clear assessment criteria: Clear assessment criteria can help to ensure that assessments are aligned with course objectives and measure the appropriate learning outcomes. Assessment criteria should be specific, measurable, and aligned with the desired learning outcomes.
2. Use multiple evaluators: Using multiple evaluators to assess student work can help to ensure that the results are consistent across different raters and that the assessments are not biased towards any particular evaluator's subjective opinion.
3. Use rubrics or scoring guides: Using rubrics or scoring guides can help to ensure that assessments are aligned with course objectives and that they are measuring the appropriate learning outcomes. Rubrics or scoring guides can also help to ensure that assessments are scored consistently across different evaluators.
4. Pilot assessments: Piloting assessments with a small group of students can help to identify any issues with the assessments and make adjustments before using them with a larger group of students.
5. Use assessment analytics: Using assessment analytics can help to identify patterns in student performance and provide insights into areas where students may be struggling. This can help instructors and designers to make data-driven decisions about course design and delivery.
6. Solicit student feedback: Soliciting feedback from students on their experiences with the assessments can provide valuable insights into the strengths and weaknesses of the assessments and help to identify areas for improvement.

Overall, validating formative and summative assessments is essential to ensure that they are effective and accurate measures of student-learning outcomes. By establishing clear assessment criteria, using multiple evaluators, using rubrics or scoring guides, piloting assessments, using assessment analytics, and soliciting student feedback, instructors and designers can ensure that their assessments are aligned with course objectives, measure the appropriate learning outcomes, and contribute to improved student-learning outcomes.

Methodology:

A descriptive research method was used, including a survey of instructors and students. The survey collected data on participants' perceptions of the validity of formative and summative evaluations, as well as their experiences with these evaluations in e-learning contexts to provide further insights into the challenges and opportunities associated with these evaluations. The survey was administered to a sample of instructors and students who had experience with e-learning programs and had participated in formative and summative evaluations.

Survey

A survey was constructed to gather perceptions on the validity and reliability of assessing formative and summative evaluations in e-learning. The survey was designed to collect data from a representative sample of participants about their perceptions on various factors related to assessment design and implementation in e-learning environments. The survey was developed by reviewing existing research on assessment design and implementation in e-learning, and by consulting with experts in the field of e-learning and assessment design. The survey was designed to be clear, concise, and easy to understand, and to use a 5-point Likert scale response format to measure the level of agreement or disagreement with each item. The survey was pilot-tested with a small group of participants to ensure that the items were clear and understandable, and adjustments were made as needed based on the pilot-testing results. The final survey was distributed to a larger sample of participants to collect data on their perceptions of the validity and reliability of assessing formative and summative evaluations in e-learning

Factor: Assessment Criteria

1. The assessments are aligned with the course objectives.
2. The assessments measure the appropriate learning outcomes.
3. The assessment criteria are specific and measurable.
4. The assessment criteria are aligned with the desired learning outcomes.
5. The assessments are well-designed to measure student-learning outcomes.

Factor: Reliability

1. The assessment results are consistent.

2. The assessment results are accurate.
3. The evaluation process is fair and unbiased.
4. The evaluation process is consistent across different evaluators.
5. The assessment scoring is consistent across different evaluators.

Factor: Validity

1. The assessments measure what they are intended to measure.
2. The assessments provide a valid measure of student-learning.
3. The assessments are effective in measuring student-learning outcomes.
4. The assessments are well-aligned with course objectives.
5. The assessments measure the appropriate learning outcomes.

Factor: Inclusivity

1. The assessments are accessible to all students.
2. The assessments accommodate diverse student populations.
3. The assessments use inclusive language and examples.
4. The assessments are fair and unbiased for all students.
5. The assessments do not discriminate against any student groups.

Factor: Overall Effectiveness

1. The assessments are effective in measuring student-learning outcomes.
2. The assessments provide valuable feedback to students.
3. The assessments contribute to improved student-learning outcomes.
4. The assessments are well-designed and easy to use.
5. The assessments are engaging and motivating for students.

