

# Authentic Assessment Based on Teaching and Learning Trajectory

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**Keywords:** Authentic assessment, teaching learning trajectory, student activity sheet.

**Abstract:** Authentic assessment is needed by lecturers as a consideration to determine the success of a lesson. The lecturer must be able to ensure that each step of teaching can be followed by the students. The efforts to ensure the learning process in every student cannot be obtained authentically. The purpose of this research is to offer authentic assessment design based on the teaching sequence of lecturer and learning process of student or Authentic Assessment Based on Teaching Learning Trajectory (AABTLT) using Student Activity Sheet (SAS). The method used is quasi experimental research. This research indicates that AABTLT by using SAS can increase student involvement in learning process and increase students' competence gradually. The study recommends that AABTLT with SAS can be used in a more operational learning process.

## 1 INTRODUCTION

Authentic assessment is needed by educators for determining the success of a lesson. The success of learning is affected by the understanding of the effects of content, context, and learning variability in the learning process (Linda Darling-Hammonda and Snyder, 2000). Every educators should be able to ensure every step of teaching can be followed by their students' learning steps. One of the principles is that the activities of educators and learners should be authentic, including classroom learning activities and all other interactions. Educators as important components that determines the success of the learning process and assessment should be able to obtain the process and learning outcomes of learners at every step of learning. The development of an educator's assessment capability is a necessity because educators are one of the determinants of authentic assessment success in an educational institution.

One of the models for developing authentic assessments is authentic assessment based on teaching and learning sequences or *authentic assessment based on teaching learning trajectory (AABTLT)* or by using *Student Activity Sheet (SAS)*. There is a pattern of assessment shifts from the outcome assessment done at the end of the learning process to the assessment of the process. Some experts suggest using this authentic assessment as an effort to improve the process as well as the learning

outcomes. Authentic assessment and feedback from learners influence the effectiveness of teacher and student interaction (Dinthera, Dochya, and Segers, 2015).

Authentic assessments that take into account the sequence of teaching and learning should be done in the form of a framework (Sztajn, Confrey, Wilson, and Edgington, 2012). The problems include ensuring that the instructor's teaching sequence is followed by the students' learning sequence. The difficulty occurs when the educators do not have a track record of how their students understand the concept stages. In addition, the educators struggle in recording learners' understanding of concepts and activities when the learning process takes place. In fact, research show that authentic assessment by educators through activities such as portfolios is more effective than just assessing the outcomes at the end of the learning process.

In order for educators to be skilled in using authentic assessments, an assessment framework that consists of formulating learning objectives, selecting learning materials, organizing learning activities, and formative evaluation is strongly needed. This research attempt to revealed the role of authentic assessment in teaching and learning sequence or *authentic assessment based on teaching learning trajectory (AABTLT)* by using Student Activity Sheet (SAS).

## 2 METHODS

This research was quasi experimental study in which applying AABTLT using SAS as the treatment for the experiment in Research Methodology subject. The authentic assessment was done using 5E cycle that includes engagement, exploration, explanation, extension, and evaluation.

The description of 5E cycle application in AABTLT using SAS is described in table 1.

Table 1: 5E Cycle Application in AABTLT using SAS.

Step	Activities
Engagement	<ul style="list-style-type: none"> <li>• Describing and writing down learning objectives</li> <li>• Delivering and writing out aperception</li> <li>• Stimulating and transcribing questions</li> </ul>
Exploration	<ul style="list-style-type: none"> <li>• Doing and planning group and individual activities</li> <li>• Presenting and responding to discussions</li> <li>• Drafting lesson concepts</li> <li>• Assessing students groupwork</li> </ul>
Explanation	<ul style="list-style-type: none"> <li>• Presenting the perceived concepts</li> <li>• Responding other students' presentation</li> <li>• Writing out and communicating the discussion</li> <li>• Reinforcing the concepts and the students' findings</li> </ul>
Extension	<ul style="list-style-type: none"> <li>• Writing out the perceived concepts</li> <li>• Giving argument for the concepts</li> <li>• Finding Information to reinforce the concepts</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>• Answering formative questions</li> <li>• Ensuring learning objective accomplishment</li> </ul>

The 5E sequence model was used as material for filling the SAS in research method for 2 phases, ie 3 meetings before midterm and 3 after midterm exam.

