



Biology Learning Profile with Electronic Student Worksheets Based on Science Process Skills

Suhardi Aldi¹, Adnan², Ismail³

¹Postgraduate Study Program, Makassar State University, Jl. Andi Jemma, Makassar, 90222, South Sulawesi, Indonesia

^{2,3} Department of Biology, State University of Makassar, Jl. Dg.Tata Raya, Makassar, 90224, South Sulawesi, Indonesia

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ABSTRACT

Learning carried out by educators requires teaching materials. Electronic student worksheets or e-LKPD are one type of teaching material. This study examines the profile of learning biology with e-LKPD. The aim is to obtain an overview of the teaching and learning process and the problems faced by teachers on student worksheets in learning biology material at SMA South Sulawesi. The subjects of this study were 10 schools consisting of 10 teachers of biology subjects. The method used is a survey using a questionnaire and a *checklist* given to 10 high school teachers in South Sulawesi. The data were obtained by using qualitative descriptive analysis. The results of the descriptive analysis show that the ownership of the LKPD in 10 Biology subject teachers in South Sulawesi is quite high, but the use of the electronic version of the LKPD is still not optimal. LKPD has a varied learning approach, students are motivated and play an active role in learning activities when using LKPD. The cognitive level of the learning objectives of the teacher LKPD is still relatively low, the formulation of objectives in the LKPD which has implications for the application of science process skills is still relatively low, and assignments in the teacher LKPD have not been maximized. The benefit of this research is that it can provide an overview of the learning process and the obstacles experienced by the teacher on the student worksheets.

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INTRODUCTION

The 2013 curriculum aims to prepare Indonesian people to have the ability to live as individuals and citizens who are faithful,

productive, creative, innovative and effective and able to contribute to the life of society, nation, state and world civilization (Permendikbud No 59, 2014). The 2013 curriculum emphasizes students so that they can play an active role in teaching and

learning activities. The learning process in the 2013 curriculum applies a scientific approach or scientific process-based approach. In addition, the learning process is designed to be student-centered.

Students are required by the government to have various competencies through the implementation of HOTS. The competencies in question are critical thinking, creative and innovative, communication skills, collaboration and confidence. These five things become student character targets so that they are attached to our evaluation system in national exams and are 21st century skills. Higher Order Thinking Skills (HOTS) are also applied following the low ranking of the Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) compared to other countries, as a result, the standard of national exam questions is being tried to be increased to catch up (Ditjen GTK Kemendikbud, 2018). Antika (2014) revealed that Student Centers can be realized if students actively construct what they experience in the learning process into a concept that they find for themselves and can relate concepts obtained at school to real life, thus making learning more meaningful.

Ausubel's theory contains that meaningful learning occurs when someone learns by associating new phenomena into their knowledge structure. The process of learning someone by constructing what he has learned and associating new experiences, phenomena, and facts into their knowledge structure (Burhanuddin & Esa, 2008). Meaningful learning theory introduces advance organizers, supporting the use of hands-on learning when it wants to suggest that learning should create a meaningful learning atmosphere. Advance organizers must be used with care so that they can become a link between information that has been stored in students' prior knowledge and new learning information. Advance organizers provide a conceptual framework

and facilitate the coding of new information in learning (Gredler, 2011).

Learning Biology is applied by involving students in the process of finding facts, building concepts, theories and scientific attitudes. So as to produce quality educational products. The process of science with the scientific method will produce various abilities for students to increase activity and train students' creativity. Concepts embedded in students' memories will last for a long time (Setyaningsih *et al.*, 2017).

