

Fostering critical thinking skills in geography education: an authentic assessment model using field-lab approach

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Abstract. This research focuses on fostering critical thinking skills in geography education through an authentic assessment model with a field lab approach. This research was used as a case study at Siliwangi University. Critical thinking is essential in geography education because it empowers students to analyze complex spatial phenomena, make decisions, and contribute effectively to society. This research answers the need for innovative assessment methods that are in line with the importance of critical thinking in geography education. This research method focuses on developing critical thinking skills through an authentic assessment approach using field laboratory methods. This research uses an experimental research design by applying quasi-experimental methods in a geography learning environment. The approach used is a qualitative approach to analyze the impact of authentic assessment models on the development of students' critical thinking skills. Findings study shows that the application of an authentic assessment model with a field-lab approach in geography education has shown promising results in improving students' critical thinking abilities. This authentic assessment model allows students to be actively involved in the learning process and apply their knowledge and skills in real-world contexts.

1 Introduction

Fostering critical thinking skills in geography education is a crucial aspect of promoting deep learning and meaningful engagement with the subject [1]. Authentic assessment involves evaluating students' abilities to apply their knowledge and skills in real-world contexts, mirroring the challenges they may encounter in their future careers [2]. This type of assessment encourages students to think critically, solve problems, and make connections between theoretical concepts and practical applications [3]. Authentic assessment in geography education goes beyond traditional methods of evaluation, such as exams and quizzes, by providing students with opportunities to demonstrate their understanding through real-world tasks and projects [3]. This approach allows for a more comprehensive assessment of students' knowledge, skills, and abilities, as it takes into account their ability to think critically, solve problems, and communicate effectively [4]. Students are inspired to take an

active role in their own education and gain a deeper comprehension of the material by participating in authentic assessment tasks [5].

One effective approach to achieve this is through the use of an authentic assessment model that incorporates a field-lab approach [6]. The field-lab approach in geography education involves taking students out of the classroom and into the field, where they can directly observe and interact with geographical phenomena [1]. Through the analysis and interpretation of real-world facts, this practical experience helps students gain a deeper comprehension of the subject matter and cultivates critical thinking abilities. [7]. In addition, according to [8], direct learning and observation can increase the acquisition of behavioral patterns and strengthen students' self-confidence in completing assignments [9]. By engaging in fieldwork, students can apply their theoretical knowledge to practical situations, enhancing their ability to think critically and make informed decisions [6].

Fostering critical thinking skills in geography education can be effectively achieved through the use of an authentic assessment model that incorporates a field-lab approach [6]. Implementing an authentic assessment model using a field-lab approach requires careful planning and design [10]. Educators need to create assessment tasks that align with the learning objectives and provide students with opportunities to apply their knowledge and skills in meaningful ways [11]. This may involve designing field-based activities, such as data collection, analysis, and interpretation, that require students to think critically and make connections between theoretical concepts and real-world phenomena [12]. Additionally, educators need to provide clear criteria and rubrics for evaluating students' performance, ensuring that the assessment is fair, valid, and reliable [13]. Educators play a crucial role in designing and implementing authentic assessment tasks that align with the learning objectives and provide students with opportunities to demonstrate their understanding in meaningful ways. The findings from various studies Geçit & Akarsu, Krause, et al., Zanden et al., Danaher et al., Şanlı & Çetin, and Cho & Kim indicate that the incorporation of problem-based learning, inquiry-based learning, and case studies has effectively engaged students in the learning process and facilitated the application of their knowledge and skills in real-world contexts [14-19].

Previous research such as research that combines problem-based activities to solve geographic problems in the real world [20], then the use of methods that utilize an inquiry-based approach where students are active in exploring and investigating geographical phenomena [21]. Additionally, case study learning by providing real-world examples and scenarios that require them to analyze and evaluate information, make connections between theoretical concepts and practical applications, and propose solutions to complex problems can be an effective method for cultivating critical thinking in geography education [22]. Previous research has focused on developing critical thinking skills through various learning models, such as inquiry-based learning and problem-based learning. In one of the research findings, it was stated that the use of authentic assessment instruments based on Higher Order Thinking Skills and integrated character succeeded in improving students' understanding and learning outcomes significantly [23]. Then peAuthentic assessment can help students improve their academic writing skills and increase productivity [24]. However, there is little research on the use of authentic assessment models, especially in the context of laboratory fieldwork in geography education. Additionally, most research focuses on developing critical thinking skills in general, without specifically exploring the role of laboratory fieldwork in improving critical thinking skills in geography education.

