

# The Development of Higher Order Thinking Skills Assessment Instrument for Online Learning Civic Education

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## ABSTRACT

This research purposed to conduce the Higher Order Thinking Skills test instrument. The instrument was displayed into a valid and reliable questionnaire to obtain information from XI grade student's HOTS on Civics Education subject. The research was settled at Universitas Bung Hatta Padang. It was adapted from the Plomp model. There are three phases that are preliminary research, prototyping phase, and assessment phase. The results of preliminary research need analysis and context analysis, literature review and conceptual framework development. Prototyping stage produces a prototype consist of literacy and a micro-cycle research by conducting formative evaluations to improve interventions. The last phase is the Assessment phase. At this stage, a (semi) summative assessment is carried out to conclude whether the solution or intervention meets the predetermined specifications. The research resulted in a recommendation that after improving the intervention, the HOTS assessment instrument developed in the Civic Education subject was sufficiently capable of measuring students' Higher Order Thinking Skills.

**Keywords:** Higher Order Thinking Skills, Preliminary Research, Online Learning.

## 1. INTRODUCTION

The effects of the Covid-19 pandemic have hastened the educational system disruption. It is characterized by a fundamental shift in instructional process. If learning was formerly done in a traditional manner, including face-to-face interaction, all aspects of education are now forced to organize online learning through digital technology. Furthermore, the biggest problems in the learning process during the Covid-19 pandemic are issues about learning loss or not acquiring long-term learning abilities. In the civic educational context, for example, it is alleged that there has been an emergency learning achievement, covering knowledge competency and the potential for learning loss, civic disposition competence due to the difficulty of cultivating good characters in distance learning, and the difficulties in practicing through democracy laboratory.

The rapidly evolving 21st century requires people to master a wide range of abilities such as being able to think critically and solve problems, communicate, collaborate, as well as creative and innovative thinking [1], [2], [3]. It encourages various disciplines in order to role actively to develop such skills. The 4.0 revolution era is said to be the era of technology disruption due to automation and connectivity from a particular field that will make the movement between the industrial world

and job competition becomes non-linear. Humans will live in global uncertainty. Therefore, people must have the ability to predict rapid future change.

The challenge in education system is the needs to prepare students with relevant competencies in life and work in the digital world. Council of the European Union 2018 recommends future competencies that need to be considered in the world of education, namely Literacy, Multilingual competence: Mathematical competence, Competence in science, Digital competences, Personal, social and learning to learn competences, Citizenship competence, Cultural awareness and expression competences, Entrepreneurship. Citizenship competence, is: an ability to act as a citizen who is responsible and fully participate in social and state life, based on knowledge about social, economics, law, political concept and structure, and continual global growth, [4]. In Indonesia, citizenship competence acquired from civic subjects which is studied in all education level. Students in civic subjects must be prepare with higher order thinking skills.

## 2. THEORETICAL REVIEW

S Nowadays, Indonesia is in digital industrialized era where industrial activity integrated through wireless

and big data technology that used massively. There are many human needs that have been supported by internet and digital world. E-education, e-government, cloud collaborative, marketplace, and smart city are all the face of the world, rapidly changing and challenging, also threatening [5], [6], [7]. The report from McKinsey [8] about Indonesia's work life showed that there are more new jobs available in 2030 than jobs lost caused by automation. There are 27-46 million of new jobs and 10 million of them are kind of jobs that never existed before. Skills in technology, social, emotional, and higher order thinking such as creativity and problem solving is an ability that must-have in this era of automation. Opportunity and threats also need to be handled properly in the world of education [8].

Schools are required to prepare students to face the complex challenges of the 21<sup>st</sup> century. Learning in school only equip students with knowledge and simple thinking, whereas, nowadays it should also prepare students to be able to develop essential skills needed. The 2013 curriculum mandates civil subjects shall be instill character in students by developing four base competencies, that are spiritual, social, knowledge and skill competencies. Indonesia's civil subjects means to build wise and cultured citizen philosophically [9]. Successful civic education will determine the character of law-obedient citizen (right and obligation balanced) as the shaper and developer of nationality values and morals in preparing multicultural mentality [9][10]. Civic curriculum should develop dynamically and the learning material must be built from four pillars of nationality namely *Pancasila*, *UUD 1945*, *NKRI*, and *Bhinneka Tunggal Ika*. Those four pillars are combined to reach those four base competencie.

The implementation of civic education in schools have been facilitated with the availability of learning resources such as teachers and students' books that are developed from scientific approach. The problem originated from the obsolescence of existing information, the teachers that tend to use conventional learning models, and their limited ability in developing assessment instrument that based on higher order thinking skills. The skill is the fundamental to prepare real-life rapid changes. To address this issue, teachers must keep up the contextual information regarding current citizenship problems, advanced science and technology, including the assessment instruments based on higher order thinking skills [11].