The results of research conducted by Adnan *et al.* (2021) found that the scientific literacy skills of junior high school students in learning biology in South Sulawesi were still low. The results showed that the percentage of junior high school students who were able to understand the inquiry method was 17.02%, while the ability to organize, analyze and interpret quantitative data and scientific information was 36.23%. The implication of this research is to show the need for reconstruction of biology learning at the primary and secondary levels in South Sulawesi. One thing that needs to be done is to implement constructivist learning in class, for example inquiry learning. The results of Adnan & Bahri (2018) show that the application of guided inquiry has a positive effect on students' metacognitive skills. the implementation of guided inquiry is proven to be able to empower students' metacognitive skills higher than traditional learning. Then Adnan, *et al.* (2021) students are expected to pay attention to the importance of learning motivation as a tendency for academic activities to be meaningful and useful and to try to obtain the desired academic benefits.

Teaching materials are information, tools and texts needed by teachers or instructors for planning and studying the implementation of learning (Prastowo, 2014). Bahan Appropriate and adequate teaching materials will make it easier for students to understand and accept learning (Zunaidah & Amin, 2016). Student worksheets (LKPD) are sheets that contain

assignments that must be done by students to carry out activities so that they acquire the knowledge and skills that need to be mastered independently. LKPD includes printed learning media that can be used to create an effective and efficient learning process (Fitriyati *et al.*, 2013). e-LKPD is a work guide for students to make it easier for students to understand learning material in electronic form where the application uses desktop computers, notebooks, smartphones, and cellphones (Putriyana *et al.*, 2020).

Through the Kemendikbudristek (2018) it is very active in advocating learning with a Higher Order Thinking Skill (HOTS) nuance. Even LKPD must be HOTS, RPP must be HOTS and assessment must be HOTS. That is the hope of the Kemendikbudristek (2018) but, in fact, from the results of preliminary research, learning objectives in the cognitive domain are not HOTS. The formulation of learning objectives that imply the implementation of aspects of science process skills is still lacking. Assignments in LKPD have not been maximized. Therefore, there is a gap which is the reason for researchers to develop e-LKPD based on science process skills with HOTS nuances. This is very important because the development of e-LKPD in the field does not yet have a HOTS nuance, while the government is very hopeful.

According to Widodo (2010) states that empirical data relating to the description of learning activities that occur in schools causes a lack of our knowledge of what is happening in the classroom. Therefore, it is very important to know the reality of the biology learning process in class as the basis for developing biology learning. This study aims to see an overview of the learning process in terms of lesson plans, as well as student teacher worksheets owned by SMA/MA teachers in South Sulawesi. The results of this study can be used to develop the learning process in a better direction and in accordance with the demands of the curriculum.

METHODS

Types of research

This research is a survey research. Implementation of this research in February 2021.

Research subject

The research subjects consisted of 10 different schools with a sample of 10 biology teachers. It consists of teachers from SMAS Hang Tuah Makassar, SMAN 4 Soppeng, MAN 2 Soppeng, SMA Maha Putra, MAN 1 Makassar City, SMA Tridharma Makassar, SMAN Islam Integrated Al-fatih Makassar, SMAN 14 Makassar, SMA Celebes Global School, SMA Negeri 2 Bulukumba .

Data collection technique

The techniques used in data collection were questionnaires and checklists filled in by the teacher and observer. The data that has been obtained will then be analyzed descriptively qualitatively. So that we can know the description of the process of teaching and learning biology and the problems faced.

RESULTS AND DISCUSSION

The results of the analysis of the learning profile of biology subject teachers in SMA/MA in South Sulawesi were obtained from data collection of 10 Biology subject teachers using instruments in the form of questionnaires and observation sheets. In this way, the desired data can be obtained. The results of the analysis of the biology learning profile can be seen in Table 1.

