# Improving Higher Order Thinking Skills and Students' Learning Interest through Problem-Based Learning Model on Literacy

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**Abstract:** This research aimed to increase students' higher order thinking skills and students' learning interest in the subject material of Interaction among ASEAN countries in class 8.6 of SMP Negeri 3 Surakarta through problem-based learning model on literacy. This research applied a classroom action research approach through an assessment process with several cycles. The subjects of this research were students of grade 8.6 of SMP Negeri 3 Surakarta. The data were taken through instruments of observation, tests, questionnaires and documentation. The analysis of data used in this research included data presentation, triangulation, validity testing, reliability testing, and conclusion drawing. Based on the analysis of the research results, it can be concluded that the application of problem-based learning model on literacy was able to increase the higher order thinking skills of students and students' learning interest in the subject material of Interaction among ASEAN countries in class 8.6 of SMP Negeri 3 Surakarta. In the pre-action activity, there were only 3 students who were able to reach the Minimum Completeness Criteria (9%), while 29 students were not able to complete (91%) and the score of higher order thinking skills obtained was 54.101. But, after the action was taken by applying the problem-based learning model on literacy in the first cycle, students who has been completed has increased to 8 people (25%) and those who were not able to complete was 24 people (75%), the higher order thinking skills average score increased to 68.94. Then, in cycle II students who have completed were 19 people (59%) and those who were not able to complete included 13 people (41%), higher order thinking skills average score increased again to 77.78. Furthermore, in cycle III students who have completed the third cycle were 29 people (91%) and those who have not completed were 3 people (9%) higher order thinking skills average score increased again to 87.74. The result of students' learning interest indicated in pre-action activities was 39.97%, in the first cycle was 59.46%, in the second cycle was 78.325%, while the result of learning interest in the third cycle was 86.235%.

***Keywords:*** *higher order thinking skills, interest in learning, problem-based learning model on literacy*

## Introduction

Paying attention to the Basic, Functions and Objectives of National Education, basically education in Indonesia is a character education that is unique in accordance with Indonesian culture, and is in line with the demands of 21st Century skills. The 21st Century is a century based on science and technology, and therefore demanding human resources to master various forms of skills, including critical thinking skills and problem solving from various increasing problems.

In general, cognitive thinking domain can be categorized into two. Those are low-level thinking (lower order thinking) and higher order thinking. This is strengthened by Bloom's Taxonomy (lower level and higher level), as stated by Soltis, Verlinden, Kruger, Carroll, and Trumbo (2015) and by Arends and Kilcher (2010: 231) opinion. That there are use of skills and cognitive process of thinking. Lower order thinking consists of aspects of remembering (C1),

understanding aspects (C2), and aspects of applying (C3) while higher order thinking is an ability that includes aspects of analyzing (C4), evaluating (C5), and creating (C6).

In Bloom's Taxonomy, there are 6 levels of cognitive domains from the lower order level to higher order thinking, namely remembering, understanding, implementing, analyzing, evaluating and creating; the last four levels are included into higher order thinking (Fitzpatrick, Hawboldt, Doyle and Genge, 2015: 2; Magas, Gruppen, Barrett, Dedhia, and Sandhu, 2017: 223)

Higher order thinking skills are not activities to memorize or apply material, but to achieve them students must think how to evaluate material (Jones, 2016: 262; Hong, Vadivelu, Daniel, and Sim, 2015: 1). Therefore, someone who has a higher order thinking skills is not only able to analyze (C4), evaluate (C5), and create (C6) but he also has control over the chosen plan even this skill can make it easy to adapt in various ways.

The revised curriculum 2013 mentions that education emphasizes higher order thinking skills, emphasizing Character Education Strengthening (*Penguatan Pendidikan Karakter*/herein after referred to as PPK), literacy and 4C (Critical thinking, Communicative, Collaborative, and Creative). Students must prosses higher order thinking skills as the important aspect and core skill of the 21$^{st}$ century as stated by Craig (2011: 70) and supported by Wang and Wang (2014: 179).are important aspects that must be possessed by students. This is supported by the research of Wang and Wang (2014: 179). To achieve the higher order thinking skills, the students must be involved in problem solving.

