Jurnal Penelitian Pembelajaran Fisika
Vol. 15 Issue 4 – October 2024, p361-366
p-ISSN 2086-2407, e-ISSN 2549-886X
Available Online at http://journal2.upgris.ac.id/index.php/JP2F
DOI: 10.26877/jp2f.v15i4.716

Improving Critical Thinking Skills Using the Guided Inquiry Learning Model Assisted by Interactive Modules on Elasticity Material

Fakhira Nursabrina[1,2] , Halimah Al Hasanah[1] and I Made Astra[1]
[1] Physics Education Postgraduate Study Program, Jakarta State University

[2] E-mail: fakhiranursabrina0517@gmail.com

Received: 18 June. Accepted: 22 August 2024. Published:31 October2024.

Abstract. This research aims to evaluate the effectiveness of the guided inquiry learning model with the help of interactive modules in improving students' critical thinking skills on elasticity material. This research was conducted involving 39 students of class XI MIPA 5 at a high school in Tangerang Regency. The research model used is Classroom Action *Research Action Research* using the Kemmis & McTaggart model . The research results showed a significant increase in the critical thinking abilities of students who used the guided inquiry learning model with interactive modules with results obtained in interpretation of 88%, analysis of 63%, evaluation of 93%, and inference of 89%. So it can be concluded that improving critical thinking skills using the guided inquiry learning model assisted by interactive modules on elasticity material results in an increase in the high category.

Keywords: critical thinking, elasticity, guided inquiry learning model, interactive module

1. Introduction

Learning in the 21st century must prepare a generation that can meet advances in information and communication technology in education [1] . Educators are required to be able to incorporate technology into the classroom learning process to create interesting learning, so they need the ability to deal with it. The abilities needed in the 21st century are known as 4C, namely Critical thinking , communication , collaboration , and creativity [2] . The ability to think critically is very important in the current learning era because the ability to think critically can help to develop an independent attitude, process information, integrate knowledge and be able to solve various problems so that students can compete at a global level by current developments. [3]

One branch of science that requires critical thinking skills is physics. Physics requires a thinking process because essentially physics material is concerned with abstract structures and ideas that are arranged systematically and logically through a reasoning process [4]. The learning model chosen by educators is no less important. Choosing a learning model that is interesting and fun and provides a touch of technology means the learning process will make students much more interactive [5].

Based on the results of interviews with physics subject educators at one of Tangerang Regency's senior high schools, school educators use *teachers for more centered learning.* This is where educators play a more active role during the learning process, even though it is combined with technology, namely when delivering the material using *powerpoint* which are interesting. However it turns out that students are still passive so students' critical thinking skills are still very lacking [6]. Therefore, educators are required to be able to choose learning models that suit the challenges faced as time goes by.

The choice of strategies, approaches, methods and learning models has a huge impact on the learning process. One model that can support the critical thinking process is using the guided inquiry learning model [7] . The inquiry model is teaching that requires students to analyze information to gain knowledge, skills, and values. The inquiry learning model is a learning process that is centered on

students so that it makes students more active during learning. The main aim of the inquiry model is to develop intellectual skills, think critically, and be able to solve problems [8].

Based on the background that has been described, the author conducted research aims to evaluate the effectiveness of the guided inquiry learning model with the help of interactive modules in improving students' critical thinking skills on elasticity material.

2. Method

The research method used is Class Action Research (PTK). PTK also known as Classroom Action Research, is research conducted by educators in the classroom with a focus on improving learning processes and practices [9] . This research was carried out at one of the senior high schools in Tangerang Regency with research subjects of class XI MIPA 5 students for the 2023/2024 academic year, totaling 39 people. The number of students in the class is 39 people, 21 women and 18 men. Data collection occurred in the fifth week of May 2024 to the first week of June 2024.

This research uses classroom action research with the Kemmis & McTaggart model. The Kemmis & McTaggart model is a development of the Kurt model Lewin [10] , because one cycle has four components which include: planning, implementation, observation, and reflection. After implementing the first cycle, re-planning will then be carried out in the form of a separate [11] . The research design was designed using a classroom action research model approach as in Figure 1.

