



## Affective Assessment Instrument Based on Krathwohl-Anderson Taxonomy in Senior High School

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### ABSTRACT

**Purpose of the study:** This study aims to develop an affective assessment instrument based on Krathwohl-Anderson taxonomy in class XI on hydrocarbons and petroleum and to find out the teacher's response to an affective assessment instrument based on Krathwohl-Anderson taxonomy in class XI on hydrocarbons and petroleum.

**Methodology:** This research is a development research with the ADDIE development model. This research was conducted at SMAN Titian Teras Jambi with 10 class XI teachers as subjects who were obtained by purposive sampling technique. The instrument in this study was a teacher response instrument in which quantitative and qualitative data were processed using descriptive statistics and the Miles and Huberman technique.

**Main Findings:** The affective assessment instrument based on Krathwohl-Anderson taxonomy in class XI on the developed hydrocarbon and petroleum material was declared valid and feasible to use. Furthermore, the teacher gave a very good response with a percentage of 60% towards the affective assessment instrument based on the Krathwohl-Anderson taxonomy.

**Novelty/Originality of this study:** The latest update in this research is to develop an affective assessment instrument based on the Krathwohl-Anderson taxonomy on hydrocarbon and petroleum materials. There are no studies on the development of affective assessment instruments based on the Krathwohl-Anderson taxonomy. Therefore, this study complements previous studies.

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## 1. INTRODUCTION

Education is an important part of the national development process [1], [2]. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation and state [3], [4]. One of the government's efforts to achieve national education success is to form a curriculum [5]. The ability of graduates from an educational level is the result of the implementation of the curriculum as outlined in every teaching and learning activity [6]. In each teaching and learning activity certainly has its own learning objectives [7]. To see whether a learning objective from a teaching and learning activity is achieved or not, a learning evaluation is needed.

Evaluation itself is a data collection activity to measure the extent to which learning objectives have been achieved [8]. Evaluation is a data collection activity to measure the extent to which objectives have been achieved. If evaluation is an activity related to assessment or data collection activities, then the assessment and

data collection activities cannot be separated from measurement. Evaluation can only be done after measurements are taken and evaluation decisions are made based on the measurement results. Evaluation is made as a benchmark to see the extent of student success in a learning activity [9]. Evaluation of learning can also be known as assessment in learning.

Assessment is an activity that covers all learning processes [10]. Assessment here is also interpreted as an activity of interpreting measurement results data or activities to obtain information about the achievement of student learning progress [11]. In learning assessment, a tool is used to carry out assessments called assessment instruments. Assessment instruments for students can be in the form of formal or informal methods and procedures to produce information about students [12]. Assessment instruments can be in the form of written tests, oral tests, observation sheets, interview guides, homework and so on.

So far, a student is said to have succeeded in a learning activity if he gets a high score in the final exam. This means that the ability of a student so far is only based on cognitive abilities. Even though the ability of graduates of a level of education in accordance with the demands of implementing the 2013 curriculum includes three domains, namely thinking skills, work skills, and behavior or attitudes [13]. The affective domain itself is a domain related to a person's attitude in dealing with or doing something [14]. The affective domain can also be associated with interests, attention, attitudes, emotions, appreciation, the process of internalization and the formation of self-characteristics. The assessment carried out as a whole is able to cover all aspects of competence which include cognitive, psychomotor, and affective abilities [15], [16]. Thus, the assessment of affective aspects is very important, one of which is in chemistry subjects at school.

Chemistry is one of the subjects that is often associated with science knowledge because most of the material in chemistry subjects has more to do with arithmetic, analyzing questions, and practicum [17]. Therefore, activities related to the affective domain are rarely seen because most teachers only assess students' abilities based on their cognitive domain. One of the materials in chemistry is the material of Hydrocarbons and Petroleum. Basically this material is more dominating the cognitive domain of students. In this material, of course, the teacher will have difficulty measuring the affective domain because at first glance this material does not indicate an affective domain that must be mastered, but that does not mean that the affective domain is not needed in studying this material because student success is usually also related to the affective domain. Making an assessment instrument for the affective domain in this material is deemed necessary to assist teachers in assessing aspects of student attitudes.

