

Research Article

The implementation of local wisdom-based learning and HOTS-based assessment: Teacher survey in Banjarmasin

A. Abidinsyah^{a,1}, Siti Ramdiah^{a,2,*}, M. Royani^{b,3}^a Biology Education Study Program, PGRI Banjarmasin School of Teacher Training and Education (STKIP PGRI Banjarmasin)
Jl. Sultan Adam Kompleks H. Iyus No 18 Banjarmasin, Kalimantan Selatan, 70121, Indonesia^b Mathematic Education Study Program, PGRI Banjarmasin School of Teacher Training and Education (STKIP PGRI Banjarmasin)
Jl. Sultan Adam Kompleks H. Iyus No 18 Banjarmasin, Kalimantan Selatan, 70121¹ abidinsyah@stkipbjm.ac.id; ² sitiramdiah@stkipbjm.ac.id*; ³ hmroyani@stkipbjm.ac.id

* Corresponding author

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ABSTRACT

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The use of local wisdom as learning sources and the empowerment of students' Higher-Order Thinking Skills (HOTS) are the two components that must be carried out in the 21st-century biology learning. The purpose of this study was to explore the information about the application of local wisdom-based learning and HOTS-based assessment in Banjarmasin. This survey research involved 41 high school biology teachers in Banjarmasin who joined in Biology Teacher Working Group activities as research samples. The research instruments were questionnaires that were validated by experts. The data were analyzed using descriptive statistics in term of percentage. The findings showed that the teacher gave a positive response to the content of local wisdom to be a source of biology learning. In addition, they believed that through the learning, the students caring attitudes towards the potential and local wisdom of South Kalimantan were developed. Nonetheless, the empowerment of HOTS was not optimal as it was less frequent for the teachers to design HOTS-based learning in their class.



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INTRODUCTION

In this era, local wisdom-based learning (LbL) is starting to be seen as a potential innovative learning. Through the application of LbL, students' knowledge and understanding can be improved (Hairida, 2017; Uge, Neolaka, & Yasin, 2019), as well as learning outcomes (Ningrum, Nandi, & Sungkawa, 2018). LbL was also reportedly able to empower students' critical thinking (Oktavia, Usmeldi, & Yohandri, 2018; Putri & Aznam, 2019). In line with these findings, students' problem-solving skills can also be improved (Kristanto, Suharno, & Gunarhadi, 2019; Putri & Aznam, 2019). Not surprisingly, LbL is considered a suitable learning implemented in the 21st Century (Jumriani & Prasetyo, 2017).

LbL is also considered very appropriate to be used in Indonesia where this country is known for its diversity of ethnicities, languages and traditions (Albantani & Madkur, 2018; Arifin, Ananta, Utami, Handayani, & Pramono, 2015; Asfina & Ovilia, 2017). By utilizing local wisdom, students' conservation character can be developed (Khusniati, Parmin, & Sudarmin, 2017). The application of LbL also fosters other positive characters (Subali, Sopyan, & Ellianawati, 2015). In line with those research results, various local wisdom-based learning source and learning media were developed in various countries, especially in Indonesia. (Anwari, Nahdi, & Sulistyowati, 2016; Oktavia et al., 2018; Tanjung, Daulay, & Ghafari, 2018; Uge et al., 2019; Yoda, 2017).

From the point of view of the learning process, LbL can optimize student understanding of the concepts being studied. The reason is, by using LbL, the teacher will associate the concepts learned by students with real-world phenomena. The ability of teachers to bring real phenomena from the surrounding environment to the learning process will increase the meaningfulness of learning (Agra et al., 2019; Huang, Chiu, Liu, & Chen, 2011; Symeonidis & Schwarz, 2016). Learning that able to direct students to learn their surrounding environment is also reported could to increase students' concentration and interest (Sulaiman, Azlan, & Anis, 2011). In addition, this kind of condition will also increase student motivation (Danis, Perangin-Angin, & Milfayetty, 2017; Kuhn & Müller, 2014). Therefore, even though text books in Indonesia are not LbL-oriented (Jufriada, Basuki, Xena, & Pasmingsih, 2019), LbL-oriented learning design is still highly recommended.

In line with LbL, learning oriented towards higher-order thinking skills (HOTS) is also seen as urgent to be implemented in the current era. HOTS empowerment is considered important because it has an essential role in forming graduates who are ready to face the 21st Century's challenges (Chalkiadaki, 2018; Pratama & Retnawati, 2018). The characteristics of science learning are actually very appropriate in the empowerment students' HOTS (Daud, Omar, Turiman, & Osman, 2012; Evagorou & Dillon, 2009; Forawi, 2016). The reason, science education focuses on logical, argumentative, and systematic understanding of several phenomena. Science learning also requires students to think critically, creatively, and skillfully at solving problems. HOTS empowerment is also considered essential because students are trained to make the best decisions to think critically in analyzing arguments. In addition, mastering HOTS enables students to see concepts holistically and reflect effective thinkers' attitudes, be persistent with deep thinking, and be sensitive to the context of current issues (Shukla & Dungsungnoen, 2016).