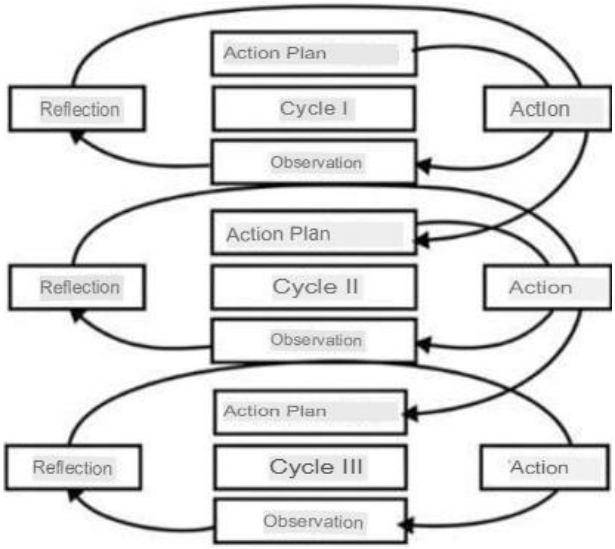

Figure 1. *Classroom* flow *Action Research.*

The research was carried out over three lessons with each lesson carried out in one complete cycle consisting of observation, reflection, design and treatment. After getting the results from cycle I, the stage entered into observation for cycle II by asking the educators regarding the learning used. Several difficulties or deficiencies in the module were noted at the reflection stage of cycle II. Furthermore, re-planning was carried out in cycle II by improving several parts of the module and a final test was carried out again in cycle II to see the improvement in critical thinking skills. This process was repeated until the final test was obtained in cycle III. In this study, the independent variable was applying the guided inquiry learning model assisted by interactive modules and the dependent variable was critical thinking skills in the elasticity material. [12]

Data collection was carried out using an evaluation instrument in the form of a test using a questionnaire at the end of each cycle before the next cycle was carried out. The final test instrument carried out at the end of each cycle is also used as data to see the improvement in students' critical thinking skills. The percentage of students' critical thinking skills results will be aligned based on achievement criteria according to the following table [13]

Table 1. Criteria for Critical Thinking Skills

Percentage (%)	Classification
$81{,}25 < X \leq 100$	Very high
$71{,}50 < X \leq 81{,}25$	Tall
$62{,}50 < X \leq 71{,}50$	Currently
$43{,}75 < X \leq 62{,}50$	Low
$0 < X \leq 43{,}75$	Very low

3. Results and Discussion

Each cycle carried out contains 4 important stages, namely, observation, reflection, design, and treatment. In Cycle I, the observation stage was carried out by interviewing physics educators regarding students' backgrounds, class conditions, learning models, and teaching methods used during the learning process [14] At this observation stage, the researcher also saw the process of teaching and learning activities directly and collected pretest data on critical thinking skills in the form of questions presented in diagnostic tests [15]. So, the following results were obtained.

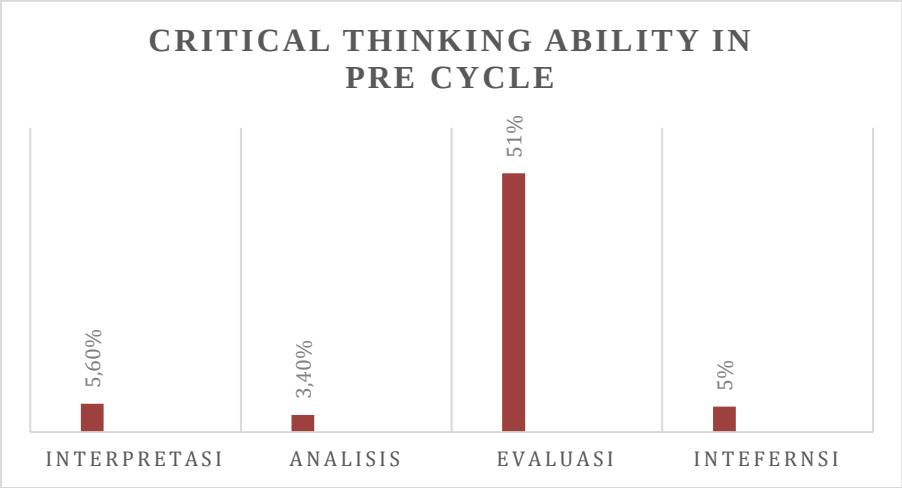

Figure 2. Critical thinking ability in pre-cycle.