During the learning process activities that the author observed at Titian Teras Public High School, the authors obtained information that the evaluation mechanism carried out by the chemistry teacher there focused more on the cognitive domain, namely on the results of daily test scores and final semester tests. The assessment of the affective domain in the school is only carried out in general. First, the teacher assesses affective based on student attendance. Second, some teachers sometimes use questionnaires to measure the affective domain. The affective assessment questionnaire made by the teacher is not the result of research so that it has not been validated by a team of experts. The questionnaire was also made subjectively by the teacher. Thus there are no clear assessment criteria that should be carried out during the learning process.

## 2. RESEARCH METHOD

This research is a development research with the ADDIE development model. Developmental research is a process used to develop and validate educational products [18]–[20]. The ADDIE development model is a development model with very systematically structured stages [21]. The ADDIE development model was chosen because it is very suitable for creating learning products. Where in this case is the affective assessment instrument based on the Krathwohl-Anderson taxonomy. The development procedure in this study is shown in Figure 1.

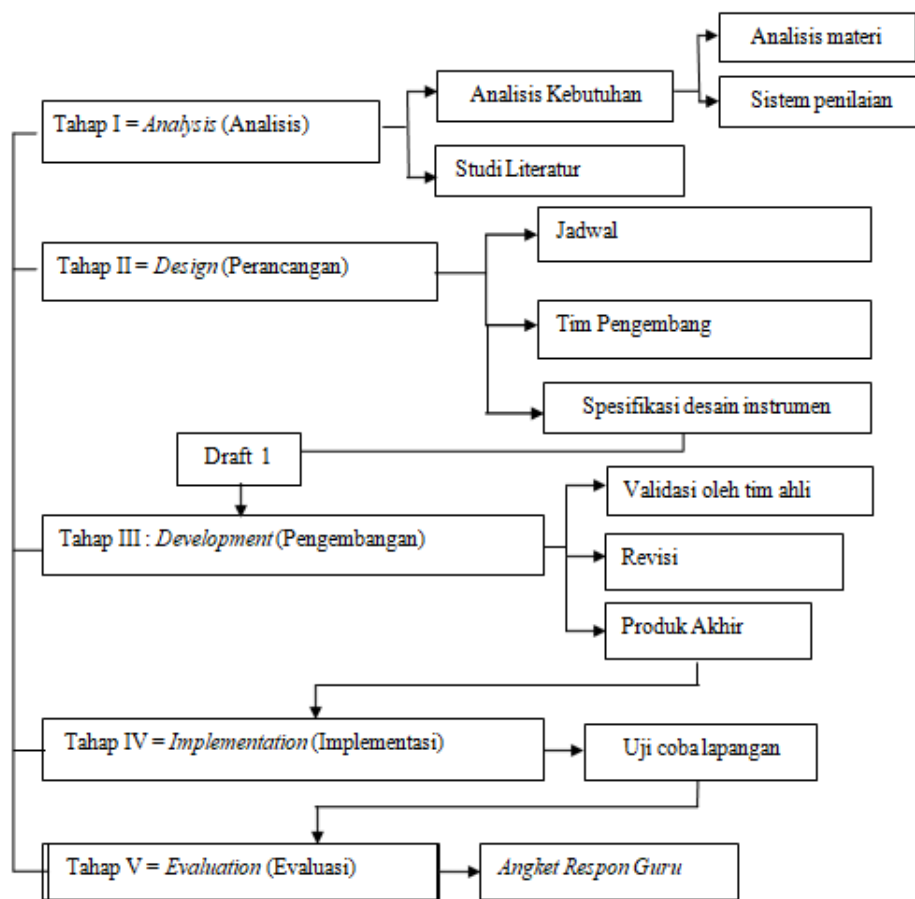


Figure 1. The procedure for developing an affective-based assessment instrument Krathwohl-Anderson taxonomy

This research was conducted at senior high school Titian Teras Jambi with the research subjects being class XI teachers of 10 teachers obtained by purposive sampling technique. Purposive sampling technique is a sampling technique that is carried out according to certain specified criteria [22]. Furthermore, this study used an instrument in the form of a teacher response instrument with the grid shown in the table below.

