Secondary metabolite learning model from *Taxus sumatrana* with ethnoscience integrated inquiry using online system and google form application

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**Abstract.** During the current Covid-19 pandemic, learning was carried out using an online system, so many training activities, seminars, and lectures were carried out online. In this research, a secondary metabolite learning model from *Taxus sumatrana* will be applied with Ethnoscience Integrated Inquiry. Learning activities are carried out online via video conference. Furthermore, to evaluate the learning process and results, the google form application is used. This research is institutional research from an Ethno-STEM based Learning Center. Lessons are conducted online for two hours and during the webinar activity. Learning consists of presenting material, question-answer, and the evaluating of the training process and results using the google form application. The learning activities were attended by 128 participants from 69 universities, 14 schools, and 4 non-educational institutions. The evaluation results of the evaluation show that the implementation of the secondary metabolite learning model from *Taxus sumatrana* is very satisfying, engaging, creates curiosity, and motivates to understand STEM literacy and local culture. Besides, an evaluation of the material mastery shows a moderate average score of 12.53 from a maximum score of 20.00.

1. **Introduction**

The use of technological developments in the era of the industrial revolution 4.0 has indirectly become one of the main solutions in the world of education during the current Covid-19 pandemic. Information technology can be useful as a medium in carrying out the educational process, such as the teaching and learning process, finding references and sources of information [1,2]. In addition, learning with the use of information technology provides quality coverage that is suitable for millennial communities that can be accessed in various places and times [3].

Information technology-based learning is an unavoidable need in the era of digitalization 4.0 [3]. The use of technology such as the Google Form application media to serve as an evaluation tool has been implemented by several researchers [5,6]. In general, it gives an idea that Google Form is one of the media that can be used in the learning process.

Inquiry learning is a learning method that combines a student-centered learning system and direct activities with discovery [7]. However, in reality, direct activity is not a requirement for inquiry
learning. The inquiry learning model is learning in which lecturers and students study the events and symptoms of scientific symptoms with the approach and spirit of scientists. Meanwhile, essence of the inquiry learning model is to organize a learning environment/atmosphere that focuses on students by providing adequate guidance in finding scientific concepts and principles.

Independently inquiry learning can encourage students to be responsible in learning. In addition, through scientific principles and methods in inquiry learning, students can observe a phenomenon, synthesize research questions, test questions repeatedly and finally analyze and communicate their findings [6]. This means that inquiry is a way of teaching students how to learn using skills, processes, attitudes, and knowledge of rational thinking.

The inquiry learning model integrates logical ethnosciences and makes it possible to develop local cultural values in solving problems in learning [8]. As with the original knowledge that exists in the Philippines, the Kankanaey community knows how to detect and anticipate [9]. This learning model can educate students to interact directly with local culture and explore, verify, reduce, conceptualize, and document scientific knowledge based on community knowledge (Indigenous Science) from community cultural activities that contain concepts or knowledge science.

In this study, the inquiry model is integrated with ethnosciences in the STEM context where the 21st century learning system becomes the reason for changing lecturer-centered learning into student-centered learning so that future generation participants are able to think critically, innovatively, deductively and inductively, solve problems, collaborative, communicative, and independent or Entrepreneur in today's global era, while the study material in Ethno-STEM learning is the medicinal plant *Taxus sumatrana*. This plant is better known as a local plant, namely Sumatran pine, where this plant has the potential to fight cancer cells.

Therefore, it is hoped that through Ethno-STEM learning through online learning and Google forms, it is able to deliver students as the younger generation to transform problem solving in everyday life, without leaving the nation's culture; and this is the essential essence in integrated inquiry learning Ethnosciences and STEM [10,11]. In addition, it can provide motivate to understand STEM literacy and local culture.

2. Methods

This research is part of a series of R&D studies whose main focus is to increase student motivation to understand STEM literacy and local culture through online learning and Google forms. Sources of data were obtained from webinar participants who came from 69 universities, 14 schools, and 4 non-educational institutions.

According to Sugiyono [12] the research method is a scientific way to obtain data with specific purposes and uses. The methods used in this study were interviews and field surveys. According to Esterberg in Sugiyono [12] an interview is a meeting conducted by two people to exchange information and an idea by means of question and answer so that it can be reduced to a conclusion or meaning in a particular topic, while a field survey according to Sugiyono [12] is research conducted on large or small populations, but the data studied is data from a sample taken from that population, so that relative incidents, distribution, and relationships between sociological and psychological variables are found.

