



Identifying Higher-Order Thinking Skills on Lesson Plan: How Do Teachers Construct the Lesson Plan?

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Abstract: In line with 21st-Century learning, the 2013 Curriculum highlights the development of critical thinking, problem analysis, problem-solving, decision making, and creating something new. Professional teachers need to facilitate students in developing these abilities. This research describes how the teachers plan the higher-order thinking skills (HOTS). This research is qualitative research with a descriptive design. The respondents were four teachers with 0-40 years of teaching experience. The data were collected qualitatively through documentation and interviews. The results showed that HOTS were not clearly expressed in the teacher's lesson plans at teaching experience levels of 0 to 10 years and 10 years to 20 years. Teachers with 20 to 30 years of teaching experience and 30 to 40 years of experience have expressed HOTS explicitly and completely in all parts of the lesson plan. Teachers have an important role in facilitating higher-order thinking skills that can be seen through the lesson plans. The lesson plan must describe the development of higher-order thinking skills holistically. Teachers need to review each lesson plan to be coherent in every part and relevant to 21st-century learning.

INTRODUCTION

The 21st-century is shaped by technological advances, rapid social change, global competition, and high-level knowledge (Darling-Hammond, L., Bransford, 2007). Individuals must face increasingly complex tasks in their professional life by selecting and applying relevant knowledge in practice (van Laar et al., 2017), and developing skills, such as problem-solving and creative thinking (Osman et al., 2010). These changes also affect education.

Education is currently directed at acquiring higher-order thinking skills (HOTS) to keep up with the times, both in the world of education and in social life.

Higher-order thinking is a broad way of finding new challenges (Heong et al., 2011). Higher-order thinking requires a person to apply newly acquired knowledge or information and manipulate it to reach possible solutions to problems in new situations. The 21st-century demands qualified human resources who can compete globally. Therefore, individuals must have higher-order thinking skills. Higher-order thinking skills in learning activities are thinking skills at the upper end of Bloom's cognitive taxonomy (Brookhart, 2010). Also, 21st-century life demands critical thinking and problem-solving, creative and innovative skills, communication

skills, and collaboration skills (Astuti et al., 2019). The purpose of teaching in analyzing, evaluating, or creating can complement students' abilities (Collins, 2014). The thinking skills train students to apply the knowledge and skills developed during learning into new contexts. The new context can be interpreted as a condition that students have not thought of before. However, it does not mean that it must be something universally new. Students who have higher-order thinking skills can connect their learning with other elements outside of it. The role of learning is to teach students to associate them.

The competencies needed in the 21st-century are also described by The Assessment and Teaching of 21st-Century Skills Project (ATC21S, 2010). The competencies are (1) way of thinking, consisting of creativity and innovation, critical thinking, problem-solving, and making decisions; (2) ways of working, consisting of communication and collaboration; (3) working tools, consisting of information and ICT literacy; (4) relating to life in the world, including life and career skills (adapting to change, managing goals and time, being an independent learner, managing activities/projects, working effectively in teams, being flexible, and guiding and leading others), personal responsibility, and social responsibility. Higher-order thinking skills are included in 21st-century skills. Some research has focused on how thinking skills are integrated with learning (Yost et al., 2000), how to evaluate thinking skills (Silva, 2009), and the use of information and communication technology (Kivunja, 2015).

The thinking skills are closely related to the development of science and technology. A teacher who is at the forefront of shaping the students' character and skills must have the skills to manage the learning process that can train 21st-century skills to the students (Bernie

Trilling, 2012; Conley, 2007; Drew, 2012). The learning process by teachers, starting from the design stage to evaluation, must train 21st-century skills to students because the 21st-century skills are important to be mastered by students. Some findings show that the learning processes are mainly focused on achieving the knowledge aspect. Many students do not understand the nature of 21st-century skills (Siswanto, 2020).

