Pro-life
Jurnal Pendidikan Biologi, Biologi, dan Ilmu Serumpun
https://ejournal.uki.ac.id/index.php/prolife

Field Trip Integrated Indigenous Knowledge of Betawi Tribe through Video-Making Skills to Improve Species Knowledge

Fajar Adinugraha[1]*, Geskia Avikasari Sembiring[2], Anne Serafin Hutabarat[3], Wahyu Agustianto[4]

[1,2,3,4] Program Studi Pendidikan Biologi, FKIP-Universitas Kristen Indonesia, Jakarta Timur, Indonesia
**Corresponding author*: fadinugraha0608@gmail.com; fajar.adinugraha@uki.ac.id

Article History

Received : 6 Desember 2024
Approved : 9 Desember 2024
Published : 10 Desember 2024

Keywords
Betawi tribe, educational video, field trip, Indigenous knowledge, species knowledge

ABSTRACT

The objective of this study is to enhance prospective biology teacher students' species knowledge by integrating the field trip method with the indigenous knowledge of the Betawi Tribe, specifically through the skill of making educational videos. The research method employed was a one-group pre-test-post-test design. This study delineates the learning steps, namely stimulation, ethnobiological discussion, exploratory research, video artifact creation, and publication, conducted with active student involvement. The findings revealed that 66.67% of the students demonstrated proficiency in video production. The field trip combined indigenous knowledge with video-making skills, effectively enhancing students' understanding of local plant and animal species commonly used in traditional Betawi cuisine. The improvement in understanding of local plants and animals is evidenced by the increase in post-test scores compared to pre-test scores, showing a gain of 3.67 points or 16.87%. In addition, the Wilcoxon test showed a significant increase in knowledge of species after the learning experience with a Sig. (Asymp. Sig. 2-tailed) of 0.005 < Sig. 0.05. Field trips that integrated the indigenous knowledge of the Betawi Tribe with video-making skills improved students' knowledge of various species. We expect this research to contribute to improving the quality of education by integrating indigenous knowledge with the development of digital skills.

INTRODUCTION

Indonesia is regarded as a country with a high level of biodiversity. Indonesia is an archipelago covering 1.3% of the Earth's surface, comprising more than 17,000 islands that have facilitated the emergence of endemic plants and animals (Malik et al., 2020; Nugroho, 2023). The data indicates that the plant biodiversity in Indonesia is of significant value, estimated at 10% of the

global total or between 30,000 and 40,000 distinct plant species (Afiyah et al., 2020). Indonesia occupies the top position in the Global Biodiversity Index, with the highest number of mammals (729 species), second highest number of fish species (4,813 species), fourth highest number of bird species (1,723 species), and fourth highest number of reptile species (773 species) in the world (Adhiem, 2023).

The high number of species diversity is inversely proportional to the low species knowledge of the younger generation. As evidenced by research conducted by Zarisma et al. (2016), there are significant challenges associated with learning plant classification. Furthermore, Christanty et al. (2021) have indicated that difficulties in plant material arise when attempting to identify the general characteristics of plants. In addition to plants, research by Fitri et al. (2021) indicates that students also encounter difficulties in understanding animal characteristics. Agustin et al. (2020) further demonstrate that students generally need more comprehension of vertebrate concepts. It is concerning that students in a country with rich biodiversity exhibit such limited knowledge of species. Moreover, these students are prospective biology teachers who require a solid foundation in species knowledge.

The aforementioned lack of knowledge about species is also evident in a test conducted on 37 prospective biology teacher students about using species in traditional Betawi cuisine. The test was conducted by presenting 30 multiple-choice items about the name of the species utilized, the identification of the species from the provided illustration, and the benefits of the compound content of the species. The data demonstrated that 37.84% of students exhibited low species knowledge, 35.13% demonstrated average species knowledge, and 27.03% demonstrated high species knowledge. These findings indicate the need to enhance species knowledge among prospective biology teacher students.