In this study the authors developed an instrument in the form of a questionnaire. Therefore, the writer must formulate the statement points of the questionnaire. The measurement scale on this questionnaire instrument uses a Likert scale. According to Sugiyono [12] "Likert scale is a scale used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena". The Likert scale answers to this questionnaire instrument are strongly agree, agree, quite agree, and disagree. The form of the questionnaire is in the form of a check list along with the respondent's reasons for choosing the score. The questionnaire instrument was prepared using a grid in the form of a table containing indicators, item numbers, and number of items.

The questionnaire items used in the Webinar on the Potential of Secondary Metabolite Compounds in the Context of Inquiry and Functional Food Learning are 15 statements, namely they can be applied
to instill a conservation character, important to be applied in learning organic chemistry of natural materials, can be applied to the Ethno-STEM integrated inquiry model, webinars encourage to make related textbooks, webinars encourage making related learning videos, webinars encourage to design teaching materials, webinars encourage knowing teaching materials/chemical materials, webinars encourage finding more information, webinars encourage applying in learning, webinars encourage understanding literacy Ethno-STEM, webinars encourage designing related learning materials, webinars fostering conservation character, webinars increase curiosity, conduct interesting webinars, participants understand webinar material.

3. Results and Discussion
In this study, the learning process was carried out online through webinars. Of course, activities such as webinars are a solution to this current pandemic. The webinar activity is a tremendous innovation in technology that is useful for interacting and collaborating across broad geographic boundaries [13]. This is evidenced by webinar participants in this study who come from various universities who are willing to attend the forum to carry out learning related to secondary metabolites, *Taxus sumatrana*.

The webinar activity offers two-way communication which becomes one of the platforms that leads to higher effectiveness and involvement by existing participants [13]. Therefore, webinar technology has many benefits in the field of online learning where it is possible to communicate real time and synchronously between speakers and listeners [14].

Online learning has an impact on student independence. The learning independence of students who received treatment in the form of a web-based inquiry method was higher than the independence of students who were treated with conventional methods. Therefore, in this research, webinar activities become a means of inquiry-based learning.

The inquiry learning model facilitates students to be interested in scientific work in obtaining procedural knowledge. In addition, this model also spurs students to get new findings and ideas. Some research results have also proven that the inquiry model has been proven to be able to develop students' potential both cognitively, affective, and psychologically [11].

The inquiry learning model provides opportunities for students to develop active learning by discovering and investigating through lesson-based inquiry activities, laboratories, the real world independently in finding their knowledge or a hypothesis. This step is taken so that students can explore critical, innovative, creative, collaborative thinking skills and try to solve problems themselves through scientific performance methods and scientific attitudes.

Conceptually, inquiry learning activities and activities include three activities, namely (1) exploration, in this case the lecturer has the role of asking questions and problems to be solved by students; (2) introduction to the concept, in this activity students collect information related to experiences in everyday life; (3) application of concepts, in this activity the lecturer exposes the activities of students to new situations, especially cultural activities or hereditary activities that contain scientific concepts and knowledge based on exploration activities and concept applications [15].

Webinar implementation on the Potential of Secondary Metabolite Compounds in the Context of Inquiry and Functional Food Learning, the author uses a questionnaire in this lesson. This questionnaire is distributed to students via a google form. The google form application makes it easier for students to access and for researchers to recap data earlier. Moreover, the last situation shows that teaching and learning activities are still being carried out online due to the Covid-19 pandemic for an indefinite time limit. In fact, lecturers or educators must continue to monitor students' academic, affective, and psychomotor, including the character of the students themselves. Figure 1 show result of the questionnaire distribution to 128 participants.
Based on the results of the evaluation, it shows that the activity of implementing the secondary metabolite learning model from *Taxus sumatrana* is very satisfying, interesting, creates curiosity, and provides motivation to understand STEM literacy and local culture. In addition, the results of the evaluation of material mastery obtained a moderate average score of 12.53 from a maximum score of 20.00.

4. Conclusion
The secondary metabolite learning model from *Taxus sumatrana* with ethnoscience integrated inquiry through online and google form applications obtained criteria that are very satisfying, interesting, creating curiosity, and providing motivation to understand STEM and local Cultural literacy.

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