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Response Analysis of Training Participants of The Project Learning Integrated Ethno-Stem for The Study of Herbal Tea as A Covid-19 Immunity

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Abstract
This time Indonesia is being hit by the Covid-19 pandemic, so it is important to introduce local plants as immunity to teachers and students. The purpose of this training is to provide knowledge and skills to recognize the Ethno-STEM integrated project learning model (PJBL) on the topic of local plant herbal teas and tropical forests as immunity. This training is important, because the results of interviews with several teachers and master students of chemistry education show that they have never received this training. This training activity was carried out at the UNNES Postgraduate online, as well as the practice of making tea and learning videos at the UNNES Chemistry Laboratory. The method of activity is through lectures, discussions, and herbal tea making practices, as well as evaluation. The target audience is teachers, 22 students of master's degree in education. The results of the training activity concluded that participants had acquired the knowledge and skills to design an integrated Ethno-STEM learning model for herbal teas and tropical forest plants as immunity. The results of the response analysis to this training concluded that (1) participants were very happy and interested in this activity, (2) this activity was useful, (3) participants understood how to make herbal tea and the syntax of PjBL Sudarmin, and (4) this learning was able to equip character conservation.

Keywords : Project base learning, Ethno-STEM, herbal tea, covid 19

INTRODUCTION

At this time, Indonesia is being hit by the Covid-19 pandemic, so it is important to introduce local materials as body immunity to teachers and students. The purpose of this training activity is to provide knowledge about the Ethno-STEM integrated project learning model for the study of local herbal teas and tropical forest plants as body immunity, followed by an analysis of the trainees' responses. Chemical studies related to herbal teas as body immunity are the main topics of discussion of solution chemistry and colloids, carbon compounds, and separation of substances. This training is important, because during the global era and the current Covid-19 pandemic, educators and master students in chemistry education are required to have broad, creative, innovative insight, literacy of the nation's culture and technology.

Mastery of TPACK means that an educator and master student in chemistry education must improve the quality of learning processes and outcomes which are part of the fast pillars of teacher competence (Sukmana, 2019). At this time an understanding of TPACK and its application for educators is very important, because the trend of chemistry learning now must be able to prepare students for mastery of scientific fields in this case related to chemistry, pedagogics regarding the diversity of models and approaches to chemistry learning, technology mastery and various learning applications. ; along with its integration between content, pedagogy, and technology in Chemistry learning.

Thus, this training will develop components in TPACK in an integrative way for the topicof herbal teas and tropical forest plants as body immunity through learning the Ethno- STEM integrated project

(Satriani, 2017).

The Ethno-STEM approach was chosen in this training, because at this time high- level thinking skills, preparing life skills in the 21st century, and preparing the younger generation for cultural literacy can be done with the Ethno-STEM approach (Roberts, 2012). this. These higher-order thinking skills include critical thinking, which is an activity or a thought process of analyzing, explaining, developing, selecting ideas, comparing, and testing arguments and assumptions, completing and evaluating conclusions, determining priorities for making choices (Fitri, 2019). This activity can be developed, for example, participants can criticize local plant materials and tropical forest plants that are capable of immunity and body health. Creative thinking skills are individual or group skills in using their thinking processes to generate new, constructive ideas based on rational and perceptual concepts and principles, and individual or group intuition to produce a new and varied process or product (Harry, 2016) Another 21st century skill is collaborative skill, which is the ability to participate in every activity to build relationships with other people, mutual respect, relationships and teamwork to achieve the same goal (Syahirah, 2020)

While communicative skills are the ability of a person to communicate in conveying knowledge, concepts, theories, or ideas to others in accordance with a particular topic or field of study. Thinking skills at this level can be developed during the Ethno-STEM integrated project-based learning process. This happens because during project learning, students are given broad opportunities to think critically to determine the types of local plants to produce herbal teas that can act as immunity, to be creative in establishing work procedures, designing project activity schedules, and implementing them; During the practice of making herbal teas, collaborative and communicative work between groups will be established.