Subjects in this study are students of even semester in 2016/2017 academic year enrolled in Research Methodology course as many as 60 people in Physics Education Studies Program UIN Sunan Gunung Djati Bandung, Indonesia. Research Methodology Topics studied in this research are Development of Research Instrument. The topic has a very important position and requires the ability of consistency and creativity as well as construction of a strong analytical understanding.

### 2.1 Classroom Organization

AABTLT is an evaluation technique designed to get the data of how much understanding and how many activities the students have done to the material presented by the lecturer. AABTLT used Student Activity Sheet (SAS) (Katerine Bielaczyc, 1995). Each learner (student) has a sheet of paper to write down all activities during the learning process (Timothy F Slater, 1996). Although students are organized into groups of 5 -7 people, they are still free to get the clarification and instructions from the lecturers.

The lecturer arranges the order of the teaching design (teaching trajectory) accompanied by a list of questions, competencies that must be possessed by learners in accordance with the 5E framework. During the learning process, the lecturer asked questions to measure learners' understanding. The level of understanding of the learners was measured from the authentic answers written the students activity sheet (SAS). The squence of the answer from the students represents their learning trajectory.

### 2.2 Research Instruments

The research instrument consists of student activity sheet (SAS), which is designed following the sequence of lecturer learning activities in research methodology course and student work result at the end of each lesson. This SAS instrument is the source of information about learners' learning sequence (*learning trajectory*).

### 2.3 Data Collection Technique

The data collected includes the results of all student activity sheets (SAS) and classroom group discussion activities. The research methodology problem presented is a challenging and comprehensive set of issues.

Research data that can be collected in the form of answers to lecturer questions, answers to questions of discussion, observations, responses to other students' presentations, or answers to formative questions. The overall answers of learners are within the framework of the 5E model learning cycle(Larkin, 2014).

### 2.4 Data Analysis Technique

The overall data obtained from SAS will be separated based on the learning process phase, ie 3 SAS based on 3 lecture meetings before midterm and 3 SAS based on 3 lecture meetings after midterm exam. In each SAS consists of 5 - 7 questions or assignments,

Any answer or tasks are in the form of a learner description. Each answer is assessed with a generic rubric with 0 to 4 scale. 0= not answering, 1= wrong answer; 2= minimum answer; 3= right but incomplete answer; 4= right and complete answer.

Scores of all learners on all SAS are processed, calculated on average, and compared based on the development of their learning process. Once the data collection is obtained, it is presented in graphical form and interpreted.

### 3 RESULTS AND DISCUSSION

#### 3.1 Comparison Profile Result of AABTLT

Based on the results of data processing, the research has come up with the graphic comparison of the authentic assessment results based on the teaching sequence / learning sequence and learning from 60 students for 3 meetings (P2, P3, dan P4) before the middle and 3rd semester exams (P9, P10 and P11) after midterm exam.

Based on the data, Figure 1 shows that the results of the authentic assessment on class B are higher at each meeting. The average score of students in class B was higher. It might be caused by the readiness of students in facing the lecture and the readiness of the lecturer in presenting the lecture material. When in class A what was implemented before experience some deficiencies, it can be fixed in the next class. Overall, the average score of class B was 1,71 and class A was 1,66.

