

## THE EFFORT ANALYSIS OF STUDENT'S CRITICAL THINKING SKILLS PROGRAM IMPROVEMENT USING A GUIDED INQUIRY APPROACH BASED ON BLENDED LEARNING

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Pupils' poor critical thinking abilities in the static fluid notion are the result of a learning procedure that does not actively engage pupils and does not develop their critical thinking abilities. This study tries to ascertain how students' critical thinking abilities are affected by the guided inquiry approach that is based on blended learning. In this study, 40 students from the experimental class and 40 from the control class made up the sample. study was conducted using a non-equivalent-control group study design and a quasi-experiment method. Using a critical thinking instrument with 10 questions, students' critical thinking abilities are evaluated. A sig value  $< 0.05$  was calculated from the Mann-Whitney test results on the posttest data. This leads to the conclusion that  $H_a$  is accepted, which indicates that the guided inquiry model based on blended learning has an impact on students' critical thinking abilities. The N-Gain data demonstrate that the experimental class increased more than the control class did. 80% of student responses to the guided inquiry model based on blended learning fell into the very good category.

### 1. INTRODUCTION

The world's economy, politics, culture, and education have all been impacted by the 21st century's rapid advancement of scientific innovation and digital information technology. Students must therefore be equipped to learn 21st-century skills. Combining 21st century skills is crucial. These skills should include knowledge of digital literacy as it relates to information, media, and technology, as well as critical thinking, communication, collaboration, and creativity skills (Bagas & Harimurti, 2017). They should also include life skills like entrepreneurship, problem solving, and productivity. Critical thinking is one of the thinking abilities that pupils need in the twenty-first century. The abilities in question relate to the ability to exchange information and use cutting-edge technology to store, organize, analyze, produce, and access it [1].

Students are expected to be able to exhibit their skills in critical reasoning, information processing, and information presentation in accordance with the competency standards for primary and secondary school graduates in the 2013 curriculum. To improve learning effectiveness, critical thinking abilities must be taught across all subject areas and grade levels (Satyaninrum, 2021). Physics is one of the subjects for which the application procedure calls for critical thinking abilities. The Natural Sciences (IPA), a body of knowledge composed of facts, hypotheses, laws, and principles, includes physics. Students are encouraged to think, comprehend, analyze, and solve problems when studying physics. Static fluids are one of the physics ideas that teaches students how to recognize and address issues in daily life [2]. Critical thinking abilities have an impact on pupils' capacity to solve problems, hence these abilities truly need to be developed. Students who are adept at critical thinking can handle difficulties involving static fluids using the right concepts rather of going with their first instinct [3].



In reality, students' tendency in learning is to memorize the formulas that have been given without understanding their physical meaning, even though just memorizing the formulas is not enough to understand them well. Even though it has been studied since elementary school, many students still experience difficulties solving problems related to this learning [4]. According to the findings of earlier research, students' critical thinking abilities on the concepts of static fluids were still somewhat lacking. According to earlier research, just 30% of students have the critical thinking abilities necessary to solve problems using the static fluid notion, further demonstrating the low level of students' critical thinking abilities [5]. Students at school should be required to have strong critical thinking abilities in order to understand static fluids. According to this justification, developing students' critical thinking abilities is crucial, especially when it comes to the idea of static fluids. It is insufficient to merely rely on reading material or one-way instruction that does not actively engage students in the learning process when studying the physics subject of static fluids [6]. Because learning is still teacher-centered, pupils become passive and do not comprehend the subject matter, which is one of the reasons why students have inadequate critical thinking skills. According to the preliminary study's findings, pupils are not actively involved in the learning process. Additionally, there hasn't been any instruction on how to think critically about issues in education [7]. These issues need for education that can help pupils develop their critical thinking abilities. The guided inquiry style of learning is one that can use issues to sharpen students' critical thinking abilities [8].

The guided inquiry model can help students learn, think critically, and discuss among their peers. The guided inquiry model involves all students' abilities to find the answer to a problem critically, analytically, and logically with full confidence. Because the guided inquiry paradigm necessitates exploration to aid students in understanding actual phenomena, it is judged ideal for use in addressing students' critical thinking abilities. One of the drawbacks of inquiry learning is that it takes a lot of time, making it challenging for teachers to fit it into the allotted amount of time at school [9]. The inquiry learning paradigm is said to take a long time to adopt, according to study on the impact of guided inquiry worksheets on student learning outcomes in static fluid content at one public senior high school in Indonesia. Combining online learning with guided inquiry learning is the answer to this problem. Blended learning refers to the process of learning that combines in-person instruction with online instruction [10].

