Response of training participants in preparation of argumentative questions to train HOTS in Davao Indonesian school teachers

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ARTICLE INFO

ABSTRACT

Higher-Order Thinking Skills (HOTS) can be trained through concepts in science learning generally, and biology in particular. Teacher competence to facilitate students skilled HOTS can be improved through scientific forums, one of which is training and workshops. This activity is an alternative for teachers to refresh their understanding and pedagogical skills and build enthusiasm through various modeling and information to generate motivation. Training activities on the preparation of argumentative questions to train HOTS for Davao Indonesian School Teachers of Philippines were held in two stages, the first stage was carried out synchronously through online meetings using Zoom Meeting, while in the second stage, training was carried out asynchronously using Google Classroom. Trainees' responses to the implementation of the training were netted with an online questionnaire using Google Form. The data were analyzed in a quantitative descriptive. The results of this study showed that all participants rated that the material presented by the resource persons was good, which included material on HOTS, STEM approaches, and argumentative thinking. In addition, participants also gave positive responses to the workshop on developing argumentative questions, the ability of resource persons, and the technical implementation of the training. Participants hope that this activity can be followed up with offline training.

Respon peserta pelatihan dalam penyusunan soal argumentatif untuk melatih HOTS guru sekolah Indonesia di Davao. *Keterampilan berpikir tingkat tinggi dapat dilatihkan melalui konsep-konsep dalam pembelajaran sains umumnya, dan biologi khususnya. Kompetensi guru untuk memfasilitasi siswa terampil berpikir tingkat tinggi dapat ditingkatkan melalui forum ilmiah, salah satunya adalah pelatihan dan workshop. Kegiatan tersebut menjadi salah satu alternatif bagi guru untuk menyegarkan kembali pemahaman dan keterampilan pedagoginya serta membangun semangat melalui berbagai modeling dan informasi untuk membangkitkan motivasi. Kegiatan pelatihan Penyusunan Soal-soal Argumentatif untuk Melatih Berpikir HOTS pada Guru Sekolah Indonesia Davao Filipina diselenggarakan dalam dua tahap, tahap pertama dilakukan secara sinkron melalui pertemuan daring dengan menggunakan Zoom Meeting, sedangkan tahap kedua, pelatihan dilakukan secara asinkron dengan menggunakan Google Classroom. Respons peserta pelatihan terhadap pelaksanaan pelatihan dijaring dengan kuesioner daring menggunakan Google Form. Data dianalisis secara deskriptif kuantitatif. Hasil studi ini menunjukkan bahwa seluruh peserta memberikan menilai bahwa materi yang disampaikan narasumber baik, yaitu meliputi materi HOTS, pendekatan STEM, dan berpikir argumentatif. Selain itu, peserta juga memberi respons positif terhadap kegiatan workshop pengembangan soal argumentatif, kemampuan narasumber, dan teknis pelaksanaan pelatihan. Peserta berhadap kegiatan ini dapat ditindaklanjuti dengan pelatihan secara luring.*

INTRODUCTION

Davao Indonesian School or Sekolah Indonesia Davao (SID) is located in Davao City, Mindanao Island, Philippines, and is intended for Indonesian children whose parents live there as Indonesian workers in various sectors. Indonesian citizens who settled in the Mindanao Islands have settled several descendants in the territory of the Philippines. With the spread of Indonesian waka in the Philippine region, SID also facilitates students to live in dormitories (SID, 2023).

The condition of schools and students as described is very possible in the implementation of quality education with global competitiveness by instilling the values of Visionary, Agility, Resilience, Innovative, having an exemplary personality, having a balance of intellectual, emotional, physical, social, and spiritual intelligence. Through uploads on the official website, it is explained that learning in schools uses various approaches, and learning methods oriented to High Order Thinking Skills and focuses on improving critical skills and problem-solving skills, collaboration skills, communication skills, and creativity and innovation skills (4C) so that the sense of nationalism and Pancasila Character remains inherent and stronger in the personality of SID Alumni (SID, 2023). Basic Education Data (Dapodik) of the Ministry of Education, Culture, Research, and Technology in 2023 shows that SID has five schools for high school with 10 teachers and 46 students (Kemdikbud, 2020). Basic Education Data (Dapodik) of the Ministry of Education, Culture, Research and Technology in 2023 shows that SID has five schools for high schools with 10 teachers and 46 students (SID, 2023).

