Analysis of student's obstacles on Biology learning assessment courses

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Abstract. Learning difficulty is an obstacle faced by students in achieving learning progress. One of the causes of learning obstacle is limited knowledge of students to certain concepts. The study aims to describe the students' learning obstacle through an in-depth analysis of learning process on Biology Learning Assessment course. The research design was qualitative with descriptive analysis method. The subject of the study was semester IV students of Biology Education at STKIP Pembangunan Indonesia academic year 2018-2019, which programmed Biology Learning Assessment course. The researcher collected the data through Respondent Ability Test (TKR) and interview. The results showed that the characteristics of student learning obstacles were complication in comparing the cognitive area on Bloom Taxonomy before and after revisions, obstacles in identifying and classifying relevant cognitive ability with learning objective, and the students had limitation designing questions by using operational verbs which suitable for Bloom Taxonomy revision.

1. Introduction

Education national policy which involves increasing the relevance of education in accordance with the demands of development, improvement of education quality, as well as efficiency of education effect tiveness, teachers professionally occupy the central point. Some components which are directly related to the professionalism of the teacher according to [1] are graduates, prospective teachers (such as university students, students, and inputs) the education process of teachers, human being, material, methods, assessment/evaluation, feedback, and community [2]. Being a teacher, student must take the education level conducted by the School of Teachers Education (SPG), colleges, and education institutions (LPTK).

The learning process in college level is extremely different with learning process in high school level. The college emphasizes independence, activeness, and responsibility of students which its characteristic tends to heterogenous in class. Yet, the desirable characteristic does not visible enough on learning process in STKIP Pembangunan Indonesia Makassar. One of the examples is on learning assessment course. the students tend to keep silence and unwilling to be creative and active in learning process. they just wait for lecturer's instruction.

The lecturers have been considered some efforts to increase the independency, the activeness, and the responsibility of students. One of the efforts is to apply some kinds of model, approach, method of innovative learning. Nevertheless, the results do not significantly satisfy. This condition becomes a sign of doing in-depth study to investigate the obstacle factors which influences students learning outcome.

Brosseau [1] reveled that the students naturally experienced a condition called learning obstacle. Learning obstacle was a condition where the students accepted an information which was considered correct but it revealed a reverse due to knowledge limitation [2]. Brousseau [1] expressed that the obstacle was not mistakes of ignorance, uncertainty, opportunity which supported by empiric learning theory or behaviourist learning theory but the uncertainty and unexpected mistakes which was obtained in understanding knowledge process. these mistakes are related to their previous knowledge.

Furthermore, according to Rosseau [1], learning obstacle was caused by three factors; 1) epistemological which related to students' knowledge toward a content. Incomplete and in unity teaching method applied by the lecturer in teaching a learning concept brought the obstacle for students. This obstacle happened since the students' understanding about a concept was incomplete and limited for certain concept. 2) onto genic was obstacle which related to mental unpreparedness of learning. The trigger was limitation of learning concept in students' development. 3) didactic was related to an error on learning process from learning system in college's environment. The students as learning subject just follow learning system that applicable without identifying the availability. The obstacle was caused by the lecturer's way in making and designing a learning which was incorrect or mistakes of students' learning sources.

Biology learning assessment course is multi-disciplinary which demands synergy with other courses such as learning theory course, designing lesson plan, using learning media, and etc. Biology learning assessment course provides a fundamental understanding of education assessment which covers purpose mastery and assessment function; the role of evaluation in teaching learning process (PBM); procedure and assessment form; assessed ability; planning, drafting, principal test analysis, validity and realibility of test/device, test (concept and process skill), processing assessment result. The concept of bloom taxonomy is a basic which must be mastered by the students before able to create questions, doing question quality analysis, and processing assessment result. [3] The Bloom Taxonomy classified attitude into six categories, it started from simple (C1/to know) until more complex (C6/to evaluate). One of Bloom's student named Lorin Anderson revised bloom taxonomy in 1990. The revision was published in 2001 using name of Taxonomy Bloom revision. This revision changed key words; each categorizes were still sorted hierarchically from the lowest order to higher. In cognitive area analytical thinking skill and synthesis were integrated into only analysis. A total of six categorizes on previous concept did not change the number since Anderson inserted new category which was *creating* where it was not available before [1].