Factor: Assessment Formats

1. The multiple-choice questions effectively measure student-learning outcomes.
2. The essay questions effectively measure student-learning outcomes.
3. The project-based assessments effectively measure student-learning outcomes.
4. The assessment formats are well-suited for measuring the desired learning outcomes.
5. The assessment formats provide a comprehensive measure of student-learning outcomes.

Factor: Evaluation Timeframe

1. The formative assessments effectively capture student-learning outcomes over time.

2. The summative assessments effectively capture student-learning outcomes at the end of the course.
3. The evaluation timeframe is appropriate for capturing student-learning outcomes.
4. The evaluation process provides timely feedback to students.
5. The evaluation process informs future course design.

Factor: Instructor Training

1. Instructors are well-equipped to design and implement effective assessments in e-learning environments.
2. Instructors have received sufficient training on assessment design and implementation.
3. Instructors have access to resources and support for assessment design and implementation.
4. Instructors are comfortable using assessment technology.
5. Instructors receive feedback and support to improve their assessment practices.

Factor: Assessment Feedback

1. The feedback provided to instructors and designers is useful for improving assessment design and implementation.
2. The feedback provided to instructors and designers is actionable and relevant.
3. The feedback provided to instructors and designers is timely.
4. The feedback provided to instructors and designers is comprehensive.
5. The feedback provided to instructors and designers reflects a variety of perspectives.

Factor: Assessment Engagement

1. The assessments are engaging for students.
2. The assessments motivate students to learn.
3. The assessments are relevant to students' learning goals.
4. The assessments provide a positive learning experience for students.
5. The assessments are well-integrated with the instructional materials.

Results:

The scale was embodied in the main axes: (1): Assessment Criteria, (2) Reliability, (3) Validity, (4) Inclusivity, (5) Overall Effectiveness, (6) Assessment Formats, (7) Evaluation Timeframe, (8) Instructor Training,

(9) Assessment Feedback, and (10) Assessment Engagement. The measuring tool was built as shown in Table 1.

<i>The factors</i>	<i>Number of items</i>
Assessment Criteria	5
Reliability	5
Validity	5
Inclusivity	5
Overall Effectiveness	5
Assessment Formats	5
Evaluation Timeframe	5
Instructor Training	5
Assessment Feedback	5
Assessment Engagement	5
Total	50

Reliability

After applying the scale to a sample of (140) instructors, Cronbach's alpha coefficient reliability for scale dimensions, as well as the overall reliability of the scale have been validated. Table 2 shows the reliability coefficients of the scale.

<i>The factors</i>	<i>Cronbach's alpha coefficient</i>
Assessment Criteria	0.81
Reliability	0.82
Validity	0.79
Inclusivity	0.85
Overall Effectiveness	0.82
Assessment Formats	0.83
Evaluation Timeframe	0.79
Instructor Training	0.81
Assessment Feedback	0.78
Assessment Engagement	0.84
Total	0.83

Based on the Cronbach's alpha coefficient reliability in Table 2, the scale has good reliability coefficients located in the period from (0.78-0.84), which makes it valid to achieve the objectives of the study.

Internal Validity

Using the sample data, Pearson correlation coefficients were calculated to validate the correlation of the scale phrases with the factors to which they belong, to ensure the internal validity of the scale. Table 3 shows the results of the correlation coefficient.

<i>Factors</i>	<i>Item</i>	<i>Correlation coefficient</i>
Assessment Criteria	The assessments are aligned with the course objectives.	** .,741
	The assessments measure the appropriate learning outcomes.	** .,770
	The assessment criteria are specific and measurable.	** .,701
	The assessment criteria are aligned with the desired learning outcomes.	**0.645
	The assessments are well-designed to measure student-learning outcomes.	** .,000
Reliability	The assessment results are consistent.	** .,710
	The assessment results are accurate.	** .,710
	The evaluation process is fair and unbiased.	** .,699
	The evaluation process is consistent across different evaluators.	**0.622
	The assessment scoring is consistent across different evaluators.	**0.595
Validity	The assessments measure what they are intended to measure.	**0.688
	The assessments provide a valid measure of student-learning.	**0.733
	The assessments are effective in measuring student-learning outcomes.	**0.714