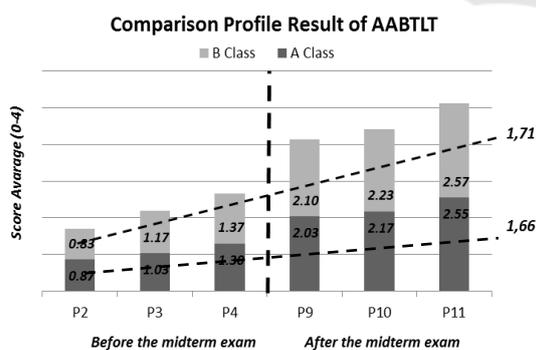


Figure 1: The comparison of authentic assessment profile based on teaching and learning trajectory.

Figure 1 also describes that there is a gradual improvement on the students' average score from meeting 2 to meeting 11. It was possible since the lecturer improves the way he deliver his lesson. And for the students, they are aware that the lecturer asked

them to record their activities. Both students' responses, discussion, assignments and other instructions.

#### 3.2 SAS Profile Based on Model 5E Circle

Based on the analysis of students' SAS related to 5E cycle in authentic assessment based on teaching learning trajectory (AABTLT) (Ergin, 2012). The steps of 5E in every meeting is portrayed in Table 2.

Table 2: SAS Profile is based on the implementation of 5 E cycle Model in all meetings.

Step	Students and Lecturer Activities	Qualificati on fikasiEnga gement
Engag ement	• Describing and writing down learning objectives	Good
	• Delivering and Writing Aperception	Good
	• Stimulating and transcribing questions	Good
Explor ation	• Doing and planning group and individual activities	Good
	• Presenting and responding to discussions	Moderate
	• Drafting lesson concepts	Good
	• Aassessing students groupwork	Moderate
Expla nation	• Presenting the perceived concepts	Moderate
	• Responding other students' presentation	Moderate
	• Writing out and communicating the discussion	Moderate
	• Reinforcing the concepts and the students' findings	Moderate
	• Finding Information to reinforce the concepts	Moderate
Extens ion	• Writing out the perceived concepts	Moderate
	• Giving argument for the concepts	Moderate
	• Finding Information to reinforce the concepts	Good
Evalu ation	• Answering formative questions	Good
	• Ensuring learning objective accomplishment	Good

Based on table 2, it can be concluded that the students activity sheet profile for authentic assessment based on teaching and learning trajectory

through 5E cycle model was categorized as moderate to good (Rule, 2006). It confirms that students has the ability to express their understanding relevant to their lecturer learning model. As in giving real examples in the learning process (Roelle et.al, 2017; Dyer et.al, 2015; Renkl, 2014; Gulwani, 2014).

### 3.3 Hypothetical Model of AABTLT, SAS and Learning Model

Based on data analysis and discussion of research methodology lecture result by using authentic assessment using SAS with 5E cycle model (Campbell, 2006), the correlation between the three variables is described in figure 2.

Figure 2 shows that there is a correlation between AABTLT, SAS and learning model in Research Methodology subject. The learning outcome improvement was as the result of the synergy and collaboration of authentic assessment through SAS using any kind o learning model. This suggested that educators are recommended to use various learning method.

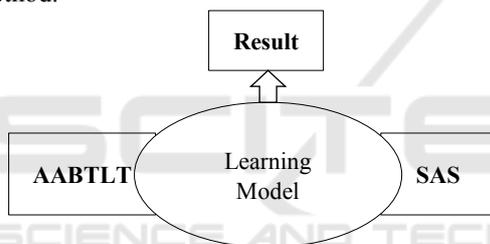


Figure 2: the correlation between AABTLT, Learning process, SAS and learning outcomes.

## 4 CONCLUSIONS

It can be concluded that the lecturer's teaching and the students' learning trajectory are represented by authentic student activity sheets. In addition, SAS can also represent the students' learning sequence and and how they comprehend the learning authentically. All students' answer in SAS can be used as the process and result assessment in Research Methodology subject. Furthermore, authentic assessment based on teaching learning trajectory (AABTLT) can improve students' focus and success.

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