In designing HOTS-based learning, teachers must be able to pay attention to various aspects of learning for the optimal learning process. Applying appropriate learning activities (Al-Mubaid, Abukmail, & Bettayeb, 2016; Ramirez & Ganaden, 2008) as well as designing appropriate learning evaluation processes (McNeill, Gosper, & Xu, 2012) will optimize efforts to empower thinking skills. HOTS-oriented learning will be useless if the teacher is not able to provide HOTS-based assessment. This condition will cause the teacher not able to measure the success of the learning process.

When discussing the urgency and its benefits, it appears that LbL and HOTS-based learning are evident, so the implementation of both learning must be conducted at this time. To optimize the achievement of these targets, various studies examining both are often conducted. Research and development that seeks to develop learning tools oriented to local wisdom is increasingly conducted (Anwari et al., 2016; Uge et al., 2019; Zukmadini, Jumiami, & Kasrina, 2018). On the other hand, research on HOTS also often examines the effect of various forms of learning on student HOTS improvement (Abrami et al., 2014; Asyari, Muhdhar, Susilo, & Ibrahim, 2016; Ramdiah, Abidinsyah, & Mayasari, 2018), designing HOTS assessments (Kurniawan & Lestari, 2019), or profiling HOTS level (Abdullah, Albeta, & Ardiansyah, 2018). From this description, it can be seen that research examining teacher responses to LbL and the frequency of using HOTS assessments is still difficult to find. In fact, the study of teacher responses is important to see the teacher's perspective on this kind of learning. This information can be used as a basis for optimizing LbL in schools. Likewise, data about the frequency of using HOTS-based assessments is also important because the evaluation process is one of the three basic components of each learning. Therefore, the purpose of this study was to survey teachers' responses to LbL and the frequency with which they applied the HOTS-based assessment.

METHOD

This survey research was using quantitative approach. The research focused on to provide information on the response of high school biology teachers about the implementation LbL and HOTS-based assessment. The population in this study was all high school biology teachers in Banjarmasin City. The research sample was 41 high school biology teachers in Banjarmasin who were involved in routine Biology Teacher Working Group activities.

The research instrument was in the form of questionnaires that has validated by experts. The questionnaire was then filled by high school biology teachers in Banjarmasin City. The collected data were in the form of

information on the teacher's response to the local wisdom of South Kalimantan as a student learning source and assessment of student learning outcomes in biology learning at Banjarmasin high schools. Furthermore, the data were analyzed using descriptive statistics by percentages, which aimed to describe the obtained data from the results of questionnaires that had been filled by the high school biology teachers.

RESULTS AND DISCUSSION

Indonesia has a variety of local wisdom that still needs to be explored and preserved. Aside from being a nation's wealth, local wisdom can be used as a source of learning in various subjects. Therefore, LbL is a recommended learning applied in biology subjects. The frequency of application and the perception of teachers in Kalimantan towards LbL is presented in [Table 1](#).

Table 1. Frequency of teacher responses to LbL implementation in Banjarmasin

| Aspects | Approval frequencies (%) |
|---|--------------------------|
| Have designed LbL based on local potential in Banjarmasin | 95.12 |
| Informing the natural potential in Banjarmasin while studying biology | 95.12 |
| Local wisdom in South Kalimantan is important as a source of learning biology | 100 |
| Implementing LbL can increase student awareness of local wisdom in South Kalimantan | 97.56 |

Based on the analysis results, it could be informed that the teachers gave a positive response to the LbL implementation in biology learning. The results also showed that teachers strongly believe that through information and learning resources based on local wisdom will develop students' caring attitude towards the environment and the nature in South Kalimantan. When examined more deeply, LbL is urgent to be implemented in biology learning, especially LbL can support several concepts taught in biology. Some concepts that can be taught using LbL, such as the role of plants in the survival of the earth, environmental changes, biodiversity, ecosystems, fungi, bacteria, and biotechnology.

The survey results also show that the majority of teachers believe that implementing LbL can improve students' understanding of the local wisdom around them. Through LbL, students will get to know the local wisdom around them. These conditions will affect students' character development. In addition, by raising local wisdom, teachers can direct students to learn biological concepts through real phenomena that occur in nature. The significance of the learning process will increase and could improve students' understanding about what they are learning ([Islakhiyah, Sutopo, & Yulianti, 2018](#)). This condition will also increase student motivation ([Albrecht & Karabenick, 2018](#)). As has been reported in previous studies, motivation is an important predictor of learning success ([Kappe & Flier, 2012](#); [Vero & Puka, 2017](#)).

In addition to the benefits that have been delivered, LbL also has the potential to empower various skills needed by students today. Several studies report, by involving local wisdom in learning, students' thinking skills can be empowered better ([Putri & Aznam, 2019](#); [Wahyuni, 2015](#)). The ability to solve which is an important competency in the current era can also be improved ([Kristanto et al., 2019](#); [Putri & Aznam, 2019](#)). Several other research reports also inform that LbL can increase student literacy ([Jumriani & Prasetyo, 2017](#); [Setiawan, Innatesari, Sabtiawan, & Sudarmin, 2017](#)). Moreover, some previous reports also reported that LbL applicants can increase students' interest in local culture ([Damayanti, Dewi, & Akhlis, 2013](#)). Other studies in several different location were also report the same findings ([Mannan, Sopyan, & Sunarno, 2015](#); [Yusa & Jayanegara, 2014](#)). Thus, by paying attention to local wisdom, the learning process can accommodate the needs of the 21st century.

