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Abstract. This descriptive study aims to determine: 1) the suitability of learning objectives with basic competencies (BC), *2) the distribution of cognitive process* levels of learning objectives based on Bloom's taxonomy revision, and 3) the completeness of the components of the formulation of learning objectives in the lesson plan (LP) for high school biology teachers at SMA Negeri 14 Gowa. There were 11 LP studied, namely 6 LP for the even semester of class XI and 5 LP for the even semester of class XII for the academic year 2020/2021 which consisted of 22 BC, 80 indicators of competency achievement (ICA), and 80 formulations of learning objectives. The instruments used are assessment sheets and checklists. The data is processed by calculating the percentage (%) of each category. It was concluded: 1) the suitability of the learning objectives with the dominant BC (63.75%) was appropriate, 28.75% was quite suitable, and 7.50% was not suitable: 2) distribution of levels of cognitive process learning objectives based on the revision of Bloom's taxonomy dominant (53.75%) C2, each level has been represented but not proportionally; 3) the completeness of the dominant learning objective component (97.50) is incomplete, containing only audience and behavior components, some even have only behavior components. Keywords: lesson plans, learning objectives, suitability, distribution, completeness.

#### Hamka Lodang

Universitas Negeri Makassar Indonesia

#### Muhiddin Palennari

Universitas Negeri Makassar Indonesia

**Wahdaniah** Universitas Negeri Makassar Indonesia

# Analysis of Learning Objectives on the Biology Teacher in Learning Implementation Plan at Senior High School 14 Gowa

Hamka Lodang Muhiddin Palennari Wahdaniah

## Introduction

Every human being is born with their own potential. In order to develop this potential in an optimal direction, education is needed. In accordance with the mandate of the 1945 Constitution of the Republic of Indonesia, every Indonesian has the right to education. Therefore, the government organizes and administers a national education system as stipulated in Law Number 20 of 2003 concerning the National Education System. The vision of the law is the realization of an education system as a strong and authoritative social institution to empower all Indonesian citizens to develop into qualified human beings who are able to productively respond to the challenges of an ever-changing era. The vision implies that Indonesian national education is aimed at forming human beings who are adaptive to the dynamic development of the times. The law formulates the objectives of national education, namely to develop the potential of students to become human beings who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. To adapt to the dynamics of the times, Indonesian people must become lifelong learners. Knowledge is needed to support life; meanwhile, knowledge can only be acquired through learning (Pane & Dasopang, 2017). Herein lies the importance of periodically reviewing the education curriculum so that it is not outdated. In general, the current education curriculum in schools is the 2013 Curriculum as a replacement for the 2006 Curriculum, including in Senior High School 14 Gowa. To realize the vision, mission, and noble goals of Indonesian national education, the role of teachers is very strategic. In the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers, the so-called teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education through

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formal education, basic education, and secondary education.

As professional educators, teachers are required to have several competencies and one of them is pedagogical competence. This competency deals with "how to teach", and it means how to teach students as well as possible so that all their potential is realized. In addition, teachers who have pedagogical competence also can formulate learning objectives that are following the learning strategies applied in the classroom. Teachers in carrying out their professional duties must refer to the process standards mandated in Government Regulation of the Republic of Indonesia Number 19 of 2005 concerning National Education Standards. Article 1 point (6) of the regulation states that process standards are national standards relating to the implementation of learning in one educational unit to achieve graduate competency standards.

In carrying out all learning activities, it cannot be done suddenly. This means that a teacher must do planning and preparation before learning. Learning activities will be optimally successful only if they are based on good planning. Learning planning is the process of translating the applicable curriculum into learning programs which can then be used as guidelines by teachers in organizing the learning process (Sanjaya, 2010). Furthermore, it was stated that with careful planning or learning design, we will avoid success that is fortuitous. With careful and accurate planning, teachers can predict how many learning objectives can be achieved. Through this planning, teachers can optimize their role as a guide or provider of input to students so that the learning process is not interrupted (Musa, 2016). In line with that, American Telephone & Telegraph (1985, in Suparman, 2005) argued, lesson plans are recipes for arranging events and activities needed to provide guidance toward achieving certain learning objectives. The result of the design or learning plan is a "blueprint" for the development of learning materials and media that will be used to achieve learning objectives.