The choice of the Ethno-STEM approach, because one of the learning approaches that is currently popular and developed is the integration of Ethnoscience and Science, Technology, Engineering and Mathematics (STEM). The Ethnoscience and STEM integration approach is known as the Ethno-STEM approach (Reeve, 2015) The STEM approach is a learning approach that uses an interdisciplinary approach where its application is problem-based or project-based active learning. Ethno-STEM approach, then a teacher through the theme of local tea and tropical forest tea plants as body immunity is discussed by connecting science, technology, engineering techniques, and mathematics. This Ethno-STEM integrated project learning model emphasizes students to always be active in learning activities using herbal tea-making technology products. This is able to encourage students to learn more actively and more meaningfully so that students' higher-order thinking skills are maximized (Ariyatun, 2020) The use of this appropriate Ethno-STEM integrated project learning model is in line with 21st century learning. Based on the description above, chemistry teachers who are members of the Semarang Chemistry Subject Teacher Consultative Organization (MGMP) as a forum for information discussions are highly expected to take part in this training activity. with students of the master's program in chemistry education. At this time, Indonesia is being hit by the Covid-19 pandemic, so it is important to introduce local materials as body immunity to teachers and students. The purpose of this training activity is to provide knowledge about the Ethno-STEM integrated project learning model for the study of local herbal teas and tropical forest plants as body immunity, followed by an analysis of the trainees' responses. Chemical studies related to herbal teas as body immunity are the main topics of discussion of solution chemistry and colloids, carbon compounds, and separation of substances. This training is important, because during the global era and the current Covid-19 pandemic, educators and master students in chemistry education are required to have broad, creative, innovative insight, literacy of the nation's culture and technology. Mastery of TPACK means that an educator and master student in chemistry education must improve the quality of learning processes and outcomes which are part of the fast pillars of teacher competence (Sukmana, 2019). At this time an understanding of TPACK and its application for educators is very important, because the trend of chemistry learning now must be able to prepare students for mastery of scientific fields in this case related to chemistry, pedagogics regarding the diversity of models and approaches to chemistry learning, technology mastery and various learning applications. ; along with its integration between content, pedagogy, and technology in Chemistry

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METHOD

The target audience for this activity are representatives of Chemistry Teachers who are members of the Chemistry MGMP Organization of MAN and SMA Semarang, master students of chemistry education, and UNNES Postgraduate chemistry lecturers. The training activities are carried out in three stages, namely; preparation, implementation and evaluation. The activities are carried out based on the participation of the target audience, as well as the participatory collaboration of the implementing team for community service activities and the target audience. In summary, the method of implementing the service program for training the Ethno-STEM integrated project learning model for making herbal teas from herbal plants and Indonesian tropical forests as body immunity is shown in Figure 1.