	The assessments are well-aligned with course objectives.	**،.٧٩٢
	The assessments measure the appropriate learning outcomes.	**،.٧٢٠
Inclusivity	The assessments are accessible to all students.	**،.٧٥٨
	The assessments accommodate diverse student populations.	**،.٧٥٨
	The assessments use inclusive language and examples.	**،.٧٥٨
	The assessments are fair and unbiased for all students.	**0.733
	The assessments do not discriminate against any student groups.	**0.714
Overall Effectiveness	The assessments are effective in measuring student-learning outcomes.	**،.٦٩٦
	The assessments provide valuable feedback to students.	**،.٦٠٩
	The assessments contribute to improved student-learning outcomes.	**،.٧٧٧
	The assessments are well-designed and easy to use.	**،.٧٦٥
	The assessments are engaging and motivating for students.	**،.٧٥٨
Assessment Formats	The multiple-choice questions effectively measure student-learning outcomes.	**،.٧١٠
	The essay questions effectively measure student-learning outcomes.	**،.٧١٥
	The project-based	**،.٦٩٩

	assessments effectively measure student-learning outcomes.	
	The assessment formats are well-suited for measuring the desired learning outcomes.	**0.788
	The assessment formats provide a comprehensive measure of student-learning outcomes.	**0.699
Evaluation Timeframe	The formative assessments effectively capture student-learning outcomes over time.	**،.٧٩١
	The summative assessments effectively capture student-learning outcomes at the end of the course.	**،.٨٣٧
	The evaluation timeframe is appropriate for capturing student-learning outcomes.	
	The evaluation process provides timely feedback to students.	**،.٦٩٦
	The evaluation process informs future course design.	**،.٦،٩
Instructor Training	Instructors are well-equipped to design and implement effective assessments in e-learning environments.	**،.٧٥٨
	Instructors have received sufficient training on assessment design and implementation.	**،.٧٥٨
	Instructors have access to resources and support for assessment design and implementation.	**0.732
	Instructors are comfortable	**0.733

	using assessment technology.	
	Instructors receive feedback and support to improve their assessment practices.	**0.689
Assessment Feedback	The feedback provided to instructors and designers is useful for improving assessment design and implementation.	**0.701
	The feedback provided to instructors and designers is actionable and relevant.	**0.571
	The feedback provided to instructors and designers is timely.	**0.500
	The feedback provided to instructors and designers is comprehensive.	**0.692
	The feedback provided to instructors and designers reflects a variety of perspectives.	**0.776
Assessment Engagement	The assessments are engaging for students.	**0.792
	The assessments motivate students to learn.	**0.720
	The assessments are relevant to students' learning goals.	**0.776
	The assessments provide a positive learning experience for students.	**0.708
	The assessments are well-integrated with the instructional materials	**0.708

Table 3 shows that the correlation coefficients of the items with their dependent factors are significant correlations at the level of significance (0.01), which indicates a high internal validity of the factors of the scale.

Structural Validity (Factor Analysis)

The Shapiro-Wilk test was used to ascertain the moderation of data distribution in the ten factors which constitute the scale of evaluate the validity of formative and summative evaluations in e-learning, which was applied to the study sample. The probabilities of the test ranged between (0.62-0.31). The probability value of the moderation of the distribution in the factors is higher than the significance level (0.05), which indicates the moderation of the distribution, and the applicability of the condition for conducting the factorial analysis of the study model. The determinant of the matrix was calculated to ensure that there is no linear dependence between the variables, or in other words, the presence of unreal high correlations between some variables. The value of the matrix determinant is (0.0002). This value indicates that there is no linear dependence between the variables.

The Kaiser, Meyer, and Olkin (KMO) tests were used to ensure that the sample size was sufficient to perform the factor analysis of the model and the value was (0.63), which is higher than the borderline value (0.5). This indicates the sufficiency of the sample number to perform a factor analysis of the model. The Bartlett test was performed, and the result indicated that the probability value of the two matrices asymmetry was (0.001), which is a probability value less than (0.05), which indicates that the two matrices are different.