Unfortunately, the results of the survey using the HOTS-based assessment ([Table 2](#)) did not get results in line with LbL. Based on [Table 2](#), the general tendency that can be obtained is the higher the cognitive level, the lower the frequency of teachers who state that they often develop. Assessments that evaluate cognitive levels of C1 (remember) and C2 (understand) were the assessments most often developed by teachers in South Kalimantan. Noted, nearly 80% of teachers often develop assessments that evaluate student understanding. On the other hand, more than 30% of teachers have never developed an assessment that evaluates the ability to create (C6). This finding indicates that teachers have not yet positioned HOTS empowerment as an important part of learning.

In fact, learning that could empower HOTS is learning needed in the 21st Century ([Darling-hammond, 2014](#); [Ennis, 2011](#); [Heong et al., 2011](#); [Magsino, 2014](#); [Trilling & Fadel, 2009](#)). The teacher has a very important role in determining the quantity and quality of teaching that is carried out ([Bennett, Agostinho, & Lockyer, 2016](#); [Ferguson-Patrick, 2018](#); [Hyslop-Margison & Sears, 2010](#); [Looney, Cumming, Kleij, & Harris, 2017](#); [Mahini, Forushan, & Haghani, 2012](#)). Therefore, teachers must think and plan carefully in increasing learning opportunities for students and improving the quality of teaching and reflecting on it ([Benade, 2015](#); [Lamb,](#)

2017). Unfortunately, during this time biology teachers have implemented learning programs are good but not maximized in applying HOTS (Ramdiah, Abidinsyah, Royani, & Husamah, 2019).

Table 2. Frequency distribution of assessment implementation at various cognitive levels by teachers in Banjarmasin

| Aspects accessed | Implementation frequencies (%) | | | |
|---------------------------|--------------------------------|-------|--------|-------|
| | Very often | Often | Seldom | Never |
| Remembering | 24.39 | 65.85 | 7.32 | 2.44 |
| Understanding | 7.32 | 78.04 | 12.2 | 2.44 |
| Applying | 4.88 | 39.02 | 53.65 | 2.44 |
| Analyzing | 4.88 | 41.46 | 53.66 | 0 |
| Evaluating | 4.88 | 39.02 | 43.9 | 12.2 |
| Creating | 0 | 7.32 | 60.98 | 31.7 |
| Deducing | 0 | 21.95 | 60.98 | 17.07 |
| Reducing | 0 | 17.07 | 63.41 | 19.51 |
| Deciding and implementing | 4.88 | 21.95 | 58.54 | 14.63 |

The urgency of designing learning activities and evaluating learning oriented to the empowerment of HOTS should be immediately recognized by teachers in South Kalimantan. Not surprisingly, educational research in various countries has long focused on learning optimization that is able to empower students' HOTS. In Israel, learning that implements innovative strategies and embedded thinking tools is reported to be able to empower the thinking skills of elementary and middle school students (Vidergor, 2018). In Canada, teachers from kindergarten through grade 9 believe that HOTS is needed by their students (Schulz & Fitzpatrick, 2016). In fact, in Malaysia, STEM is recommended to be implemented to improve critical and creative thinking skills, problem solving, and scientific thinking of students (Baharin, Kamarudin, Abdul, & Manaf, 2018). In line with this, in Malaysia, the application of authentic assessments is reported to have the potential to measure students' HOTS (Mohamed & Lebar, 2017). Therefore, Indonesia must also take these steps so as not to compete with these countries more and more.

Based on the discussions that have been conveyed, it can be seen that in South Kalimantan most of the teachers have implemented LbL. Unfortunately, they are still not optimal in implementing HOTS-based assessment. The two conditions of learning are urgent in the 21st Century, both for the demands of the times and to increase the effectiveness of learning. The two conditions of learning can actually be made into a series of interrelated learning activities. The teacher can apply LbL during the learning process and when the evaluation phase the teacher uses HOTS-based assessments. Through analyzing local wisdom around them, students are directed to improve their HOTS. Therefore, the assessment used by the teacher should be in line with these learning activities.

CONCLUSION

Based on the findings of this study, it can be concluded that the teachers gave a positive response to the effort to design and implement the LbL. They are also aware of the importance and benefits of applying LbL in learning biology. Unfortunately, unlike LbL, teachers are still not optimally using assessments oriented to HOTS. They are more likely to evaluate at a low cognitive level. In response, teachers are expected to be more aware and more motivated to empower HOTS students more. HOTS-oriented evaluation preparation training also needs to be carried out by related agencies. Research that seeks to develop learning that links LbL with HOTS-based assessment also needs to be done. The hope, with such research, will initiate the emergence of a variety of innovative learning that accommodates both of it.

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