Based on the diagram, it can be seen that the interpretation indicator is 5.60%, the analysis indicator is 3.40%, and the inference indicator is 5%. These three indicators show that students' interpretation, analysis and inference abilities are still classified as very low (SR). Meanwhile, the evaluation indicator shows 51%, meaning that students' evaluation abilities are classified as low (R).

Next, the reflection stage is carried out to see the shortcomings and problems that arise in the teaching and learning activities that have been carried out. At the design stage, the researcher designed an interactive module with the syntax of the guided inquiry learning model. The interactive module that has been designed has the syntax of the guided inquiry learning model which includes: 1) Problem orientation, 2) Formulating the problem, 3) Proposing a hypothesis, 4) Gathering information, 5) Testing the hypothesis, and 6) Concluding. The guided inquiry learning model is used to improve critical thinking skills [16] .

At the treatment stage, learning will be carried out using a guided inquiry learning model assisted by interactive modules. So, at the end of learning in cycle I there will be a final test to see the improvement in critical thinking skills. After getting the results from cycle I, the stage goes into observation for cycle II by asking educators regarding the learning used using the guided inquiry learning model assisted by interactive modules that have been created previously. In the reflection stage of cycle II, several

difficulties or shortcomings regarding the module were noted. Next, planning was carried out again in cycle II by correcting several parts of the module that were not by the learning syntax. In the implementation phase of cycle II, learning was carried out again with several parts of the guided inquiry learning model assisted by improved interactive modules, and another final test was carried out in cycle II to see the improvement in critical thinking skills. This process is repeated until the final test is obtained in cycle III. So that the final test result data for each cycle is obtained as in Figure 3.

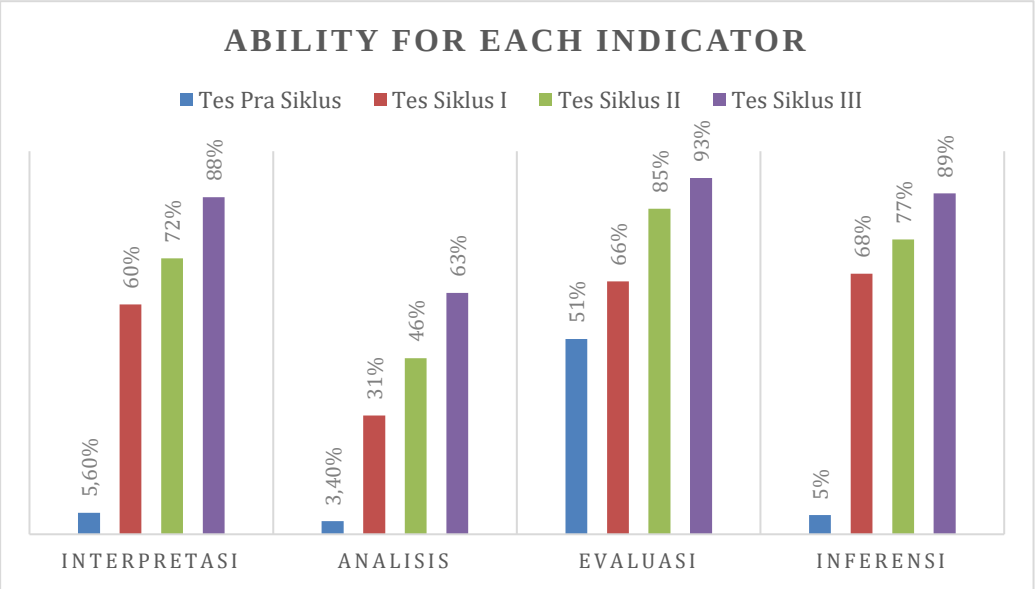

Figure 3. Students' critical thinking ability in pre-cycle, cycle I, cycle II and cycle II.