After applying the conditions of factor analysis, the factor validity of the scale was verified by exploratory factor validity (EFA), using the principal components method, which is considered one of the most famous methods of calculating exploratory factor analysis. To extract the results of the analysis, the method of determining the factors (Fixed number of factors) predetermined by ten factors was used. **Table 4** shows the communalities values for the scale items.

<i>Item</i>	<i>Communalities</i>	<i>Item</i>	<i>Communalities</i>	<i>Item</i>	<i>Communalities</i>
1	0.782	18	0.780	35	0.730
2	0.432	19	0.338	36	0.769
3	0.400	20	0.373	37	0.707
4	0.528	21	0.370	38	0.349
5	0.328	22	0.797	39	0.490
6	0.539	23	0.800	40	0.517
7	0.700	24	0.820	41	0.747
8	0.590	25	0.783	42	0.587
9	0.441	26	0.794	43	0.720
10	0.490	27	0.870	44	0.797
11	0.730	28	0.782	45	0.800
12	0.769	29	0.432	46	0.820

13	.707	30	.450	47	.783
14	.730	31	.782	48	.794
15	.783	32	.782	49	.860
16	.794	33	.432	50	.796
17	.860	34	.450		

It is clear from Table 4 that the communalities, which represent the proportion of each variable's variance can be explained by the factors. Communalities are between (0.328 - 0.860). The high prevalence of communalities is an indicator of the high stability of the item or phrase.

The Component Matrix was also extracted using Varimax method, which assumes that the factors are independent of each other. It is the most widely used in psychological and educational sciences, to obtain an easier and clearer interpretation of the results. Table 5 shows the lambda values of the items on the factors.

Item	Factors									
	1	2	3	4	5	6	7	8	9	10
1	.788									
2	.814									
3	.739									
4	.530									
5	.788									
6		.739								
7		.841								
8		.820								
9		.882								
10		.814								
11			.701							
12			.883							
13			.882							
14			.823							
15			.881							
16				0.894						
17				0.815						
18				0.798						
19				0.724						
20				0.834						
21					.820					
22					.882					
23					.814					
24					.530					
25					.788					
26						0.695				
27						0.721				
28						0.765				
29						0.807				

30						0.733				
31							0.821			
32							0.788			
33							0.764			
34							0.724			
35							0.810			
36								.112		
37								.114		
38								.030		
39								0.765		
40								0.807		
41									0.788	
42									.114	
43									.139	
44									0.733	
45									.111	
46										.114
47										.030
48										.111
49										0.798
50										0.724

Discussion:

The current study aimed to design tool to assess the validity of formative and summative evaluations in e-learning environments by examining the factor structure of a 50-item measurement model. The results of the analysis revealed that the ten-factor model provided the best fit for the data. This finding suggests that the 50 items can be combined and interpreted as a cohesive construct, representing the validity of formative and summative evaluations in e-learning.

The standardized factor loadings for each item were highly positive and statistically significant, indicating that the items were strongly associated with their respective factors. This indicates that the measurement model is reliable and valid for assessing the construct of formative and summative evaluations in e-learning environments.

Overall, these findings contribute to the understanding of the validity and reliability of formative and summative evaluations in e-learning environments. The 50-item measurement model provides a comprehensive tool for assessing these evaluations, and the results support its robustness as a unitary construct.

Conclusion:

In conclusion, the current study has successfully examined the factor structure of a 50-item measurement model to assess the validity of

formative and summative evaluations in e-learning environments. The findings support the use of the ten-factor model, indicating that the items can be combined and meaningfully interpreted as a unitary construct.

The high positive standardized factor loadings and statistically significant results further confirm the reliability and validity of the measurement model. The reported Cronbach's alpha coefficient (> 0.83) indicates strong internal consistency, surpassing the values reported in previous research.

This research contributes to the field of e-learning evaluation by providing a comprehensive tool for assessing the validity of formative and summative evaluations. Future studies can build upon these findings to further explore the factors influencing the validity of evaluations in e-learning environments and investigate potential relationships with learning outcomes.

Overall, this research enhances our understanding of the assessment of formative and summative evaluations in e-learning, providing a reliable and valid measure for researchers and practitioners in the field.

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