It is imperative that students, particularly those pursuing a degree in biology at Universitas Kristen Indonesia (UKI), attain a comprehensive understanding of species, as this is a prerequisite for graduation. Understanding of species is consistent with the vision and mission of the study program about biodiversity, the environment, and indigenous knowledge. A lack of biodiversity knowledge, particularly regarding plant and animal species, will inevitably result in a diminished awareness of the significance of biodiversity. The study of biodiversity is a core component of the curriculum for students pursuing a degree in biology education at UKI. Biodiversity is defined as the diversity of all life forms on Earth, encompassing plants, animals,

microorganisms, genes, and the ecosystems they create (Gour, 2022; Kusmana, 2015). It is closely intertwined with local wisdom or indigenous knowledge, as evidenced by studies conducted by Gadgil et al. (2021) and Toledo (2013).

A lack of knowledge of plant and animal species may be attributed to learning factors (Jayanti & Susantini, 2021). The current challenge is to develop methods for teaching biodiversity in higher education courses directly related to indigenous knowledge. Indigenous knowledge is defined as local knowledge unique to a particular culture and acquired by local communities through the accumulation of experiences passed down through generations (A.A Adam et al., 2019; Chikaire et al., 2012; Senanayake, 2006). In this research, the term "*kearifan lokal*" or "local wisdom" is used to refer to what is commonly known as "indigenous knowledge." This indigenous knowledge is studied in the *Pembelajaran Biologi berbasis Kearifan Lokal* course. In the context of UKI, indigenous knowledge that can be explored is related to the culture of the Betawi Tribe.

Prior research has investigated the cultural practices of the Betawi Tribe to understand their potential as a basis for scientific learning. A study by Firdaus et al. (2021) examines Betawi cuisine from the perspective of chemistry learning. Muliani (2016) conducted research examining *bir pletok* from an anthropological and cultural perspective. Research by Somantri & Merlina (2014) examines the *Baritan* ceremony from a sociological perspective. Previous research by Adinugraha et al. (2020) also discussed the Betawi culture by developing educational videos. However, these studies have yet to address the question of how to implement indigenous knowledge in courses by directly visiting the Betawi Cultural Center.

Efforts to educate students about species knowledge employ a field trip methodology integrated with indigenous knowledge at Setu Babakan Betawi Cultural Village. Prospective biology teacher students are invited to gain insight into Betawi culture through field trips and to analyze these experiences for potential use as educational videos. Field trips are defined as visits to locations outside the classroom that are designed to achieve goals that cannot be effectively addressed through other methods (Oluwayimika & Adeoye, 2023). The benefits of field trips include enhanced creativity on the part of teachers and a reduction in student boredom (S. S. Adam, 2016).

The imperative for conducting field trips that are integrated with indigenous knowledge and educational video skills is to enhance comprehension of species utilization. Students may engage in basic on-

site research employing the tenets of ethnobiology. Ethnobiology can play an important role in elaborating ideas about local expertise by documenting the complexity of traditional knowledge beyond the scope of academic research (Ludwig & El-Hani, 2020). The findings of the student research were subsequently transformed into an educational video. Video is an electronic medium that is capable of integrating audio and visual technology simultaneously (Setiawan et al., 2022). Given that the students enrolled in this course are prospective teachers, they must possess the requisite skills to create educational videos. Video is a pervasive pedagogical tool that can facilitate the acquisition of knowledge through the combination of visual and auditory channels (Wu, 2016).

The need for species knowledge among prospective biology teacher students at an early stage in their academic careers represents a significant challenge that requires collective action to address. The limited understanding of species can be addressed through the implementation of field trips that integrate indigenous knowledge with educational video skills. This study aimed to describe the field trip method integrated with indigenous knowledge and video-making skills, assess the proficiency in video-making skills, and evaluate the impact of the method on students' species knowledge. This research is anticipated to contribute to the enhancement of educational quality through the indigenous knowledge approach and the development of digital skills.