2 Methods

The research begins with a literature review and field study to identify opportunities for authentic assessment. Subsequently, the design is based on theory and needs analysis, considering the unique characteristics of geography education and Universitas Siliwangi, Tasikmalaya City. This research method focuses on developing critical thinking skills through an authentic assessment approach using field laboratory methods.

The evaluation model used seen from the aspect of the mechanism for implementing field practicum, namely pre-activity in the form of planning/debriefing (which requires participation/presence, activeness, cooperative discipline), implementation (which requires activeness and participation), and post-implementation in the field in the form of reports and presentations/ exposure. Assessment of the types of activities/products produced in the form of articles, brochures, banners, posters. Based on implementation mechanisms in the field laboratory, the activities carried out and the form of assessment can be described as in the following scheme.

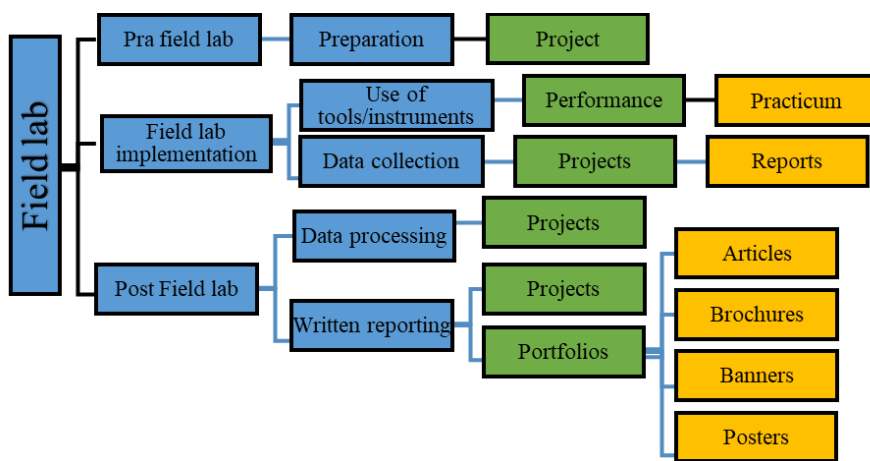


Fig 1. Process and product assessment schemes field lab

This approach was chosen for its ability to integrate theoretical learning with practical application in the field, enabling students to directly engage in observation, measurement, and analysis of relevant geographical data. This method not only promotes a deeper understanding of geographical concepts but also builds problem-solving skills and critical reasoning through hands-on experiences grounded in real-world contexts.

The study employs an experimental research design by applying quasi-experimental methods in the geography learning environment. The field approach allows researchers to gather direct data from geographically relevant locations, while the laboratory approach facilitates deeper data analysis and reflection on field experiences. Observation, interviews, and documentation analysis of fieldwork and instructional procedures are some of the data gathering techniques..

Furthermore, the research adopts a qualitative approach to analyze the impact of the authentic assessment model on the development of students' critical thinking skills. Through this approach, researchers can explore and understand students' thought processes in responding to challenges presented in the context of geographical field activities. Qualitative data analysis such as thematic and narrative analysis will be used to identify patterns in how students understand, interpret, and respond to geographical information acquired during the learning process. Thus, this qualitative approach is expected to provide deep insights into the effectiveness of the authentic assessment model in enhancing critical thinking skills in geography education.

3 Result and Discussion

In an effort to improve students' critical thinking skills and ability to apply their knowledge and skills in real world contexts, an authentic assessment model using a field laboratory approach has become an effective strategy in geography education. The application of an authentic assessment model with a field-lab approach in geography education has produced promising results in fostering critical thinking skills in students. Students are actively involved in the learning process and apply their knowledge and skills in real-world contexts. This hands-on approach facilitates a deeper understanding of geographic concepts and enhances students' ability to think critically and make informed decisions. Authentic assessment models provide students with opportunities to develop critical thinking skills that are important for their future careers and community involvement. These skills enable students to analyze complex problems, evaluate information, and make informed decisions, which is critical in a rapidly changing and interconnected world. Additionally, authentic assessment models encourage a shift from traditional assessment methods, such as exams and quizzes, to more comprehensive and meaningful assessments. Performance-based assessments, such as project-based assessments and presentations, have provided students with opportunities to demonstrate their understanding and application of geographic knowledge in authentic scenarios [25]. By combining performance-based assessments, open-ended questions, and problem-solving tasks, educators can assess students' critical thinking skills more holistically. This allows for a more accurate evaluation of students' ability to apply their knowledge and skills in real-world contexts.