Table 1. Teacher response questionnaire grid

Aspect	Indicator	Item Number
Clarity	Clarity in the delivery of goals	1
	Clarity in the delivery of material	2
Satisfaction	Interesting addition	3
Curiosity	Experience in using interactive multimedia as a learning medium	4
	Curiosity in developing	8
Spirit	Not bored in the learning process	6
Convenience	There is no difficulty in managing learning	7
	There is no difficulty in using the media	10
Interest	The desire of students in learning the material	5
	Interest in using similar media in the delivery of other material	9

The teacher's response questionnaire uses a Likert scale, while the categories of teacher responses to the affective assessment instrument based on the Krathwohl-Anderson taxonomy are shown in the table below.

Table 2. Teacher response categories

Range	Score	Category
1.00 – 1.75	1	Very Bad
1.76 – 2.50	2	Bad
2.51 – 3.25	3	Good
3.26 – 4.00	4	Very Good

Quantitative data processing techniques in this study use descriptive statistics. Descriptive statistics are concerned with providing information about a data [23], [24]. Descriptive statistics can be presented in the form of mean, median, mode, maximum value, and minimum value [25], [26]. While the qualitative data were analyzed using the Miles and Huberman technique. The Miles and Huberman technique is a qualitative data processing technique consisting of data reduction, data presentation, and drawing conclusions. The qualitative data in this study came from suggestions and input obtained when validating the product to experts.

### 3. RESULTS AND DISCUSSION

The results of this development research were in the form of an affective assessment instrument based on Krathwohl-Anderson taxonomy in class XI on hydrocarbons and petroleum material and the teacher's response to an affective assessment instrument based on Krathwohl-Anderson taxonomy in class XI on hydrocarbons and petroleum material. An affective assessment instrument based on the Krathwohl-Anderson taxonomy which was developed through validation carried out by a team of experts. Validation was carried out several times starting with validation of the validation questionnaire in general and validation of the instrument which includes validation based on the construct, language, and content of the instrument.

First, the validator suggests that the aspects to be validated from the instrument to be developed are general construction, linguistic construction, and content. This is in accordance with the rules for writing non-test instruments related to material, construction, and language. In addition, the validator also corrected several statements in the questionnaire that were inappropriate and replaced them with the correct ones for validation. The validator also suggests validating each statement item at each affective level.

Second, the validator suggested improving the rubric that was made so that it was adjusted to the statement items from the observation sheet. This is because the criteria in the rubric must be stated clearly, concisely, can be observed, states behavior, and is written in language that is easy to understand. In addition, the validator also suggests making statement items per operational verb so that it will be easy to validate.

Third, the Validator also suggests that the teacher's observation sheet should not use a rating scale that points towards perceptions such as Strongly Agree, Agree, Disagree, and Strongly Disagree. Meanwhile, for self-assessment sheets and peer assessment sheets there is no need to make a rubric because the two assessment instruments are perception questionnaires so there is no rubric that regulates the perceptions of each individual in assessing later. This is in accordance with the opinion of the expert that in making observation sheets, the writer or teacher who makes the instrument must plan the technique for recording attitudes that are appropriate for the description and qualifications of the attitude display of students.

Fourth, the validator suggests making a qualitative narrative of the four categories of attitudes that are obtained when students get grades later. This is in accordance with the technical guidelines for assessing and filling out report cards for the affective domain which must be described in qualitative form.

Fifth, the validation suggests changing some of the statements on the instrument that are not in accordance with the language and content constructs. Statements that are not in accordance with the construct linguistically are like replacing words that are not appropriate in the statement items. Apart from that, there are also statements that contain multiple meanings. The author accepts advice from experts because in the guidelines for writing questions on aspects of language construction, the Ministry of National Education states that sentences must be free from statements that are double and sentences must be free from statements that are irrelevant to the object in question. While statements that are inconsistent with the construct in content are like statements that contain cognitive meaning. This is in accordance with the guidelines for writing items on the content aspect stating that statements must be in accordance with the formulation of indicators and grids. In other words, statements must also be able to measure the aspect to be measured, not other aspects.

