Development of Assessment Indicators for an Online Lecture Process

ABSTRACT

In the ever-evolving digital era, online lectures offer greater flexibility and accessibility compared to conventional methods. However, significant challenges arise in ensuring the active participation of students during online lectures.

AIMS: This research aims to develop an assessment instrument for the online lecture process that is valid, effective, and practical.
Place and Duration of Study: Ahmad Dahlan Islamic University, Sinjai Regency, South Sulawesi, during the 2023-2024 academic year.
Methodology: This study uses a Research and Development (R&D) methodology with an ADDIE (Analysis, Design, Development, Implementation, Evaluation) approach.This instrument was tested for validity and reliability using the Gregory method.
Results: The implementation stage is carried out by applying assessment instruments that have been developed in several online classes at Ahmad Dahlan Islamic University. Data collection was carried out through observations, questionnaires, and interviews to assess the effectiveness of the assessment model. The results of the study show that this assessment instrument is able to increase the active participation and quality of student interaction in online lectures. The assessment instrument used has high validity and reliability with a content validity coefficient of 0.95.
Conclusion: The application of this assessment instrument also positively impacts the quality of learning, as students show an increase in the use of technology and digital literacy. Lecturers feel supported by the systematic and user-friendly assessment format. Overall, this study concludes that the developed assessment model is effective in evaluating student activities during online lectures and can be adopted more widely to enhance the quality of online learning across various universities

Keywords:Online Lecture Assessment, Instruments, validity, effectiveness,

1. INTRODUCTION

Developing online lecture process assessment is crucial as it enhances teaching effectiveness, allows real-time monitoring of student progress, and provides prompt feedback for improvement. Additionally, online assessment offers flexibility in evaluation methods, facilitates access for students across various locations, and can be adapted to the evolving trends in educational technology.

Higher education has undergone significant transformations alongside the development of information technology and the demands of the 4.0 technology era, moving towards Society 5.0. This evolution has led to the creation of the concept of distance learning in response to these changes[1], [2], [3], [4].Distance learning allows the teaching and learning process to continue despite physical restrictions. In the context of mathematics lectures at universities, e-learning has emerged as a significant alternative, providing solutions to challenges in education[5].However, the transition to online learning also brings new challenges, particularly in terms of assessing student learning outcomes[6].

Assessment is the process of collecting, synthesizing, and interpreting information to make decisions[7]. Online learning assessments require different indicators compared to face-to-face assessments. These assessment indicators must be capable of measuring learning outcomes objectively and comprehensively in a virtual context[8]. The concept of assessment of the lecture process is becoming increasingly relevant and urgent[9].

It is important to remember that assessment is not only about logistics (what, when, why, and how), but also about achieving the desired level of success in the course and skill development[10], [11]. The learning process must be meaningful and encourage students to progress, so that it not only develops cognitive skills but also enhances the affective and psychomotor domains. This can be achieved through the processes of assimilation and accommodation as developed by Piaget and Vygotsky. Therefore, assessment should not only occur at the end of the course but should also be integrated throughout the learning process[12]. A good assessment is the right assessment to measure achievement indicators and in what way lectures are carried out, for that it is necessary to have assessment techniques in the form of observations, performance checks, and the like[12].

Guidelines are needed in the implementation of the assessment of the lecture process for students. It is important for students to know or be aware that the lecturer is conducting an assessment, including during the lecture process [13]. Students should be told to do their best or reminded of the importance of demonstrating their true beliefs and feelings on affective assessments related to effort.

However, there is currently no comprehensive framework that specifically addresses the development of effective assessment indicators for online lectures in universities. Therefore, this study aims to develop an assessment indicator model that can be adapted and implemented in the context of online learning. It is hoped that the results of this study can serve as a reference for universities in evaluating student learning outcomes in online settings more effectively.

2. METHODOLOGY

This study uses the Research and Development (R&D) method by applying the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model to develop effective assessment indicators in online lectures in universities.

2.1 ADDIE Models

2.1.1 Analysis Stage:

At this stage, a needs analysis is conducted on assessment indicators appropriate for the context of online lectures. This analysis includes identifying challenges and weaknesses in online learning, as well as a review of literature related to previously applied assessment indicators. The analysis is carried out through literature studies, interviews with lecturers and students, and needs surveys.

2.1.2 Design Stage:

Based on the results of the analysis, the research team designed a conceptual framework and assessment indicator model that can be adapted for online lectures. The design considers the principles of effective assessment, including validity, reliability, objectivity, and practicality. This stage also involves the preparation of a blueprint for assessment indicators along with the corresponding assessment rubric.

2.1.3 Development Stage:

At this stage, the assessment indicators and rubrics that have been designed are developed in more detail. The research team involved online learning assessment experts to validate

and provide suggestions for improvements to the developed model. Revisions were made based on the experts' input until a final prototype of the assessment indicators was obtained.