The condition of the school as written above illustrates that the number of teachers and students is not as many as Indonesian schools in the country. The learning method applied is oriented towards High Order Thinking Skills and focuses on achieving the 4Cs. It is possible to optimize the achievement of higher order thinking skills (HOTS), through workshops and higher order thinking conditioning by teachers on students during the learning process. Teacher competence to facilitate students skilled in higher-order thinking (HOTS) can be improved through scientific forums, one of which is workshops and workshops. This activity is an alternative for teachers to refresh their understanding and pedagogical skills and build enthusiasm through various modeling and information to generate motivation.

Higher order thinking skills (HOTS) can be trained through concepts in science learning generally, and biology in particular. Science/biology learning essentially activates students both physically and mentally in learning, linking learning materials with their application in everyday life, combining science-technology-society and practicing process skills namely observing, questioning, collecting information, reasoning, and communicating. Mastery of concepts by students is expected to be able to produce completeness according to learning competencies.

The importance of facilitating learning to encourage students' understanding of concepts is a study caused by the fact that understanding is closely related to learning. Learning focuses on what we know and the process of transferring knowledge does not rule out the possibility of acquiring students' core skills. Core skills are acquired through activities, 1) discussion, 2) experiment, 3) teacher demonstration, 4) experiment, 5) making observations, 6) verifying scientific laws through experiments, 7) formulating and testing hypotheses, 8) presenting and communicating research procedures and results, 9) documenting scientific activities, 10) identifying and summarizing information (Viyanti et al., 2016). One way to strengthen concepts in students can be done through the activity of the ability to argue.

Argumentation is an important means of learning through natural phenomena and encourages the development of students' critical attitudes (Driver et al., 2020). This encourages students' understanding of concepts associated with empowering argumentation skills with steps that are linked to argumentation elements. Similarities and differences between cooperative and collaborative learning. Cooperative learning; 1) students assess individual and group performance, 2) students work together in groups with an emphasis on social skills, and 3) Improve social skills in solving problems in everyday life. Collaborative learning; 1) students assess individual and group performance, 2) students are required to work together in groups with an emphasis on social skills, and 3) improve social skills in solving problems in everyday life. Differences cooperative learning 1) students receive social skills workshops in small groups, 2)structured problem-solving activities with each student having a specific role, 3) the teacher observes, listens and intervenes in the group when necessary, 4) cooperative learning is described as an "order" in the community process that helps and interconnects with each other in order to fulfill a goal with closed-ended tasks, 5) cooperative learning is more directive and more controlled by the learner, 6) cooperative learning many mechanisms of team analysis and introspection are learner-centered whereas in collaborative learning they are more learner-centered. Collaborative learning; 1) there is a belief that students already have the necessary social skills and they will build on their existing skills to achieve their goals, 2) students in groups (at least 2 people) jointly organize and negotiate in solving problems that are more open and complex in nature, 3) collaborative activities do not always have to be monitored by instructors/teachers. When questions are directed towards the teacher, the teacher simply guides the students to the information needed, 4) in collaborative learning, students are encouraged to build knowledge where it is distributed throughout the group and is open-ended in problem solving, 5) many of the mechanisms of team analysis and introspection are more learner-centered, and 6) collaborative learning more controlled by learners.