Overall, after going through the validation process it was finally found that the affective assessment instrument based on the Krathwohl-Anderson taxonomy had been declared good and feasible for field trials. Field trials in this study were carried out by giving response questionnaires to users. In this case, the users of the affective assessment instrument based on the Krathwohl-Anderson taxonomy developed were ten class XI teachers. The results of the teacher's response to the affective assessment instrument based on the Krathwohl-Anderson taxonomy are shown in the table below.

Table 3. Statistical description of teacher response

Interval	f	%	Category	Mean	Me	Mo	Max	Min
1.00 – 1.75	0	0%	Very Bad					
1.76 – 2.50	0	0%	Bad	3.40	3.48	3.46	3.82	2.98
2.51 – 3.25	4	40%	Good					
3.26 – 4.00	6	60%	Very Good					

The table above shows the teacher's response to the affective assessment instrument based on the Krathwohl-Anderson taxonomy. Based on the table above, the mean is 3.40, the median is 3.48, the mode is 3.46, the maximum value is 3.82, and the minimum value is 2.98. Based on the total percentage, it was found that 60% or as many as 6 teachers were in the very good category and as many as 40% or as many as 4 teachers were in the good category. Thus, it can be concluded that Titian Teras Jambi State High School teachers showed a very good response to the development of an affective assessment instrument based on the Krathwohl-Anderson taxonomy.

This study aims to develop an affective assessment instrument based on Krathwohl-Anderson taxonomy on hydrocarbons and petroleum in class XI SMA Negeri Titian Teras Jambi. In chemistry subjects, of course there is an assessment, where this assessment requires an instrument as a reference in the process of carrying out the assessment [27]. The type of assessment instrument must be adjusted to the competency or area to be assessed and meet the characteristics and requirements of a good assessment. A comprehensive affective assessment of students is carried out by observing their overall behavior both at school and in the community [28].

Research that develops affective assessment instruments has been carried out by many previous researchers. Hadiati, Anita, & Pramuda, (2020) [29] develop affective assessment instruments for physics laboratory practicum assistants and the developed instruments meet valid and reliable criteria. Arum, Khumaedi, & Susilaningsih, (2022) [30] develop an affective assessment instrument (attitude) of self-confidence in students and declared valid for use. Furthermore, Indrayani, Djuniadi, & Ridlo, (2017) [31] develop affective assessment instruments for specialization of students at SMAN 1 Semarang which are declared suitable for use and packaged into a guidebook for the use of affective assessment for specialization of high school students. Furthermore, Riscaputantri & Wening, (2018) [32] develop a student affective assessment instrument that is suitable for use in elementary schools in Klaten District.

Based on previous studies, it shows that the development of student affective assessment instruments is very necessary. So this research also develops students' affective assessment instruments by showing the updates offered. The latest update in this research is to develop an affective assessment instrument based on the Krathwohl-Anderson taxonomy on hydrocarbon and petroleum materials. There are no studies on the development of affective assessment instruments based on the Krathwohl-Anderson taxonomy. Therefore, this study complements previous studies.

This research is expected to be used by teachers in conducting affective assessment of students in a lesson. Not only used on hydrocarbon and petroleum materials, researchers provide recommendations for further research to be able to use or even develop an affective assessment instrument based on Krathwohl-Anderson taxonomy that can be used on other materials.

#### 4. CONCLUSION

Based on the results of the research that has been done, it can be concluded that the affective assessment instrument based on the Krathwohl-Anderson taxonomy on class XI hydrocarbon and petroleum materials at Senior high school Negeri Titian Teras Jambi is stated to be good and valid to use. Furthermore, the teacher's response to the affective assessment instrument based on the Krathwohl-Anderson taxonomy showed very good results where the teacher gave a positive response to the product being developed. Where as many as 60% of teachers showed a very good response to the use of an affective assessment instrument based on the Krathwohl-Anderson taxonomy. Thus, the affective assessment instrument based on the Krathwohl-Anderson taxonomy that has been developed is good and can then be used further.

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