# Analysis of Students' Cognitive and Affective Ability in the

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# Analysis of Students' Cognitive and Affective Ability in the FliCKu Learning Model Based on Bloom's Taxonomy

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***Abstract***

*Entering the New Normal era, educators think hard about how new steps or new methods should be taken in learning activities. The teacher hopes that in this new normal era, student learning achievement can increase and there is synchronization during online and offline learning. In order to meet the teacher's expectations, the researcher offers the Flipped Classroom learning model combined with the Kumon learning model, which in this study is called FliCKu. The aims of this study are (1). To find out the FliCKu learning model can improve students' abilities in the cognitive and affective aspects of students. (2). To determine the increase in students' cognitive abilities based on Bloom's taxonomy. The research method used is the mix method with a sample of 22 students. The result of this study is that the FliCku learning model can improve students' cognitive and affective aspects. From the results of the analysis of increasing students' cognitive abilities based on Bloom's taxonomy, at the cognitive level C1 shows students are in the very high category. At the cognitive level C2 shows students are in the very high category. At the C3 cognitive level, it shows that students are in the high category. At the C4 cognitive level, it shows that students are in the medium category. At the cognitive level of C5, it shows that students are in the low category.*

**Keywords:** Learning Model; Cognitive; Affective; Bloom Taxonomy

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## Introduction

The Covid-19 pandemic has spread since 2019, at which time the government implemented distance learning (PJJ). All sectors, including education, are required to adapt to the new regulations made by the government. In 2021 the end of the Covid-19 pandemic has subsided and the New-Normal era has been implemented. Entering the New Normal era, educators think hard about how new steps or new methods must be taken in learning activities. During this pandemic, there was a decline in student learning achievement and expected competency targets, this was due to the monotonous application of online learning models or methods.

According to Hartati (2019), 76% of students in class XI of SMAN 1 Sakti did not complete learning, according to Dhiniaty (2021) there was a 33% decline in students' cognitive decline at SD Negeri Rejodadi due to online learning. According to Suharno (2020) 90% of students in the lower middle class have a tendency to be less active due to online learning.

The teacher hopes that in this new normal era, student learning achievement can increase and there is synchronization during online and offline learning. Based

on the results of interviews and observations with physics teachers at MAN 1 Madiun City. The occurrence of an out of sync between online and offline learning. Where when students are given assignments at home students get good grades or about 86% of students get good grades when learning online, but when learning at school takes place students cannot rework similar questions, and students tend to be passive in class. In order to meet the teacher's expectations, the researcher offers the Flipped Classroom learning model combined with the Kumon learning model, which in this study is called FliCKu.

The combination of these two learning models is done to synchronize online and offline learning. Where it can be seen that the Flipped Classroom learning model is an inverted class where students are asked to study independently at home, in order to support students to learn independently at home, the researchers combined it with the Kumon learning model, where this Kumon learning model teaches students to do practice questions in stages from level to level. low cognitive level to high cognitive level. With this practice, students are expected to be able to better understand the material. And when offline learning takes place, students are not familiar with the material provided, so there is no gap between online and offline learning. The FliCKu learning model is a breakthrough that can be offered to teachers by using the concept of blended learning to facilitate online and offline learning. Researchers will use the Google Classroom application to control students during independent study at home.

FliCKu is a combination of 2 learning models Flipped Classroon and Kumon. FliCKu is where students get the material first outside the classroom and do the exercises given so that when learning in class there will be discussion activities to solve problems in order to get maximum results and maintain a fun and comfortable learning atmosphere. The syntax of the FliCKu learning model is Exploration, Excercise, Reflection & Evaluation, Enhancement.

a. Exploration is an activity to find or explore with the aim of finding something. The teacher provides learning materials/videos 1-2 days before class, and students can look for references from various sources and students summarize the material provided.
b. Excercise is an act of practicing behavior that is done repeatedly. The teacher provides practice questions to be done at home independently and students report the results of their work gradually through Google Classroom.
c. Reflection & Evaluation. Reflection is an assessment or feedback activity after receiving the material. Evaluation is a measurement and improvement activity. In classroom learning, the teacher reflects on the material that has been given and conducts joint discussions and corrects the results of student practice questions.
d. Enhancement is an increase in student learning. If there are some wrong answers to the questions, the teacher will provide opportunities for students to study with friends who can answer correctly (Tentor Peers).

The aims of this study are (1). To find out the FliCKu learning model can improve students' abilities in the cognitive and affective aspects of students. (2). To determine the increase in students' cognitive abilities based on Bloom's taxonomy.