The existence of collaboration in learning is very effective for students in the classroom to empower argumentation skills (Burns. et al., 2014). Based on this background, argumentation skills workshops through collaborative activities in learning are needed. Activities are expected to be able to improve the ability of SID teachers to train students' argumentation skills to build higher-order thinking skills (HOTS). The success of this workshop activity will improve the quality of student learning, especially for SID. Based on these main problems, several problems can be described that is how the workshop participants respond to the preparation and use of argumentation-based assessment instruments. The workshop included a global partnership that brought together state and non-state organizations to collaborate on

advocacy, policymaking, implementation of activities, and/or joint funding to directly respond to education crises. For example, the Global Partnership for Education (GPE), Global Business Coalition for Education, the Global Partners Project, and others each support initiatives directed at improving educational (Menashy & Zeena, 2023).

METHOD

The method of implementing activities or solving the problems offered is formulated into three stages, namely the preparation, implementation and evaluation stages and feedback. This activity was attended by teachers who teach at Davao School Philippines, the participants total 7, there are 4 teachers male and 3 female teachers, teaching time 7-28 years, Teaching classes of elementary, junior high, and senior high school, Teaching of Civic Education, Art and Cultural, Science, Mathematics, Indonesian, Elementary and Social Studies Indonesian, Geography, Informatics, IT, History, Biology, and Christian Education.

The preparation stage includes information dissemination activities to the target audience, namely teachers from several SID Junior High Schools / High Schools about the implementation of this PKM activity, duplication and provision of workshop modules, preparation of tools and materials needed for the workshop for participants in complete and in sufficient quantities. In the preparation stage, workshop evaluation tools and instruments needed to record data during the implementation of activities were also compiled.

The implementation phase includes the implementation of workshops that are planned to be carried out on SID junior and senior high school teachers. The number of participants involved was 7 teachers from various school levels at SID. At the beginning of the activity, participants will get adequate information about concepts related to the importance of argumentation skills through collaborative activities in learning. In this activity, an explanation of the concept of argumentative-collaborative skills was carried out by the activity implementation team and then the workshop participants carried out the practice of developing tools to train students' argumentation skills and practice the preparation and use of assessment instruments for students' argumentation skills trained. Thus, in this activity, various methods are used, namely 1) presentations to convey information about the importance of the concept of argumentative-collaborative skills in learning; 2) demonstrations are carried out to provide examples of the preparation of assessment instruments and their use in classroom learning; 3) Practice of preparing tools and instruments by workshop participants to train teachers' skills to improve.

The evaluation stage is carried out at several stages of activity, namely the evaluation of the product questions produced by the teachers participating in the implementation of this PKM activity. Immediate feedback is provided upon completion of the evaluation. The feedback is in the form of input for the improvement of the assessment devices and instruments used, the overall learning steps in which there is a student learning assessment component. Peer learning evaluation is carried out in the last part of the workshop material.

At the end, the workshop participants were given the test by App Quiziz about concepts related to argumentation skills. Performance tests for the creation and use of instruments assessing the ability of argumentation trained. The answers on the evaluation sheet during the test are data that can be used to determine the ability of workshop participants to absorb related workshop material the concept of argumentation skills. The results of the performance tests of the workshop participants provide an overview of the skills of the workshop participants in compiling and using the instruments trained. The questionnaire filled out by the participants in the last part of the activity to find out the response of workshop participants to PKM activities. Throughout the process of implementing activities, the necessary data collection is carried out.

RESULTS AND DISCUSSION

The workshop on preparing argumentative questions to train HOTS thinking for Indonesian school teachers in Davao Philippines, will be held online on June 27, 2023. The activity was attended by Indonesian Davao Filipino school teachers from various types and various subjects has been carried out well.

The workshop equipment prepared for participants includes a collection of material in the form of material on argumentation skills and argumentation problem development exercise sheets. This workshop activity provides opportunities for participating teachers to develop argumentation questions as a way to train HOTs thinking in students. Participants were given one week to develop argumentation-based questions to be uploaded on a specially prepared GC platform. Socialization of activities to target audiences is carried out openly through social media Figure 1.