One of the products of learning planning that must be made by every teacher in an education unit is a lesson plan. Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 22 of 2016 concerning Process Standards for Primary and Secondary Education, lesson plans are face-to-face learning implementation plans for one or more meetings. The lesson plan is developed from the syllabus to direct students' learning activities in an effort to achieve basic competencies (KD). With reference to Permendikbud Number 22 of 2016, lesson plans made by teachers must include 13 components, three of which are basic competencies (KD), indicators of competency achievement (IPK), and learning objectives.

Basic Competencies are a form of students' mastery of knowledge, behavior, skills, and attitudes after obtaining learning materials at a certain level of education. Basic competencies are developed based on the characteristics of learners and must refer to the core competencies (KI) that have been formulated. These Basic Competencies and Core Competencies are not formulated by the teacher. The achievement of KD is measured based on the GPA that has been formulated by the teacher with reference to the minimum learning completeness criteria (KKM) set by each school. If the KKM has not been met by students, remedial teaching is needed.

According to Sukardi (2005, in Utami, 2010), there are two characteristics of competence, namely observability, and durability. Observability means that it can be measured; from the results of the measurement it will be known whether the competence has been owned by students. Retention means that competencies that have been possessed by learners remain relatively stable for a certain period of time. Based on the characteristics of observability, the GPA must be formulated using operational verbs (OWV).

In addition to KD and IPK, another component of the lesson plan is learning objectives. Learning activities carried out by teachers are intended to achieve certain goals. Without clear objectives, learning will lose direction and become ineffective (Suciati, 2005).

Davis (1974, in Hamalik, 2007) states: A lerning objectives is a description of behavior expected of leaner after instruction. The formulation of learning objectives is closely related to GPA. Learning objectives serve to focus learning and testing (evaluation) on more specific and

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narrow subject matter learned at a given time (Anderson & Krathwohl, 2010). These learning objectives are the basis for making questions.

Nababan (2018) wrote four benefits of formulating learning objectives, namely: (1) providing an overview of the process of what students must do individually or in groups, (2) describing the targets that students must obtain after participating in the learning process, (3) as a reference, the direction of the learning process, directing teachers in choosing appropriate learning methods and media and (4) describing the scope of abilities that students must obtain after participating in the learning process. Therefore, the formulation of learning objectives must fulfill the conditions: (1) formulated based on KD from KI-3 and KI-4, (2) using KKO that can be observed and measured, (3) illustrates the process carried out and the learning outcomes achieved by students collectively and (4) is a description of one or several IPK, which means that one learning objective can represent one or several IPK and vice versa. This fourth requirement emphasizes that the formulation of learning objectives and KD must be compatible.

Learning objectives, which are also commonly called educational objectives, cover three domains, namely the affective, cognitive, and psychomotor domains (Suciati, 2005). In practice, these three domains are actually interrelated. Cognitive objectives are sorted into several levels or taxonomies that are organized and ordered based on certain characteristics. Several taxonomies of cognitive objectives are known according to their inventors: Bloom, Gagne, Merill, Gerlach with Sullivan.

In Indonesia, the level of cognitive objectives generally refers to Benjamin S. Bloom, which is known as Bloom's taxonomy (Sani, 2016). Bloom's taxonomy consists of six levels, namely remembering (C1), understanding (C2), applying (C3), analyzing (C4), synthesizing (C5), and evaluating (C6). In 2001, a revised edition was published entitled "A Taxonomy of Educational Learning and Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives" (Widodo, 2005); hereafter referred to as Bloom's revised taxonomy. In Bloom's revised taxonomy, the cognitive process dimension still consists of six levels, namely remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6) (Anderson and Krathwohl, 2010). In addition to these cognitive dimensions, a knowledge dimension is also added which consists of factual, conceptual, procedural, and metacognitive knowledge.

