Discourse on the Improvement of History Learning Quality Through HOTS Assessment Instrument Based on Learning Trajectory

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Abstract-**Improving the quality of history learning is something that every historical education practitioner wants. The demands of the twentieth century (21st) era which is increasingly developing requires a balanced effort to serve these rapid developments. Hence, the discourse to improve the quality of learning through HOTS assessment instrument which is based on learning trajectory arises. The method used in this writing is literature study. The results show that the learning trajectory basis which is integrated into the Lesson Plan becomes the foundation for making the higher order thinking skills (HOTS) assessment instruments. Moreover, the discourse on improving the quality of history learning can be seen through the higher order thinking skill (HOTS) assessment instrument based on the learning trajectory.**

Keywords: assessment instrument, HOTS, learning trajectory, learning, history

I. Introduction

The Partnership of 21st Century Skill outlines that learning in the 21st century is based on the development of high-level thinking skills as follows: critical thinking, problem solving, communication skills, ICT (mastery of technology use), information literacy (knowledgeable), and media literacy (proficient in media use) [1]. It is important to understand that those capabilities should be mastered in the 21st century since they are essential and absolute things to be mastered by students. By having a great encouragement in preparation for 21st century learning goals, the concept of higher order thinking skills certainly has an achievable assessment concept to meet the intended purposes.

An access towards world development and education world is essentially connected with the assessment of learning in schools, if world development is responded adaptively by humans in almost every context, the feedback is directed towards meeting the demanded goals of the world development while on the other hand assessment is often seen as a heart of education by some education experts. It can be interpreted that there is a symbiosis of mutualism. It is between learning objective that answer world advances demand and assessment as the heart of education, therefore the next question is, how to relate the mindset between those required goals and judgments. This study discusses the basic of standard process until learning assessment. Later, the standard process will be used as learning trajectory.

The assessment itself has several principles that we need to be carefully understood based on its foundation. We can see those principles listed in the following assessment principles: (1) curriculum alignment, (2) explicit criteria and standards, (3) methodical robustness, (4) improvement-orientation [2]. While learning trajectory according to Chuang Yih Chen is manifested through the components of learning goal, learning activity and hypothetical learning process. Chuang Yih Chen develops those trajectories by expressing learning purposes and naming the learning activities which obviously containing the typical use of task for students to achieve goals and finally setting hypotheses of achievement of the learning process [3].

The purpose of this article is to spawn a discourse on improving the quality of history learning, especially in senior high schools (curriculum 2013) which rests on the 21st century learning development demands. It is also patronized on higher-order thinking skills via trajectory learning basis. This discourse certainly becomes an interesting discourse to be discussed and conversed by Indonesian stakeholders as an effort of education world to improve the quality of learning, especially learning history in high schools.

II. Related Works / Literature Review

The first literature review is an international article of The Development of Higher Order Thinking Skill (Hots) Instrument for Assessment in Physics Study written by Mertha Dhewa Kusuma, Undang Rosidin, Abdurahman and Agus Suyatna that reveals: (1) the results of indicator research of analytical skills (C4) could be assembled by conducting a factual, conceptual, procedural, and metacognition knowledge cognition analysis; (2) the indicators of evaluation ability (C5) that could be developed are the ability to do a factual, conceptual and metacognitive knowledge evaluation; (3) the indicators of ability to create (C6) could be arranged by developing a factual, conceptual and metacognition knowledge of ability to create; (4) the HOTS assessment instrument is an effective assessment to train students' HOTS abilities and it is also an effective measuring tool in calculating each students' thinking ability at each level [4]. The similarity between this study and the submitted proposal research by the author is to develop HOTS assessment as learning instruments, while the difference lies on the scientific domain and the use of learning trajectory as a learning base which is employed as research proposal's object.

The second section of the international article entitled Higher Order Thinking Skills Assessment (Hots) by I Wayan Widana reveals that the results of the study by analyzing: (1) HOTS assessment as a question or task to review characteristics that become as a tool to assess

students' ability, furthermore, it will used to analyze, evaluate and empower the characteristics based on contextual and unfamiliar issues; (2) the steps in compiling HOTS items are: a) analyzing KD that can be made based on HOTS items, b) compiling blueprints of HOTS items, c) writing items into cards, d) determining key answers (multiple choices) or writing rubric / scoring guide (essay), e) using qualitative analysis and f) using quantitative analysis; (3) the benefits of HOTS assessment are: a) increasing students' motivation to learn and b) improving learning outcomes. The similarity of the submitted research proposal by the author and this study is that the employment of HOTS's assessment in learning, while the difference lies that this article only discusses the assessment points, HOTS assessment and preparation steps. On the other hand, the submitted research proposal wants to create HOTS assessment instruments which are based on learning trajectory [5].