21st-century skills need to be presented in the learning process by teachers. Teachers can provide a constructive learning environment to facilitate 21st-century skills (Anagün, 2018). To present the skills, teachers must have good pedagogical competencies, starting from designing learning activities, carrying out learning activities, to evaluating learning activities. The pedagogical competencies have many dimensions in institutions, one of which is the development of individual educators' careers (Merkt, 2017). The initial stage of developing pedagogical competence is indicated by the lesson plans designed by the teacher. The lesson plan is one of the key learning factors in improving the learning process (Jamali Nasari & Heidari, 2014). Lesson plans can be quite effective for students in obtaining learning outcomes (Ceylan & Ozdilek, 2015). Therefore, the process of learning higher-order thinking skills must be reflected in the lesson plan. Analysis of learning tools can provide researchers with information about larger teaching units than one-day observation, thus providing a complete view of teacher practice for researchers (Jacobs et al., 2008). Research conducted by Gülten (2013) shows that teachers face problems in formulating goals and selecting appropriate activities for certain stages. Therefore, it is necessary to see the suitability of lesson plans that teach higher-order thinking skills. The study aims to describe how teachers plan higher-order thinking skills.

THEORETICAL SUPPORT

Twenty-first-century learning must develop students' skills to orient themselves in the twenty-first-century world. An effective learning environment in the 21st-century activates all students' skills (Istance & Dumont, 2010). These skills are not only memorization and repetition. The positive aspects of the 21st-century learning environment are related to student satisfaction and student-teacher relationships linked to technology (Lemley et al., 2014). It is increasingly recognized internationally that developing higher-order thinking skills requires an appropriate learning environment. Thus, the one-way teaching model is not very effective for the twenty-first century (Luna Scott, 2015).

Higher-order thinking skills (HOTs) contain the last three aspects of Bloom's taxonomy, namely analyzing, evaluating, and creating (Moore & Stanley, 2010). Students who have higher-order thinking skills can study well, improve their abilities, and reduce their weaknesses (Heong et al., 2011). Higher-order thinking skills are believed to prepare students to face the challenges of academic life and working life in the future (Pogrow, 2005).

Higher-order thinking skills are believed to prepare students to face the challenges of academic life and working life in the future. Ichsan (2019) developed an innovative environment-based learning model. This learning model can be applied to science and the environment. Reviewing reading activities is also an effort made by Yoke et al. (2015) to improve students' higher-order thinking skills. Students are assigned to read articles from newspapers related to crime, then analyze, synthesize, and evaluate the texts. They were then asked to comment critically in 150 words. Before the assignment, a class group discussion was held where they were placed in different groups and allowed to debate the topic. Students were encouraged to voice their

views and use prior knowledge of the subject matter as input. In Malaysia, other research was conducted by Ghasempour et al. (2012) on higher-order thinking skills through mathematical problem-posing tasks. Some of these efforts can improve higher-order thinking skills.

Teachers have an important role in leading students to master certain competencies through learning. Teachers need to create quality learning (Kim et al., 2021). Teachers must have the skills to use various appropriate and relevant approaches, strategies, methods, techniques, and learning models. The skills demonstrate the performance of the teacher's task by providing learning experiences that encourage students to continue learning and assist students in finding and analyzing the information needed to make good decisions. Therefore, teachers are expected to apply innovative learning models (Suharto et al., 2020).

Teachers need to prepare a set of written steps in teaching higher-order thinking skills in the classroom (a lesson plan). Brown (2001) describes that the lesson plan is a series of activities in a curriculum that will be evaluated and prepared for the next lesson. Teachers should plan their learning to guide them in learning so that students can give positive responses according to the plans that have been made (Harmer, 2007).

Although there is no standard format in the lesson plan, several elements must be included. These components include general objectives, specific objectives, activities, media, and assessments (Brown, 2001). In designing lessons that facilitate higher-order thinking skills (HOTs), teachers must pay attention to the main components in the lesson plan implementation. In this research, the general objective is to equip students with higher-order thinking skills. Researchers link some of these components to their suitability in achieving general goals.

METHOD

This research is qualitative research within the descriptive study framework. This research examines how a teacher fits his professional competence in facilitating students' higher-order thinking skills based on a descriptive qualitative approach.