Ministry of Education and Culture, Tuesday 6 December 2016, in Jakarta (*Kementerian Pendidikan dan Kebudayaan/*herein after reffered to as Kemendikbud, 2016:1*)*) release Program for International Student Assessment (PISA) survey conducted by the Organization for Economic Co-operation and Development (OECD) show that the average value of Indonesian students is still low, ranking 69 out of 79 countries. The low higher order thinking skills of students in Indonesia occurs because schools have not emphasized learning that leads or stimulates the ability to analyze (C4), evaluate (C5), and create (C6) whereas the learning objectives to be achieved include higher order aspects of thinking skills (Noma, Prayitno, and Suwarno, 2016: 62-63). The impact is that students are focused on memorizing the meaning of certain material without relating it to real life.

According to Yen and Halili (2015: 42) in the world of education, there are three elements that influence students' higher order thinking skills, namely curriculum, teaching, and assessment. The curriculum acts as a foundation in education, teaching is the implementation of the curriculum, and assessment is applied to measure the level of teaching achievement. Similar opinion is also stated by Tajudin and Chinnapan (2016: 209); Saido, Siraj, Nordin, and Al-Amedy (2015: 17) that educators have an important role in integrating higher order thinking skills of students, because educators are parties who play a role in implementing the provisions in the curriculum in learning activities.

Brookhart (2010: 57); Wendt and Kenny (2009: 150), and Nicholl and Tracey (2007: 286) provide an overview of how formative assessment can be done with multiple choice questions, essay questions and performance appraisals. The form of questions to measure and stimulate higher order thinking skills is not limited to essays but it can be in the form of multiple choice questions.

The researcher tried to improve learning in class 8.6 through the application of problem-based learning models based on literacy so that children will be motivated in learning. With the model of problem-based learning based on literacy, it is expected to be able to increase students' higher order thinking skills and interest.

The problem-based learning model is a learning model that involves students to work in small groups and stimulate them to analyze, integrate, and use problems. In this learning model, educators are as the facilitators and guidance. Asyari, Muhdhar, Susilo, and Ibrohim, (2016: 37); Tan, 2003 in Rusman, (2012: 229); and Utrifani A and Turnip M. Betty, (2014) stated that this model can encourage the students to participate actively to solve problems.

With regard to literacy, a Summit was held in Berlin, Germany on March 7-8, 2002. This summit produced a "white book" entitled 21st Century in a Convergent Media Word of Communication and Informatics (*Departemen Komunikasi dan Informatika*/herein after referred to as Depkominfo, 2006). This summit identifies literacy standards for the 21st Century associated with challenges faced and in line with the development of science and technology. In the white book, it is stated that 21st Century literacy is more than traditional literacy based on reading, writing, mathematics, and science. The new concept of literacy includes the following components to enrich human knowledge and critical thinking skills by combining social, professional and technological developments, namely: 1) technology literacy; 2) Information Literacy; 3) media creativity; 4) Responsibility and social competence (Bertelsmann and AOL Time-Warner in Iriantara, 2009).

## Method

The type of research used was Classroom Action Research (CAR). Classroom Action Research, according to Arikunto, Suhardjono, and Supardi (2016: 124), is an action taken by the teacher to improve the quality of classroom learning. Action Research Class with a cycle model contains four stages of activity, namely: planning, implementation (action), observation, and reflection. This research was carried out in SMP Negeri 3 Surakarta in the first semester of the 2018/2019 academic year. The study was conducted in 3 cycles consisting of 2 meetings each cycle with a time allocation of 2 x 40 minutes for one meeting.

The data validity testing technique used triangulation techniques and content validity. Triangulation, according to Sugiyono (2015: 373), is checking data from sources in various ways and times. Data obtained from different data collection techniqus are compared,then conclusions are drawn so that the data has strong validity. Data collection techniques used test and non-test techniques (documentation, observation). Content validity, according to Sugiyono (2015: 182), is a validity testing technique by comparing the contents of the instrument with the material being taught. The use of content validity requires assistance from experts in the field of study, or experts who have expertise relevant to research, so that the study can be used as a basis for establishing validity. The validity of the contents of this research was used to test the test results by matching test questions with syllabuses and grids, conducting discussions with collaborators.