RESEARCH METHOD

Method

This study employed a quasi-experimental research design with a one-group pre-test-post-test format. In this design, a group is subjected to a treatment. Before the treatment, the students completed the pre-test, and subsequently, following the conclusion of the treatment, they completed the post-test. Consequently, the results of the treatment can be ascertained with greater precision by comparing them with the situation before the treatment (Sugiyono, 2019). An experimental research study was conducted on the *Pembelajaran Biologi berbasis Kearifan Lokal* course. The research was conducted between April 2024 and June 2024. The research was conducted at two locations: the first was the University of Kristen Indonesia (UKI), which is situated at Cawang, East Jakarta, Indonesia; the second was Setu Babakan Betawi Cultural Village, Srengseng Sawah, Kecamatan Jagakarsa, South Jakarta City, Special Capital Region of Jakarta.

Research Variables

The variables under investigation in this study are also referred to as the factors being examined. A variable is defined as a

characteristic (person, place, or thing) that exhibits different values (Coladarci & Cobb, 2014). In this study, the independent variable is the field trip learning method integrated with the indigenous knowledge of the Betawi tribe and the skill of making educational videos. The dependent variable in this study is species knowledge.

Population and Sample

The population in this study was comprised of all students enrolled in the Biology Education program. The sample was a class that took an indigenous knowledge-based biology learning or *Pembelajaran Biologi berbasis Kearifan Lokal* course in the even semester of 2023/2024, with a total of 12 students. The sampling technique employed was purposive sampling, as it targeted only those classes that took indigenous knowledge-based biology learning courses.

Data Collection Techniques

The data collection techniques employed encompass both qualitative and non-test techniques and test techniques. The data describing the field trip learning method integrated with indigenous knowledge were collected through observation and documentation, including the use of photographic and video evidence. Observation is conducted through the observation of student activities within the classroom and during field trips in Kampung Betawi. The following indicators will be discussed in the description of indigenous knowledge-integrated field trip learning methods: lesson plans, forms of activities carried out by students, and artifacts produced by students. The activities carried out by students include group activities in the production of artifacts. The data on the skills required for the creation of educational videos were collected using a video assessment sheet comprising 11 questions derived from 11 indicators. The data on the students' knowledge of species was gathered using a test technique, namely multiple choice, in the form of a pre-and post-test. The questions given were 30 questions derived from 9 indicators.

Data Analysis Technique

The analysis techniques used were descriptive and inferential. The data description of the field trip learning method integrated with indigenous knowledge was analyzed descriptively and qualitatively. Based on photos and observations, learning activities are described to produce a new concept of how to teach field trips with indigenous knowledge. Data on skills in making educational videos were analyzed using descriptive statistics from the average score of skills in making educational videos. Descriptive statistics were also carried out by calculating the average and categorizing it into certain categories. Data on pre-test and post-test scores related to species knowledge were analyzed with descriptive

and inferential statistics. Descriptive statistics are calculated by calculating the mean, median, and mode so that the average species knowledge between pre-and post-test can be seen. Descriptive statistics involve organizing, summarizing, tabulating, and describing data sets (Cohen et al., 2018; Ubi, 2017). Before calculating using inferential statistics, normality and homogeneity are first calculated. If the data is normally distributed using parametric statistics, namely using a paired sample t-test, if the data is not normally distributed using non-parametric statistics.

RESULTS AND DISCUSSION

Description of Field Trip Method integrated with Indigenous knowledge and Video Making Skills

The integration of the field trip method with indigenous knowledge and video production skills represents an innovative approach to learning. By combining these two elements, educators can create a unique learning experience that is both engaging and informative. This approach to learning offers a comprehensive and contextualized experience. A field trip represents one of the most effective learning methods for providing meaningful learning opportunities in the community (Hassan et al., 2022). This is achieved by expanding the resources available to students (Rugaiyah, 2018). Students have the opportunity to engage in novel activities, confront new situations, and acquire invaluable life lessons (Oluwayimika & Adeoye, 2023). This field trip is enhanced by the incorporation of indigenous knowledge from the Betawi tribe. Indigenous knowledge can be defined as a body of knowledge that is obtained through a series of activities by a group of people in a specific area or location and then transmitted from generation to generation orally (Hunaepi & Firdaus, 2017).