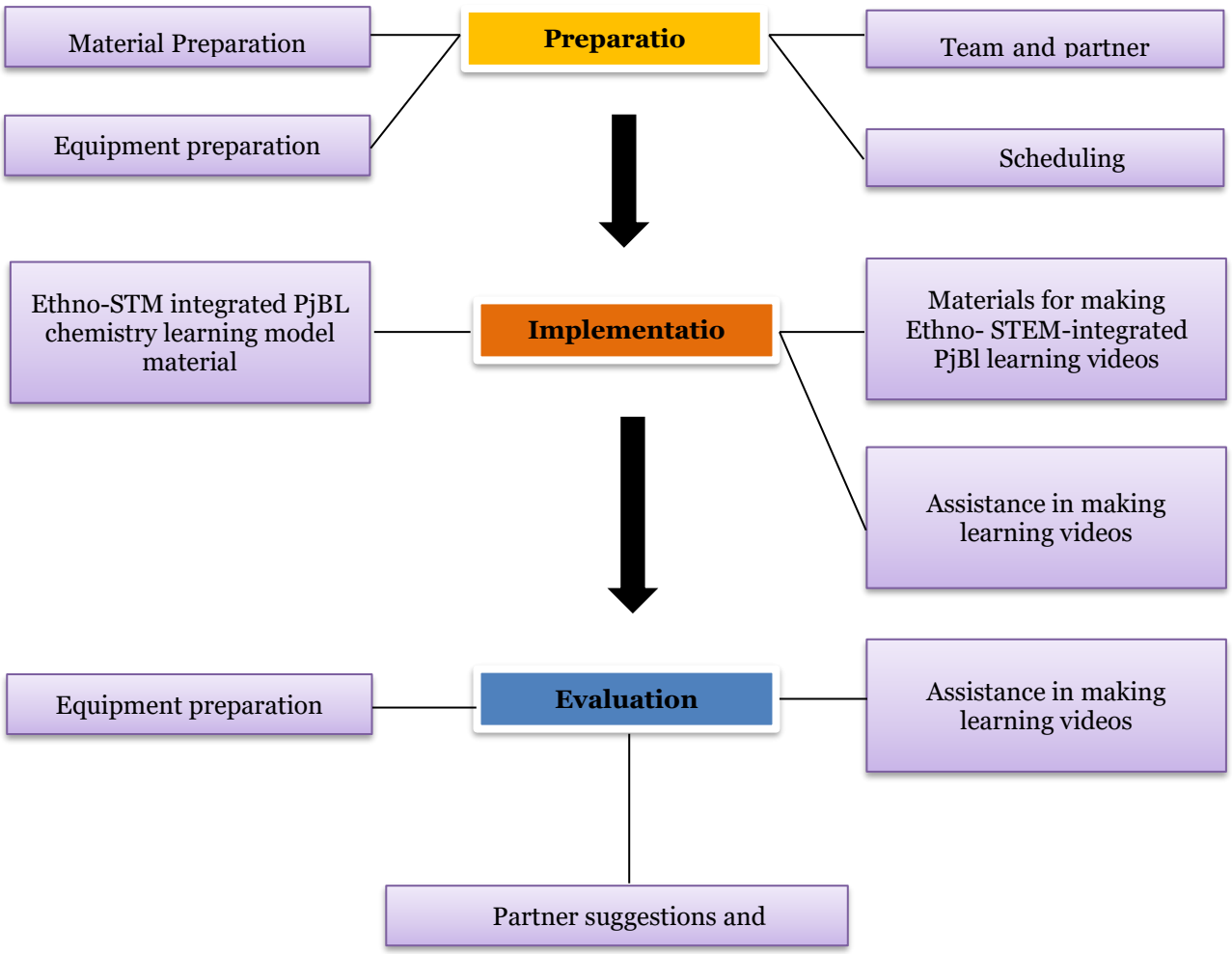

Figure 1. Methods of implementing the training program

At the implementation stage of this training activity, the training activities are carried out through stages (a) the Preparation stage, which at this stage carries out activities (a) a coordination meeting for the community service lecturer team with the chairman of the Chemistry MGMP and UNNES Chemistry Masters Education Students, (b) Preparation of the schedule for the implementation of the training program, and (c) Preparing the learning materials for the integrated Ethno-STEM project. Stages of implementation: At this stage, the delivery of training materials in the form of knowledge, the practice stage of making local herbal teas, and mentoring is carried out. The Knowledge Phase contains webinar activities that discuss the Ethno-STEM integrated project learning model, knowledge of herbal teas and how to make them; as well as the benefits of tea for immunity, antioxidants, anticancer and body health.

In this activity, during the herbal tea-making process, the service team provided direction and guidance to training participants for making herbal teas from local plants and tropical forest plants, as well as making learning videos for ethno-STEM integrated projects. At this stage of the herbal tea-making activity, mentoring and evaluation of the process and product of the herbal tea-making project were followed. In connection with the Covid 19 pandemic, where training participants were accompanied and assigned to make herbal teas and videos, the Ethno-STEM integrated project learning training was only carried out in one group and was followed by evaluation and feedback on the overall implementation of the training program in this community service program.

RESULTS AND DISCUSSION

Implementation of Training Activities

At the implementation stage of this training activity, the training activities are carried out through stages (a) the Preparation stage, which at this stage carries out activities (a) a coordination meeting for the community service lecturer team with the chairman of the Chemistry MGMP and UNNES Chemistry Masters Education Students, (b) Preparation of the schedule for the implementation of the training program, and (c) Preparing the learning materials for the integrated Ethno-STEM project. Stages of implementation: At this stage, the delivery of training materials in the form of knowledge, the practice stage of making local herbal teas, and mentoring is carried out. The Knowledge Phase contains webinar activities that discuss the Ethno-STEM integrated project learning model, knowledge of herbal teas and how to make them; as well as the benefits of tea for immunity, antioxidants, anticancer and body health.

