



AUTHENTIC ASSESSMENT TEACHING AND LEARNING TRAJECTORY WITH E-STUDENT ACTIVITY SHEET (E-SAS) TO IMPROVE THE QUALITY OF LEARNING PROCESS

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Abstract

Traditional assessment in education primarily measures the academic performance of learners without reflecting the learning process. Many educators neglect to reflect on their teaching practices for continuous quality improvement. The authentic assessment instrument, Teaching and Learning Trajectory with E-Student Activity Sheet (E-SAS), can identify the profile of teaching and learning trajectories within the syntax of instructional models, enabling educators to determine appropriate corrective measures for each session. The development of this assessment instrument utilized the Research and Development (R&D) method, following the ADDIE model. The study involved 34 students enrolled in a Basic Science Concepts course. Fifteen authentic teaching and learning trajectory test items were developed for three sessions and were validated as "Valid" and achieved a "High" reliability category, with a Cronbach's Alpha reliability coefficient value of 0.68. The overall average student scores showed a significant improvement to 83.33 after the implementation of corrective actions. The quality of the learning process, employing Problem-Based Learning syntax, improved in each session following the educators' reflections based on the teaching and learning trajectory profiles.

Keywords: authentic assessment, process assessment, teaching and learning trajectory

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INTRODUCTION

Over the past two decades, education has evolved towards learner-centered pedagogies. Educators, serving as facilitators of learning, consider the diverse abilities and potential of students (Le Ha, 2014). By providing integrated and contextual assessments, educators can holistically understand their students (James et al., 2014), offering assessments that depict the progression of student learning rather than merely the outcomes (Mardapi & Herawan, 2018).

Assessment can be used as a reference for reflecting on learning. Fisher Jr & Bandy (2019) compare assessment to a magnifying glass that educators use to determine whether the teaching and learning process has been effective or requires changes. Therefore, the main objective of assessment is not only to evaluate students but also to improve and enhance the quality of learning (Braun & Kanjee, 2006). Educators base their decisions on the results of assessments (Mikre, 2010) to improve learning practices (Darling-Hammond, 2010a).

Assessment serves not only as an indicator of success but also as an indicator of the factors contributing to that success. It reflects the abilities of both students and educators (Wangid et al., 2017). However, traditional teaching practices that view assessments merely as measures of student success, rather than reflections of the learning process, still prevail (Persky et al., 2020). This is also the case in Indonesia (Wulan, 2007; Yulianto & Iryani, 2023). Some assessments are conducted solely to measure student success, rather than to improve continuous learning by educators (Crooks, 2001; Darling-Hammond, 2010b). Therefore, opportunities, challenges, weaknesses, and strengths of the learning cannot be identified, hindering the emergence of sustainable learning improvements at the next meeting.

Another reality is that most educators have yet to engage in systematic and structured reflection on their teaching practices (Szűcs, 2018). Constraints such as limited time and a lack of understanding of constructive reflective practices hinder the structured evaluation of teaching processes (Hatton & Smith, 1995). Without reflective teaching, educators remain unaware of the aspects of their teaching that are not yet optimal, leading to stagnation in teaching quality (Sellars, 2012).

Therefore, educators require an assessment method that can help them evaluate the learning process objectively and comprehensively, thereby improving the quality of teaching. This method can aid in the successful implementation of a learning model. One such method is Authentic Assessment Based on Teaching and Learning Trajectory (AABTTL), which involves assessing teaching and learning sequences to obtain information on student learning (Rochman, 2019). Authentic assessment in this case measures not only students' theoretical abilities as learning outcomes but also their abilities in processes that include skills and methods (Fook & Sidhu, 2010). Authentic Assessment Based on Teaching and Learning Trajectory (AABTTL) provides information on students' learning processing abilities. The concept is that

every teaching trajectory of educators will obtain information on the learning trajectory of students (Rochman et al., 2018). Thus, this assessment method enables educators to validly determine students' abilities in each syntax of the learning model used, such as the Problem-Based Learning (PBL) model. By understanding information on students' learning trajectory and educators' teaching trajectory in the PBL model, educators can reflect and improve future learning. The AABTTTL assessment instrument was developed as an E-Student Activity Sheet (E-SAS) to facilitate student evaluation. This decision was made due to the prevalence of electronic devices among students during lectures, such as mobile phones, tablets, and laptops.