The formulation of learning objectives must contain components: audience (A) is a student who is the subject of learning, behavior (B) refers to the achievement of specific behaviors in basic competencies, condition (C) is a learning effort that can help students to achieve learning behavior in basic competencies, and degree (D) is the limit of abilities that must be possessed (Suparman, 2005; Hamalik, 2007; Nababan, 2018). Robert Heinich and his colleagues call it the ABCD learning objective model (Dian, 2021).

#### **Research Method**

This descriptive study aims to determine: 1) the suitability of learning objectives with KD, 2) the distribution of cognitive process levels of learning objectives based on the revision of Bloom's taxonomy, and 3) the completeness of the components of the formulation of learning objectives in the lesson plans of biology teachers of Senior High School 14 Gowa. The lesson plans studied were even semester lesson plans for 2020/2021 made by two biology teachers, each as a biology teacher for classes XI and XII, with a total of 11 lesson plans. The complete data is shown in Table 1.

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	Component			
Class	Lesson Plan	Basic Competence	indicators of competency achievement	Learning objective formulation
XI	6	12	49	49
XII	5	10	31	31
Total	11	22	80	80

# Table 1. The Sum of Each Component of Each Class

The research instrument used is an assessment sheet to assess the suitability of learning objectives with Basic Competencies and the distribution of cognitive process levels while the checklist is to assess the components of learning objectives. The suitability of learning objectives with KD is assessed based on the suitability of learning objectives with GPA. This is based on Utami's (2010) statement that GPA is a behavior that can be measured or observed to show the achievement of certain KD. Thus, if the learning objectives are in accordance with the GPA, it means that the learning objectives are in accordance with the KD as long as the GPA is in accordance with the KD. The suitability of learning objectives with KD is sorted into three categories, namely appropriate, quite appropriate, and less appropriate.

The distribution of cognitive process levels of learning objectives refers to the revision of Bloom's taxonomy consisting of C1 to C6 without including the knowledge dimension (only refers to the cognitive process dimension). Meanwhile, the completeness of the components of learning objective formulation refers to components A, B, C, and D which are sorted into three categories: complete, quite complete, and incomplete. It is considered complete if it contains all four components, quite complete if it contains only three components, and incomplete if it contains only two and/or one component.

Data is processed by calculating the percentage (%) of each category with the formula:  $Category \ Percentage = \left(\frac{Number \ of \ each \ category}{number \ of \ learning \ objective \ formulations}\right) x \ 100$ 

## **Result and Discussion**

The results of data processing on the suitability of learning objectives with KD, the distribution of levels of learning objectives based on Bloom's taxonomy revision, and the completeness of the formulation of learning objectives in the lesson plans of biology teachers of Senior High School 14 Gowa are shown in the following table.

Category	Total	Percentage
Suitable	51	63,75
Quite Suitable	23	28,75
Not suitable	6	7,50
Total	80	100

Table 2. Suitability of Learning Objectives With KD

The data in Table 2 above shows that the suitability of learning objectives with KD is obtained as much as 63.75% in the appropriate category. However, there are still 28.75% in the moderately appropriate category; there are even 7.50% in the less appropriate category; all of which are in the lesson plans of class XI.

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Revised faxonomy				
Level	Total	Percentage		
C1	3	3,75		
C2	43	53,75		
C3	6	7,50		
C4	17	21,25		
C5	10	12,50		
C6	1	1,25		
Total	80	100		

### Table 3. Distribution of Cognitive Process Levels of Learning Objectives Based on Bloom's Revised Taxonomy

The data in Table 3 above shows that the C2 level (understanding) is the most dominant (53.75%), while the C6 level (creating) is only 1.25%.

Category	Total	Percentage
Complete	0	0
Quite Complete	2	2,50
Incomplete	78	97,50
Total	80	100

### **Table 4. Completeness of Learning Objective Formulation Components**

The data in Table 4 above shows that the completeness of the components or elements of the formulation of learning objectives is almost entirely (97.50%) in the incomplete category and none in the complete category.