## METHODS

This study uses a mix method. Mix method is a combination of quantitative research methods and qualitative research methods. The mix method was chosen

because if the quantitative and qualitative methods were used independently, they were not accurate enough to answer or understand the research.

Based on the combination research method, an embedded experimental research design was taken. Embedded design is a mixed methods design in which one data set provides a secondary role that supports the other data (Creswell, 2006). The following is a schematic of the embedded experimental design adapted from Creswell (2006),

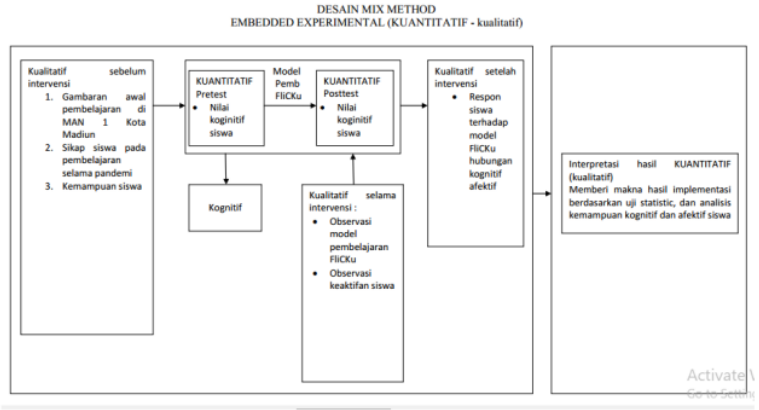



Figure 1. *Mix Method Design*

Based on the mix method design, there is a qualitative approach before the intervention, in this study, it presents an initial picture of learning at MAN 1 Madiun City, students' attitudes towards pandemic learning and students' abilities. Based on the results of observations and interviews with physics teachers at MAN 1 Madiun City during online learning, students are less active and tend to be passive during learning, because learning is only limited through LMS, whatsapp and google meet, and the lack of supervision from the teacher. Based on interviews with physics teachers, it was stated that where students were able to do the questions correctly during online learning, but when offline learning took place, students could not re-work the same questions as the questions given during online learning. The physics teacher said that students only cheated so that they could answer correctly during online learning which resulted in the students' honesty scores being reduced.

The sample size of this research is 1 class. The researcher took a group of class XI MAN 1 Madiun City students in the 2021/2022 academic year as research subjects. The number of students who participated in the study were 22 people. The data collection techniques from this study are (1) a test with pre-test questions given before the use of the FliCKu learning model, and post-test after using the FliCKu learning model. (2) a questionnaire on student responses to the FliCKu learning model to find out how effectively the FliCKu learning model was used. (3) observation of student activity, is useful for seeing the affective aspects of students when learning takes place using the FliCKu learning model.

This study uses 2 data analysis techniques, namely pre-requisites and hypothesis testing. The prerequisite test used is the normality test using SPSS 16 One Sample Kolmogorov-Smirnov, and the homogeneity test using the Levene Statistic test with SPSS 16. In this study the data used were normally distributed,

so the hypothesis test used in this study used paired parametric test. samples T-Test.

## RESULTS AND DISCUSSION

a. The FliCKu learning model can improve the ability of students' cognitive aspects.

Based on the Paired Samples T Test, a significant value of 0.000, because the significant value is less than 0.05, the FliCKu learning model can improve students' cognitive abilities. The paired sample t test also showed a difference or increase in the results of the pre-test to the post-test of 2.28.

Table 1. *Paired Sampls Test*

| Paired Samples Test | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paired Differences | | | | | | | |
| | | | | | 95% Confidence Interval of the Difference | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| Pair 1 | Pre Test - Post Test | -2.273 | .550 | .117 | -2.517 | -2.029 | -19.365 | 21 | .000 |

Table 2. *Test Results*

| | Nilai Pre-Test ( 22 siswa) | Nilai Post-Test (22 siswa) | n-Gain ( 22 siswa) |
|---|---|---|---|
| **Jumlah** | 76 | 126 | 14,73 |
| **Rata-rata** | 3.454545455 | 5.727272727 | 0.669545 |

Hake (1999) revealed, if the Gain value is more than equal to 0.7, it is included in the high criteria, the Gain is worth more than equal to 0.3, less than 0.7 is included in the medium criteria, and the Gain is less than 0.3 in the low category. Based on the table of N-test results Gain obtained an average N-Gain 0.67 which states that all student learning outcomes are in the medium category. There are 7 students in the high category and 15 students in the medium category. There is 1 student, namely student Q whose n-Gain value is 0.33. where 0.33 results almost fall into the moderate criteria. This is because student Q is less active in learning. Student Q was included in the 4 students who did not answer during the question and answer process.