This research applied comparative descriptive data analysis technique. Comparative descriptive technique is to analyze quantitative data by comparing the results of inter-cycle research and between the results before research with the results at the end of each cycle. The average score of HOTS in the material of interaction among ASEAN countries of pre-action, Cycle I, Cycle II, and Cycle III were compared. The results of the analysis were used as the basis for preparing the next cycle of action planning according to the existing cycle.

The research performance indicator used the Minimum Completeness Criteria (*Kriteria Ketuntasan Minimal*/herein after referred to as KKM) that is 78. Learning is considered to be successful if the percentage of students completing a score of ≥ 78 is 85% of the number of students who present with the average grade reaching KKM (≥ 78).

## Results and Discussion

The detail of the higher order thinking skills (HOTS) test results from pre-action, cycle I, cycle II, and cycle III is explained as follows:

**Table 1.** Comparison of higher order thinking skills (hots) in pre-action, cycle i, cycle ii, and cycle iii

| Results | Pre-action | Cycle I | Cycle II | Cycle III |
|---|---|---|---|---|
| Minimum Score | 28,125 | 45,31 | 48,44 | 60,94 |
| Maximum Score | 90,625 | 92,19 | 95,31 | 96,875 |
| Clasical Mean | 54,101 | 68,94 | 77,78 | 87,74 |
| Persentage of Completeness | 9 % | 25 % | 59 % | 91 % |