Workshop activities were carried out online and obtained by participants who participated were 20 participants, but those who attended and followed to completion were seven teachers who had filled in the registration link, followed the workshop material, did assignments and collected assignments on the GC, received input and were revised by the PKM assistance team and conducted questions and answers in the follow-up activities on the GC to completion. This program is using a learning approach 4.0 that applies the digital era learning activities, (Haleem et al., 2022; Singh et al., 2021) and teachers to be able to do learning is not limited space, interactive discussion (Haouas & Bouakaz, 2018). Training materials and introduction to argumentation learning concepts through online or using learning media as problem solvers (Sudiran & Adityo, 2023).

Figure 1. PKM implementation flyer packaged in online workshop

Extracting Preliminary Information related to Argumentation Skills

Workshop activities have been carried out with speakers from lecturers majoring in biology and biology education who are competent in their fields, material delivered related to high-level thinking skills, argumentation skills material, material about STEM, material about examples of argumentation problems in Biology learning that can be developed to train students to think higher-order. The following is a Figure 3 and Figure 4 of the Davao School Joint Workshop in the Philippines.

Figure 3. Argumentation skills material for workshop participants

Figure 4. Workshop online with Teachers DAVAO School

The measurement of participants' initial and final understanding was carried out simply through questions and answers. The PKM team provides a simple understanding of argumentation thinking and HOTS. In recent years, regulation of learning, which involves self-, co-, and socially shared regulations (Ramirez-Montoya et al., 2023).

In this initial information extracting process, participants respond well by asking questions and ideas about phenomena around students and schools that have the potential to be a stimulus to train HOTS thinking and compile all scientific arguments (Toulmins, 2006). The results are in the form of argumentation questions developed by participants. The arguments which we put forward, and the steps which occur in them, will be correspondingly various: depending on the logical types of the facts adduced and of the conclusions drawn from them, the steps we take—the transitions of logical type—will be different (Setiyaningsih et al., 2023). This program one of the stages to anticipate the developments in the era of globalization, it is necessary to improve the quality of education in Indonesia (Rizqi et al., 2020).

Workshop participants' response

Based on the results of this initial information, it was used to see the argumentation skills of participants from SID. These results are discussed based on participant response diagrams. Participants' responses showed 100% pleasure participating in the argumentation skills development workshop as shown in Figure 5.
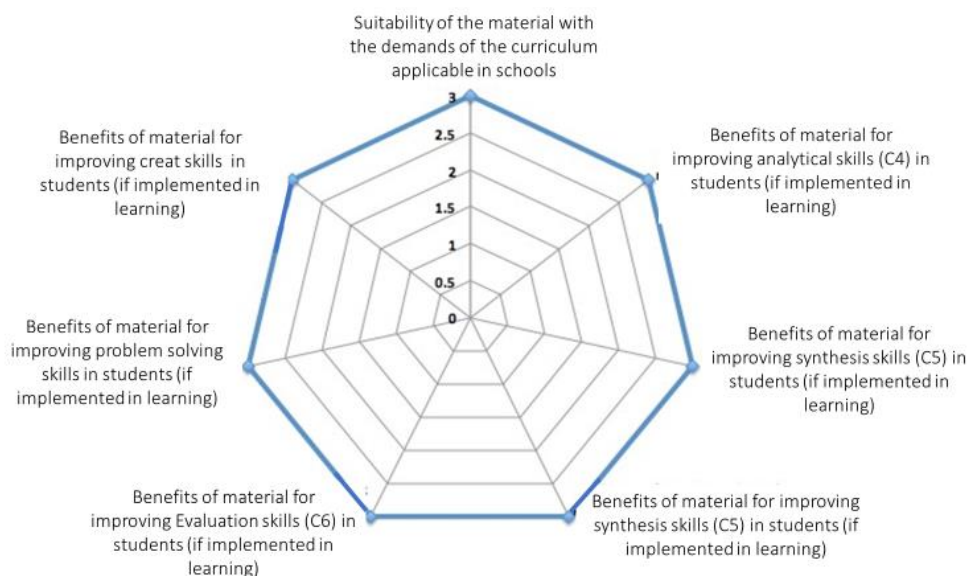

Figure 5. Trainee responses to higher-order thinking skills (HOTs) material; Description 3= good, 2= sufficient, 1= less.