The third review is the article Development of Higher Order Thinking Skill Assessment Instruments (HOTS) in Mathematics Subjects of Class VIII Semester 1 by Agus Budiman and Jailani. It states that the results of valid research HOTS assessment instruments with 24 pieces of multiple-choice problems have the 0,713 of reliability coefficients; the number of difficulties is 0,406 (moderate); the average differentiation number 0,330 (good); and all side trackers are functioning well. Furthermore, the results of 19 pieces of problem description are as follows: the 0.920 of reliability coefficient, the number of difficulties is 0.373 (moderate) and the average difference is 0.508 (good). The research based on the aspect of material, construction, and language is declared valid and feasible to use. The similarity of this article with the intended proposal by the author is that the development of HOTS assessment instruments. The difference between Agus et.al study and this study lies about the learning. Agus et.al study focuses on 8th grader class of mathematics studies, while the researcher's subject is historical studies that are based on learning trajectory [6].

The fourth article on the Development of HOTS Assessment Instruments Based on 2013 Curriculum on Discipline Attitudes by Umi Pratiwi and Eka Farida Fasha reveals the results of Independent variables (HOTS) and dependent variables (disciplinary attitudes) through assessment instruments in the form of RPP. The results obtain a valid status through the validator with an average rating of 3.57 and the results of the assessment instrument with HOTS coefficient of 73.3% and the disciplined attitude percentage number of 90% of the 12 established indicators (maximum value of 4). The similarity of Pratiwi and Fasha's research and the author's proposed research is together developing an instrument for evaluating HOTS based on established intended competency, if this article is based on the 2013 curriculum and on the discipline attitude competency. Therefore, this research is proposing the use of learning trajectory as base on the material and basic competencies (KD) history field of study in senior high school (SMA) [7].

The state of art aspect based on the literature review outlines from two international journal articles and two national standard journal articles is the novelty aspect of research and the urgency of the research. The novelty aspect that can be submitted is HOTS assessment instrument based on learning trajectory. Next, the first of the two international articles is outlining research on assessment instruments in physics studies and the second article focusses on HOTS's assessment concept, while the first article of the two national articles discusses HOTS assessment instruments in mathematics studies, and the second article has an aim at the use of HOTS assessment instruments based on 2013 curriculum of discipline attitude. By looking at previous explanation, it can be inferred that the article entitled Development of Higher Order Thinking Skill Instruments based on Trajectory Learning is something new within the realm of academic research and it faces the urgency of 21st century learning with a patron on the development of higher-order thinking skills such as critical thinking, problem solving, communication skills, mastery of the use of technology, being knowledgeable and being competent in the use of media.

III. MATERIAL & METHODOLOGY

Almost all types of research required a literature study. Although people often distinguished between library research and field research, both required still a literature search. The main difference was only in the purpose, function and position of literature study within each of the studies. In field research, literature exploration was primarily intended as a first step to prepare a research design or proposal to obtain similar research information, a deeper theoretical study or sharpen methodologies. Whereas in literature research, library search was more than just serving all the functions mentioned above. Library research also utilized library resources to obtain research data [8].

There were at least four main characteristics of library research that needed to be considered by students or prospective researchers since the characteristics may affect the nature and method of work of the research: (1) researchers were dealing directly with text (nash) or numerical data and they did not have direct knowledge from the field or eyewitness; (2) library data was 'ready-made'; (3) library data were generally secondary sources; (4) the condition of library data was not limited to space and time [8].

The library research steps were divided into four stages of activities, the following four steps were limited to the technical aspects that mostly having a direct refer to the research literature. Therefore, it did not include the stages of research in general, such as finding research ideas and writing research reports. The steps were: (1) preparing equipment (stationery & pad used to collect data based on the classification that we needed); (2) compiling a bibliography work (information from the literature used as data reference); (3) time management (the estimated schedule and target); (4) reading and making research notes (collecting data via reading process, then record the content through data classification that we had already designed and needed) [8].