Based on the results in Figure 3. The diagram above shows that there was an increase in all indicators in cycle I, namely interpretation from 5.60% to 60%, analysis from 3.40% to 31%, evaluation from 51% to 66%, and inference from 5% to 68%. This increase occurred because the interactive module provided during cycle I had been improved according to suggestions from students. Then the increase in the three indicators in cycle II can also be seen from the diagram where interpretation is from 60% to 71%, analysis from 31% to 46%, evaluation from 66% to 85%, and inference 68% to 77%. Furthermore, in cycle III, it was found that interpretation was from 71% to 88%, analysis was from 46% & 63%, evaluation was from 85% to 93%, and inference was 77% to 89%.

The results of critical thinking skills obtained in cycle I and cycle II for all indicators were still in the very low to high interval. This can be caused by adaptations made by students regarding the learning model used. Previously, students used conventional learning models, so when they were given a guided inquiry-based learning model assisted by interactive modules, students still had to adapt and adapt to learn based on the syntax of the learning model provided, especially in the problem formulat section. The final results of critical thinking abilities in cycle III provide increased results in the high to very high category for each indicator of critical thinking abilities. This is because, with the existence of a guided inquiry learning model assisted by interactive modules, students can better understand and interpret experiences in personal, social, and global contexts [17]

The cause of low critical thinking skills is the lack of practice on questions based on daily problems and the boring learning process in class [18]. The activities that occur in learning are dominated by educators, making students passive in learning. Apart from that, students' lack of attention to the subject matter in the learning process results in students' abilities being at a very low level. Guided inquiry learning with the help of interactive modules produces excellent results for students' critical thinking skills [19] . The guided inquiry learning model is assisted by interactive modules that use a combination of colors to attract students' attention, images that can motivate students, and also animations that can focus students' attention on the material to be studied. The guided inquiry learning model assisted by

interactive modules makes it easier for students to study without being limited by space and time so that students can still study again anytime and anywhere. [20] .

Based on the explanation above, improving critical thinking skills can be done using a guided inquiry learning model assisted by interactive modules on elasticity material.

4. Conclusion

Based on the three cycles that have been carried out, and the final test in each cycle to see improvements in critical thinking skills. Cycle III obtained an increase in interpretation of 88%, analysis of 63%, evaluation of 93%, and inference of 89%. So it can be concluded that improving critical thinking skills using the guided inquiry learning model assisted by interactive modules on elasticity material results in an increase in the high category. This research still requires ongoing research to see improvements in other categories of student abilities.

Acknowledgments

Acknowledgments to the SMAN school in Tangerang Regency, physics educators, and class XI MIPA 5 students for allowing us to carry out this research. Then to the journal editors and reviewers for their significant contributions throughout the publishing process of this journal.

References

[1] Rahayu R, Iskandar S and Abidin Y 2022 Inovasi Pembelajaran Abad 21 dan Penerapannya di Indonesia *Jurnal Basicedu* **6** 2099–2104

[2] Nafi'ah W 2023 *Pengaruh Model Pembelajaran Attention, Relevance, Confidence, And Satisfaction (Arcs) Dengan Strategi Quick On The Draw Terhadap Kemampuan Berpikir Kreatif Matematis Ditinjau Dari Gaya Belajar* (Lampung)

[3] Hasnan S M, Rusdinal R and Fitria Y 2020 Pengaruh Penggunaan Model Discovery Learning Dan Motivasi Terhadap Kemampuan Berpikir Kritis Peserta Didik Sekolah Dasar *Jurnal Basicedu* **4** 239–49

[4] Kusuma Hati F and Setiaji B 2024 Pengembangan E-Modul Fisika Untuk Meningkatkan Kemandirian Belajar Dan Kemampuan Berpikir Kritis Peserta Didik *Jurnal Pendidikan Fisika* **11** 56–65

[5] Ashari H and Makmur E 2024 Desain Pembelajaran Inovatif: Implementasi Aplikasi Quiver Berbasis Augmented Reality Dalam Perkuliahan *Jurnal MediaTIK* **7** 7–12

[6] Nuraisyah 2023 *Pengembangan Media Pembelajaran Video Animasi Berbasis Multimedia Powtoon Pada Materi Perubahan Wujud Benda Kelas Iii Sdn 277 Sambirejo*