Findings in Figure 5 show that the results based on the GC platform to answer the needs of the remote and difficult Indonesian teacher service community from Indonesia can answer researchers' questions, this is in line with the results of service reflection that is aligned with critical thinking reflection for online community service. (Wahyuni, 2023). The service program can also be able to obtain information from participants through workshops on how they carry out the teaching and learning process in class about HOTS questions (Sudiran, S., & Adityo, A.2023). Argumentation activities can be developed through the PKM program (Permana. et al., 2023).

Teachers at Davao schools also hope to practice the process of teaching and learning activities collaboratively in the classroom and apply HOTs questions such as STEM-shaped questions, argumentative, from the results of workshop activities. Teachers' skills to promote constructive and active learning can affect meaningful learning for their students (Apriono, 2013). This is in line with the results of research on argumentative that every researcher can use the argumentation model well as a tool to analyze a form of argumentation (Widhi et al., 2021).

Through this workshop, STEM-related materials are also presented to strengthen the concept of thinking, argumentation, and participants' opinions or responses can be netted with profiles as shown in Figure 6.
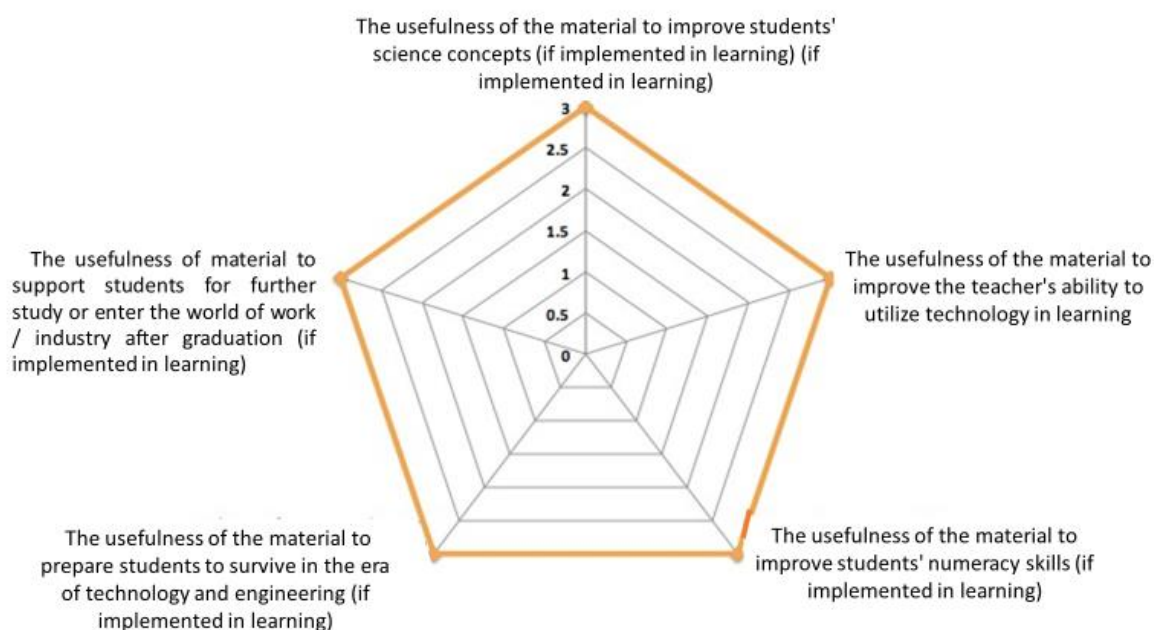

Figure 6. Trainees' responses to STEM (Science, Technology, Engineering, Mathematics) approach material; Description 3= good, 2= sufficient, 1= less.