HOTS learning and assessment essentially is a meaningful learning and assessment ways that is not just memorizing the materials because this learning and assessment enable students to: 1) **apply and transfer** the knowledge and skills they already have into new contexts or in more complex ways; 2) **thinking critically**, judge wisely or make reasonable criticism; 3) **identify and solve** problems in their lives [11]. This learning and assessment skills also have

various techniques and instruments that give chances to students to develop critical, creative thinking, and solving abilities which can improve and intensify the thinking skills.

It can be concluded that effective learning carries such characteristics: successfully escort students to achieve instruction objectives, give interesting learning experience, involve students actively in learning, have facilities that help to sustain the teaching and learning process, and well-organized learning. According to Slayin [12][13][14], there are four indicators of effective learning, namely: the quality of teaching, the level of teaching, the incentives, and adequate time. These all requires professional teachers. Effective learning can be achieved if assisted by teacher competences. The proper competencies of the teacher outcomes in high quality of learning, thus improves the quality of education. In fact, it is also supported by appropriate curriculum.

Currently, the government made a policy about revitalized learning system which focused towards three new literacies, namely digital, technological, and human literacies [15]. The latter aims for improving communication skills and science mastery [15]. In order to optimize critical thinker, independent, and productive students, teachers must develop HOTS learning. Preceding studies prove that HOTS students are more open toward differences and diversities, are not easily influenced without having rational reasons, have independent thinking and action, can distinguish important things and priorities so that they can produce real and useful work. Higher order thinking skills are needed to improve the quality of human life

### 3. METHOD

This type of research is research and development. The preliminary research was conducted at SMA Negeri 4 Padang on the second term in the school year of 2020-2021. The total population is 659 which consists of the X and XI grade students. The research instrument is a questionnaire given to all students through google forms, with response rate of 548 respondents (83,15%). The data was analyzed using descriptive statistical analysis. Research and development model used is the Plomp model [16]. Plomp divided the research stage into three phases, which are preliminary, prototyping, and assessment phase. This model is a learning design model based on an effective and efficient system approach and interactive process. The result of each phase is the initial product for the next phase. The following is the overview of research procedure:

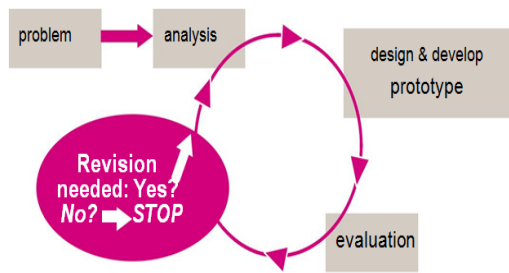


Figure 1. Research Procedure

Preliminary phase: in this stage, researcher do the requirement and contextual analysis, literature review, theoretical or conceptual structure development for research. Prototyping phase: in this stage, researcher make a prototype, continual planning which consist of literacies, each are a cycle of micro-research with formative evaluation as a research activity that aims to fix interventions. Assessment phase: this last stage is an assessment, semi-summative evaluation to conclude whether the solution or intervention fulfill the prior specification. This phase results recommendation to fix the intervention.

The following is the table of research activity phases:

Table 1. Preliminary Phase

Research Activity	Research Focus	Instrument
Material analysis, adequacy, methods and techniques relevance	Data about Basic competencies indicators and primary subject, material sufficiency level for HOTS	Checklist
Concept analysis	Essential concepts	Supporting theory
Student characteristic analysis	Student characteristics Suitable assessment instrument	Questionnaire
Learning equipment analysis	Which attribute will be highlighted in the TS assessment	Checklist

#### 4. RESULTS AND DISCUSSION

A development of assessment instrument must meet the requirement of substances, constructions, and language utilizations. A substance, in this case, is representing the assessed competence, whilst a construction is fulfilling the technical requirement that

according to the instrument application forms. All must be described with decent, correct and communicative language utilization that appropriate for students [12]. The essence of higher order thinking skills assessment is a meaningful learning that enable students to: 1) transfer, apply the skills and knowledges into new context or in more complex ways; 2) think critically, judge wisely or create reasonable criticism; 3) identify and solve problems in real life.

Thinking is a mental activity that happened when someone is going through a condition and needs to solve a problem. The most known classification from educational field is Bloom’s taxonomy which is revised and published by Lorin Anderson and David Krathwol in 2001. This classification formulated six level of thinking process, such as remembering, understanding, applying, analyzing, evaluating, and creating. The following is the result of the preliminary research. The data gathered using questionnaire in SMA Negeri 4 Padang from 548 respondent. The preliminary research is done to see how the students’ perception toward online learning in civic subjects.