Tea Making Equipment as a Result of Institutional Research Activities

The problems currently being faced are chemistry teachers and students regarding the need for knowledge of the Ethno-STEM integrated project-based learning model and the skills of making herbal teas and tropical forest plant teas as antioxidants, antibacterial, anticancer, immunity and body health. Referring to the results of the needs analysis, the service team from the UNNES Postgraduate chemistry education master in collaboration with MGMP Kimia Semarang agreed to hold a training program for the development of the Ethno-STEM integrated learning model. This training program will combine the knowledge needs of teachers in facing the 21st century era and learning based on local wisdom, namely herbal tea. In this activity the herbal teas that will be made are lemongrass leaf and stem tea, bay leaf tea, moringa leaf tea, lime leaf tea; as well as bajakah tea, taxus tea, kunung root tea and ant nest tea. The diversity of various kinds of tea is believed by the public to be efficacious for immunity and body health during the Covid-19 pandemic (Capraro, 2013)

One of the learning characteristics of the Ethno-STEM integrated project in this activity is integrating science, technology, engineering, and mathematics in solving real problems in this case local tea making as immunity to Covid 19. The results of the analysis of chemical materials, followed by discussions with the MGMP chairman, so in this service activity for the Ethno-STEM integrated project learning model related to local herbal teas and tropical forest plants, the selected subjects are solution and colloid chemistry, carbon compounds, and separation of substances. In research activities with students with UNNES DIPA funds, they have designed the design of tools and the use of technology for making herbal teas from local plants and tropical forest plants to solve real problems regarding the body's immunity to covid 19.

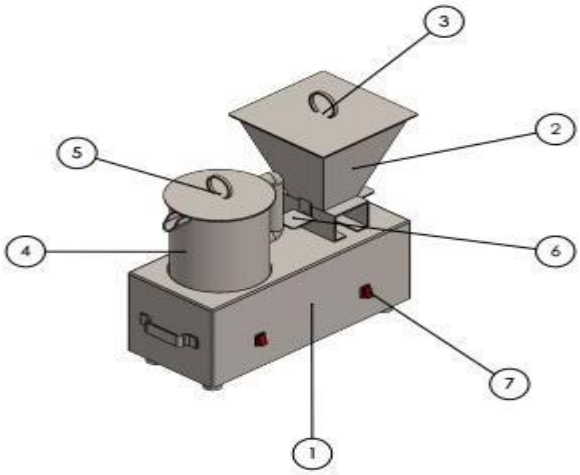

Figure 2. Design of herbal tea making equipment from local plants and tropicalforest plants in Indonesia

In Figure 2, the tea maker consists of the following parts (1) Box, (2) Blender, (3) Blender cover, (4)

Heater, (5) Heater cover, (6) Blender lock, and (7) Switch. The Ethno- STEM integrated project learning model training program for the study material for making herbal teas will contribute to improving the quality of the chemistry learning process in Indonesia, as well as a shift in individual learning towards collaborative learning, emphasizing the linkage of scientific knowledge, creativity and problem solving with learning needs. 21st century (Han, 2016)

Implementation of Ethno-STEM Integrated Project-Based Learning Model Training

During the COVID-19 pandemic which has not ended, it is necessary for teachers and Masters Students of Postgraduate Chemistry Education to be creative in developing the learning models needed today. On this basis, the UNNES Postgraduate Chemistry Education Masters program held training on the development of an Ethno-STEM integrated project- based learning design. This training activity was carried out on July 6, 2021 with 39 participants from lecturers, teachers, and students, in which the topic discussed was Designing an Ethno-STEM integrated PjBL Model for the topic of herbal tea and tropical forest plant tea projects for immunity. body during the Covid-19 pandemic. The speaker of this activity is the head of the community service program team, Prof. Dr. Sudarmin, M.Si.

In presenting the material, the resource persons gave examples of making herbal teas from Taxus and Akar Kuning through video presentations, and presentations of material, so that participants are expected to be able to implement the developed model. The next stage of this activity is the implementation of practicum on making various herbal teas, such as bay leaf tea, lemongrass tea, parijoto tea, and others in the Chemistry Laboratory. This training activity was carried out online, so at the end of the activity participants filled out a questionnaire to measure the process and success of this training activity.

