Geography Teachers’ Skills: Higher Order Thinking Skills (HOTS) Oriented Assessment Instrument

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HOTS or higher order thinking skills are divided into four groups, namely problem solving, decision making, critical thinking, and creative thinking (Nitko & Brookhart 2011). HOTS can also encourage students to think deeply about subject matter, and it is able to stimulate the development of higher order thinking skills in students (Barnett & Francis, 2012). The Program for International Student Assessment (PISA), released the results of the 2018 PISA survey, placing Indonesia in 74th place, aka sixth from the bottom. In the Science category, Indonesia scored 396, far below the OECD average score of 489. Meanwhile, in Mathematics, Indonesia is ranked 7th from the bottom with a score of 379 (OECD average score of 489). Meanwhile, the lowest score obtained by Indonesia was in the Reading category, which is 371 (OECD average score of 489).

Responding to the results of the 2018 PISA survey, the existence of teachers really needs to be considered for their competence in carrying out the learning and assessment process in class.

Regarding the ability studied in this study, it is the geography teachers’ ability in making HOTS-based assessment instruments. Given that in Indonesia more than a quarter of geography teachers outside Java are taught by teachers with non-geographic backgrounds, so that the skills and knowledge of geography taught are incorrect (Grabber, 2000). The ability of geography teachers related to the development of learning outcomes instruments should pay attention to the rules in the preparation of higher order thinking skills (HOTS) oriented items in the form of operational verbs used in constructing items based on cognitive levels. The operational verbs that are often used in the preparation of items according to Anderson & Krathwohl (2001) are described in Table 1 below.
The six cognitive levels that have been described above, form a theoretical basis that will be matched by the questions that have been made by geography teachers in recent years. The aims and objectives of this study were to identify and analyze the geography teacher’s ability to make LOTS, MOTS, and HOTS oriented questions. The questions that were analyzed were questions that had been made by the geography teacher and recorded in a research product that had been neatly arranged by the researcher in the four assessment books for grades X, XI, and XII. These four assessment books are the result of a documentary study conducted by researchers, regarding the existence of a documentary study that has been in the book, which is the researcher’s capital to determine and analyze the ability of the geography teacher of High Schools in Metro City, Lampung Province in the skill of making item questions.

Table 1. The dimension classification of thought processes based on Anderson & Krathwohl's taxonomy

<table>
<thead>
<tr>
<th>Level</th>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
</table>
| LOTS  | Know (C1) | - Recalling.  
- Verb: remember, register, repeat, mimic. |
| MOTS  | Understand (C2) | - Explain the idea/concept.  
- Verb: explain, classify, accept, report. |
|        | Apply (C3) | - Using information on a different domain.  
- Verb: use, demonstrate, illustrate, operate. |
|        | Evaluate (C5) | - Make up your own mind.  
- Verb: evaluate, judge, argue, decide, choose, support. |
|        | Create (C6) | - Create your own ideas.  
- Verb: construct, design, create, develop, write, formulate. |

Source: Anderson & Krathwohl (2001)
**Research sample**

This research is a population study, so no sampling was made. All populations are automatically sampled. According to Arikunto (2010), if someone is going to examine all the characteristics and elements in a research area, of course this type of research is included in population research. Moreover, there are several reasons for determining the population study, including the number of schools that are not too many, geographically all schools can be reached with easy accessibility, the MGMP Geography of Metro City highly welcomes this research. So, the population and sample in this study were all high school geography teachers in Metro City, in total of 30 geography teachers.

**Research site**

**Research analysis**

The analysis used to determine the ability of geography teachers in making questions in the past 3 years, while the percentage formula (Ali, 1984).

**Data collection technique**

The data collection techniques used were documentation study by collecting questions made by the teacher in the past 3 years, assessment instrument documents in the form of daily test questions, midterm assessments (PTS) and end of semester assessments (PAS). This collection technique aims to present the geography teacher’s ability to develop HOTS-oriented questions and make research products in the form of a question bank that are classified into three levels, namely low order thinking skills (LOTS) oriented question level, middle order thinking skills (MOTS) and higher order thinking skills (HOTS).

The questions that have been collected by the researcher are arranged neatly in the form of an assessment book for class X, XI, and XII as well as a bonus about geography. The four products of this research serve as the researcher’s capital in classifying the questions made by the geography teacher into three levels, namely LOTS, MOTS, and HOTS oriented questions.
### Result and Discussion

Regarding the research data that has been presented in Table 2 and Figure 3 (a, b, c, d, e), it can be interpreted that the geography teachers' ability to make questions is still dominated by MOTS-oriented with a total of 1976 items from 3710 items. Then, the percentage reaches 53.26%, and the dominance is also seen in the questions/items made by a geography teacher who is oriented to LOTS with a total of 1431 items from 3710 all items, and the percentage is 38.57%. Meanwhile, the teachers' ability to make HOTS-oriented questions was still trapped in a figure of less than 10%, namely only 8.167% with a total of 303 items out of the 3710 items analyzed. Regarding this, there are actually several factors that affect the ability of teachers. According to Uno (2011), teacher competence cannot stand alone, but it is affected by factors of educational background, and the experience and length of teaching.