Based on the aspects obtained based on Figure 6 has given very good results because each component provides an overview of the usefulness of workshop activities. Every critical thinking learning that utilizes technology is very important to be developed by teachers in order to keep up with the times. Following the innovations of technology to adapt to the rapidly, with sufficient knowledge, it is also crucial that they are equipped with the competencies, to enhance students' critical thinking skills and problem solving (Tasgin & Ciqdem, 2023). Many of the people responsible for these innovations were only slightly educated and/or were in some type of apprenticeship. Many of the people responsible for these innovations were only slightly educated and/or were in some type of apprenticeship. Technology Education teachers may use educational technology to deliver lessons and for assessment (White, 2014).

Learning that supports critical thinking skills is through investigation. The investigation focuses on two primary contexts, the most popular teaching and learning instructional methods and by implementation of integrated STEM teaching approach (Muchtar & Lin. 2023). Other studies also state that by learning STEM indicators in teaching materials for students can train BioEntrepreneurship skills to support SDGs in advanced learning, teachers can develop these indicators (Makhmudi et al., 2020).

Findings in Figure 7 show that during the workshop activities that have been carried out online, participants also filled out questionnaires which were distributed through G. Form. The selection of participants' responses on the implementation of PKM is divided into materials; practice and motivation in carrying out entrepreneurial activities.

The components in this instrument can be used as an aspect to assess the opinions of workshop participants, it is hope that in accordance with the purpose of the argumentation strategy is clarify and improve ideas, so that can make decisions appropriately and good. Technique to assess, classify, and show the quality or level or argumentation from students (Widhi et al., 2021).
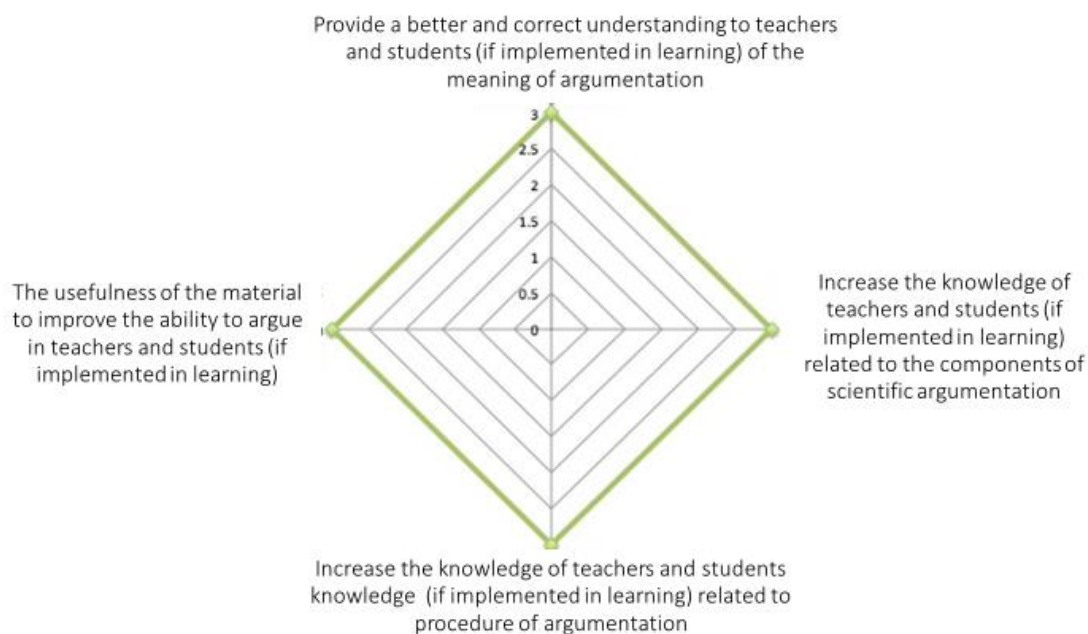
Figure 7. Trainees' responses to argumentative thinking material; Description 3= good, 2= sufficient, 1= less

The participants were also given a questionnaire at the end of the activity to see the response of the workshop activities which can be seen in Table 1.