Figure 3. Ethno-STEM Integrated Project-Based Learning Model Development Training

In this activity, knowledge was presented to participants regarding the stages of the Ethno-STEM integrated project learning model. The stages of developing an Ethno- STEM integrated PjBl are as follows: 1) Identification of various Basic Competencies (Knowledge and Skills) that are in accordance with the Ethno-STEM integrated project learning unit; 2) identification of topics from the chemistry learning unit regarding herbal teas as body immunity in accordance with Basic Competencies; 3) Formulate indicators of competency achievement as a description of basic competencies; and 4) Analysis of the study of the components of Ethnoscience and STEM (Ethno-STEM) on thetopic of herbal tea in the context of learning chemistry. In Table 2, an example of material analysis for the Ethno-STEM Integrated project learning for the study of herbal teas presented in this training is presented.

Table 1. Material analysis for Ethno-STEM Integrated project learning

Science and Ethnoscience	Technology and Ethnotechnology
Science: Herbal teas are scientifically proven to contain secondary metabolites that act as immunity, antioxidants, and anticancer Ethnoscience: Community knowledge about local plants extracted or brewed to make local tea as medicine, immunity, and	Technology 1. Using a herbal tea maker consisting of a blender, a tea extract reactor with an integrated lid on the Volatil Oil Compound sensor 2. Using the computer to search for information to solve the problem of making the best herbal teas, the chemical components in tea, as well as relevant articles 3. Using computer technology for report generation and data analysis Ethnotechnology Traditional technology involves making herbal teas by boiling, brewing and filtering
Engineering and Ethnotechnology	**Mathematics and Ethnomathematics**
Engineering Engineered to produce a composition between herbal tea ingredients that is more effective for body immunity, attractive aroma, and is worthy of sale Ethnoengineering People's knowledge of how herbal teas are more nutritious, durable, and delicious; anddelicious.	Mathematics Calculating the composition between water solvent (solvent) and herbal tea ingredients (solute) which is ideal in making herbal teas, calculating the composition (concentration) of herbal teas made. Ethnomathematics Traditionally calculating the dose of water with ingredients from local plants and tropicalforests in the manufacture of herbal teas.

The results of the analysis of basic competencies and their development, learning the Ethno-STEM integrated chemistry project, students must understand the relevant concepts of herbal tea and body immunity, namely the concept of solution and colloid chemistry, extraction and isolation, metabolite compounds, and separation of substances. Previous research (Sudarmin, 2019) has found an Ethno-STEM integrated project learning model following the Sudarmin syntax which is applied to this training activity as presented in Table 2.

Table 2. Ethno-STEM integrated project learning model with *Sudarmin* Sintax

Ethno-STEM integrated PjBL syntax stages	Learning Activities
S*ajikan* (Present) a scientific problem or issue that demands higher order thinking.For example: Why do people use herbal teas as body immunityduring the covid pandemic?	Students are active independently or in groups by utilizing their five senses and various digital information to understand and identify scientific problems or issues or factual issues in society. In this research, why do people use a minimum of herbal tea ingredients as body

Unjuk kerja (Performance) by submitting innovative and creative ideas after reading relevant references regarding research projects on herbal teas from local plants and tropical forest plants as immunity.	Students independently or in groups look for the best answer to the problemof herbal tea as immunity as an ethno- STEM study given by the lectur
*Diskusika*n (Disscuss) in groups to solve problems regarding project assignments regarding the manufacture of herbal teas andtesting their bioactivity in the body.	Students in groups discuss with the guidance of the lecturer to discuss a predetermined project regarding what herbal teas are useful for immunity in the context and content of Ethno-STEM
Analisis [Analyze] and determine the best project design regarding the manufacture of herbal tea as immunity based on the results ofdiscussions and lecturer guidance.	Each group of students critically andresponsibly decides on the best project design fromthe results of the project work intheir group.
Rancang [Design] project work schedules and detailed laboratory work to prove the truth ofpublic knowledge about herbal teas as body immunity.	Students critically and creatively design project and laboratory work schedules indetail to prove the truth of public knowledge about herbal teas as body immunity.
*Mantapka*n (Steady) Steady of a project work schedule starting with the preparation of materials, procedures, and project work observation sheets regarding the manufacture of herbal teas as immunity.	Students critically and creatively steady and establish a project work schedule starting from the preparation stage, implementation; procedures, and observation sheets.
Implementasikan [Implementation] the results of project work designs, laboratory work and activity schedules to prove the truth of people's knowledge that herbal tea is an immune system.	Groups of students collaboratively make herbal teas, laboratory work accordingto the schedule of activities set to prove the truth of public knowledge that herbalteas are the body's immunity.
Nyimpulkan (Conclusion) and evaluating the truth of public knowledge that herbal tea as body immunity based on data analysis from laboratory work, as well as assessing the limitations of the project work.	Students conduct data analysis to conclude the truth of public knowledge that herbal tea is the body's immunity, and communicate this conclusion through presentations Zoom.