In the first step, the literature research was to prepare data collection equipment in the form of paper pad and stationery, then categorized the general aspects that we want to write as data to be collected. It would be included

in the second step of literature research, the compilation of work bibliography led to the keywords that you want to look for writing an improvement of the quality of learning history through the learning trajectory-based HOTS assessment instruments. The collection was a literature related to HOTS assessment instrument, learning trajectory and history learning. The third step was to plan the targeted time to complete the writing, the final step was to read the literature found and then record the content of the literature based on aspects or keywords of the HOTS assessment instrument, learning trajectory and history learning

IV. RESULTS AND DISCUSSION

A. Assessment, HOTS, and Learning Trajectory

Assessment of learning outcomes could be classified in aspects of attitudes, knowledge, and skills that had a balanced position to determine the relative position of each student towards a predetermined standard [9]. In the world of assessment education, it was substantial to measure the extent to which the achievement of goals and processes of student learning activities in the class. Assessment as a device that met academic requirements to be used as an instrument of proper assessment of the desired learning base. The learning outcomes of achieving the objectives and the learning process above were the outputs to be assessed. In the context of this assessment, the author took on the focus of discussion of basic competencies (KD) in the senior high school (SMA) of history education syllabus.

Learning outcomes were obtained from the basis of learning used to convey them. The basis used was learning trajectory. The fundamental question was why this learning base was used as basic competencies (KD) in the senior high school (SMA) history education syllabus? The cognitive taxonomy by Bloom required sequential stages of knowledge (C1), understanding (C2) and application (C3). To reach this stage, a base that had the appropriate scheme was needed. Relying on this, Simon developed learning trajectory with the components of learning goals, learning activity and hypothetical learning process [10]. The ability and the capability to absorb Bloom's taxonomy stages ranged from knowledge (C1), understanding (C2), and application (C3) towards established levels of HOTS such as C4, C5 and C6 on basic competencies (KD) in the senior high school history syllabus. A series of learning trajectory processes at the learning goals stage was to absorb learning objectives from KD. At the learning activity stage knowledge (C1), understanding (C2), application (C3) and analysis (C4) were accommodated. Furthermore, at the stage of hypothetical learning process, it was used to hypothesize learning outcomes (outputs) obtained by students from a series of learning goals components and learning activity.

The learning outcomes (outputs) of students' course were requiring an assessment. It should be reflecting on the goals of KD that contained high or established levels of thinking. The assessment in this established category (C4, C5, C6) required an established assessment instrument in the process. Instruments that met this category were the higher order thinking skills (HOTS) based on instruments. It was coined by Anderson and Krathwohl [11]. Higher order thinking skills (HOTS) were the development and revisions of Bloom's taxonomy (1956). Anderson and

Krathwohl developed Bloom's cognitive taxonomy within two dimensions, namely lower order thinking skills (LOTS) and higher order thinking skills (HOTS). LOTS consisted of knowledge (C1), understanding (C2) and application (C3). Higher order thinking skills (HOTS) were consisting of analysis (C4), evaluation (C5), and making (C6). Further question was why the instrument for assessing higher order thinking skills (HOTS) and learning trajectory bases was employed. The most basic thing was the reality of KD learning since it was mainly about its effectiveness and efficiency. In the syllabus for 2013 senior high school (SMA) curriculum, the allocation of time and material in history subjects was divided into 2 categories, national history (mandatory) and specialized history. History class should have a time allocation of 2 hours per week, including KD. In the developed target to get to an established stage of thinking, KD learning certainly required an effective and efficient strategy to meet the target of delivering the material which was charged within one time of allocation. The target must be fulfilled with the right learning base and a good measuring instrument as an accomplishment of assessment tool. Speaking of assessments in the field, based on Zia U Haq's journal, the assessment developed in general in the 2013 Curriculum was as follows [12].

TABLE 1. TYPE OF ASSESSMENT

No	Knowledge	Skill	Attitude
1	Written Test	Practice	Observation
2	Observation	Project	Self-Assessment
3	Assignment	Product	Peer-Assessment
		Portfolio	Journal

With various aspects of assessment which were as teacher's tasks and during demands for KD achievement, teachers must be creative in dealing with the hourly allocations that required the achievement of the ability to "analyze" in KD. It was certainly not an easy matter. Other problems that may arise in the field are saturation and limitations for the ability to analyze only on written tests. Previously we talked about the output of learning outcomes through learning trajectory, if the output of learning outcomes followed the learning trajectory patterns, the written test was only a small part of the pattern. The real part of learning trajectory was in the process of reaching the stage of thinking abilities C4, C5 and C6 which were aimed at the basic competence (KD) of the high school syllabus.