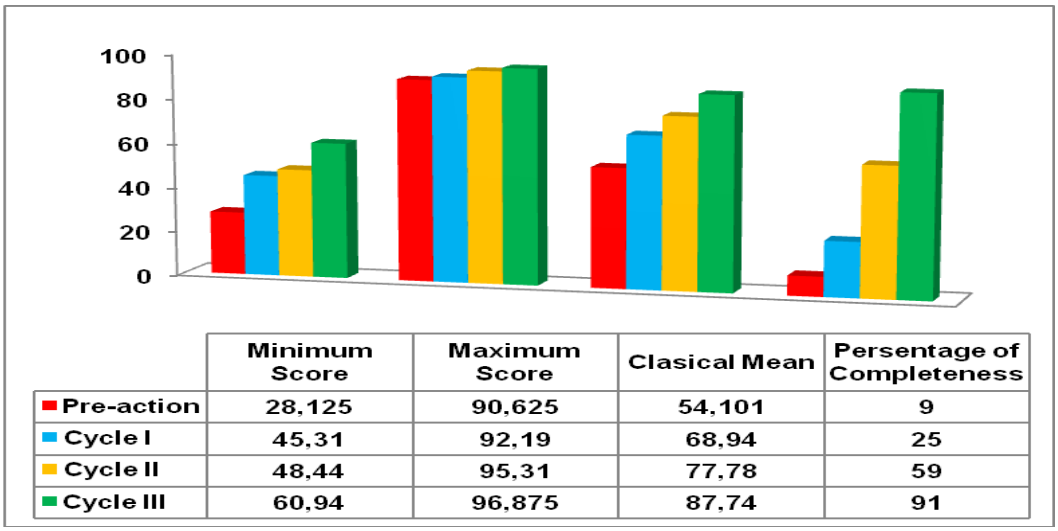


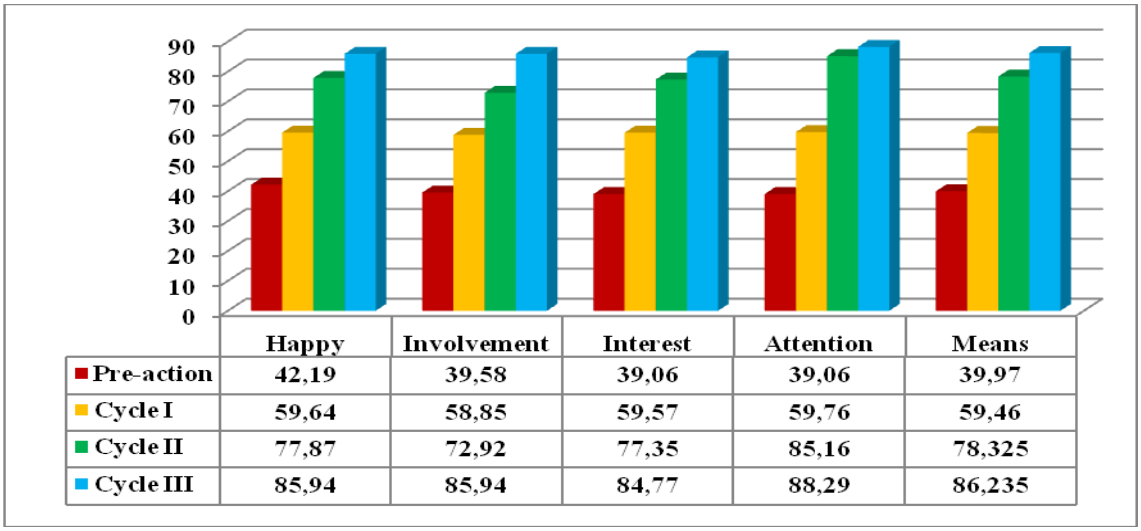

**Figure 1.** Bar chart of hots score comparison of pre-action, cycle i, cycle ii, and cycle iii

Based on Table 1 and Figure 1, it can be seen that HOTS scores have increased from pre-action to Cycle I, Cycle II, and Cycle III. The increase of HOTS score in the material of ASEAN countries interaction shows the conclusion that the problem- based learning model based on literacy is appropriate to be applied in increasing Students' higher order thinking skills and interest in the material of interaction among ASEAN countries. These improvements include:

1) The minimum sscore of pre-action was 28.125, increased to 45.31 in Cycle I, increased to 48.44 in Cycle II, and increased again to 60.94 in Cycle III.
2) The maximum score of pre-action was 90.625, increased to 92.19 in Cycle I, and increased to 95.31 in Cycle II and increased again to 96.875 in Cycle III.
3) The average score of pre-action classes was 54.101, increased to 68.94 in Cycle I, increased to 77.78 in Cycle II, and increased again to 87.74 in Cycle III.
4) The percentage of completeness from pre-action was 9%, increased to 25% in Cycle I, increased by 59% in Cycle II, and increased again to 91% in Cycle III.

**Table 2.** The comparison of questionnaire results on learning interests in pre-action, cycle i, ii, and iii

| Indicator | Pre-action | Cycle I | Cycle II | Cycle III |
|---|---|---|---|---|
| Happy | 42,19 | 59,64 | 77.87 | 85.94 |
| Involvement | 39,58 | 58,85 | 72.92 | 85.94 |
| Interest | 39,06 | 59,57 | 77.35 | 84.77 |
| Attention | 39,06 | 59,76 | 85.16 | 88.29 |
| Means | 39,97 | 59,46 | 78.325 | 86.235 |




| | Happy | Involvement | Interest | Attention | Means |
|---|---|---|---|---|---|
| Pre-action | 42,19 | 39,58 | 39,06 | 39,06 | 39,97 |
| Cycle I | 59,64 | 58,85 | 59,57 | 59,76 | 59,46 |
| Cycle II | 77,87 | 72,92 | 77,35 | 85,16 | 78,325 |
| Cycle III | 85,94 | 85,94 | 84,77 | 88,29 | 86,235 |

**Figure 2.** Bar chart comparison of questionnaire results on learning interest of pre-action, cycle i, cycle ii, and cycle iii

Based on Table 2 and Figure 2, it was obtained that the average of students' learning interest from pre-action 39.97 increased to 59.46 in Cycle I, increased to 78.325 in Cycle II, and increased again to 86.235 in Cycle III. Therefore, it can be concluded that students' learning interest in the material of interaction among ASEAN countries has increased by applying the problem-based learning model based on literacy.

## Conclusion

Problem-based learning model based on literacy can increase the higher order thinking skills and learning interest of students of SMP Negeri 3 Surakarta on the material of interaction among ASEAN countries.

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