The use of E-SAS as a tool in the AABTTTL method aligns with the 21st-century learning paradigm, which favours digital-based learning over conventional methods. This approach is considered more relevant to life in a global society (Rochman et al., 2018). E-SAS was developed using the Google Sites platform, allowing students to access and work on test questions in real-time during lectures.

This research develops an authentic assessment method for problem-based learning supported by E-SAS and tests this assessment method to obtain a comprehensive learning profile that includes both teaching and learning trajectories. This can serve as a reference for improving assessment processes in education, ensuring continuous enhancement of learning quality in the classroom.

METHODS

The aim of this research and development (R&D) project is to create assessment instruments. Specifically, the author intends to develop an authentic assessment that can reveal information about student and teaching trajectories through Authentic Assessment Based on Teaching and Learning Trajectory (AABTTTL). The learning model employed is Problem Based Learning (PBL), and the development model used is ADDIE (Analyze, Design, Develop, Implement, Evaluate). This model is commonly used for developing learning products. This study developed a test that aligns with the syntax of the Problem Based Learning model. The steps for developing assessment instruments are: (1) Determining instrument specifications, (2) writing instruments, (3) determining instrument scales, (4) determining scoring systems, (5) checking instruments, (6) conducting trials, (7) analysing instruments, (8) assembling instruments, (9) carrying out measurements, and (10) interpreting measurement results (Mardapi, 2012). The study employed observation techniques to determine the steps of applying Problem-Based Learning syntax, also known as Teaching Trajectory, and test techniques to evaluate student test results using Authentic Assessment Based on Teaching and Learning Trajectory (AABTTTL) instruments, also known as Learning Trajectory.

Content Validity

The content validation test was conducted with a panel of five experts, including two learning assessment experts, two learning model experts, and one expert in Madrasah Ibtidaiyah Teacher Education. This validation comprises four aspects: (1) the suitability of the items with indicators, (2) the suitability of the questions with the syntax of the problem-based model, (3) the level of difficulty of the questions in accordance with the level of undergraduate students, and (4) the use of clear language that avoids multiple interpretations.

Content validity is further established by using the Content Validity Ratio (CVR) (Lawshe: 1975, p.567), with the following formula:

$$CVR = \frac{2ne}{n} - 1$$

Description:

ne = number of SMEs (Subject Matter Experts) who rated an item as 'essential'

n = the number of SMEs who conducted the assessment

The CVR value has a range between -1 and 1, items with a negative value are invalid items and vice versa, as for the validity reference as follows:

Table 1. Minimum Standard CVR based on SME

Number of SMEs	Minimum CVR Score
5	0,99
6	0,99
7	0,99
8	0,75
9	0,78
10	0,62

The validity of the question is declared if it has a $CVR \geq 0.99$, based on the critical table for the number of experts, which is five people. Additionally, content validation was conducted to obtain input and suggestions on the developed tests.

The next step is to conduct an initial trial with six students to determine the instrument's readability level and improve it based on their responses. Finally, the results of the readability test will be revised.

Empirical Validity:

The following stage involves testing the empirical validity of the product through field tests. The study involved 34 Madrasah Ibtidaiyah Teacher Education students who took the Basic Science Concepts course. A description test was used in this study, and the validity of the test was tested using product moment correlation (r_{xy}). The acceptance criteria for the items are as follows: if the calculated value of r_{xy} is greater than the value of r_{xy} in the table, then the item is considered valid. Conversely, if the calculated value of r_{xy} is less than the value of r_{xy} in the table, then the item is considered invalid.