The integration of indigenous knowledge on field trips is characterized by students being invited to visit cultural sites or environments related to the Betawi tribe in the Setu Babakan Betawi Cultural Village area. As outlined by Firdaus et al. (2021), elements of indigenous knowledge in Betawi culture encompass culinary traditions, artistic practices, and theatrical performances. This study, however, is more focused on Betawi cuisine, which is associated with ethnobiology. The classic definition of ethnobiology is the study of the direct relationship between humans and biota, including fields such as ethnobotany, ethnozoology, ethnoecology, and ethnomycology (Albuquerque et al., 2020). In their groups, students make observations according to the culinary subject matter under study.

In addition to experiences related to indigenous knowledge, this method also integrates video-making skills, which is a

crucial competency in the digital era. Following the collection of material during the field trip by the principles of ethnobiology, students package the information in the form of an educational video. Video is an electronic medium that is capable of combining audio and visual technology simultaneously (Setiawan et al., 2022). This technical skill of making educational videos will prove invaluable in the future, both in the context of education and the world of work. The learning steps are presented in **Figure 1.**

Step 1 is stimulation, which consists of apperception and explanation of learning objectives. In this step, students are in groups and asked to discuss indigenous knowledge that will be researched. Step 2 is the discussion of the research method of exploration, which consists of concepts and discussion related to exploration research with ethnobiological principles. Step 3 is the exploration of indigenous knowledge, which consists of field exploration for collecting the data. Students conduct research using interview and observation techniques. This stage takes longer and is constantly monitored by the teacher with guidance. Step 4, namely making artifacts, which consists of data analysis, making drafts of artifacts, and presenting drafts of artifacts. Step 5, namely reflection and publication, which consists of revising the artifact and publishing the artifact. The results of the exploratory research were realized in an educational video related to Betawi cuisine.

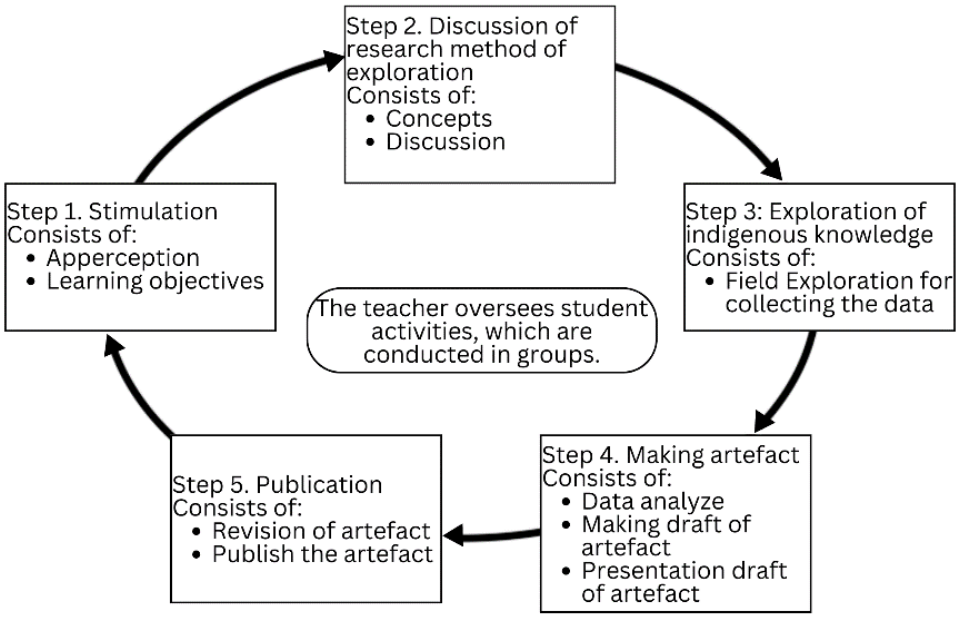

Figure 1. Learning Steps of Field Trip Method Integrated with Indigenous Knowledge with Making Video Skills
Source. Author's document (2024)