#### Table 2: Item Level

<table>
<thead>
<tr>
<th>No</th>
<th>Class</th>
<th>The Item Level Cognitive</th>
<th>The Total of Items</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assessment Book for Grade X</td>
<td>LOTS oriented item</td>
<td>266</td>
<td>33.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOTS oriented item</td>
<td>461</td>
<td>57.625</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HOTS oriented item</td>
<td>73</td>
<td>9.125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>800</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Assessment Book for Grade XI</td>
<td>LOTS oriented item</td>
<td>195</td>
<td>24.375</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOTS oriented item</td>
<td>460</td>
<td>57.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HOTS oriented item</td>
<td>145</td>
<td>18.125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>800</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Assessment Book for Grade XII</td>
<td>LOTS oriented item</td>
<td>170</td>
<td>34.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOTS oriented item</td>
<td>295</td>
<td>59.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HOTS oriented item</td>
<td>35</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Bonus Items for Grade X, XI, dan XII</td>
<td>LOTS oriented item</td>
<td>800</td>
<td>49.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOTS oriented item</td>
<td>760</td>
<td>47.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HOTS oriented item</td>
<td>50</td>
<td>3.105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>1610</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>The total of the items for Grade X, XI, XII</td>
<td>LOTS oriented item</td>
<td>1431</td>
<td>38.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOTS oriented item</td>
<td>1976</td>
<td>53.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HOTS oriented item</td>
<td>303</td>
<td>8.167</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3710</td>
<td>100</td>
</tr>
</tbody>
</table>

#### Figures

- **Figure 3a.** Item analysis of assessment book for Grade X
  - Source: The Results of Data Processing (2020)
  - Jumlah Soal: 256, 461, 73
  - Persentase: 33.25, 57.625, 9.125

- **Figure 3b.** Item analysis of assessment book for Grade XI
  - Source: The Results of Data Processing (2020)
  - Jumlah Soal: 195, 460, 145
  - Persentase: 26.375, 57.5, 18.125

- **Figure 3c.** Item analysis of assessment book for Grade XII
  - Source: The Results of Data Processing (2020)
  - Jumlah Soal: 170, 265, 35
  - Persentase: 48.58, 47.2, 3.105

- **Figure 3d.** Item analysis of assessment book for Grade X, XI, XII
  - Source: The Results of Data Processing (2020)
  - Jumlah Soal: 800, 1976, 303
  - Persentase: 30.37, 51.26, 18.37
It is in line with the statement of B. Suryobroto (1997) who states that the factors that affect the ability of teachers include: 1) Personality concerning behavior, authority, character and others that will affect the interaction process, 2) Mastery of subject matter, 3) Classroom control, 4) The way the teacher talks or communicates with students, 5) How to create a conducive classroom atmosphere, 6) Pay attention to the principle of individuality, and 7) Pass standards. In addition, teacher education and training factors also affect the ability of a teacher, mentioned by Walker (1992: 112) who argues that “Training and education are a central element in the process of developing employees. Training in its myriad forms skill and obtain knowledge that will help then to improve their performance and further the organization's goals”.

The professional competence of a teacher can be developed and improved through training in accordance with the demands of the needs of teachers in the field. The training that is carried out should be directly related to solving real problems and conditions faced by teachers in the classroom, as stated by Lang (1999) in Martinet, et al. (2001) that “there is no finalized model today to describe the deliberate development of professional practice, but rather a series of questions about the knowledge and competencies required that are accessible through training”. In relation to it, the researcher tries to respond and synchronize it with the situation in the field that the factors that influence geography teachers in making questions/items, one of which is the lack of training for geography teachers in making HOTS-oriented items, especially for high school teachers in Metro City, Lampung Province.
In this article, the researcher tries to examine the abilities of teachers, especially in geography subject in high schools in Metro City, Lampung Province, and it can be concluded that the geography teachers’ ability to make questions/items is still dominated by MOTS-oriented with a total of 1976 items from 3710 items, so it reached 53.26%, and the dominance was also seen in the items made by geography teachers who was oriented to LOTS with a total of 1431 items from 3710 all items, and the percentage was obtained a figure of 38.57%. Meanwhile, the teachers’ ability to make HOTS-oriented items was still trapped in a figure of less than 10%, namely only 8.167% with a total of 303 items out of the 3710 items analyzed. Given this fact, there is a recommendation submitted to academics, quality service, and the provincial government that is the need to conduct teacher training related to teacher training in developing HOTS-oriented questions/items in order to improve the geography teachers’ ability to make HOTS-oriented items.
REFERENCES

4. Badan Pusat Statistik Kota Metro Tahun 2019