Ismet Basuki and Haryanto revealed that assessment was the process of gathering information that was used to make decisions related to the education policy, the quality of education programs, the quality of the curriculum, the quality of teaching, or the extent of knowledge that a student had already obtained about the previously taught teaching materials [13]. This assessment was intended to determine the direction or action that must be taken after gathering enough information from students through a mechanism that could bring up the assessment. Unfortunately, the opinion of Ismet Basuki and Haryanto did not explain in detail what mechanisms were used.

Mansyur and Suratno revealed that the assessment emphasized the efforts made by the teacher and students to obtain information related to the learning that they did [14]. This information could be used as feedback for them to

make changes in teaching and learning activities that were better than before. Teachers and students in this context had balanced responsibilities in the information gathering process. Therefore, both, teacher and students should establish a harmonious partnership, so that the efforts carried out by them would provide information which was accurate, balanced and in accordance with the real conditions of both parties.

Furthermore, Mansyur & Suratno's opinion explained about the involvement between the one who gave values and the one who was being valued to make the assessment flow could be done well. Based on the two assessment opinions that had been described, it could be concluded that as a conscious effort of collecting data from the process, all aspects were related to the world of education in general in order to achieve the objectives of the assessment. In a small section (special) assessment was the process of collecting data that provided information from the students' learning process. it would be followed up according to the expected objective of the previous assessment. When it was associated with the assessment instrument in this study, the conscious effort in collecting data was identified in the process of learning trajectory learning that led to higher order thinking skills.

B. Learning Trajectory and Learning Implementation Plans (RPP)

The use of trajectory learning or hypothetical learning trajectory when first introduced by Simon in 1995 was used in mathematics learning, he argued that trajectory hypothetical learning has the following components: 1) learning objectives that had a number of goals to be achieved in learning; 2) a series of tasks that were used as materials to achieve these goals; 3) the hypothesis of achieving students' learning and thinking based on the previous process. Simon described learning trajectory as having a strong bond with hypothetical learning trajectory as an ingredient that had been tested in learning and actual learning trajectory as a part obtained after the trial phase [15].

Like Simon's, learning trajectory according to Chuang Yih Chen was manifested by the components of learning goals, learning activity and hypothetical learning process. Chuang Yih Chen developed the trajectory learning conception with the three trajectories by expressing the learning objectives and naming the learning activities which used the typical use of tasks for students to achieve goals and finally setting hypotheses of the learning process achievements [15]. Clement and Samara revealed that learning trajectories had three parts, namely goals, a development process that helped students to achieve goals, and a set of activities that had been arranged, or tasks that corresponded to each level of development that helped to develop the achievable highest level of thinking [16].

In the learning trajectory section of the three opinions above Simon, Chuang Yih Chen and Clement & Sarama theoretically stated that the research and development of this assessment instrument were parts that must be described fully with higher order thinking skills (HOTS) expressed by Anderson & Krathwohl as a place of application. In this case, the media was the Learning Implementation Plan (RPP). Theoretically and explicatively, the use of (RPP) was the starting point in the learning process, the teacher in such a way designed the learning process to accomplish the competency targets to be achieved. Assessment instruments were part of the design of the learning implementation plan (RPP), so before entering into the realm of assessment and creating the instrument, the design of the learning implementation plan (RPP) was a substantial and rational thing to study in the research and the development of the learning trajectory based of the higher order thinking skills assessment instruments. Part of the output assessment with written tests certainly did not represent fully at a strategic point to pursue KD fulfillment demands. At certain point, written tests may be used to measure ability. Although, in fact, by looking at current situation, we tend to find a danger of different personal abilities in students. Some of them were not smart, some of them were moderate, and the others were smart. Even in written tests, these personalities were classified into those who were able to write ideas down, some were slack, and others were mediocre. But on the other hand, we could find someone who was able to express verbally but quite the opposite when it came to write. There was also a person who was able to write well but was mediocre or even slack in delivery. In learning trajectory, the emphasis on the process of learning activities was carried out step by step. The stages of the process were certainly through the level of cognitive thinking that lead to the goal of steady thinking (high level).