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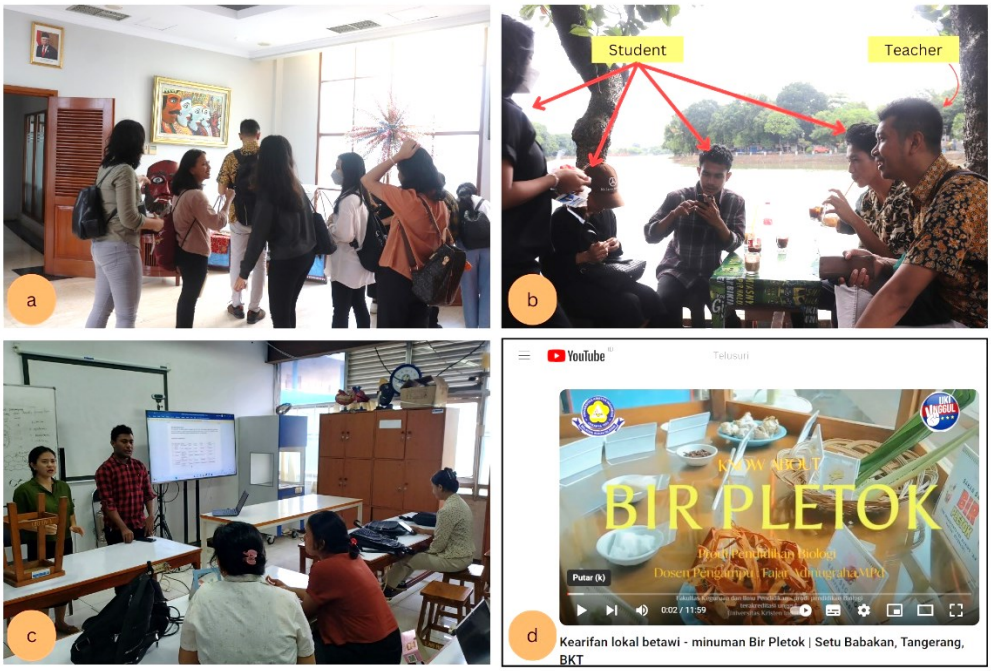

Figure 2. Documentation of Learning Steps. (a) Exploration of the Betawi Museum and Setu Babakan Area; (b) Teacher-guided consultation on the results of interviews and documentation during the exploration research; (c) Presentation of educational video artifacts; (d) Publication of one of the artifact results on YouTube. [The images have been approved for publication].
Source. Author's document (2024)

The integration of the field trip method with indigenous knowledge and video-making skills offers a multifaceted approach to learning that is replete with benefits. The combination of local culture and modern technology in the learning process is expected to enhance student's awareness of the significance of cultural heritage preservation in the context of the digital age. Furthermore, this approach fosters creativity and collaboration among students, as they are required to work in teams to produce informative and engaging videos. Consequently, this learning method has the potential to enhance academic understanding while also developing skills such as the creation of educational videos. The documentation of the activity steps is presented in **Figure 2**.

Educational Video Making Skills

The competencies associated with the production of educational videos were evaluated based on a set of criteria modified from the SMM Conference (2021), including (1) content and message; (2) relevance; (3) educational value; (4) organization; (5) grammar; (6) delivery and narration; (7) production and editing techniques; (8) audio and sound; (9) visuals and graphics; (10) video quality and camera techniques; and (11) creativity. The students' video-making skills were distributed in three categories: high (excellent and above average), sufficient (average), and low

(below average and failure). The majority of students (66.67%) were placed in the high category, indicating that the majority of students had excellent or above-average skills in video making.

However, 16.67% of students fall into the Sufficient category, meaning they have average skills, and the same percentage (16.67%) fall into the Low category, indicating below-average or failing ability in video-making skills. This indicates that although most students have mastered the skill, there are a small number who still need guidance to improve their skills in creating learning videos. The distribution of video-making skill categories is presented in **Figure 3.**

Effect of Field Trip Method integrated with Indigenous knowledge and Educational Video-Making Skills on Species Knowledge

Students took a pre-test before treatment and a post-test after treatment. Table 1 illustrates the comparison between pre-test and post-test scores on nine indicators related to students' ability to identify and explain the species and health benefits of some traditional Betawi foods, such as *bir pletok, kerak telor*, and *selendang mayang*. Table 1 shows an increase in scores across all indicators after the learning, demonstrating the effectiveness of the learning method used. Overall, indicator 9, which explained the health benefits of species in *selendang mayang*, experienced the highest score increase, 114.29%. Meanwhile, indicator 8, which identified species utilized in *selendang mayang* through pictures of species, experienced the lowest score increase, which was 4.26%.