Table 1. Respondent Criteria Based on the Teaching Experience

Respondents	Length of Teaching (years)
Respondent 1	0 < p < 10
Respondent 2	10 p < 20
Respondent 3	20 p < 30
Respondent 4	30 p < 40

Respondents in this research were junior high school teachers from various subjects. The teachers' professional competence criteria are seen from the length of teaching experience and ownership of educator certificates. The teachers selected as samples have different lengths of teaching experience and ownership of educator certificates. The career cycle based on teaching experience is seen from a range of 4 to 10

years (Eros, 2011). In this research, the researchers distinguished teaching experiences in 10 years.

Each teacher provided a lesson plan where the researchers then analyzed the contents to facilitate students' higher-order thinking skills. There were four analyzed lesson plans constructed by the teachers with the following criteria: 1) Code R1 was a teacher with two years of teaching experience and did not yet have an educator certificate, 2) Code R2 was a teacher with 15 years of teaching experience and possessed an educator certificate, 3) Code R3 was a teacher with 22 years of experience and possessed an educator certificate, and 4) Code R4 was a teacher with 32 years of teaching experience and possessed an educator certificate.

To determine whether the respondents' lesson plans already contained higher-order thinking skills indicators, the researchers analyzed the objectives, activities, and learning media. The assessment indicators were adapted from Kartika et al., 2019.

Table 2. HOTS Assessment Indicators in the Lesson Plan

Observed Aspects	Rating Indicators
Learning Objectives	Clear indicators and learning objectives
	Using HOTS operational verbs that can be measured
	Exploring students' prior knowledge
Learning Activities	Suitability with learning objectives
	Containing effective and meaningful questioning activities using open-ended questions
	Connecting material with relevant and contextual new knowledge
Instructional Media	Using learning models that can activate student activities
	Relevant with the learning objectives
	Using effective and efficient media
	Motivating student activities

RESULT AND DISCUSSION

Data analysis was performed on four teachers with different teaching experiences constructed on the lesson plan. The analysis was carried out by looking at the achievement of each

indicator in each aspect so that all indicators are reflected in every aspect observed. The analysis results on learning objectives, learning activities, and learning media are shown in Table 3.

Table 3. The Results of the Analysis

Observed Aspects	R1	R2	R3	R4
Learning objectives	Inappropriate	Appropriate	Appropriate	Appropriate
Learning Activities	Inappropriate	Inappropriate	Appropriate	Appropriate
Instructional Media	Inappropriate	Inappropriate	Appropriate	Appropriate

Learning Objectives

R1 prepared a lesson plan according to the online learning context. The stated objectives were the same as the formulation of indicators in learning. If analyzed in meaning, the sentence structure in the proposed objectives had several objectives that showed higher-order thinking skills. Students were invited to determine in detail the part of the subject being studied (the formulation of objectives in Figure 1). These abilities were classified in Bloom's C5 taxonomic ability, namely evaluating. However, the language structure did not state the objectives clearly because the verbs used were not operational. The verb used was "to determine."

1. *Determine detailed and explicit information in the text.*
2. *Determine the implied meaning in the text.*
3. *Determine the characteristics of descriptive text in terms of content and communication objectives.*
4. *Determine the characteristics of the descriptive text from the linguistic aspect.*
5. *Determine the type and pattern of description text development.*

Figure 1. Subject R1's Learning Objectives Formulation in the Lesson Plan

R2 set up clear and measurable learning objectives. The analysis of the operational verbs indicated some higher-order thinking skills. Students were invited to project the application of a working principle into the application of daily life. This ability is included in higher-order thinking skills. R3 constructed learning objectives in great

detail. The components of audience, behavior, condition and degree have been described clearly. Also, the goals of student character development were linked. R3 described the purpose of C4's higher-order thinking ability, namely "analyzing." The learning objectives compiled by R3 are shown in Figure 2.

After carrying out activities through the Problem-Based Learning model and Discovery Learning, students can explain concepts, influencing factors, benefits, and barriers to international trade; analyze the efforts that can be made to overcome the negative impacts of international trade; analyze the influence (positive and negative) of international trade on the life of the State; discover the benefits students feel from international trade; presenting the results of international trade analysis; display an attitude of hard work, responsibility, care, and courtesy, as well as gratitude.