Results of Training on Making Herbal Tea as Body Immunity

In the next stage, a series of training activities on making herbal teas as well as making herbal teas will be carried out learning video media for this training activity. At this time it was still the era of the covid 19 pandemic, so that the training activities were only represented by one group consisting of master students of postgraduate chemistry education UNNES, chemistry teachers MAN I Semarang, a chemistry teacher at SMA Semarang, and a chemistry student at FMIPA UNNES. In the activity of making herbal tea, the ingredients for making tea are washed in running water, dried in an oven at a temperature of 70-80 oC for 24 hours, taken and cooled, after being cooled put in a blender, after being finely extracted in a heating tube with add about 1 liter of water. When heating, the ingredients will be extracted so that the water will be brown, yellow, or according to the color of the initial material, after a temperature of 100

oC. The tea extract formed is filtered, so that the residue of tea granules is obtained, and herbal tea extracts are ready to drink for body immunity.

(a) (b)

Figure 4. Produf of Herbal Tea (a) and (b) ready to drink

Participant Response Analysis and Discussion

At the end of the training activities carried out with the Zoom application, participants were given a questionnaire using the Google Form application on the process of training activities that had been carried out. The results of the analysis of the training activity data are presented in Table 3.

Table 3. Questionnaire Results of the Project Integreted Ethno-STEM

Statement	Average Score	Criteria
Participants understand the Workshop material	3.37	Strongly agree
The workshop is going well	3.39	Strongly agree
Workshops increase curiosity	3.54	Strongly agree
The workshop encourages to design 21st century learning.	3.50	Strongly agree
The workshop encourages STEM literacy and local culture.	3.46	Strongly agree
The workshop encourages to apply it in chemistry learning	3.45	Strongly agree
Workshops encourage seeking more information	3.46	Strongly agree
Workshops encourage more knowledge about study materials/chemical materials	3.44	Strongly agree
Workshops encourage to design teaching materials	3.38	Strongly agree
The workshop encouraged me to design learning evaluation tools	3.39	Strongly agree

Workshop to make understanding related to thecharacteristics of STEM/STEM Ethno	3.35	Strongly agree
Workshop made to look for related approach videos.	3.41	Strongly agree
Workshop made to search for related textbooks	3.36	Strongly agree
STEM/Ethno-STEM learning can be applied to all fields of study	3.12	Agree
STEM/Ethno-STEM can be applied to instill conservation character	3.50	Strongly agree

In Table 3 above, the average price of participants' answers is between 3.25- 400 strongly agree. Meanwhile, the responses of the trainees on the manufacture of herbal teas are presented in Table 4.

Table 4. Training Participants' Responses to the Ethno-STEM Integrated Project Learning Training Activities Study Materials for Making Herbal Teas for Health and Body Immunity.

Participants' responses to the activities	Score	Achievement category
Interesting Ethno-STEM Integrated PjBl learning training activities.	3.6	Very high
Useful Ethno-STEM Integrated PjBl learning training activities	3.6	Very high
Understanding the benefits of herbal teas and tropical forest tea	3.2	Currently
Understand the stages of making herbal tea with this ethno stem integrated project learning	3.0	Enough
Ethno stem integrated project learning is able to foster conservation character	3.2	Very high

In Table 4, it is known that the response of the training participants to this service activity was very positive, marked by a very high response to the aspects of usefulness, interest, addition of knowledge, and developing conservation character.

CONCLUSION

The results of the training activities concluded that participants had acquired the knowledge and skills to design and practice the Ethno-STEM integrated learning model study materials Herbal tea and tropical forest plants as body immunity, the implementation of the delivery of training materials was interesting, motivated to apply, the Ethno-STEM integrated PjBl learning model added participants' knowledge of innovative learning models, as well as skilled participants in designing and applying knowledge related to herbal tea making; and this learning is able to equip the conservation character of the participants.,.

ACKNOWLEDGMENT

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