NEEDS ANALYSIS FOR DEVELOPING AN INTEGRATED ETHNOSCIENCE BLENDED LEARNING INQUIRY MODEL IN THE BIOLOGY EDUCATION STUDY PROGRAM

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ABSTRACT

One of the learning models that is still being implemented after the pandemic ends is blended learning. This study aims to analyze the needs of developing an Inquiry Blended Learning model integrated with ethnoscience in the biology education study program, Lancang Kuning University. The needs analysis in the development of this ethnoscience integrated Inquiry Blended Learning model is in the define phase in the 4D model development research (Define, Design, Develop, Disseminate). The method used is descriptive qualitative. The research instrument used was a questionnaire to analyze the needs of educators and students for the development of an inquiry blended learning model integrated with ethnoscience. The results showed the level of importance of this learning development obtained a kappa moment score from the student response of 0.90 and 0.81 (Very high category) from the lecturer's response. Based on these results it can be concluded that the development of Inquiry Blended Learning integrated with Ethnoscience is needed by students and lecturers in the Biology Education Study Program, Faculty of Education and Vocational Education.

Introduction

The era of the "Industrial Revolution 4.0" has had a major impact in all fields. This revolution fundamentally changes the way people think, live and interact with each other (Prasetyo & Trisyanti, 2019). The way we live and interact with each other cannot be separated from the role of technology. The development of digital technology in the current Industry 4.0 era is changing and impacting various aspects of human life, including education (Putrawansa & Hasanah, 2018). One of the important changes brought by digital technology to the world of education is its impact on the teaching and learning process.

After the covid pandemic ended, online learning is still considered capable of answering the problems experienced by educational institutions. Information technology remains one of the solutions for implementing learning (Astini, 2020). The learning system is implemented through a computer device (PC/laptop) or Android phone connected to an internet network connection. One of the learning models that is still being implemented is blended learning.

Blended learning is hybrid learning, which is the blending and organizing of learning that is varied to fit appropriately to meet students' learning needs (Avinash, 2017; Husamah, 2015; Smaldino, 2012). Blending the two models is necessary to achieve learning objectives. Blended learning has several meanings, namely 1) the integration of traditional learning with

web-based online approaches; 2) a combination of media and tools (e.g. textbooks) used in an e-learning environment, and 3) a combination of a number of teaching and learning approaches regardless of the technology used (Hidayati, 2013). Blended learning is a process of delivering learning in the form of a combination of face-to-face learning and online learning (Castle & McGuire, 2010; Rivera, 2017).

21st century learning demands a change from conventional educator-centered learning to learner-centered learning. In this case, educators have an important role in changing learning patterns, where learning is an effort made by educators deliberately to convey knowledge, organize, and create a learning environment with the help of various methods, so that students can carry out learning activities effectively, efficiently, and can get maximum results (Ledoh, et al, 2020).

The learning approach that is suitable and in line with the independent curriculum in implementing the scientific approach is the inquiry learning model. The inquiry learning model is a learning model that in its implementation requires the active involvement of students with the guidance of educators in solving a problem. The main objective is to develop learners' attitudes and skills in solving problems independently (Conway, 2014, Ledoh *et al.*, 2020).

Students' critical and creative thinking skills, which are the main focus in 21st century learning, can be improved through integrating local culture in learning. Learners learn better if they utilize the environment or resources around them, thus stimulating their interest, making discoveries, asking questions to reach conclusions, and gaining experience through the scientific method (Wiyanto *et al.,* 2017). The experience gained through integrating local culture into the scientific method is permanent, recorded, and remembered by students (Juariah *et al.*, 2013). Integrating local culture into science learning is better known as ethnoscience.

Learning models that combine Inquiry Learning and Blended Learning have not been widely researched, especially those that integrate ethnoscience in learning. Based on the strategic plan for the development of Lancang Kuning University, namely excellence at the national level in education and teaching, research, and community service by strengthening information technology based on local genius, the Inquiry Blended Learning model integrated with ethnoscience is one of the learning alternatives that can be developed. Needs analysis studies for educators and students of the Biology Education Study Program, Faculty of Education and Vocational Studies to develop this learning model are necessary for the implementation of learning in accordance with the institution's strategic plan. Based on this background, the purpose of this research is to analyze the needs of developing an Inquiry Blended Learning model integrated with Ethnoscience at the Faculty of Education and Vocational Studies, Lancang Kuning University.

Method

This research is a development research activity in the Define phase which includes needs analysis in developing an Inquiry Blended Learning model integrated with ethnoscience. The method used is descriptive qualitative. The subjects of this study were lecturers of the biology education study programme and 33 first semester students of the Faculty of Education and Vocational Studies, Lancang Kuning University. Research activities were carried out from December 2023 to July 2024, located at Fadiksi, Unilak.