Table 1. Response of Training Participants in Preparation of Argumentative Questions to Train HOTS Thinking in Indonesian School Teachers Davao Philippines Table 1.

No	Aspects	Average Score
A	Argumentation Question Development Workshop	
1	Improve argumentative problem-making skills	3
2	Gain insight into variations / types of argumentative questions	3
3	Improve the ability to make argumentation questions according to student conditions at school	3
B	Resource Person's Ability	
1	Mastery of the material presented	3
2	Clarity of articulation and expression	3
3	Communicative choice of words/sentences	3
4	Hospitality	3
5	Empathy	3
6	Openness	3
7	Responsive	3
C	Implementation techniques/sarara/infrastructure	
1	Internet connection	3
2	Supporting modules/files	3
3	Sound clarity	3
4	Slide clarity	3
5	Lighting	3

Based on Table 1, it can be seen that 100% of participants gave a positive response to the activities carried out. The input given by the participants was intensive assistance to teachers to compile argumentation questions aimed at compiling question banks for each subject at each school level.

Based on the response questionnaire that has been filled out by respondents, it can be seen that participants give positive responses to the activities that have been followed. Positive comments have also been given by participants

(Table 1). Based on three indicators, it can be seen that the average reaction of participants to the online workshop material averaged a score of 3 with a good predicate.

Collaborative learning activities with argumentative models show that participants' responses to argumentative material are good so that good understanding of material concepts can be measured and can be analyzed through Tolmins' argumentation model (Widhi et al., 2021).

Results of Argumentative Question development by participants

The evaluation stage, after attending the workshop on preparing argumentative questions, participants together tried to develop questions according to their subjects and education levels and the results were reported through Google Classroom, so that lecturers could provide comments and input to improve the question products that had been prepared. Students' perceptions of argumentation were based on knowledge, classroom activities, understanding, nature of science, actions by teachers and students, and classroom management (Kaya et al., 2010)

Based on the results of the workshop, participants can make argumentation questions that are collected, reviewed and assessed by accompanying lecturers. This is in line with previous research that learning based on Toulmin's Argumentation Pattern has advantages, including; 1) affect the ability of argumentation affect, 2) increase the strengthening and acceleration of understanding of concepts, 3) build better argumentation patterns, improve the quality of argumentation, and 4) create creative and innovative material development in learning. Therefore, the development of collaboration with the discussion learning that we do conducting, providing problem-based learning material, argumentation, STEM, and HOTs concepts can increase participants' knowledge in developing argumentative problems. Of course, it will be able to be used in classroom learning.

The end of this activity provides benefits that have a direct impact on participants. The novelty of this training includes: 1} Other maple teachers besides biology succeeded in developing argumentative questions2, meaning that these competencies can be learned across maples. For example, Indonesian maple teachers succeeded in compiling good argumentative questions, 2) Argumentative questions allow HOTS to be trained and mastered by participants, and 3} Of these 2 things mean that HOTS and argumentative thinking are general thinking logic, and can be trained without material content limits.

This activity is also obtained there are those skills that lend themselves to be possibly learned within the instructional/training cum community framework, for example, collaboration and leadership within a particular practice (Lee & Hung, 2012).

CONCLUSION

Based on the response questionnaire that has been filled out by respondents, it can be seen that teachers at DAVAO schools in the Philippines gave a positive response to the activities that have been carried out. This result is seen based on three indicators; it can be seen that the average response of participants to the online workshop material averaged a score of 3 with a good predicate.

ACKNOWLEDGEMENT

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