2.1.4 Implementation Stage:

The prototype of the developed assessment indicators is then implemented in several online courses at universities involved in the research. The implementation stage aims to test the effectiveness and practicality of the assessment indicators in the context of actual online lectures.

2.1.5 Evaluation Stage:

In the final stage, a comprehensive evaluation of the implementation of the assessment indicators is conducted. This evaluation includes collecting feedback from lecturers and students, analyzing the achievement of learning outcomes, and identifying obstacles and challenges encountered. The results of the evaluation are used to refine the assessment indicator model, ensuring it can be implemented more optimally.

2.2. TEST SUBJECTS

The resulting lecture assessment products will be tested in the Mathematics Study Program at Ahmad Dahlan Islamic University, Sinjai Regency, using a purposive sampling technique with limited trials.

2.2.1. Lecturer Criteria

- Lecturer in the Mathematics Study Program
- Willing and able to apply the developed online lecture assessment model
- Experienced in online teaching and proficient in using educational technolog

2.2.2. Student Criteria

- Actively participating in online lectures in the Mathematics Study Program.
- Taking courses that are the focus of research.
- Have adequate access to the technology needed for online lectures.
- Demonstrate active and consistent participation in online lectures.

This study involved three lecturers who carried out a trial with three different classes:

- Class A: A total of 17 students.
- Class B: A total of 8 students.
- Class C: A total of 13 students.

2.3. DATA ANALYSIS TECHNIQUES

2.3.1. Validity Data Analysis

Instrument assessment using the validation of the Gregory method, Content Validity Coefficient = $\frac{D}{A+B+C+D}$[14].

Table 1. Validity indicators

Aspects	Indicators
Quality of content and purpose	a. Accuracy b. Completeness c. Justice d. Balance e. Suitability to student conditions

*Source[15], [16], [17]

2.3.2. Effectiveness Data Analysis

Table 2. Effectiveness Indicators

Aspects	Indicators
Instructional quality	a. Objective assessment b. Giving a positive impact to students c. Increasing students' motivation to learn d. Instructional flexibility

*Source[18]

2.3.3. Practical Data Analysis

Table 3. Practicality indicators

Aspects	Indicators
Technical quality	a. Easy to use b. Quality of answer handling c. The quality of the program management d. The quality of the documentation

2.3.4. Criteria for Assessing the Implementation of Instruments

Table 4. Criteria for assessing the implementation of research instruments

No	Interval	criterion
1	$3.5 \leq x \leq 4$	Highly Active
2	$2.5 \leq x < 3.5$	Active
3	$1.5 \leq x < 2.5$	Less Active
4	$1 \leq x < 1.5$	Inactive

*Source[19], [20]

Dimensional effectiveness= $\frac{\sum Nilai\ indikator}{\sum Indikator}$

Effectiveness of student assessment in 1 meeting = $\frac{\sum Nilai\ Dimensi}{\sum Dimensi}$

Effectiveness of meeting assessments = $\frac{\sum Nilai\ Permahasiswa}{\sum Mahasiswa}$

Effectiveness of student assessment in 1 semester = $\frac{\sum Nilai\ Perpertemuan}{\sum pertemuan}$

3. RESULTS AND DISCUSSION

The results of the development of online lecture assessment instruments are presented in the following table:

Table 5. Results of the Development of Online Lecture Process Assessment Indicators

Dimension	Activity	Indicators	Relevance of Theory/Research Results
Obedience & Compliance	1. Activating the Camera 2. Dress neatly & Politely 3. Conducive learning place	1. Visual interaction 2. Active presence 3. Focus & concentration 4. Compliance with rules	1. Lecturers & students create an effective learning process & take responsibility for their conditions and knowledge [21]. 2. Learning is a process of behavior change that

		5. Clean & organized 6. Polite 7. Obey the norms 8. Physical comfort 9. Stable internet 10. Lecture equipment available	occurs through interaction with the environment observed through the senses [22] 3. Vygotsky's theory provides an explanation that the interaction of interpersonal (social), cultural-historical, and individual factors is the key to human development
Enthusiasm	1. Attitude & Presence 2. Actively Respond 3. Provide solutions	1. Present at the beginning 2. present at the core 3. present at the end 4. Respond 5. Inquiry Initiative 6. Quality & Relevance of Responses 7. Accuracy of analysis	1. Behaviorist learning theory is the relationship between stimuli and responses shown by individuals through interaction with the environment [23] 2. The theory of constructivist learning also emphasizes that students think more confidently, more progressively and better in the activities they do. The teaching and lecture process is more memorable and meaningful so that the activities carried out can attract the attention of students Piaget's Theory is strong for the constructivist view that students learn well when they actively build information and knowledge.
Openness to Learning	3. High year's craving 4. Able to adapt 5. IT Skilled	1. Participation 2. Exploration 3. Material research 4. Technical proficiency 5. Challenge resilience 6. self-sufficient 7. IT proficient	The growing use of social networking tools has also brought attention to the contribution of social and collaborative lectures [24], [25] Scientific approach by enabling students to explore and elaborate the material studied [26]. Application of AI principles, *machine learning,* & HOTS [27]
Collaborate	1. Able to Collaborate	1. Effective	Behaviorism and