[7] Marina Sepriyani E 2024 Pengaruh Model Pembelajaran Kooperatif Two Stay Two Stray (Tsts) Berbantuan Media Interaktif Berbasis Stem Terhadap Berpikir Kritis Dan Hasil Belajar Siswa Pada Materi Sistem Indera Di Sma Negeri 2 Kerinci

[8] Listyaningrum T A and Widodo 2024 Meta Analisis Pengaruh Pembelajaran Berbasis Inkuiri Terbimbing dalam Meningkatkan Pemahaman Konsep Fisika *Jurnal Genesis Indonesia* **3** 69–79

[9] Septianingsih R and Safitri D Media Audio Visual Dalam Konteks Pembelajaran Ips: Implikasinya Untuk Pendidikan Di Era Digital

[10] Alfian Fachri A and Achmad A 2024 Peningkatan Hasil Belajar Siswa Materi Turunan Melalui Model Pembelajaran Berbasis Masalah *Global Journal Education Humanuty* 107–112

[11] Sinaga M and Noviyanti S 2024 Penerapan Model Pembelajaran Quantum Teaching Sebagai Upaya Meningkatkan Keterampilan Berbicara Pada Siswa Kelas V Sekolah Dasar *Jurnal Tunas Pendidikan* **6** 496–505

[12] Permatasari D, Sherly Pamela I, Jambi U, Jambi -Muara Bulian NoKM J, Darat M, Jambi Luar Kota K and Muaro Jambi K 2023 Peningkatan Keterampilan Berpikir Kreatif Melalui Model Project Based Learning Pada Peserta Didik Kelas IV Sekolah Dasar *Journal on Education* **05** 16151–64

[13] Fanani M A, Wafiroh Z and Yaqin M H 2024 Penerapan Model Problem Based Learning (PBL) dalam Pembelajaran Berdiferensiasi untuk Meningkatkan Keterampilan Berpikir Kritis

Peserta Didik pada Pelajaran Matematika *Proceeding International Conference on Lesson Study* **1** 537–48

[14] Ni Wayan S D, Kompyang S, Ni Putu A H S, Dimas Q, I Komang W B W, Kadek Y W, I Ketut M A J and Ni Nengah P 2024 *Penelitian Tindakan Kelas (PTK): Panduan dan Implementasinya bagi Guru dan Mahasiswa* (Bali: Nilacakra)

[15] Sinaga D 2024 *Buku Ajar Penelitian Tindakan Kelas (PTK)* ed Aliwar (Jakarta: UKI Press)

[16] Yogi I K N D, Sudiana I N and Putrayasa I B 2024 Media Video Pembelajaran Ipas Berbasis Model Inkuiri Terbimbing Materi Perubahan Wujud Zat *Jurnal Pendidikan DasaR Indonesia* **8** 111–23

[17] Yasin M, Judijanto L, Septi Andrini V, Patriasih R, Siwi Hutami T, Hasni H, Fitri Arisa M, Mufida Asriningsih T, Saifuddin M, Hariyono H, Tarrapa S and Triyana S N 2024 *Model Pembelajaran Berbasis Teknologi : Teori dan Implementasi* ed E Rianty and I Kumala Sari (Yogyakarta: PT. Green Pustaka Indonesia)

[18] Leony Margaretha, Feri Tiona Pasaribu and Yelli Ramalisa 2024 Pengembangan E-LKPD Berbasis STEM Berbantuan Video Animasi untuk Meningkatkan Kemampuan Berpikir Kritis Siswa SMA *Jurnal Pendidikan MIPA* **14** 90–8

[19] Aditiyas S E and Kuswanto H 2024 Analisis Implementasi Keterampilan Proses Sains Di Indonesia Pada Pembelajaran Fisika : Literatur Review *Jurnal Penelitian Pembelajaran Fisika* **15** 153–66

[20] Temur A, Durukan A and Artun H 2022 The Relationship between the Pre-Service Science Teachers' Self-Efficacy towards Science Teaching and Tendency to Use Technology in Classes *Mimbar Sekolah Dasar* **9** 367–80