The research instrument used is a questionnaire to analyse the needs of educators and students for the development of inquiry blended learning models integrated with ethnoscience. Needs analysis for the development of inquiry blended learning integrated with ethnoscience is very necessary. Data collection was carried out by referring to the indicators and aspects used as benchmarks to obtain this needs analysis data, namely (1) the response of students and educators to the inquiry blended learning model; (2) the needs of students and educators for the development of the inquiry blended learning model.

Data analysis techniques were used to analyse the need for developing an inquiry blended learning model. The needs analysis questionnaire data was analysed with the following steps:

1. Tabulation of data by educators and learners. Data tabulation is done by giving an assessment on the assessment aspects by giving a score of 4, 3, 2, and 1.
2. Questionnaire tabulation data of educators and learners were processed using simple descriptive statistics, namely percentages, then analysed descriptively.

Table 1. Scoring Guidelines for educator and learner needs analysis questionnaires.

Categories	Scor
Very Important	4
Penting	3
Less Important	2
Not important	1

(Widoyoko, 2009)

Furthermore, the questionnaire scores were analysed using Cohen's kappa formula as follows:

$$momen\ kappa\ (\kappa) = \frac{\rho_o - \rho_e}{1 - \rho_e}$$

Keterangan:

K	=	momen kappa
ρ_o	=	Proporsi yang terealisasi
ρ_e	=	Proporsi yang tidakterealisasi

The kappa moment criteria obtained are categorised as follows:

Table 2. Criteria Momen Kappa

Interval	Categories
0.81 – 1.00	Very High
0.61 – 0.80	High
0.41 – 0.60	Medium
0.21 – 0.40	Low
0.01 – 0.20	Very Low
< 0.00	Not important

(Boslaugh, 2008)

The flow of research to be carried out can be seen in the following figure :
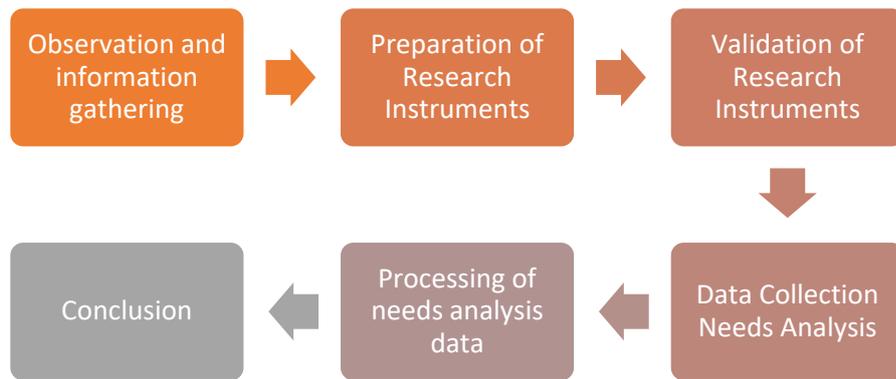
Figure 1. Research flowchart

Results

The data obtained in this study are student needs analysis data consisting of 21 Biology Education students and lecturer needs analysis data totalling 8 lecturers of Biology Education at Lancang Kuning University. The following table presents the response to the analysis of student needs related to the development of the Inquiry Blended Learning model integrated with ethnoscience in learning:

Table 3. Student Response on Individual Ability

No	Statement	Answer Options (%)				
		SM	M	CM	TM	STM
1	In your opinion, Fadiksi lecturers apply blended learning in learning	76,19	23,81	-	-	-
2	Your ability to operate Information and Communication Technology (ICT) devices	19,05	57,14	23,81	-	-
3	Your ability to use the Internet	47,62	38,10	14,29	-	-
4	Your ability to manage learning with the Blended Learning Platform at Unilak (Edlink)	38,10	52,38	9,52	-	-
5	Your level of understanding of Inquiry Learning	9,52	61.90	28,57	-	-
6	Your level of understanding of Ethnoscience	4,76	47,62	47,62	-	-
7	Availability of internet network facilities in the Faculty	9,52	47,62	33,33	9,52	
	Average	29,25	46,94	22,45	1,36	0,00

Description: SM = Very capable/adequate; M = Capable/adequate; CM = Capable/adequate; TM = Not capable/adequate; STM = Very Poor/Inadequate

The following is presented the response to the analysis of lecturers' needs related to the development of the Inquiry Blended Learning model integrated with ethnoscience in learning:

Table 4. Lecturer Response on Individual Ability

No	Statement	Answer Options (%)				
		SM	M	CM	TM	STM
1	I apply blended learning in learning	12,50	75,00	12,50	-	-
2	Your ability to operate Information and Communication Technology (ICT) devices	12,50	87,50	-	-	-
3	Your ability to use the Internet	25,00	75,00	-	-	-
4	Your ability to use the Blended Learning Platform at Unilak (Edlink) in learning	37,50	50,00	12,50	-	-
5	Your level of understanding of Inquiry Learning	12,50	87,50	-	-	-
6	Your level of understanding of Ethnoscience	25,00	62,50	12,50	-	-
7	Availability of internet network facilities in the Faculty	-	75,00	25,00	-	
	Average	**17,86**	**73,21**	**8,93**	**0,00**	**0,00**

Description: SM = Very capable/adequate; M = Capable/adequate; CM = Capable/adequate; TM = Not capable/adequate; STM = Very Poor/Inadequate

Data on current conditions according to lecturers related to learning carried out in the Biology Education Study Programme, Faculty of Education and Vocational Studies. The data extracted related to the opinion of Biology Education Study Programme lecturers regarding the application of Blended Learning is presented in the following figure:
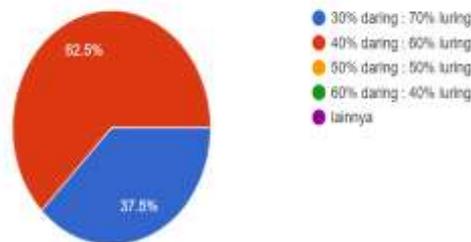

Figure 2. Comparison of Online and Offline Learning by Lecturers

The application of Inquiry Learning by lecturers of Fadiksi Biology Education Study Programme is presented in the following figure :
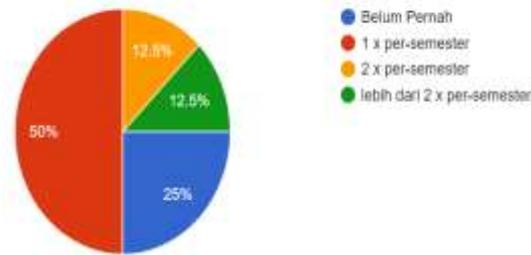
Figure 3. Application of Inquiry Learning by Biology Education lecturers

The integration of ethnoscience in learning by lecturers of Fadiksi Biology Education Study Programme is presented in the following figure:
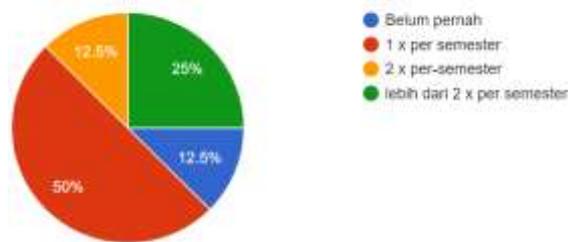

Figure 4. Integration of Ethnoscience in Learning by Biology Education Study Programme Lecturers

Lecturer response questionnaires were also conducted to explore the level of lecturer needs for the development of the Inquiry Blended Learning model integrated with ethnoscience in learning. The following table presents the data from the analysis of the level of needs of students and lecturers:

Table 5. Student and Lecturer Needs Analysis related to the Development of Inquiry Blendel Learning integrated with Ethnoscience in Learning

No	Responder	Momen Kappa		
		P_o	P_e	K
1	Student	0,91	0,09	0,90
2	Lesturer	0,84	0,16	0,81

Description : P_o = Proportion realised; P_e = Unrealised proportion; K = Momen Kappa.

Discussion

Based on the results of the current condition questionnaire given to lecturers, it is known that 75% of Biology Education Study Program lecturers are able to apply blended learning in learning. The ratio between online and offline activities carried out by lecturers varies, and the largest composition is 62.50% of lecturers carry out 40% online versus 60% offline. As many as 50.0% of lecturers carry out Inquiry Learning in learning 1 time per semester, and there are

still 25% of lecturers who have never applied Inquiry learning in learning. As many as 50% of lecturers have linked ethnoscience in learning once a semester, but there are still 12.5% of lecturers who have never linked ethnoscience in learning.... Based on these results it can be said that lecturers have implemented Blended learning, Inquiry and linking it with ethnoscience is in the sufficient category.

Regarding the ability of students and lecturers to operate information communication technology devices, only 23.81% of students stated that they were quite capable, the rest stated that they were capable and very capable of operating them, while the ability of lecturers 87.5% stated that they were capable and 12.5% stated that they were very capable. The ability of students in using the internet is 47.62% very capable, 38.10% capable, and 14.29% stated quite capable, while lecturers stated 75% capable and 25% stated very capable in using the internet. The ability of students to use the blended learning platform at Unilak was seen to be more than 80% very capable and capable, as well as lecturers, only 12.5% of lecturers stated that they were quite capable while the rest stated that they were capable (50%) and very capable (37.5%). Survey regarding the availability of internet network facilities in Fadiksi, more than 50% of students and 75% of lecturers agreed that the internet in Fadiksi was adequate. The ability of individual students and lecturers is a determining factor in implementing Inquiry Blended Learning.