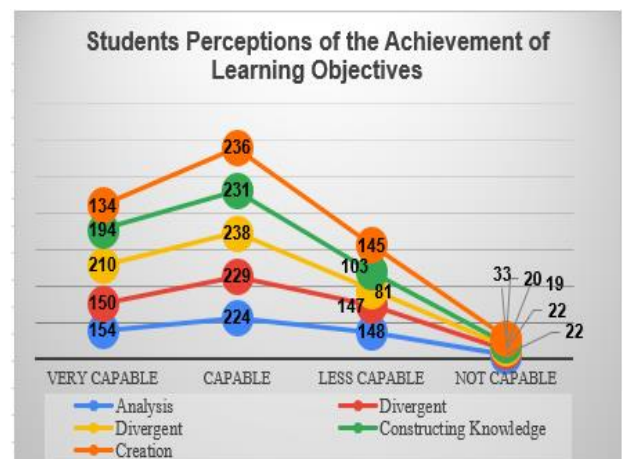


Figure 2. Students’ Perceptions of the Accomplishment of Civic Subjects

Figure 1 shows that 72.99% of the students presume that the online learning of civic subjects can improve analyzing skills, divergent thinking, the ability to improve morals, construct new knowledge and create new work steps in quick thinking. The following figure 2 describes how students’ opinion about teacher ability in using learning models.

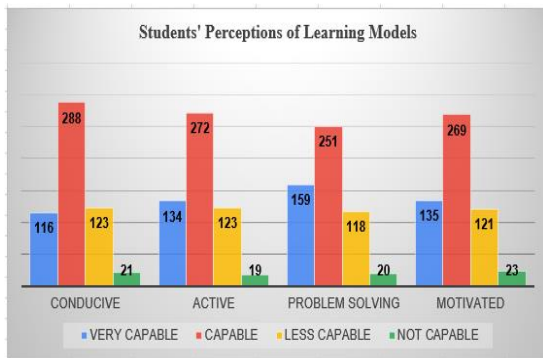


Figure 3. Students' Perception on Teacher Ability in Using Learning Models.

Figure 2 explains that students have good perception on teachers' ability in using learning model. There are 74.08% of student said that teachers are able to choose which model is suitable for learning. It is proved by a conducive learning atmosphere and the ability to make student active in online learning. Furthermore, students also think that teachers are able to choose suitable learning models that can improve critical, innovative thinking, and problem solving, enough to motivate students to achieve the learning objectives.

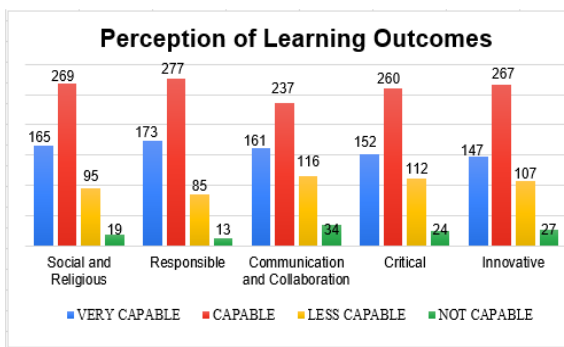


Figure 4. Students' Perception of Learning Outcome

Following figure 3 displays how students' perceptions to learning Outcomes. There are five questions asked in the questionnaire, namely social and religious morals, hardworking skills and responsibility, the ability to communicate and collaborate, critical thinking and problem-solving skills, and being creative and innovative. Preliminary research results prove that online citizenship education can improve higher-order thinking skills. For that need to be developed HOTS-based assessment, which can be used online.

Susan Brookhart categorized three uppermost cognitive processes in Bloom taxonomy, which are analyzing, evaluating, and creating as the higher order thinking skills.

Table 2. Third Level HOTS Keywords

Third Level	Keyword
Creating	Create their own idea Keywords: construction, design, creating, developing, writing, formulating
Evaluating	Make their own decision Keywords: evaluating, measuring, contravene, determine, choosing, supporting
Analyzing	Specify aspect and element Keywords: comparing, checking, criticize, examine

HOTS cognitive level involves creative, critical, analytical thinking process, evaluating and creating [14]. The 23<sup>rd</sup> Permendikbud in 2016 about assessment standard explained that teachers' instrument in assessing can be in the form of test, observation, and others according to competencies characteristic and students' growth level. As can be seen from educational dimension, HOTS questions type measures meta-cognitive dimensions [17][18]. Grouped HOTS dimension into three thinking skill dimensions [13] such as follows:

1. HOTS as a knowledge, that is the ability to think and enquire about facts by applying Bloom taxonomy in ability, application, analyzing, synthesist, and evaluation level.
2. HOTS as an ability to think critically, that is observing and explaining, comparing and conducting, founding complexities, exploring views, reasoning, asking, and searching.
3. HOTS as a solving problem, that is identifying issues, identify irrelevant things, explaining strategic evaluations, making model problems, identify obstacles or additional information to fix the issues, and data-based reasoning.