Figure 2. Subject R3's Learning Objectives Formulation in the Lesson Plan

R4 constructed the learning objectives, ranging from low-level to higher-order thinking skills at the analysis level. Students were invited to find a solution to a problem raised by the teacher. The operational verb used by R4 had been explicitly measured. The indicators provided include low-level thinking indicators, which then lead students to achieve higher-order thinking indicators.

Learning Activities

HOTs' learning skills are characterized by 1) analysis, evaluation, and creation, 2) logical reasoning, 3)

consideration and critical thinking, and 4) problem solving and creative thinking. The skills can be seen in the learning activities design (Nofrion & Wijayanto, 2018). R1 described learning activities that follow learning objectives. In this activity, there are no activities that support higher-order thinking skills. Students read the material and then listen to the material on the PowerPoint provided by the teacher.

The learning activities designed by R2 in the lesson plan did not show any facilitation of higher-order thinking skills. The activities only request students to read the material followed by discussion. Interviews were conducted to further confirm the activities. R2 claims that students are directed with lighter questions in the discussion process that invite them to think at higher levels. Further investigation of what kind of questions are given to students shows that the questions do not direct students to higher-order thinking. The questions do not direct students to reason, analyze, or solve problems. The learning activities designed by R2 were not relevant to the learning objectives.

R3 described that the learning activities contained 21st-century skills. The activities arranged were divided into critical activities, communication and collaboration, and creative activities. The activities designed by R3 covered activities that facilitate the acquisition of related skills. Critical activities invited students to think critically according to the problems in the reading passage. Students were invited to critically relate the impact of a social problem into their lives by applying a problem-based learning model. In this case, the teacher must understand the interrelationship of aspects in the problem-based learning model and higher-order thinking skills. The teacher's challenge is not understanding the problem-based learning model and higher-order thinking skills (Retnawati, 2016). Communication and

collaboration activities were reflected in group activities. However, the creative activities described were still inappropriate. Students were not taught to creatively find solutions to problems. They only reviewed what they learned. Higher-order thinking skills can be developed through questioning activities. Curtis (2017) stated that questioning is an important component of the teaching and learning process embedded in quality instruction and strategic thinking.

R4 planned to learn activities based on HOTS by providing factual questions to hypothetical questions. Learning with factual questions means that low-level thinking skills are developed. Higher-order thinking skills can be trained preceded by lower-order thinking skills. Therefore, HOTS can be developed from factual to hypothetical questions (Hendriawan & Usmaedi, 2019).

Instructional Media

The media used by R1 and R2 were student books equipped with power points made by the teachers. Research by (Arifah, 2020) shows that the proportion of HOTS questions in textbooks should be around 50%. However, there has been no study related to student activities in textbooks. Based on the indicators, teachers who only use textbooks are not included in media that facilitate HOTS. One learning media that helps students in higher-order thinking is the Borland Delphi application, where students solve HOTS-oriented evaluation questions (Siregar et al., 2020). Another example is the STEM-based PhET media that integrates various study materials so that students can think at higher levels and link concepts (Yusuf & Widyaningsih, 2019).

R3 and R4 utilized interactive media, including textbooks, interactive videos, PowerPoint files equipped with internet access, and a map of a problem case (map of the distribution of diseases). The media used by respondents facilitate

higher-order thinking skills. The results align with Chasanah et al. (2019) that interactive learning media can improve higher-order thinking skills.

CONCLUSION

Based on the findings and discussion, the researchers conclude several points related to the objectives, learning activities, and learning media from the lesson plans constructed by four teachers based on their level of teaching experience. The analysis showed that several sections could be categorized as Higher-order Thinking Skills (HOTs), but not all teachers based their lesson plan on the explicit criteria. HOTs were not clearly expressed in the lesson plans by a teacher with teaching experience of 0 to 10 years and 10 years to 20 years. Teachers with 20 to 30 years of teaching experience and 30 to 40 years of experience expressed HOTs explicitly and completely in all parts of the lesson plans. The weakness in this research is that there was no grouping of respondents based on subjects. Further research can be conducted on a more representative sample and teaching experiences.

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