In addition to the validity test, a good instrument must also meet reliability requirements to ensure that it can be trusted as a data collection tool. This analysis examines the reliability of a test instrument in the form of a description/essay using the internal consistency technique, Alpha Cronbach (Yusup, 2018). According to Guilford's classification, the degree of reliability is as follows:

$r_{11} \leq 0.20$: very low degree of reliability

$0.20 < r_{11} < 0.40$: low degree of reliability

$0.40 < r_{11} < 0.60$: medium degree of reliability

$0.60 < r_{11} < 0.80$: high degree of reliability

$0.80 < r_{11} < 1.00$: very high degree of reliability

Trial

The study trialled the Authentic Assessment Based on Teaching and Learning Trajectory (AABTTL) instrument to obtain a teaching and learning trajectory profile. The research method employed the weak experiment method with a one-shot case study design. The study was conducted during the Basic Science Concepts Course over three meetings, covering Ecosystem Material, Digestive System, and Carbon Footprint. The study involved 30 students enrolled in the Basic Concepts of Science MI/SD course at Madrasah Ibtidaiyah Educator Education (PGMI) programme of UIN Syarif Hidayatullah Jakarta. The researcher acted as an observer of the learning process. The criteria for assessing learning achievement were as follows:

Table 2. Learning Outcome Criteria

Average Percentage of Learning Outcome (%)	Criteria
<55	Not effective
55-70	Less effective
71-85	Effective
>85	Highly Effective

Source : Kusuma (2018)..

RESULTS AND DISCUSSION

Result

The authentic teaching and learning trajectory assessment instrument was developed in the form of a description test based on the syntax of the problem-based learning model. The syntax of the problem-based learning model used in this research and development are: (1) Orienting to the Problem, (2) Organising for Problem-based Learning, (3) Conducting an Inquiry, (4) Developing and Presenting Inquiry Results, (5) Analysing and Evaluating the Problem Solving Process (Barrett, 2017). Tests were developed in each syntax to obtain authentic assessment based on the sequence of teaching and learning, so as to obtain data on student responses or answers according to their learning trajectory in problem-solving-based learning. The test indicators developed in each syntax of problem-solving-based learning are as follows:

Table 3. Problem-Based Learning Test Indicators in Basic Science Concepts Course

Syntax of Problem-Based Learning	Test Indicator		
	Material 1: Ecosystem	Material 2: Digestive System	Material 3: Carbon Footprint
Problem Orientation (OM)	1. Students are able to correctly identify the main problem about the phenomenon of ecosystem damage in the video presented.	1. Students are able to correctly identify the main problems about the phenomenon of digestive system diseases	1. Students are able to correctly identify the main problems about the phenomenon of carbon footprint

			in the video presented	in the video presented
Problem based learning (BM)	2.	Students are able to formulate various possible solutions to the problem of the phenomenon of ecosystem damage in national and global contexts	2. Students are able to formulate various possible solutions to the problem of the phenomenon of digestive system diseases in a local and global context	2. Students are able to formulate various possible solutions to the problem of the carbon footprint phenomenon in a local and global context
Inquiry (P)	3.	Students are able to design investigations to solve problems relevant to ecosystem damage in local and global contexts	3. Students are able to design investigations to solve problems relevant to digestive system diseases in local and global contexts	3. Students are able to design an investigation to solve problems relevant to carbon footprint in local and global context
Development and Presentation of Inquiry Results (PH)	4.	Students are able to construct data on the results of investigations on ecosystem damage in the form of tables, graphs, diagrams, or mindmapping	4. Students are able to construct data on the results of investigations on digestive system diseases in the form of tables, graphs, diagrams, or mindmapping	4. Students are able to construct data from investigations on carbon footprint disease in the form of tables, graphs, diagrams, or mindmapping.

Analyse Evaluate Problem Solving Process (EM)	and	5. Students are able to evaluate the priority scale of overcoming the phenomenon of ecosystem damage in the local and global context.	5. Students are able to evaluate the priority scale of management of human digestive system diseases in the local and global context.	5. Students are able to evaluate the prioritisation of carbon footprint mitigation in local and global contexts.
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The E-Student Activity Sheet (SAS) was developed using Google Sites to enable students to access and complete the test during real-time lectures. Please refer to Figure 1 for the developed E-SAS form.