To make HOTS questions, teacher must determine which behavior that is going to be measured. Then, compose the material that is being expected to be the basic gusion (stimulus) to a specific context accordingly into expected behavior. The following displays steps of creating HOTS questions [13].

1. Analyzing which basic competencies that can be made into HOTS questions. Firstly, teachers choose which basic competencies can be made into HOTS questions. Therefore, teachers must be able to analyze the basic competencies independently.
2. Setting the questions grid. HOTS questions grid aims so that the teachers able to create HOTS questions. Generally, the grid is needed to guide teacher in choosing which basic competencies that can be made into HOTS questions, selecting base material that suitable for the inspected basic competencies,

formulating question indicators, determine cognitive level and decide the form and number of questions.

3. Deciding an intriguing and contextual stimulus. The stimulus that is going to be used should be interesting, able to encourage students to read stimulus. An enthralling stimulus usually a new stimulus that have not been read by the students yet. Whereas, a contextual stimulus should be based on real life situation.
4. Writing questions corresponding with questions grid. The questions are written according into HOTS questions rules. The rules are different than general rules of writing questions. The difference lies in material aspects, whereas the construction aspects and the languages are more similar.
5. Making the guide of assessment or answer keys. Each HOTS questions that have been written should be completed with assessment guide or answer keys. The guide is made in the form of essays, whilst the answer key in the form of multiple choice, complex multiple choice, and short answers.

Example of HOTS Questions, Consider the following case. With a shaking voice, the affected residents of the Mandalika circuit construction: "I lost the land where I was born", Kompas.com 15/04/ 2021, 07:16 WIB.

Based on this case, in your opinion what efforts can the government make to continue to protect citizens' rights The problem above includes level 3 (reasoning) which measures problem solving ability, with the following stages of thinking:

1. Identify who and why the eviction occurred
2. Understand the concept of human rights and citizens' rights
3. Evaluating government policies in developing Mandalika tourism destinations
4. Predicting the impacts caused by the development of tourist destinations
5. Draw conclusions and propose ways/efforts to minimize the negative impact of development.

## 5. CONCLUSION

HOTS assessment cannot be separated from HOTS learning. The teacher's task is not only to conduct HOTS assessments, but also be able to carry out learning that can train students to have higher order thinking skills. A valid assessment instrument must meet the following criteria: Presenting a stimulus for students to think about, in the form of introductory texts, visuals, scenarios, discourses, or cases. Using new problems for students, not yet discussed in class, and not questions to remember. Distinguish between the difficulty level of the questions and the cognitive level (low-level thinking and high-level thinking).

HOTS in the context of assessment measures skills: 1) transferring one concept to another, 2) processing and integrating information, 3) looking for links from different kinds of information, 4) using information to solve problems (problem solving), and 5) critically examine ideas and information. Thus, the HOTS questions test the thinking skills of analyzing, evaluating, and creating.

In determining operational verbs (KKO) to formulate indicators when making HOTS questions is not always limited into KKO grouping only. In instance case, the verb 'determine' based on Bloom Taxonomy is grouped into C2 and C3. However, when composing HOTS question, it can be concluded into C5 (evaluate) if the question is aimed to decide a consideration that initialized by the thinking process and analyzed the information provided by the stimulus. After that, students should decide which decision is the most propitious. Furthermore, the verb 'determine' can even be grouped into C6 if the question entailed students to be able to develop new strategies when solving a problem. In conclusion, a group of operational verbs (KKO) is strongly altered by which thinking processes are required to a certain question.

Viewed from the knowledge dimension, generally HOTS questions measure the metacognitive dimension, not just measuring the factual, conceptual, or procedural dimensions. The metacognitive dimension describes the ability to connect several different concepts, interpret, solve problems (problem solving), choose problem solving strategies, find (discovery) new methods, argue (reasoning), and make the right decisions. The structure of HOTS questions usually used a stimulus. A stimulus is the basis for understanding information.

## AUTHORS' CONTRIBUTIONS

Pebriyenni: Topic and research frame construction, theory finding, paper writing and corresponding.

Muslim: collecting data.

Sumarni: Data analysis.

Azwar Ananda: publication finding

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