Table 1. Results of observations on biology teachers in South Sulawesi

No.	Statement	Answer	Score	Percentage
1	You have an LKPD	Yes	10	100%
		No	0	0
2	LKPD Maker	Individual	8	80%
		Collective	2	20%
3	LKPD is self-made	Yes	6	60%
		No	4	40%
4	LKPD created with MGMP	Yes	3	30%
		No	7	70%
5	LKPD procurement is purchased	Yes	2	20%
		No	8	80%
6	Electronic LKPD is used	Yes	5	50%
		No	5	50%
7	The LKPD used has an approach	Scientific processing skills	4	40%
		Scientific approach	4	40%
		Scientific literacy	1	10%
		<i>Inquiry</i>	3	30%
		<i>Discovery</i>	3	30%
		<i>Project Based Learning</i>	2	20%
		<i>Problem solving</i>	2	20%
		Contextual Constructivism	2	20%
		High	6	60%
		Medium	4	40%
8	Students are motivated in the learning process if they use LKPD	Low	0	0
		High	10	100%
		Medium	0	0
9	Students are active in learning if they use LKPD	Low	0	0
		Book	6	60%
		Module	1	10%
10	Supporting factors when using LKPD	Video	1	10%
		Props	1	10%
		25%	0	0
11	Percentage of completeness of LKPD during learning	50%	1	10%
		75%	9	90%
		100%	0	0

Based on the results of the initial observations of the Biology subject teacher:

- Points 1,2,3,4, and 5 describe the ownership of the LKPD. Point 1 shows that as many as 100% of teachers have LKPD. Points 2 and 3 LKPD are made individually as much as 80% and 60% are made by themselves. LKPD made with MGMP is only 30%. As well as the

procurement of LKPD purchased only 20%. Based on these data, it shows that the ownership of LKPD among teachers is already a lot. LKPD procurement has been done independently. This is in accordance with the results of research by Sari & Lepiyanto (2016) regarding the importance of procuring LKPD for students who act as a tool to build student

- knowledge. The results of research conducted by Celikler & Aksan (2012) and Töman *et al.*, (2013) states that student worksheets make it easier for teachers to teach regularly and create an active learning atmosphere.
2. Point 6 describes as many as 50% of teachers using electronic LKPD or e-LKPD. So that shows that there is still a lack of application of e-LKPD. This is not in line with the statement of Putriyana *et al.* (2020) that e-LKPD makes it easier for students to understand learning materials in electronic form whose operation can be through desktop computers, notebooks, smartphones, or mobile phones. Dewi & Susilowibowo (2016) revealed that the use of e-LKPD can have a positive impact on student learning outcomes, for example during a pandemic.
 3. Point 7 shows the LKPD approach. 40% are science process skills, 40% are scientific approaches, 10% are scientific literacy, 30% are inquiry, 30% are discovery, 20% are project based learning, 20% are problem based learning, 20% are problem solving, 20 % is contextual, and 20% is constructivism. This describes that the LKPD developed by teachers has a variety of approaches. This is in accordance with the statement of Asnaini *et al.*, (2016) namely that the LKPD that has an approach can improve student learning outcomes and learning activities.
 4. Points 8 and 9 illustrate that students are motivated and take an active role in learning when using LKPD. The category of high motivation is 60%, medium 40%.
- This is in line with the results of research by Hanim *et al.* (2018) which shows that LKPD has an effect on student motivation. The student activity category shows a high score of 100%, which is in line with the results of the research by Marsa *et al.* (2016) that LKPD can make students become more active figures in learning activities, so that it will have a good impact on learning outcomes.
5. Points 10 and 11 cover the supporting factors of LKPD and the percentage of completeness of LKPD work. The most dominant supporting factors for using LKPD are books (60%), modules (10%), videos (10%), and teaching aids (10%). This shows that the most dominant supporting factor for the use of LKPD is books. According to Prajawinanti (2020), the function of the book has a very effective role that can be used as a means of education and scientific institutions.
 6. The percentage of completeness in LKPD work is dominated by the 75% category with a percentage of 90%, while the completeness category is 50% with a percentage of 10%. The most dominant percentage of completion of LKPD work is 75%. Based on this, the completeness of working on LKPD is quite high because worksheets can increase students' interest in doing assignments and build cohesiveness in learning in groups so that they can complete LKPD properly (Cosby *et al.*, 2009).

