Affective Assessment Tools Development in Biology Subjects for X Grade in State High School

D J Pratama¹, S Edi² and Syarifuddin³

¹Student Postgraduate of Biology Education State University of Medan Indonesia
²Lecture Postgraduate of Biology Education State University of Medan Indonesia
³Lecture Postgraduate of Biology Education State University of Medan Indonesia

Corresponding author : vindra09@gmail.com

Abstract. This study aims to develop affective assessment tools in high school grade X Biology subject. The instrument developed will be tested for validity, reliability and practicality. The research was conducted at SMAN 1 and SMAN 2 Tanjungbalai. The development of affective domain assessment instruments is carried out using the 4-D model which is carried out in stages. The stage consists of Define, Design, Development and Dissemination. The result of research consisted of valid, practical and reliable affective assessment instruments that can be used to conduct affective assessments in schools. Validation value of the affective domain assessment instrument is 90.5%, categorized as good and worthy of use.

Keyword : Affective assessment, biology learning, biology learning assessment

1. Introduction

Assessment activities are held to measure the ability of students to master competencies in the aspects of attitudes, knowledge and skills. Assessment of student learning outcomes is carried out thoroughly both on the cognitive or knowledge aspects, psychomotor or skills and attitudes or affective. Learning outcomes are influenced by student abilities and whether or not the learning process is effective or not [1-3].

Assessment is basically the process of collecting and processing information to determine the achievement of student outcomes. The assessment of learning outcomes by a teacher uses various assessment techniques such as tests, observations, assignments and other forms according to the competence characteristics and development of students. In practice, the assessment will measure students' abilities from the cognitive, psychomotor and affective aspects. The affective domain can determine a person's success. People who do not have good affective skills find it difficult to achieve optimal learning success. The cognitive and psychomotor domain learning outcomes will be optimal if the affective ability is also high. [4].

In the domain implementation attitude (affective) is the domain of many complaints in the assessment process. So, what is found in the field is that the teacher assesses only two domains, Cognitive and Psychomotor. Almost all cognitive goals have an affective component, in science learning, for example, there is a scientific attitude component [5-6]. This scientific attitude is an affective component [7].
In a preliminary study in the field it was found that teachers had not yet made affective assessments, even though the demands of the 2013 and 2013 revised curriculum required affective assessment. Even though there has been done it cannot be said as an affective assessment because it does not use proper assessment instruments, only in the form of observation by looking at students’ attitudes during the learning process.

The initial goal of affective assessment is said to be a determinant of a student's learning success. It will be seen the correspondence between the cognitive value and the affective value obtained. Students' attitudes towards subjects will illustrate the success of these subjects. So with that problem the development of adequate and relevant affective assessment tools for biology subjects must be carried out.

This research was conducted in two high schools in the city of Tanjungbalai, SMA Negeri 1 Tanjungbalai and SMA Negeri 2 Tanjungbalai. Development of assessment instruments using the 4-D model [8] which consists of the stages of Define, Design, Development and Dissemination. The instrument developed will produce valid and reliable instruments so that it can be used in student affective assessments for Biology subjects consistently [9].

2. Method
This research is included in the research and development (Research & Development) R&D type. According to [10] R&D research is a process used to produce certain products and test the effectiveness of these products.

Development is carried out in four stages of development. The first stage is Define in the form of learning analysis with the affective domain. At the design stage, it is determined what form of assessment is and how the assessment is carried out. Then the Development stage is the result of validation by experts whose data is in the form of scores then transferred in a qualitative form. The final stage of Disseminate is a rubric assessment of how students are able to use and fill out the instruments correctly.

Data analysis techniques in this study include quantitative and qualitative analysis. Qualitative analysis was conducted to describe the results of the quantitative analysis and to describe suggestions, improvements, and responses to the affective assessment instrument.

The results of the assessment by experts are presented in a percentage descriptive analysis with the formula:

\[ Ps = \frac{n}{N} \times 100\% \]

Information:
Ps = percentage of score
n = number of scores obtained
N = maximum number of scores

Using the formula used for percentage descriptive analysis, the scoring criteria can be seen in the following table:

| No | Skor   | Criteria     |
|----|--------|--------------|
| 1  | 8% - 31% | Not good     |
| 2  | 32% - 54% | Pretty good  |
| 3  | 55% - 77% | Good         |
| 4  | 78% - 100% | Very good   |

3. Result and Discussion
Validation activities by the validator include aspects of learning objectives and materials, circumstances and techniques of the affective domain assessment instrument which consists of conformity with indicators of the affective domain and Krathwohl taxonomy.
Table 2. Results of instrument validation by experts

| Indicator | Validator I | Validator II | Validator III | Average (%) | Category |
|-----------|-------------|--------------|---------------|-------------|----------|
| Aspects of Learning Objectives and Materials | 79 | 91 | 91 | 87.5 | Very good |
| Conformity with learning indicators | 95 | 95 | 100 | 96 | Very good |
| Conformity with the affective domain and Krathwohl taxonomy | 83 | 91 | 91 | 88 | Very good |
| Average | | | | 90.5 | Very good |

Table 2 shows the results of the validator's assessment of the product. In general, the validator's assessment of the affective domain assessment instrument is valid with an average value of 90.5%. Based on the criteria contained in the validity analysis, the affective domain assessment instrument that has been produced is included in the valid criteria.

The resulting affective domain assessment instrument can be used for practicality testing after the first revision was made according to the validator's suggestion during the initial validation, the validator's suggestions can be seen in Table 3:

Table 3. Validator Suggestions

| No | Suggestion |
|----|------------|
| 1  | a. In order to make a period at the end of the sentence |
|    | b. Grammar and writing are improved according to scientific rules. |
|    | c. To the question / statement to add "Biology Teacher" |
|    | d. The Code of Operational Verbs is sufficient in Chapter 3 |

According to [11] valid means that the assessment has provided accurate information about the product being developed. An instrument is said to be valid if it can provide precise and accurate information on the field to be measured so that the product is suitable for use.

4. Conclusions
The validation value obtained after revision of expert advice is 90.5% categorized as very good. Based on the results of the validation carried out by the expert, it is found that the affective assessment instrument for class X biology subjects is valid and can be used for field testing. Instruments that have been valid are tested for reliability and practicality before being used for the assessment process in class.

With the Affective assessment instrument for Biology subject, it is hoped that it will help Biology teachers in schools in making affective assessments in class X. Next, there will be additional affective assessment instruments for materials that do not have any assessment instruments.

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