In the pre-test, the average score obtained was 21.75, while in the post-test, the average score increased to 25.42, which increased by 3.67 points or 16.87%. The observed increase in post-test scores suggests that the integration of field trip learning with indigenous knowledge has a beneficial impact on participants. The integration of indigenous knowledge of the Betawi tribe with technical skills such as video-making provides a more contextual and applicable learning experience.

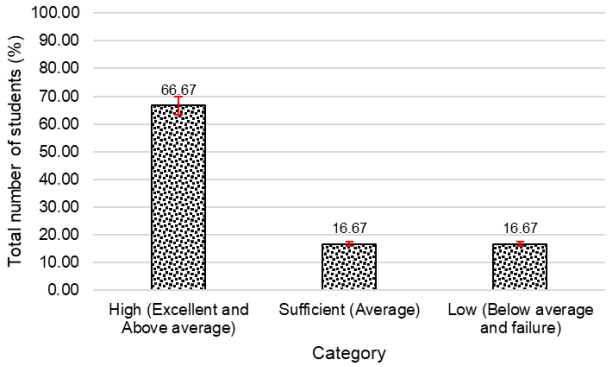

Figure 3. Category Distribution of Video-Making Skills

Table 1. The Mean Score of Each Species Knowledge Indicator

No	Indicator	Pre-test	Post-test	Difference	Improvement (%)
1	Students can identify the species utilized in the production of *bir pletok*.	0.64	0.81	0.17	26.09
2	Students are able to identify the species utilized in the *bir pletok* through the examination of images of the species in question.	0.92	0.97	0.05	5.45
3	Students can explain the health benefits of the species used in *bir pletok*.	0.54	0.71	0.17	30.77
4	Students can identify the species utilized in the preparation of *kerak telor*.	0.69	0.81	0.11	16.00
5	Students can identify the species utilized in *kerak telor* through the examination of photographic representations of said species.	0.88	0.97	0.08	9.43
6	Students can explain the advantages of the species utilized in *kerak telor* for health.	0.54	0.71	0.17	30.77
7	Students can identify the species utilized in the preparation of *selendang mayang*.	0.69	0.83	0.14	20.00
8	Students are able to identify the species utilized in *selendang mayang* the examination of images of the species in question	0.78	0.82	0.03	4.26
9	Students can explain the advantages of the species utilized in *selendang mayang* for health purposes.	0.29	0.63	0.33	114.29

This result lends further support to the argument that the use of learning methods that involve hands-on experience and cultural linkages can increase participants' engagement and understanding. Students can construct species knowledge through observation and social learning. This is in accordance with Vygotsky's (1978) theory of social constructivism and (Bandura, 1977) social learning theory. The data is presented in **Figure 4.**

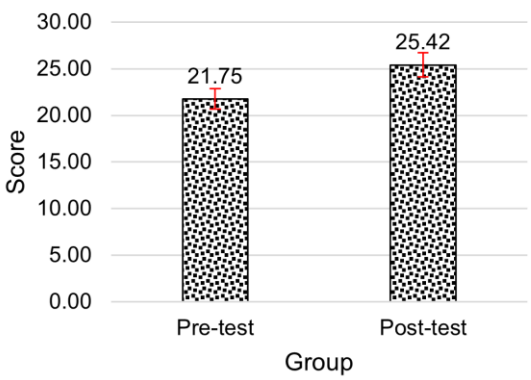

Figure 4. Comparison of species knowledge pre and post-test scores

Furthermore, the alteration in the proportion of students within the three highest categories before and following the learning intervention also demonstrated an improvement. In the pre-test group, only 33.33% of students were in the high category (excellent and above average), indicating that before the learning intervention, a significant proportion of students demonstrated a suboptimal level of understanding. Following the learning intervention, there was a notable increase in the percentage of students in the high category, which rose to 83.33%. This outcome demonstrates the efficacy of contextualized learning that integrates local cultural elements with digital skills, facilitating students' acquisition of more sophisticated knowledge. The data is illustrated in **Figure 5**.