Table 2 Cognitive level learning objectives LKPD of 10 biology teachers SMA/MA South Sulawesi.

Cognitive Level	Qty	Percentage (%)
C1	10	29
C2	17	50
C3	0	0
C4	6	18
C5	0	0
C6	1	3

Based on Table 2, the results of the analysis of learning objectives in the cognitive domain are obtained. In the LKPD, only 29% of teachers listed learning in the C1 category. Then, 50% of teachers include learning objectives with category C2. Furthermore, 18% of teachers listed learning objectives with category C4. 3% of teachers listed learning objectives with category C6. This is in stark contrast to the government's expectation that the formulation of learning objectives must be HOTS-oriented. In fact, the LKPD must be HOTS, the RPP must be HOTS and the

assessment must be HOTS. It does foster hope, (Kemendikbudristek, 2018) but the truth is that from the results of preliminary research on learning objectives in the cognitive domain, it is not HOTS. This is due to the low ranking of the Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) compared to other countries. Therefore, learning development must be HOTS-oriented, one of which is on learning devices (Ditjen GTK Kemendikbud, 2018).

Table 3. The results of the analysis of the formulation of objectives on the LKPD indicate the implementation of scientific processing skills.

KPS Stages	Qty	Percentage (%)
Observation	22	62
Inference	8	23
Classification	2	6
Communicating	2	6
Predicting	0	0
Variable identification	0	0
Operational definition	0	0
Creating a hypothesis	0	0
Formulating the problem	1	3
Interpreting data	0	0
Making an experiment	0	0

Table 3 illustrates that the formulation of objectives in the teacher LKPD implies the implementation of aspects of science process skills. Only 62% of teacher LKPD assignments are in the aspect of observing, 23% of teacher LKPD assignments are in the inference aspect, 6% of teacher LKPD assignments are in the classifying aspect and 3% of teacher LKPD assignments are in the aspect of formulating problems. Based on these data, the

formulation of objectives indicating the implementation of aspects of science process skills as a form of learning experience is still lacking. This must be improved because according to Bybee (2012), science process skills can make students develop attitudes, understanding, and scientific thinking. This knowledge is acquired as a result of the scientific investigations.

Table 4. Assignment in LKPD 10 biology teachers SMA/MA South Sulawesi.

Assignments in LKPD	Qty	Percentage (%)
Clarity of assigned instructions	108	23
Instructions on each assignment are short, concise and communicative	107	23
Text is legible	104	22
Image is visible	40	9
Other illustrations (Tables, Graphs etc.) are legible	0	0
There is relevance between text and images in assignments	18	4
Provide space to answer according to the portion of the answer	93	20

Table 4 shows that the assignments in the teacher LKPD 93% have a level of clarity of instructions assigned, 92% of instructions on each assignment are short, dense, and communicative, 96% of the text is easy to read, 44% of images are visible, there are no other illustrations in the form of tables and graphics, 52% there is relevance between text and images in the assignment, 79% provide space to answer according to the portion of the answer. In this case, the assignment in the teacher LKPD is not yet optimal. Daryanto (2013) states that the components needed in teaching materials are cover aspects, pictures or illustrations, the use of text, and assignments must be interesting to add to the attractiveness of learning process for the students.

CONCLUSION

Biology learning profile on electronic student worksheets (e-LKPD) based on science process skills using the survey method. The results of the descriptive analysis show that the ownership of LKPD in 10 Biology subject teachers in South Sulawesi is high, but the use of the electronic version of LKPD is still not optimal. LKPD has a variety of learning approaches, students are motivated and active in learning activities when using LKPD. The cognitive level of the teacher's LKPD learning objectives is still relatively low, the formulation of objectives in the LKPD which indicates the implementation of science process skills is still relatively low, and the assignments in the teacher's LKPD are not maximized.

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