#### Discussion

The data in Table 2 shows that the level of suitability of learning objectives with KD in the lesson plans of biology teachers of Senior High School 14 Gowa where 63.75% which is included in the appropriate category. This is based on the category of the suitability of the formulation of learning objectives with the GPA of each KD. However, there are still GPAs that are not clear in meaning, for example, GPA 3.8.7 class XI which reads: "Explain the relationship between environmental air conditions that are not clean". This is because, in the formulation of this GPA, it is not clear what the relationship between unclean air conditions is. Perhaps what is meant is the relationship with human health, especially related to the respiratory system.

There are still six (7.50%) formulations of learning objectives that fall into the less appropriate category. For example, KD 3.11 with a GPA of 3.11.3 and 3.11.4 for class XI. KD 3.11 reads: "Evaluate the dangers of using psychotropic compounds and their impact on personal health, the environment, and society". Meanwhile, GPA 3.11.3 reads: "Linking the structure of nerve cells with their functions"; while GPA 3.11.4 reads: "Differentiating the structure of nerve cells with other body constituent cells in the function of bioprocesses in the body, impulse propagation in nerve cells to produce work in muscle cells". The incompatibility of learning objectives with KD is due to the interpretation of verbs in KD can mean more than one operational verb so the formulation of learning objectives is not clear.

If we examine the formulation of learning objectives made based on GPA 3.11.3 and 3.11.4, it seems that they are consistent, but it is precisely the two GPAs that do not correspond to the KD so that the learning objectives are declared not in accordance with the KD. The learning objectives presented refer to the GPA, thus the GPA must be clear and in accordance with the KD in the lesson plan learning tool. This is in line with Hamalik's (2007) statement that indicators are specific basic competencies that can be used as a measure to assess the achievement of learning outcomes.

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Besides there are GPAs that are not in accordance with the KD, and therefore the learning objectives are not in accordance with the KD, there are also many GPAs that are not specific so teachers will have difficulty measuring them. Some GPA formulations are exactly the same as the KD formulation. An example of a GPA formulation that is very long and contains many behaviors as learning outcomes is GPA 4.8.1 class XI which reads: "Present the relationship between the results of observations of the human and animal respiratory systems, the effect of smoking on respiratory health, the relationship between clean environmental air conditions, smoking behavior with the structure of respiratory organs, the function of cells that make up the tissues in respiratory organs with diseases/disorders that occur in the respiratory tract". This is not in line with the SMART principle (Specific, Measurable, Achievable, Realistic, Timely) in the preparation for GPA (Rumanti, 2017). The SMART principle means that GPA must be specific, measurable (evaluable), achievable by learners, real in the process and there is enough time to achieve it.

Of the 80 GPA formulations in the lesson plans, not a single one contains the audience aspect, whereas the formulation of GPA must at least contain two aspects, namely audience, and behavior. If this happens then the GPA is not clear who is actually learning. Therefore, GPA must have an audience component. The data in Table 3 shows that the cognitive process dimension of learning objectives contained in the biology teacher's lesson plan is dominant (53.75%) C2 (understanding) category, following C4 (analyzing) as much as 21.25%. The C6 (creating) category is only 1.25%. This means that the distribution of cognitive process levels of learning objectives is uneven (disproportionate).

Today's learning is required to develop students' higher-order thinking skills (HOTS), not just lower-order thinking skills (LOTS). Referring to Ariyana et al. (2018), those classified as HOTS are C4 (analyze), C5 (evaluate), and C6 (create); those classified as LOTS are C1 (remember), C2 (understand), and C3 (apply). Thus, 65% of the formulation of learning objectives in the lesson plans studied was at the low-level thinking level. Higher-level thinking skills are one of the skills needed in the 21st century.

