

The Evaluation of Affective Domain Learning Outcome in Students' Basic Learning of Electrical Circuit in Vocational Education School

Hantje Ponto

Department of Electrical Engineering Education, Universitas Negeri Manado, Minahasa, PO Box 95618, North Sulawesi, Indonesia

Bloom Taxonomy consists of three domains namely cognitive, affective and psychomotor. Successful learning activity on cognitive and psychomotor aspects needs to be supported by affective domain. This research aims evaluate affective domain in to basic Electric Circuit learning of students in Vocational Education School. This study employed survey research by observing students learning process in BEC subject. Research finding shows that students' affective domain in BEC learning was categorized high. Recommendations for this research were: (1) in BEC learning, teacher needed to develop students' affective domain, (2) headmaster as leadership instruction needs to guide teacher so that they will be able to develop students' affective domain, and (3) headmaster must monitor teacher's teaching activity.

Keywords: Affective Domain Assessment, Basic Electric Circuit, Vocational Education School.

1. INTRODUCTION

Electricity had an important role towards technology development in 21st century. For electricity was important, that the learning substance about electricity was included in curriculum of physics lesson in primary school and Junior High School. The mastery of electrical theory was needed by students to carry on to the VES level. BEC was a subject which must be mastered by students so that they would be able to pick up further subject as lightning installation and electric energy in building such as house, office for service and business and industry. Other subjects which related to BEC were generator, electric motor, transformer programmable logic control etc. Content of BEC material covers charge, current, circuits, parallel circuits, parallel series combination and energy. In order to calculate these scales, Cuolumb's Law, Ohm's Law, Kirchhoff's current Law and Kirchhoff's Voltage Laws were employed.

Several studies found that many students experienced difficulty and misconception in learning electrical concept [1–8] for electricity was an abstract and complex phenomenon. Students' difficulty and misconception towards certain lesson were caused by teacher and students themselves. In learning process, teachers sometimes only transferred the knowledge and did not care if the lesson had already been understood by students. In learning activity, teacher should have paid attention to students' psychological condition. Sometimes, it was difficult for students

to understand the lesson because of affective domain, which later cause low learning outcome. Reference [19] said that affective domain was important to the existence of learning activity in classroom.

In Indonesia, particularly North Sulawesi, there were still number of VES teacher who had never noticed affective domain in learning process, thus it affected learning outcome and students' competencies. It caused, somehow, the highest unemployed VES graduate compared to other graduates [9]. This needed to be addressed by the government to be more selective in pointing leader and supervising VHS implementation especially monitoring their performance, for the headmaster was a strategic position and VHS goal determiner [10].

Problem Statement: How was the result of students' affective domain in BEC learning on VES in North Sulawesi?

2. LITERATURE REVIEW

2.1. Definition of Affective Domain

Affective domain is included in to Bloom Taxonomy besides cognitive domain and psychomotor [11, 12]. Cognitive domain (think) covers knowledge that is being proceeded through brain. Affective domain relates to emotional and feelings [12–15]. Meanwhile, psychomotor domain is a physical skill such as doing or working something by generating muscle movement (motoric) [16–18].

Affective domain emphasizes the learning outcome in emotional aspect which relates individual refusal and acceptance level on something [12], for instance refusing or accepting lesson substance. Thus, students' success in learning BEC is determined by affective domain factor.

Affective domain relates to individual emotional stance and feelings [19–21]. This domain is the most complicated phenomenon in students' emotional existence which covers belief, behavior, desire, preference, value, and interest [22, 23]. Many researchers relate affective domain and emotion. Researchers often differs emotional concept as trigger but there are some who view it as a result [24]. According to Ref. [25] emotion is an individual attempt to develop, to transform, to raise or to connect with others and the environment.

2.2. Internalization of Affective Domain

The affective domain creates hierarchical structure and is made of from more simplified feelings to the more complicated ones. This hierarchical structure is based on internalization principle. Internalization refers to a process in which your influence towards certain thing moves from a general level of consciousness to a point where the influence is internalized and consistently guides or takes over individual behavior. Therefore, by moving to more complexity, individual becomes internally involved, committed and motivated.

According to Ref. [12] affective domain is someone's way of handling particular thing that covers emotional, such as feeling, value, appreciation, enthusiasm, motivation and attitude.

2.3. Categorization of Affective Domain

Affective domain is categorized into 5 sub-domains namely: (i) receiving, (ii) responding, (iii) valuing, (iv) organizing and (v) characterizing. The level of categorization is presented in Figure 1.

Receiving, students are sensitive and aware of particular phenomenon, individual has willing to tolerate [12].

For instance, during teaching activity, students willingly receive and listen to the material presented by teacher and also pleased to join the BEC learning activity.

Responding is a commitment relating to idea, material and phenomenon by actively responding and participating in learning activity [12]. Say, students willing to spend time and obediently follow BEC learning activity.

Valuing is an ability to value certain object and to express it. Valuing relates to an object, phenomenon, behavior or certain information. The level of valuing starts from a simple acceptance to a more complicated level of commitment. Simple acceptance increases skill while complicated level of commitment has a role to take responsibility to a whole raising [12]. For example, students plan a entire exclamation, they attempt to develop ideas to increase self-ability in undertaking something that relates to BEC.

Organization is taking action to collect different values, information and ideas which then relating it to a belief [12]. Say, students are able to differentiate current, strains, and obstruction then attach or link it to parallel electric circuit, serial electric circuit, and combination of both parallel and serial electric circuit.

2.4. Empirical Study of Affective Domain

Several studies that had been conducted found that students' affective domain was important in teaching process [26–33]. The finding conveyed that in learning process, affective domain could be activate students in doing learning activity.