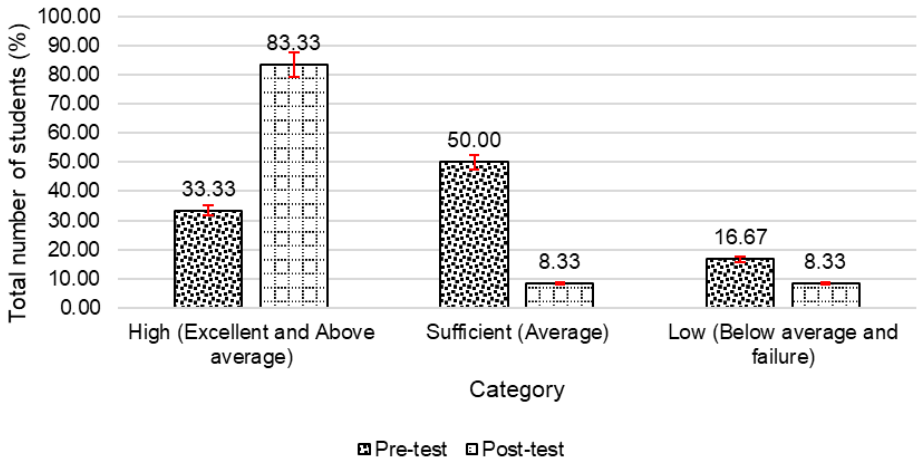

Figure 5. Comparison of high, sufficient, and low categories in the pre and post-test

The observed increase in scores and pre-test results is not statistically significant, indicating the need for a different test. Nevertheless, a normality test was conducted initially. As evidenced by the results of the Shapiro-Wilk normality test, the pre-test and post-test data exhibit a lack of normal distribution. This is evident from the significance value (Sig.) in both tests. The value of Sig. for the pre-test was 0.004, while that for the post-test was 0.011. The aforementioned values are below the significance limit of 0.05, indicating that the data from the pre-test and post-test do not adhere to a normal distribution. This observation necessitates the utilization of non-parametric statistical tests, such as the Wilcoxon Signed Rank Test, to assess the comparison between the pre-test and post-test data.

The results of the Wilcoxon Signed Ranks Test indicate a statistically significant difference in student species knowledge before and after the implementation of a learning approach that integrates field trips with indigenous knowledge of the Betawi Tribe and the skill of video production. The results of the statistical test indicate a Z-value of -2.799 with a significance value (Asymp. Sig. 2-tailed) of 0.005. Given that the significance value is less than the critical limit of 0.05, the null hypothesis (H_0), which states that "there is no difference in students' species knowledge before and after learning," is rejected. Therefore, there is sufficient evidence to conclude that learning is efficacious in improving students' knowledge about species. The data are presented in **Table 2**.

Table 2. Wilcoxon Signed Ranks Test

Score	Post-test - Pre-test
Z	-2.799[b]
Asymp. Sig. (2-tailed)	0.005

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Table 3. Ranks

Score		N	Mean Rank	Sum of Ranks
Post-test - Pre-test	Negative Ranks	1[a]	3.50	3.50
	Positive Ranks	11[b]	6.77	74.50
	Ties	0[c]		
	Total	12		

a. Post-test < Pre-test
b. Post-test> Pre-test
c. Post-test = Pre-test

As detailed in the "Ranks" table, 11 students exhibited an increase in knowledge following the lesson, with an average positive rank of 6.77 and a total positive rank of 74.50. Conversely, a single student exhibited a decline in knowledge, with an average negative rating of 3.50 and a total negative rating of 3.50. No students exhibited the same rating between the pre-test and post-test (ties = 0). These findings suggest that the majority of students demonstrated a notable enhancement in their species knowledge following their participation in a field trip-based learning experience that integrated Betawi Indigenous knowledge and video-making skills. The data are presented in Table 3.