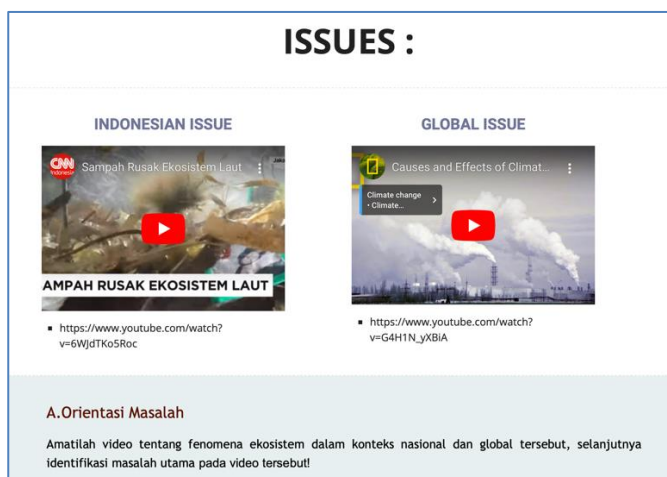


Figure 1. E-SAS Example on Google Sites

Prior to its use in the limited and field trials, the authentic teaching and learning trajectory instrument underwent two validity tests: content validity and empirical validity.

Content Validity

The content validity of the question is an expert or expert assessment to review the accuracy of the test instrument in terms of relevance to the objectives, construction, and language. The results of the expert assessment of the authentic teaching and learning trajectory assessment instrument showed a CVR of 1.00 with a CVR table of 0.99 so that it was included in the Valid category. All test questions Q1 to Q15 have valid criteria but have not shown student response to the test. Therefore, it is necessary to conduct further validity tests empirically.

Empirical Validity

Empirical validation was carried out with student subjects who attended the basic science concepts course totalling 34 students. Based on the results of the calculation, the Cronbach Alpha reliability coefficient value $r_{ii} = 0,68$ which means that the items have a high level of constancy (Arikunto, 2010), so it can be used to obtain information on teaching and learning trajectory in problem-based learning in the Basic Concepts of Science Course.

Trial Results

The pilot test in this research aims to produce learning and teaching trajectories for each syntax of the Problem-Based Learning model.

1. Problem Orientation (OM)

Lecturers present contextual problems that are open ended, namely problems with complex situations whose solutions can be done through several solutions. Meanwhile, students describe the problem and identify the main problem.

2. Problem-based Learning (BM)

Lecturers provide instructions for students to design strategies to solve the main problem. Students formulate various possible solutions to the problem.

3. Inquiry (P)

Lecturers ignite students to find problem solving solutions through investigation. Students investigate appropriate problem solving.

4. Development and Presentation of Inquiry Results (PH)

Lecturers give instructions to students to develop and present the results of the investigation. Students develop and present the results of the investigation

5. Analysis and Evaluation of the Problem Solving Process (EM)

Lecturers trigger students to analyse and evaluate the problem solving process. Students can analyse and evaluate the appropriate problem solving process.

The five steps of teaching and learning were carried out in three meetings, resulting in the following teaching and learning profile:

Table 4. Teaching and Learning Trajectory Profile of Meeting 1

Group	Problem Based Learning Syntax					Learning Trajectory	
	OM	BM	P	PH	EM	Average	Percentage (%)
	Q1	Q3	Q4	Q5	Q6		
I	3,00	3,00	2,00	2,00	3,00	2,60	65,00
II	3,00	3,00	2,00	2,00	3,00	2,60	65,00
III	3,00	4,00	3,00	3,00	2,00	3,00	75,00
IV	4,00	3,00	2,00	2,00	2,00	2,60	65,00
V	4,00	3,00	3,00	2,00	2,00	2,80	70,00
VI	3,00	4,00	3,00	3,00	2,00	3,00	75,00
Average	3,33	3,33	2,50	2,33	2,33	2,77	69,17
Percentage (%)	83,33	83,33	62,50	58,33	58,33	69,17	
	Effective	Effective	Less Effective	Less Effective	Less Effective	Less Effective	
Teaching Trajectory							

Table 4 shows the profile of the teaching and learning trajectories in the problem-based learning of the Ecosystem material. It is known that the profile of the teaching trajectory that has reached effectiveness is in the syntax of OM and BM. While the syntax of P, PH and EM still shows the less effective category. Overall, it can be seen from the average student score (learning trajectory) which is 69.17, indicating that the implementation of the PBL model syntax in learning is still less effective overall.