3. METHODOLOGY

The stage of evaluation was started off by the activity of measuring and valuing [14, 24]. In this case, qualitative value as the data were going to be used for analysis would be obtained. To evaluate learning outcome of affective domain, it was important to determine the indicators that would later be measured. This measurement employed instrument.

Affective learning is integrated to all learning domain, then combining cognitive leaning followed by behavior and exploring values and feelings [34–37]. The components of affective domain covered attitude, values, ethics, and self-awareness [38].



Fig. 1. Five level in the affective domain.

Table I. Grid of affective domain.

Indicator	Number of items
Attitude	1, 4, 5, 6, 7, 29
Interest	10, 11, 12, 18, 19, 20, 21
Self-concept	8, 9, 13, 14, 15, 16, 23, 26
Values	17, 24, 25, 27, 30, 31
Moral	2, 3, 22, 28, 32, 33, 34
Total	34

Note: Adapted from Ponto et al. [15].

Table II. Instrument scale.

Scale	Score
Very high	5
High	4
Enough	3
Low	2
Very low	1

Table III. Categorization of affective domain learning outcome.

Score	Category
$4.6 \leq X \leq 5.0$	Very high
$3.6 \leq X \leq 4.5$	High
$3.0 \leq X \leq 3.5$	Medium
$2.0 \leq X \leq 2.9$	Low
$X \leq 1.9$	Very low

Some references stated that moral and good character were included into affective domain [39–41]. Emotion guided individual moral [24]. Reference [15] put forward that the indicator of affective domain covered attitude, interest, self-concept, value, and moral.

3.1. Objective of Research

This research aimed to evaluate students' learning outcome in BEC subject of VES education in North Sulawesi province.

3.2. Research Method

This study used survey research which was doing survey to a VES school in North Sulawesi in which there was Electrical Engineering Study Program.

3.3. Sample

Sample was randomly picked from VES in North Sulawesi which had Electrical Engineering Study Program. There were 108 students of 10th grade.

3.4. Instrument

Observation rubric which had already passed validity test and was practical to use was employed in this research [12]. The indicator and item of instrument might be viewed in Table I.

This instrument used Likert's Scale as emphasized in Table II.

The gap between scores categorized to evaluate learning outcome of affective domain was shown in Table III.

4. RESULTS AND FINDINGS

By using the instrument of observation assessment so research data had already been collected as shown in Table IV.

Research datum was described in form of graphic as shown in Figure 2.

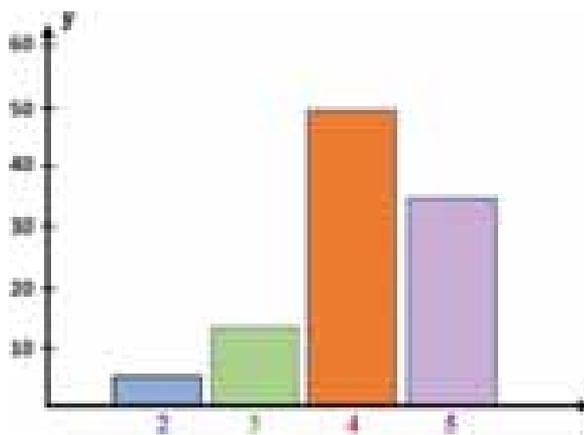
Table IV. Research data.

Score	Frequency	Percent
5	35	32.4
4	51	47.2
3	16	14.8
2	6	5.6
1	–	0.0
Total	108	100.0
Total score	439	–
Mean	4.06	–

Based on research finding on Table IV, it showed that students who reached score 5 were 35 students, score 4 were 52 students, score 3 were 16 students, score 2 were 6 students and there was no student who reach score 1. The data were described in form of graphic in Figure 2. These data were obtained from 108 students as sample. Furthermore, total of research score was 439 and the mean was 4.06. This score was between $3.6 \leq X \leq 4.5$. Thus, research finding shoed that in students' learning outcome of affective domain, in general, was categorized high. In other word, generally, students who learned BEC in VES at North Sulawesi province were good or their learning emotional could be relied on to support cognitive domain [42] for instance in BEC learning.

High learning outcome of affective domain could be identified as said by Ref. [43] that identifying components to evaluate the learning of affective domain, covered: (i) emotional quality, (ii) sensitivity and awareness of concept, (iii) automation of response, and (iv) the most essential in learning evaluation was internalization, it was defined consistently with individual (student) behavior and internal scheme.

Many researchers backed up that students were emotionally involved in learning. If their emotion was stimulated by teacher during the transfer of knowledge in classroom, student would have been motivated and actively followed learning activity. Affective domain was integrated well

**Fig. 2.** Research data graphic.

with cognitive domain, Ref. [44] said that emotion (affective) and mindset (cognitive) would affect and organize learning activity. In this case, information that had already been possessed would be save in brain then organized to be remembered in learning activity. Relating to this explanation, during BEC learning students would remember basic electrical theory while learning in JHS, meanwhile this material was needed to complete a complex BEC learning.

5. CONCLUSION

Conclusion that could be put forward from this research was the learning outcome of affective domain in BEC learning was categorized high. This showed that students' learning emotion were good, for students' performed positive attitude towards BEC subject, they had strong interest, self-concept, personality values, as well as academic moral. High learning outcome of affective domain would pull up the BEC learning outcome of cognitive domain and psychomotor in VES education.

Recommendation in this research were (1) in BEC learning activity, teacher needed to improvise students' affective domain by stimulating students' emotion to be active in learning activity, (2) headmaster as leadership instruction needs to guide teacher so that they will be able to develop students' affective domain, and (3) headmaster must monitor teacher's teaching activity.

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