Blended learning is learning that mixes traditional face-to-face instruction with online instruction, in which learning resources, including as assignments, learning materials, and assessments, are saved online so that students can access them whenever they want, around the clock. The use of a blended learning model, apart from being able to overcome time limitations in the inquiry process, can also train students' abilities in utilizing technology. The Minister of Education and Culture's statement No. 22 of 2016 regarding the implementation of the 2013 Curriculum states that learning activities must adhere to the principles of using information and communication technology between students and teachers; in addition, students are encouraged to learn from a variety of learning sources. However, there is definitely room for improvement in how information technology is used to support learning in classrooms. The results of the preliminary study state that learning in schools has not fully implemented a learning process that is supported by the use of information technology. Meanwhile, the development of the era of globalization is getting stronger, and the internet is a facility that has dominated various life activities, one of which is education [11].

The percentage was 90.2% according to a study report from the Association of Internet Service Providers in Indonesia (APJII) from 2018, specifically information on internet users in the high school (SMA) student category. 22 According to the research, internet use has become into a fascinating hobby for high school pupils. According to the findings of research studies, 76% of students are interested in learning online. Thus, using the internet, which is one of the stages of inquiry learning based on blended learning, is something that is very possible to do. In

the blended learning stage, online learning is carried out using a learning management system (LMS). LMS can be said to be a learning management system that can be used by students and teachers to conduct learning through software. One LMS that can be used is Google Classroom. Google Classroom is a product from Google for Education that is used as a learning medium because it can be used by students to study outside of class hours.

### Literature Review

Students' Critical Thinking Ability Using the Inquiry Approach is the ability of students to systematically analyze, evaluate, and integrate information from various sources to understand, identify problems, develop questions, collect data, test hypotheses, and compile and present arguments based on relevant evidence. The inquiry approach in this context refers to a learning method that encourages students to actively seek, explore, and solve problems in ways that promote critical thinking, problem solving, and knowledge discovery through a process of independent or collaborative inquiry. Thus, students' critical thinking skills using the inquiry approach include skills in making informed decisions, as well as the ability to identify bias, evaluate arguments, and construct evidence-based solutions in a learning context centered on exploration and discovery.

## 2. METHOD

The method used in this study is quasi-experimental. This study used a non-equivalent control group design as its method. In this design, the experimental group and control group weren't picked at random. When it was put into practice, both groups received various treatments after a preliminary test (pretest). The control group received treatment using traditional learning methods that have been used in schools, while the experimental group received treatment using a guided inquiry model based on blended learning. Both groups took a final exam (posttest) after receiving various treatments to see if there were any variations in the students' critical thinking abilities between the two groups. A number of groups are considered the population by the researcher, and it is from these groups that generalizations about the findings of his research are drawn. Students in classes A were the only participants in this investigation. A sample is a more limited representation of the entire population. How useful the sample is for drawing research results is determined by the research sample. Purposive sampling, in which samples are taken with a specified goal or purpose, is the sampling technique utilized in this study. Class A served as the control class and class B served as the experimental class in this study.

The inception stage, the implementation stage, and the final stage make up this research process. The preparatory stage for the research is the first phase. Making lesson plans and worksheets, formulating the research question, reviewing relevant theories, creating research instruments in the form of critical thinking skills test instruments, and creating non-test instruments in the form of student response questionnaires regarding the implementation of a guided inquiry model based on blended learning are all part of this stage. The viability of the developed instruments is next evaluated by qualified validators. The instruments are then examined for usage during the implementation stage after having been evaluated for suitability. Data collecting occurs throughout the implementation step.

To assess the level of students' critical thinking abilities before to receiving therapy, a pretest is administered to the experimental group and control group at the beginning of this stage. The two groups were then subjected to various therapies. The experimental group received learning support utilizing a blended learning approach based on a guided inquiry paradigm, while the control group received traditional learning support. Both groups were given a posttest following various treatments to determine whether there had been any changes in the degree of critical thinking abilities, particularly in the group that had received treatment utilizing a guided inquiry approach based on blended learning. The analysis and report stage comes last. At this stage, the researcher processes and analyzes the results that have been obtained through the

implementation stage. Then the researcher will test the research hypothesis and draw conclusions.

In this study, the preliminary study involved teacher interviews and the distribution of questionnaires about student observations. The research implementation stage involved the distribution of pretest and posttest questions for the experimental and control groups, as well as student response questionnaires for the experimental class. Before using instruments in research, researchers must calibrate the instruments first. Instrument calibration is carried out to determine whether or not the instrument is suitable for use in research. Instrument calibration includes various kinds of tests, including validity tests, reliability tests, distinguishing power test, and level of difficulty. In the instrument calibration process, a trial was carried out first on class A students. To determine the validity, reliability, distinguishing power test, and level of difficulty of the instrument.