The field trip method provides a contextual experience for students, which allows them to learn directly from the real environment. Student teacher candidates conduct ethnobiological exploratory research, thus enhancing their understanding and engagement in the learning material. Field trips can promote social growth for participating students by encouraging positive interactions among students and teachers (Behrendt & Franklin, 2014). Field trips can also expose them to new environments, improve their social skills, and serve to enhance the information developed in the curriculum (Kennedy, 2014). Field trips can have a lasting impact that goes beyond learning facts (Hassan et al., 2022).

The Betawi tribe's indigenous knowledge offers a wealth of information regarding traditional cuisine, particularly about the utilization of local plants and animals as food ingredients. A variety of plant and animal species are frequently utilized in traditional Betawi cuisine, including *bir pletok*, *kerak telor*, and *selendang mayang*. Furthermore, indigenous knowledge encompasses the noble values espoused by the nation's ancestors, which can serve as a foundation for fostering a nation with good and strong character (Suprihatin et al., 2020). Additionally, indigenous knowledge can be linked to the subject matter concerning the interaction of living organisms with their surrounding environment (Lestari et al., 2019).

The method was modified with the incorporation of video skills, which represents a significant advancement in digital skills development, particularly in enhancing students' memory abilities. Another advantage of this video medium is

that the message conveyed is readily comprehensible and will have a tangible impact on learning outcomes across the cognitive, effective, and psychomotor domains (Sayuti et al., 2022). Educational videos provide an alternative for on-site learning in situations where it may not be feasible (Adinugraha, 2022). Furthermore, research indicates that educational videos related to indigenous knowledge created by student teachers can also enhance students' team communication skills (Adinugraha, 2024). Therefore, video skills are a crucial component of contemporary technology-based learning.

This research still has some limitations, one of which is its limited scope on the local wisdom of the Betawi Tribe. While this method has been shown to enhance students' knowledge scores, the findings of this study still need to be expanded in their generalizability to a relatively narrow demographic. To enhance its reach, additional research integrating indigenous knowledge from other regions in Indonesia is imperative. There is a plethora of indigenous knowledge related to biodiversity in Indonesia. Indigenous knowledge includes the use of plants and animals for *ubarampe* (Adinugraha et al., 2024), traditional dances related to biodiversity (Adinugraha, 2018), and the use of the environment based on custom (Sabasti et al., 2024). Indigenous knowledge will ensure effective implementation in diverse regions, aligning with the indigenous knowledge unique to each community.

This research offers guidance to lecturers in higher education regarding the utilization of the field trip method in conjunction with indigenous knowledge through the medium of video production. It is incumbent upon lecturers to analyze indigenous knowledge that students may potentially employ in the conduct of exploratory research. Furthermore, lecturers must ensure that students have undertaken courses about biodiversity, thus facilitating the identification of species during the analysis phase. Additionally, lecturers are advised to conduct training in video production in advance to optimize the outcomes of the videos created by students.

CONCLUSION

The present study demonstrates that the field trip method, when integrated with indigenous knowledge and video-making skills, is an effective method for enhancing students' species knowledge. The learning steps, which included stimulation, ethnobiological discussion, exploratory research, video artifact creation, and publication, were effective in engaging students in an active learning process. The results demonstrated that 66.67% of students exhibited proficient video-making abilities. Furthermore, the method markedly

improved students' understanding of local species, as evidenced by the 16.87% increase in post-test scores from the pre-test and supported by the Wilcoxon test, which revealed a significant increase in knowledge after the learning period with a Sig value. (Asymp. Sig. 2-tailed), which is 0.005 < Sig. 0.05. The integration of the field trip method with indigenous knowledge through video skills is anticipated to serve as an alternative learning strategy to enhance species understanding. Additionally, students can engage in the study of biodiversity while developing an appreciation for culture and enhancing their digital skills.

ACKNOWLEDGMENTS

We want to express our gratitude to LPPM Universitas Kristen Indonesia for their financial support of the lecturer and student group research scheme, identified by the following number: 9 /UKI.LPPM/PPM.00.00/Kontrak_Penelitian/2024.

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