Some of the results of the reflection are (1) The Investigation Stage, Lecturers should guide students to find valid and relevant sources of information to identify appropriate problem-solving solutions. (2) Development and Presentation of Investigation Results (PH) Stage, at this stage, students do not have enough prior knowledge to present the data from the investigation appropriately, so the lecturer should provide several examples of data presentation forms and guide students to make the data presentation more creative. (3) Analysis and evaluation of the problem solving process (EM), at this stage, after each group has presented the results of its discussion to the class, the teacher must provide sufficient background for the students to analyse and evaluate the results of the problem solving of other groups, so that the conclusions generated by each group are the results of the most appropriate problem solving formulation.

The improvements resulting from the reflection were implemented during the second meeting. Additionally, during this meeting, the profiles for the teaching and learning trajectories were obtained as follows.:

Table 5. Teaching and Learning Trajectory Profile of Meeting 2

Group	Problem Based Learning Syntax					Learning Trajectory	
	OM	BM	P	PH	EM	Average	Percentage (%)
	Q1	Q3	Q4	Q5	Q6		
I	4	4	3	2	3	3,20	80,00
II	4	3	3	2	3	3,00	75,00
III	4	4	4	3	3	3,60	90,00
IV	4	3	4	3	3	3,40	85,00
V	3	3	3	3	3	3,00	75,00
VI	3	3	3	3	3	3,00	75,00
Average	3,67	3,33	3,33	2,67	3,00	3,20	80,00
Percentage (%)	91,67	83,33	83,33	66,67	75,00	80,00	
	Highly Effective	Effective	Effective	Less Effective	Effective	Effective	
Teaching Trajectory							

Table 5 displays the teaching and learning trajectory profile, indicating an increase in achievement for each syntax or PBL learning step. At the 2nd meeting, OM syntax was found to be highly effective, while P and EM syntax were categorized as effective. However, PH remained in the less effective category. Overall, PBL learning at the 2nd meeting was effective. This implies that there is an enhancement in the learning process and student learning outcomes following the lecturer's improvements based on the reflection of the teaching and learning trajectory profile at the first meeting.

The reflection results are currently at the stage of Development and Presentation of Inquiry Results (PH). Students are still presenting their investigation results in a uniform manner, specifically by using PowerPoint. To encourage problem-solving and creativity within each group, lecturers should provide guidance to students on how to present their investigation results in various relevant ways. At this stage, student participation is limited to groups presenting the results of the investigation without any response or input from other groups. To

encourage constructive feedback, the lecturer should intervene and facilitate a more participatory process.

The improvements resulting from the reflection were implemented during the second meeting. Additionally, during the third meeting, the profiles for the teaching and learning trajectories were obtained as follows:

Table 6. Teaching and Learning Trajectory Profile of Meeting 3

Group	Problem Based Learning Syntax					Learning Trajectory	
	OM	BM	P	PH	EM	Average	Percentage (%)
	Q1	Q3	Q4	Q5	Q6		
I	4	4	3	3	3	3,40	85,00
II	4	3	3	3	3	3,20	80,00
III	3	3	3	3	3	3,00	75,00
IV	4	3	4	4	3	3,60	90,00
V	4	4	4	3	3	3,60	90,00
VI	4	3	3	3	3	3,20	80,00
Average	3,83	3,33	3,33	3,17	3,00	3,33	83,33
	95,83	83,33	83,33	79,17	75,00	83,33	
Percentage (%)	Highly Effective	Effective	Effective	Effective	Effective	Effective	
Teaching Trajectory							

Table 6 displays the teaching and learning trajectory profile, indicating significant improvement in achieving each syntax or PBL learning steps from previous meetings. The lecturers have appropriately focused on improving each syntax in accordance with the essence of the PBL syntax. The reflection results have been followed up well, resulting in effective outcomes for BM, P, PH, and EM syntaxes, and even more so for OM syntax. Overall, the teaching and learning trajectory in PBL learning has been effective.

Discussion

Assessment in learning can improve the quality of teaching (Nitko, 1996). According to Van den Akker et al. (2006), assessment based on learning trajectory can demonstrate the actual effectiveness of learning. In this case, the researchers developed an assessment instrument based on problem-based learning flow to obtain information on the profile of the teaching and

learning trajectory. Educators can use the results of students' answers to obtain information on the achievement of each teaching stage. This information can be used as evaluation material to carry out the next lesson. Rochman et al. (2018) explained in a similar study that authentic assessment of teaching and learning trajectories can enhance the quality of learning in a sustainable manner.