It seems that teachers pay less attention to the distribution of cognitive process levels in formulating learning objectives in lesson plans. It will be even more difficult for teachers if the formulation of learning objectives must contain the dimensions of knowledge (in addition to the dimensions of cognitive processes) according to the revision of Bloom's taxonomy. Based on the observation, this happens because the formulation of learning objectives is only a re-copy of the GPA, while the GPA does not pay attention to the level of cognitive processes based on the revision of Bloom's taxonomy. There is an impression that the level of cognitive processes based on the revision of Bloom's taxonomy only applies to the formulation of learning objectives; meanwhile, in formulating the formulation of learning objectives teachers only copy the formulation of GPA.

So far there is no standard regarding the proportion of each level of cognitive process in the formulation of learning objectives. In Arikunto (2013) it is stated, preferably C1 2%, C2 14%, C3 34%, C4 34%, C5 14%, and C6 2%. Determining proportions like this is not easy for teachers to implement, nor does it need to be rigid, because the level of the cognitive process in the formulation of learning objectives is largely determined by the characteristics of the material and must also consider the characteristics of students.

Among teachers, there are still those who misunderstand the formulation of cognitive process levels C1 to C6. As if C1 to C6 shows the level (gradient) from "not good" to "very good". In fact, C1 to C6 shows the sequence of cognitive processes from simple to complex (Suciati, 2005). Remembering or memorizing certain facts, formulas, or principles (C1) is still needed as a basis for more complex cognitive processes. In short, the six levels of cognitive processes must appear proportionally in teaching each subject. If it is not possible, it is not necessary for all of them to appear at each meeting.

The data in Table 4 shows that almost all (97.50%) formulations of learning objectives in lesson plans are incomplete, which only contain two or one component, namely audience (A),

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and behavior (B). There were three formulations of learning objectives that only contained one component, namely behavior (B), which was found in the lesson plans for class XII. The KD, GPA, and the formulation of learning objectives are exactly the same. This was found in KD 4.8, 4.9, and 4.10.

Two formulations of learning objectives that fall into the fairly complete category, namely containing three components, namely audience (A), behavior (B), and condition (C), are found in the lesson plans for grade XI KD 4.10 and 3.14. Meanwhile, none of the learning objective formulations contain the degree (D) component. In writing the formulation of learning objectives, the teacher only repeats writing the IPK formulation by adding the word "students can".

The absence of the condition (C) component in the formulation of learning objectives causes unclear processes that must be carried out by students to realize (achieve) behavior (B); therefore, the learning process will not be well directed. Meanwhile, the absence of the degree component (D) will make it difficult for the teacher to determine the minimum level of mastery as an indicator that the behavior (B) has been achieved, so it will be difficult to determine whether the KD has been achieved.

Teachers in making questions to measure the achievement of learning objectives must refer to the formulation of learning objectives that have been compiled by the teacher in the lesson plan. According to Suparman (2005), learning objectives are the only basis for preparing test grids. The formulation of learning objectives contained in the lesson plans of biology teachers in this study, in addition to being incomplete, also many are not specific so it is difficult to measure them, some even seem unrealistic.

## Conclusion

Based on the results of data processing and discussion that have been presented, it is concluded that the suitability of learning objectives with KD in the lesson plans of biology teachers of Senior Hight School 14 Gowa is dominant (63.75%) in the appropriate category, 28.75% in the quite appropriate category, and 7.50% in the less appropriate category. The distribution of cognitive process levels of learning objectives based on Bloom's revised taxonomy is dominant (53.75%) C2, each level has been represented but not proportional. The completeness of the components of the learning objective formulation is dominant (97.50%) incomplete, where it only contains the audience and behavior components, some even only the behavior component.

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Hamka Lodang	M.S. Lecturer of Biology Department. Universitas Negeri Makassar, Makassar, Indonesia E-mail: <u>hamka.l@unm.ac.id</u>	
Muhiddin Palennari	S,Pd. MPd. Dr. Lecturer of Biology Department. Universitas Negeri Makassar, Makassar, Indonesia E-mail: <u>muhiddin.p@unm.ac.id</u>	
Wahdaniah	Student of Biology Department. Universitas Negeri Makassar, Makassar, Indonesia E-mail: <u>wahdaniyah1011@gmail.com</u>	