2. Research Methods

The study was conducted in STKIP Pembangunan Indonesia Makassar. The research subject was the students of biology education whom were taking biology learning assessment course academic year 2018/2019. The approach of the study was qualitative with descriptive analysis method which described and interpreted the object naturally [2]. The type of instrument of the study was Respondent Ability Test (TKR) which was further clarified with interview result of students.
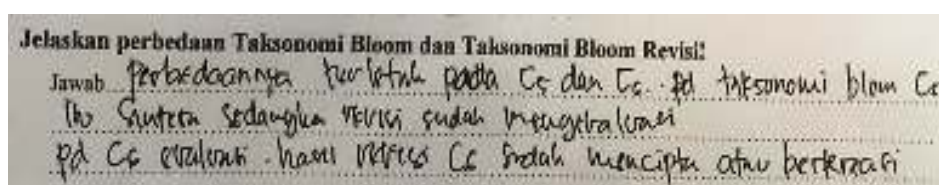
3. Results

The description of learning obstacles experienced by the students on biology learning assessment course was obtained from analysis results of student answer findings on Respondent Ability Test (TKR) which further clarified through interview. The given test consisted of three questions; first question was about the difference of Bloom Taxonomy before and after revision, second question was about identification skill and classified cognitive skill which relevant with learning objectives, third question was about designing question skill using operation verbs which was suitable for level of knowledge.

The first question was the students' skill differentiate Bloom Taxonomy before revision and after revision which measured using questions of table which paired the level of knowledge area on Bloom Taxonomy before revision and after revision. Based on the results, the data is shown on table 1.
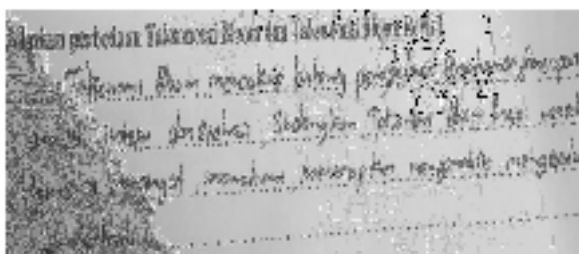
Table 1. Distribution of Students' Capabilities in Answering Questions of Bloom Taxonomy Difference and Revised

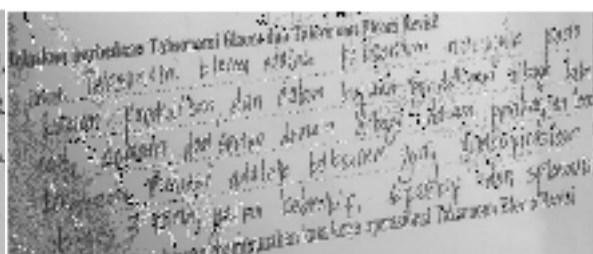| Question number	Student Result Score (%) n=35				
	Score 4	Score 3	Score 2	Score 1	Score 0
1	14,29	28,57	37,14	11.43	8,57

Table 1 has shown the percentage of the number of students whom able to answer all question aspects correctly and clearly was 14,29%, answered almost all aspects of question correctly was 28,57%, answered partly all aspects of question correctly was 37,14%, answered not accordance of question's aspect or incorrect taking conclusion was 11,43% and no answer was 8,57%. Based on the percentage, it was obtained a description of low students' skill. it was caused by the students' obstacle answering questions about Bloom Taxonomy difference before and after revision.

(a)

(b)   (c)

Figure 1. Some Examples of Student Work on First Question Regarding to the Difference of Bloom's Taxonomy Before and After Revision

Generally, students' answer just focused on an answer which was the difference of thinking ability levels between synthesis (be creative) with analysis. The students have never been expressed word form of each key words and the number of dimensions on the bloom taxonomy. Meanwhile, the expected answer of basic difference questions between bloom taxonomy revision with previous bloom taxonomy was in terms of separation between knowledge dimension and cognitive process dimension. Besides, picture 1 showed some mistakes of the students explaining the difference of Bloom Taxonomy before and after revision, such as the students were only able rewriting the domain of knowledge of Bloom Taxonomy before and after revision without further explanation about knowledge dimension and cognitive process. it was also found some answers which was not suitable for questions' context. It showed that some students answered the questions by guessing or counting on their memorizing only.