	2. Group contributions 3. Group IT utilization	communication 2. Timely response 3. Be actively involved in the group 4. Teamwork 5. Quality of contribution 6. conflict resolution 7. creativity in the use of IT	constructivism theories that lead students to cooperate and communicate effectively [28], [29]
Independence	1. Time Management 2. Self-management 3. active unattended	1. Efficiency 2. On time 3. Additional learning resources 4. Focus & concentration	A scientific approach so that students are able to explore and elaborate so that they can become systematic problem solvers [26]
Positive Response to Feedback	1. Reflection	1. Make repairs	The theory of constrictivism involves individuals in solving problems, improving thinking skills, and being productive [30], [31].
Involved in all lecture activities	1. Responding at the end of the lecture	1. Making conclusions	There is an increase in ability and a change in the level of practice for the better according to the theory of behaviorime[32]

- Adaptation and Openness to Technology:
  The study found that students gradually showed good adaptation to the use of technology in the online lecture process. Most students are able to take advantage of various digital learning platforms, such as Google Docs and other collaboration applications, to complete assignments together even though they are in different locations. This increases collaboration and active participation of students in lectures.
- Increasing Student Activity and Creativity:
  One of the positive impacts of the implementation of this assessment model is the increase in student activity and creativity. This assessment model triggers students to be more proactive in looking for additional references, discussing, and doing assignments. Students not only rely on the material delivered by lecturers but also conduct independent exploration, which can be seen from their enthusiasm in providing responses and feedback during lecture discussions.
- Effectiveness of the Learning Process: The results show that this assessment model helps in creating a more structured and systematic learning process. Lecturers who apply this assessment model are able to provide a more objective and comprehensive assessment of student activities. This also helps lecturers in planning and carrying out lectures more efficiently, in accordance with the goals and expectations of the curriculum. Another finding is that with the assessment of this process, lecturers have a reference in controlling the course of lectures so that lecturers must prepare themselves by completing assessment instruments that will be used to monitor students.

- Lecturer and Student Satisfaction: The study also found that both lecturers and students were satisfied with the assessment model applied. Lecturers feel helped by the existence of a clear and systematic assessment format, while students feel more cared for and motivated to actively participate in lectures. This satisfaction is reflected in the increase in students' grades and achievements, the majority of which are in the "Good" and "Very Good" categories.

  The Role of the Independent Learning Curriculum: The findings of this study are also in line with the principles of the Independent Learning Curriculum initiated by the Minister of Education. The assessment model developed supports flexibility, independence, and personalization of learning, where students can learn according to their interests and abilities. This supports the goals of Independent Learning which focuses on competency-based and project-based learning.

Table 6. Results of Practicality and Validity

		Observation Indicators				
		Practicality			Effectiveness	
It	**Subject**	**a. Implementation of Online Lectures**	**b. Implementation of the Process Assessment Model**	**c. Lecturer Response**	**a. Student Activities**	**b. Student Response**
1	First Lecturer	2.8	2.9	3.0	2.9	2.8
2	Second Lecturer	2.5	2.8	2.9	2.8	2.6
3	Third Lecturer	3.1	3.3	3.5	3.3	3.0
Value		**2.8**	**3.0**	**3.1**	**3.0**	**2.8**
Achievement Category		**2.9 (Practical)**			**2.9 (Effective)**	

4. CONCLUSION

The application of this assessment instrument also has a positive impact on the quality of learning, where students show an increase in the use of technology and digital literacy. Lecturers feel helped by the systematic and easy-to-use assessment format. Overall, this study concludes that the assessment model developed is effective in assessing student activities during online lectures and can be adopted more widely to improve the quality of online learning in various universities.

This research has succeeded in developing and implementing an effective assessment model for online mathematics lectures in universities. This assessment model not only increases student activity and creativity but also provides satisfaction for lecturers in providing assessments. With several recommendations for improvement, this assessment model is expected to be adopted more widely to improve the quality of online learning in various higher education institutions.

The results of the study show that this assessment model is able to increase the active participation and quality of student interaction in online lectures. The assessment instrument used has high validity and reliability with a content validity coefficient of 0.95.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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