C. Measurement, HOTS Assessment Instrument, and History Learning Quality

HOTS's assessment was an assessment based on high-level thinking taken from Bloom's taxonomy. The level of thinking starts from C4 (analysis), C5 (evaluation) and C6 (creating). It was based on the basic competencies of the material which was being taught and had a peculiarity in its measurement plus learning needed in the 21st century. Furthermore, it was also based on the development of higher-order thinking skills such as critical thinking, problem solving, communication skills, ICT (mastery of technology use), information literacy (knowledgeable) and media literacy (proficient in media use). The steps that could be taken to map the measurements were by analyzing the basic competencies (KD) of the material syllabus (especially high school) to inventory HOTS contained in it, developing the guideline of HOTS questions, sorting the HOTS questions into multiple-choice or essay, creating a scoring guide from HOTS questions that had been made and the last was an analysis unit both qualitatively and quantitatively.

In meeting the demands of basic competencies (KD) learning that lead to higher order thinking skills in the context of Anderson and Kratwohl, it certainly had its own problems in assessing the level of thinking that wanted to be achieved. The development of the instrument of higher order thinking skills assessment which was going to be used would help to map the position and limit of students' level of thinking achievement. In addition, the learning trajectory emphasized on the process of learning activities was of course, being carried out step by step. The stages of the process were certainly had gone through the level of cognitive thinking that lead to the goal of thinking (higher order thinking skills). For this learning trajectory-based

higher order thinking skills (HOTS) assessment instruments were based on learning implementation plans (RPP) that accommodated the basic competencies (KD and higher order thinking skills were based on 21st century learning needs.

After all these things had been administered, the improvement of the quality of learning history through learning trajectory-based HOTS assessment instruments was attainable. Based on Aman's opinion the quality of learning was a measurement that showed how high the quality of interaction between the teacher and students that occurred in the place of learning (classroom) to achieve learning goals or certain competencies. These interactions involved teachers and students who were carried out in certain environments with the support of certain facilities and infrastructure. Thus, the success of the learning process or the quality of learning would be depended and be influenced by: teachers, students, learning facilities, classroom environment, and classroom climate. Aman also formulated five learning quality indicators from ten indicators. It was the reduction indicators of Morrison, Mokashi & Cotter which included: 1) Rich and stimulating physical environment; 2) Classroom climate (conducive to learning); 3) Clear and high expectation for all students; 4) Coherent, focused instruction; 5) Thoughtful discourse; 6) Authentic learning; 7) Regular diagnostic assessment for learning; 8) Reading and writing as essential activities; 9) Mathematical reasoning; 10) Effective use of technology. The five quality indicators of history learning that were considered to have an enough influential portion on the quality of learning were the teacher performance in teaching and learning activities in the classroom, the media of learning history, the culture or class climate, the students' attitudes towards history lessons, and the student learning motivation [17]. The discourse of improving the quality of history learning through HOTS-based learning trajectory instruments was no longer just a discourse, but it must be done immediately through a measurable, substantive and comprehensive of actions and research. Reflecting on the five indicators of the quality of history learning above, the assessment instrument was a lighter to enhance the quality of history learning.

V. CONCLUSION

HOTS assessment instrument based on learning trajectory is a form of compromise between the three stages of learning in learning trajectories namely goals; the development processes that help students achieve goals; and the set of activities that have been arranged or tasks that correspond to each level of development or helping to develop the achievable of highest level of thinking (C4, C5 , C6). The three stages are included in the learning implementation plan (RPP). Furthermore, the planning also includes measurement through tests to calculate the ability of students to be assessed. This research's topic; "HOTS-based learning trajectory assessment instrument"; is still a discourse and the discussion flow are still general, since it discuses only the history learning at senior high school (SMA), therefore there is still an opportunity for the next researcher to conduct research per material containing basic competencies (KD) in the syllabus of senior high school (SMA). Moreover, this research can be utilized as a way for the next researcher to develop HOTS based

learning trajectory assessment instrument. Especially when it is viewed from the aspect of state of art and novelty of the research theme. This learning trajectory-based HOTS assessment instrument which is certainly very worth writing.

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