Students' thinking skills while in the field are developed through several processes, namely inquiry, investigation and problem solving processes, which are facilitated by the authentic assessment model. Narrative analysis further revealed that students' critical thinking skills were developed through their ability to reflect on their own learning processes and identify areas for improvement, so that students can improve their critical thinking skills and make informed decisions. Narrative analysis also shows that students can develop their critical thinking skills through the process of analyzing and interpreting geographic data, and can identify patterns and relationships between variables. Students can also make informed decisions based on evidence and can defend arguments using evidence-based reasoning. students' ability to articulate their thought processes and justify their decisions, indicating a high level of critical thinking. Some students realize that it is important to consider multiple perspectives when analyzing geographic data, and not rely on just one source of information. Then students learn a lot to identify the limitations of their knowledge and look for additional information to support the arguments given. Apart from that, narrative analysis also shows that an authentic assessment model using a field laboratory approach can increase students' motivation and interest in learning geography. Students can feel more involved and motivated in the learning process because they can apply their knowledge and skills in real-world contexts. The findings of this research indicate that the authentic assessment model used in the laboratory fieldwork approach significantly improves students' critical thinking skills. The authentic assessment model used in this study can be an effective way to improve critical thinking skills in geography education. Students demonstrate the ability to analyze and interpret geographic information, identify patterns and relationships, and make sound decisions based on evidence.

The research results show that the authentic assessment model provides a more comprehensive evaluation of students' abilities to apply their knowledge and skills in real-world contexts. The laboratory fieldwork approach provides an opportunity for students to develop their critical thinking skills in a more authentic and meaningful way. Apart from that, implementing the authentic assessment model also has a positive impact on student motivation and interest. in geography education. The assessment method used to evaluate

students' critical thinking skills shows the effectiveness of authentic assessment models in measuring their ability to analyze information, critical thinking, and problem solving. Performance-based assessments, such as project-based assessments and presentations, provide students with opportunities to demonstrate their understanding and application of geographic knowledge in authentic scenarios. Open-ended questions and problem-solving tasks further assess students' capacity to think critically and make reasoned judgments based on evidence.

The implication of this research is that educators should consider incorporating authentic assessment models into their teaching practice, particularly in the context of laboratory fieldwork in geography education. In doing so, educators can provide students with opportunities to develop their critical thinking skills in a more meaningful and engaging way. Several implications of implementing the authentic assessment model with a field lab approach include 1) the authentic assessment model provides opportunities for students to develop critical thinking skills. 2) authentic assessment models encourage a shift from traditional assessment methods, such as exams and quizzes, to more comprehensive and meaningful assessments. 3) create authentic learning experiences that connect classroom learning to the real world. Furthermore, this research highlights the importance of reflection and self-assessment in the development of critical thinking skills, and suggests that educators should provide students with opportunities to reflect on their own learning processes and identify areas which need to be improved.

4 Conclusions

The application of an authentic assessment model with a field-lab approach in geography education has shown promising results in improving students' critical thinking abilities. This authentic assessment model allows students to actively engage in the learning process and apply their knowledge and skills in real-world contexts. This approach facilitates a deeper understanding of geographic concepts and enhances students' ability to think critically and make informed decisions. This authentic assessment model also allows students to develop critical thinking skills that are important for their future careers and civic engagement. These abilities enable students to analyze complex problems, evaluate information, and make informed decisions, which is critical in a rapidly changing and connected world. This research shows that authentic assessment models can improve students' critical thinking abilities and provide them with opportunities to develop these abilities in more meaningful and interesting ways. The implication of this research is that educators should consider integrating authentic assessment models into their teaching practices, especially in the context of fieldwork laboratories in geography education.

5 References

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