Second question was given to measure students' skill in identifying and classifying cognitive area with learning objective based on the given question. There were some questions provided as in Figure 2.
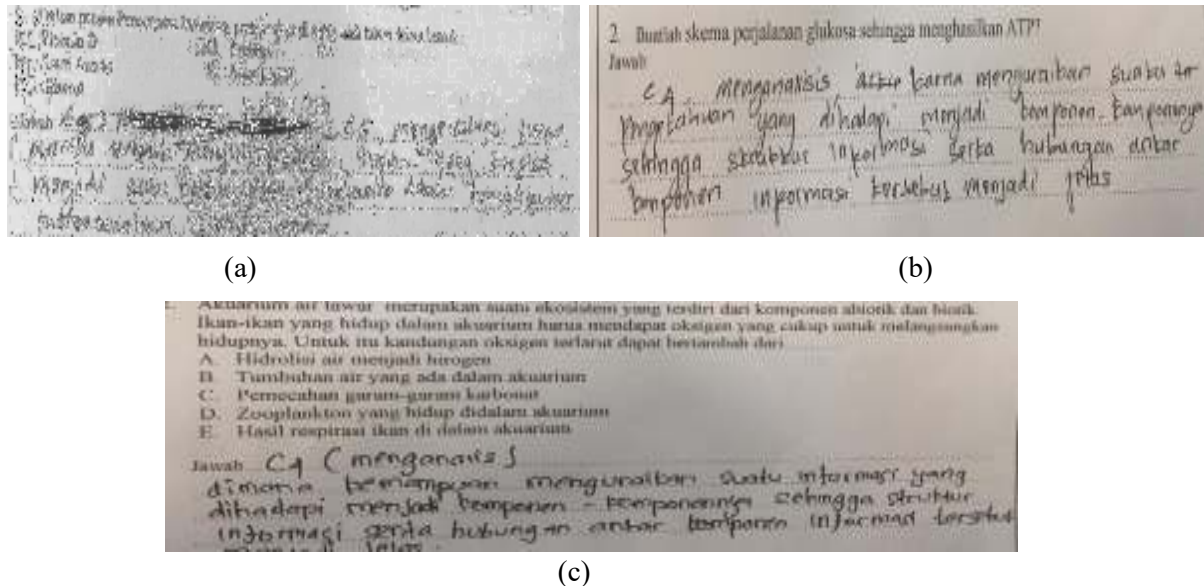

(a)

(b)

(c)

Figure 2. Some Examples of students work on identifying and classifying cognitive area with learning objective.

Based on the question (a), the students were incorrect in interpreting questions. The expected answer of question was analysis area (C4) since the questions expected the students analyzing a concept between protein and the smallest part of protein which was amino acid. The questions of (b), the students were incorrect in identifying knowledge area. The expected answer was creative area (C6) since the question guided the students to be more creative in making glucose flow scheme accompanied with reactions of producing ATP. In contrast, the question (c) have made the students able to identify analysis skill (C4), but some mistakes were found in giving explanation.

The third question was distributed to measure the students' skill in designing question by using operational verbs based on Bloom Taxonomy revision. In this case, the students were expected to design 3 questions. The first question was multiple-choice which measured understanding ability (C2). The second and third questions were match in pair which measured applying ability (C3) and analyzing (C4). Figure 3 showed the students' answer:
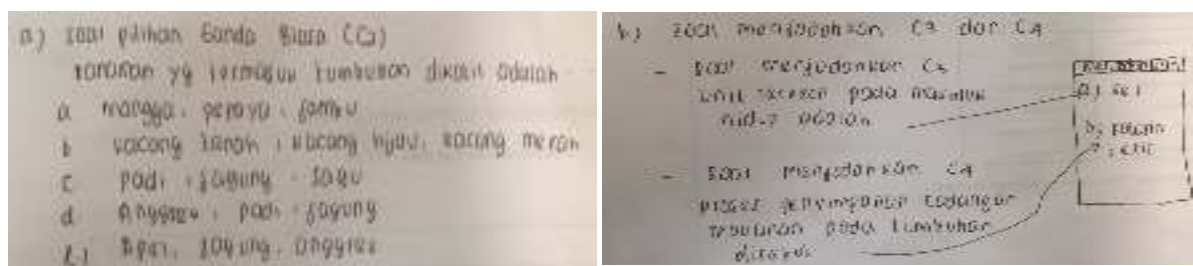

Figure 3. Some examples of students' worksheet designing questions using operational verbs

The students made a qualified question for multiple-choice form which measured understanding ability. This question provided plants including dicotyledonous plants. Therefore, the students must understand the concept of dicotyledonous plants to answer question. Meanwhile, the students were not able to design proper question for match in pair which measured applying ability (C3). The students provided match in pair question but the measured ability was just level of understanding ability (C2) that was definition concept of cell. The next question measured analyzing ability (C4). The form of question was correct which match in pair but the desired thinking ability was not appropriate. On the questions made by the students, thinking ability was measured on understanding ability only (C2) which was not on analyzing ability (C4). The questions were just for expecting answer which related to photosynthesis definition.

The result of interview was used to support the students' learning barriers which was identified using the results of students' answer on Respondent Ability Test (TKR). The interview was conducted after taking test for some students. Based on the result of interview, it showed that the students experienced learning obstacle in Biology Learning Assessment course based on previously learning experience. The students did not understand the concept of Bloom Taxonomy so that they experienced learning obstacles in using operational verbs of Bloom Taxonomy on analyzing question, in particular designing question. The result of interview also described that one of the students' obstacle was biology concept mastery which was not yet well established.

4. Conclusions

According to research, result, and discussion, it can be conclude that the characteristics of student learning obstacles were complication in comparing the cognitive area on Bloom Taxonomy before and after revisions, obstacles in identifying and classifying relevant cognitive ability with learning objective, and the students had limitation designing questions by using operational verbs which suitable for Bloom Taxonomy revision.

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