Preliminary tests must be run first to establish which parametric statistical techniques will be utilized to conduct hypothesis testing before beginning data analysis. The homogeneity test and the normalcy test are examples of these precondition tests. When testing research hypotheses, a method known as hypothesis testing is utilized to assess whether a hypothesis may be accepted or rejected. To ascertain the impact of a guided inquiry model treatment based on blended learning, this hypothesis test was conducted. There are two statistical assumptions that must be the foundation of the statistics used to determine hypothesis testing: normality tests and homogeneity tests. In this study, pretest and posttest data were analyzed using the t-test and Mann-Whitney U-test, respectively. Both tests were carried out with the help of SPSS software.

### 3. RESULTS AND DISCUSSION

Students' capacity for critical thought is impacted by the guided inquiry paradigm based on blended learning. The hypothesis test's findings, which indicate a sig value, serve as evidence for this. significance level 0.05 with two tails  $< (0.000092)$ . Based on this, it can be said that  $H_a$  is accepted, which indicates that the guided inquiry approach based on blended learning has an impact on students' critical thinking abilities with regard to static and fluid concepts. The experimental class increased more than the control class, according to the N-Gain results, which is a significant improvement. With an average N-Gain score of 0.64, which was in the medium range, students in the experimental class improved their critical thinking abilities more than those in the control class. An overall percentage of 80% places learning utilizing a guided inquiry paradigm based on blended learning in the very good category. This indicates that students in the experimental class responded favorably to the usage of a blended learning-based guided inquiry methodology.

Previous studies found that students' critical thinking abilities were still only moderately high. Other research that claims that just 30% of pupils have critical thinking skills when solving learning difficulties further supports the low level of students' critical thinking abilities. Students at school must have strong critical thinking abilities in order to study. This justification shows how important it is to help pupils develop their critical thinking abilities. Because learning is still teacher-centered, pupils become passive and do not comprehend the subject matter, which is one of the reasons why students have inadequate critical thinking skills. According to the preliminary study's findings, pupils are not actively involved in the learning process. Additionally, there hasn't been any instruction on how to think critically about issues in education. These issues need for education that can help pupils develop their critical thinking abilities. The guided inquiry style of learning is one that can use issues to sharpen students' critical thinking abilities.

Because the idea necessitates study to aid students in understanding actual phenomena, the guided inquiry model is judged effective for addressing students' critical thinking abilities. One of the weaknesses of inquiry learning is that it requires a lot of time, so it is difficult for teachers to adjust it to the time specified at school. According to earlier studies, implementing the inquiry

learning methodology takes a lot of time. Combining online learning with guided inquiry learning is the answer to this problem. Blended learning refers to the process of learning that combines in-person instruction with online instruction. Blended learning is learning that mixes traditional face-to-face instruction with online instruction, in which learning resources, including as assignments, learning materials, and assessments, are saved online so that students can access them whenever they want, around the clock. Use of learning models with blended learning, apart from being able to overcome time limitations in the inquiry process, it can also train students' abilities in utilizing technology.

However, there is definitely room for improvement in how information technology is used to support learning in classrooms. The results of the preliminary study state that learning in schools has not fully implemented a learning process that is supported by the use of information technology. Meanwhile, the development of the era of globalization is getting stronger, and the internet is a facility that has dominated various life activities, one of which is education. Based on a survey report conducted specifically, internet user data in the student category was 90.2%. These data show that internet use is something that is attracting interest among students. Based on the results of research studies, more than half of students are interested in internet-based learning. Thus, using the internet, which is one of the stages of inquiry learning based on blended learning, is something that is very possible to do. In the blended learning stage, online learning is carried out using a learning management system (LMS). LMS can be said to be a learning management system that can be used by students and teachers to conduct learning through software. One LMS that can be used is Google Classroom.

#### 4. CONCLUSIONS

The guided inquiry approach based on blended learning can be utilized as an alternative in the learning process because the research results suggest that it can enhance students' critical thinking abilities. Before implementing the guided inquiry model based on blended learning, teachers or researchers are advised to ensure students' readiness, especially at the online learning stage, both in terms of the ability to operate the LMS class used, ease of internet access, and the availability of personal smartphones so that learning can take place effectively. Researchers and teachers are expected to be able to provide clearer direction at the beginning of learning regarding the stages of the inquiry model used so that students are not confused when learning takes place. This study's flaw is that it does not contrast the outcomes of students' critical thinking abilities between those who use the guided inquiry model integrated into blended learning and those who use solely that model; therefore, it is recommended for future researchers to conduct research in three classes with different learning styles, namely the conventional model, guided inquiry, and guided inquiry models based on blended learning, so that they can be compared and the results obtained are more accurate. You can utilize a website or another LMS to use as a class for researchers or teachers that want to adopt a guided inquiry methodology based on blended learning.

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