The benefits of Information Communication Technology (ICT) are felt when learning is done online. Online learning is held from home. Lecturers use various learning applications that can be downloaded on students' cellphones, such as Zoom, Google Meet, E-Learning, Telegram, Padlet, and others. The implementation of blended learning system will also prepare the next generation to adapt to era 4.0, familiarizing themselves with modern technology that facilitates various activities, including learning using information communication technology (Suranti *et al.*, 2022; Wardani *et al.*, 2018).

The needs analysis conducted on Biology Education students and lecturers related to the development of the Ethnoscience integrated Inquiry Blended Learning Model can be seen in Tables 5 and 7. The statements given are related to the importance of implementing ethnoscience integrated Inquiry Blended Learning to see the opinions of students and lecturers to what extent this learning model is considered important to do. Based on the results obtained as a whole of the 15 statements analyzed, the kappa moment value for analyzing student needs is 0.75 (high) and 0.83 (very high) for analyzing lecturer needs. This means that students and lecturers realize Inquiry blended learning is important in learning both to increase student motivation and critical thinking skills, increase understanding of local culture, increase student involvement and participation in learning, facilitate the learning process, and make learning effective and efficient.

This inquiry-based learning is an approach that focuses on student activeness in carrying out learning process activities. Inquiry learning is a series of learning activities that emphasize the critical and analytical thinking process to seek and find answers to questionable problems (Sanjani, 2019). Inquiry learning gives learners the freedom to explore topics that interest them. This can increase their motivation and engagement in the learning process. Kuhn and Pease (2008) found that students who learn through an inquiry approach show higher levels of engagement and are more motivated to learn.

The importance of blended learning is also recognized by several researchers. Blended

learning allows learners to access course materials anytime and anywhere, providing significant flexibility compared to conventional face-to-face learning. Means *et al.* (2013) found that this flexibility can increase students' access and participation in the learning process. By utilizing various technologies and media, blended learning can increase learner engagement and motivation. Lim & Morris (2009) show that the use of technology in learning can make materials more interesting and interactive, which in turn increases student engagement. Blended learning allows personalization of learning where instructors can tailor teaching materials and methods according to each student's needs and learning style. According to Garrison and Vaughan (2008), this approach can help students achieve better learning outcomes as they can learn at a pace and manner that suits their preferences. The combination of online and face-to-face learning can improve the efficiency and effectiveness of the learning process. Owston *et al.* (2013) found that blended learning can optimize instructor and learner time, allowing more time for in-depth discussions and practical application of learned concepts.

The importance of integrating ethnoscience in learning is in line with the results of several researchers. Ethnoscience helps students understand scientific concepts in the context of their daily lives. Aikenhead & Ogawa (2007) stated that the integration of local knowledge in the science curriculum can make learning more relevant and meaningful for students, especially those from indigenous communities or remote areas. The integration of ethnoscience in education plays an important role in the preservation of traditional knowledge that may be lost along with the times. Nakashima *et al.* (2012) emphasized that education is one of the effective ways to document and transmit traditional knowledge to the younger generation. By studying ethnoscience, students are encouraged to think critically and creatively in connecting modern scientific concepts with traditional knowledge. Corsiglia & Snively (2001) point out that this approach can improve students' ability to analyze and solve problems in innovative ways. Ethnoscience teaches students to appreciate and respect cultural diversity. Battiste (2002) revealed that learning that includes local cultural perspectives can build mutual respect and intercultural understanding, which is important in a multicultural society.

Based on the research results and the description above regarding the needs analysis and the description above, the development of inquiry blended learning integrated with ethnoscience needs to be carried out in the Biology Education Study Program, Faculty of Education and Vocational Education. The development of this learning model can be an innovative solution in improving the quality of education, preparing students to face global challenges, and still appreciating and preserving local wisdom.

Conclusion

Based on the results of this study, it can be concluded that the development of Inquiry Blended Learning integrated with Ethnoscience is needed by students and lecturers in the Biology Education Study Program, Faculty of Education and Vocational Education. This can be seen from the level of importance of this learning development obtaining a kappa moment score from student responses of 0.90 (very high category) and 0.81 (very high category) from lecturer responses. The development of this learning model can be done considering that students and lecturers have good individual abilities in mastering ICT, the Internet and learning platforms.

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