For an instrument to be suitable for use, it must be both valid and reliable (Arikunto, 2010). Therefore, the E-SAS instrument, which is an authentic assessment teaching and learning trajectory tool, was tested for validity and reliability to determine its suitability. The content validity test and empirical validation revealed that all test questions, Q1 to Q20, met the valid criteria. Furthermore, according to the reliability test, the Cronbach Alpha reliability coefficient value is 0.68, indicating a high level of consistency among the items (Arikunto, 2010). This assessment instrument for authentic teaching and learning trajectories can be used to gather information on the effectiveness of each step of problem-based learning from the perspective of the teaching and learning trajectory. For instance, Surya and Aman (2016) developed the teaching and learning trajectory instrument as a formative assessment for evaluating students' attitudes, knowledge, and skills. They obtained comprehensive information on students' competencies and the effectiveness of the learning process.

One assessment instrument that can be used is the Student Activity Sheet (SAS). Rochman et al. (2018) tested the effectiveness of Authentic Assessment Based on Teaching and Learning Trajectory (AABTLT) using SAS in Basic Physics 1 Course. The results showed that lectures with presentation and presentation of the AABTLT model with SAS can be effective. This study utilised a printed Student Activity Sheet (SAS). However, the researcher modified the SAS into a digital format, which was named E-SAS. The purpose of this modification was to reduce paper usage in the classroom and to enhance the effectiveness of recording student answers. E-SAS can neatly record all student answers and store them online, ensuring the security of information and data, and preventing loss or scattering of data. The E-SAS developer platform used in this case is Google Sites. Students can access E-SAS on Google Sites online using laptops or smartphones during the learning process. Educators can integrate various material, issue, and question links to students through Google Sites, making it a viable Learning Management System (LMS) (Nane, 2022). The website, Google Sites in this case, facilitates students in enhancing their knowledge and honing their skills (Amarulloh, 2022).

Conclusion

The research and discussion results lead to the conclusion that the E-SAS form of authentic assessment teaching and learning trajectory was developed with a problem-based learning orientation. The developed instrument takes the form of a description based on the syntax of the problem-based learning model, which includes five steps: (1) Orienting to the

Problem, (2) Organising for Problem-based Learning, (3) Conducting an Inquiry, (4) Developing and Presenting the Results of the Inquiry, and (5) Analysing and Evaluating the Problem Solving Process. The instrument has been deemed 'suitable for use' after undergoing content validity, empirical validity, and reliability testing. There are 20 authentic test questions on teaching and learning trajectories in problem-based learning that have been declared 'valid' and have achieved a 'high' reliability category with a Cronbach Alpha reliability coefficient value of $r_{ii} = 0.68$.

The teaching and learning trajectory profile indicates an increase in achievement for each syntax or PBL learning step. It is noted that during the first meeting, PBL learning was less effective, with syntax P, PH, and EM falling into the less effective category. After proper reflection and follow-up, the application of the PBL model syntax improved during the second meeting and was categorized as effective. Specifically, OM was very effective, BM, PH, and EM were effective, while PH remained less effective. The reflection on the teaching and learning trajectory during the second meeting can serve as a reference for lecturers to improve learning, particularly in PH syntax. This will enable all syntax to reach the effective category by the third meeting, resulting in overall effective PBL learning.

REFERENCES

- Amarulloh, R. R. (2022). Pengembangan Media Pembelajaran Fisika Dasar Berbasis Literasi Sains dengan Menggunakan Google Sites. *Jurnal Inovasi Dan Pembelajaran Fisika*, 9(2), 154–164.
- Arikunto, S. (2010). Metode penelitian. *Jakarta: Rineka Cipta*, 173.
- Barrett, T. (2017). A new model of problem-based learning: Inspiring concepts, practice strategies and case studies from higher education. *Maynooth: AISHE*, 14.
- Black, P., & Wiliam, D. (1999). Assessment for learning: Beyond the black box. *Assessment*, 1, 1–12.
- Braun, H., & Kanjee, A. (2006). Using assessment to improve education in developing nations. *Improving Education through Assessment, Innovation, and Evaluation*, 1–46.
- Crooks, T. (2001). The validity of formative assessments. *British Educational Research Association Annual Conference, University of Leeds*, 13, 15.
- Darling-Hammond, L. (2010a). Evaluating teacher effectiveness: How teacher performance assessments can measure and improve teaching. *Center for American Progress*.
- Darling-Hammond, L. (2010b). Evaluating teacher effectiveness: How teacher performance assessments can measure and improve teaching. *Center for American Progress*.
- Fisher Jr, M. R., & Bandy, J. (2019). Assessing student learning. *Vanderbilt University Center for Teaching*.

- Fook, C. Y., & Sidhu, G. K. (2010). Authentic assessment and pedagogical strategies in higher education. *Journal of Social Sciences*, 6(2), 153–161.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education*, 11(1), 33–49.
- James, M., Pollard, A., & Gronn, P. (2014). *Research and a standards-based primary teaching profession*.
- Le Ha, P. (2014). The politics of naming: Critiquing “learner-centred” and “teacher as facilitator” in English language and humanities classrooms. *Asia-Pacific Journal of Teacher Education*, 42(4), 392–405.
- Mardapi, D. (2012). Pengukuran, penilaian, dan evaluasi pendidikan. *Yogyakarta: Nuha Medika*, 45.
- Mardapi, D., & Herawan, T. (2018). Assessing teacher competence and its follow-up to support professional development sustainability. *Journal of Teacher Education for Sustainability*, 20(1), 106–123.
- Mikre, F. (2010). The roles of assessment in curriculum practice and enhancement of learning. *Ethiopian Journal of Education and Sciences*, 5(2).
- Nane, L. (2022). Pelatihan pembuatan dan penggunaan google sites sebagai media pembelajaran kepada guru madrasah aliyah se-kabupaten boalemo. *ARTIKEL*, 1(6447).
- Nitko, A. J. (1996). *Educational assessment of students*. ERIC.
- Persky, A. M., Lee, E., & Schlesselman, L. S. (2020). Perception of Learning Versus Performance as Outcome Measures of Educational Research. *American Journal of Pharmaceutical Education*, 84(7), ajpe7782. <https://doi.org/https://doi.org/10.5688/ajpe7782>
- Rochman, C., Mahen, E. C. S., & Nasrudin, D. (2018). Authentic Assessment Based on Teaching and Learning Trajectory with Student Activity Sheet (SAS) on Basic Physics Courses. *WAPFI (Wahana Pendidikan Fisika)*, 3(1), 1–8.
- Sellars, M. (2012). Teachers and change: The role of reflective practice. *Procedia-Social and Behavioral Sciences*, 55, 461–469.
- Surya, A., & Aman, A. (2016). Developing formative authentic assessment instruments based on learning trajectory for elementary school. *REiD (Research and Evaluation in Education)*, 2(1), 13–24.
- Szűcs, I. Z. (2018). Teacher trainers’ self-reflection and self-evaluation. *Acta Educationis Generalis*, 8(2), 9–23.
- Van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). *Educational design research*. Routledge.
- Wangid, M. N., Mustadi, A., Senen, A., & Herianingtyas, N. L. R. (2017). The evaluation of authentic assessment implementation of Curriculum 2013 in Elementary School. *Jurnal Penelitian Dan Evaluasi Pendidikan*, 21(1), 104–115. <https://doi.org/10.21831/pep.v21i1.15779>

- Wulan, A. R. (2007). Penggunaan asesmen alternatif pada Pembelajaran biologi. *Jurnal Perkembangan Biologi Dan Pendidikan Biologi Untuk Menunjang Profesionalisme Jurusan Pendidikan Biologi FPMIPA UPI*.
- Yulianto, H., & Iryani, I. (2023). Pendampingan Asesmen Pembelajaran Dalam Implementasi Kurikulum Merdeka Pada SMAN 13 Takalar. *To Maega: Jurnal Pengabdian Masyarakat*, 6(3), 488–503.
- Yusup, F. (2018). Uji validitas dan reliabilitas instrumen penelitian kuantitatif. *Tarbiyah: Jurnal Ilmiah Kependidikan*, 7(1).