This is because during the question and answer session students are not able to show courage in the question and answer process and Q students tend to be quiet and passive in class. Based on the results of the practice questions, Q students only answer practice questions without including how to do them, on the other hand the time used in the learning process is relatively short so students do not have the opportunity to answer

questions during the question and answer process during learning. In addition, there are 4 students who get perfect n-Gain scores, namely students F, I, J, and S. Based on the results of observations of student activity, these students fall into the active category in all categories, and the four students are able to become peer tutors, based on the results practice questions for students, the four students were able to answer the practice questions along with how to do them.

In general, in April the school has started to go offline although it has not been maximized, where children are starting to adapt from the original online learning to offline. starting from unstructured study habits, so teachers need to encourage students to achieve learning or cognitive achievement of students to reach the KKM. This is in line with research from Leni Meileni (2021), where 50% of students have not been able to adapt to online learning, and there is no change in students' cognitive, students tend to get lower grades, and students are easier to cheat due to lack of supervision from the teacher.

b. The FliCKu learning model can improve the ability of students' affective aspects.

Table 3. *Result Of Observation Of Student Activity*

| | INDIKATOR | | | |
|---|---|---|---|---|
| | siswa mampu mengumpulkan tugas latihan soal dengan batas waktu yang telah ditentukan. | siswa mampu untuk menjadi tentor bagi teman-temannya | siswa mampu menjawab pertanyaan dengan benar saat terjadi tanya jawab. | siswa mampu merangkum materi yang telah dipelajari dan diajarkan. |
| **Hasil** | 100% | 36,4% | 81,2% | 100% |
| **Rata-Rata** | 79,4% | | | |
| **Kriteria** | Aktif | | | |

In the observation data on student activity, Table 3 states that all students are in the active category or 100% of active students. However, in indicator 2, that is, students are able to become tutors for their friends, only 36.4% of students are able to become tutors. This is due to the decision making of students who can become tutors, decision making on the basis of students who are able to answer the practice questions correctly and are able to collect the practice questions first. Only 8 students can become tutors for their friends, where 4 students become tutors at the first meeting and 4 other students become tutors at the second meeting. The task of this peer tutor is to help his friend in learning and do the practice questions if his friend does not understand it.

This peer tutor is selected by the student who first collects the practice questions and answers correctly. After the peer tutoring is done, the student who becomes the tutor appoints his group friends to come forward to work on the practice questions. When the tutor appointed his friend to come forward, there were some students who were reluctant to go forward, as a result the tutor himself went forward to work on it. In Table 3,

observation of student activity also stated that only 81.2% of students were able to answer questions correctly during a question and answer session. This is due to the limited time during the learning process, so not all students have the opportunity to answer questions during a question and answer session. From the results of observations of student activity where 100% of students are able to collect practice questions on time and are able to summarize the material that has been learned and taught. Based on the student active response questionnaire in Table 4 it is stated that 75.7% of students show a good response to the ability of students' affective competencies.

Table 4. *Student Activity Response Questionnaire Results*

| No Item | Skor | Frekuensi | Jumlah Skor | Presentase |
|---|---|---|---|---|
| 11, 12, 13, 14, 15, 16, 17, 18 | 4 | 47 | 188 | 35.3% |
| | 3 | 90 | 270 | 50.7% |
| | 2 | 36 | 72 | 13.5% |
| | 1 | 3 | 3 | 0.5% |
| **Jumlah** | | 176 | 533 | 100% |
| **Skor Tertinggi** | | | 4 | |
| **Jumlah Pernyataan** | | | 8 | |
| **Jumlah Responden** | | | 22 | |
| **Skor Maksimal** | | | 704 | |
| **Presentase** | | | 75.7% | |

In online to offline learning, students begin to adapt again, initially students are not on-time and passive during online learning or about 70% of students are passive during online learning, students are expected to be able to come on time at school and be active in class when offline learning. This is in line with research from Leni Meileni (2021) 40% of students' affectiveness did not experience changes where students tended to be passive, not on-time in online learning activities, and the value of students' honesty was reduced.

In order to determine student responses to the FliCKu learning model, students were given a response questionnaire to the FliCKu learning model, with the results shown in Table 5.

Table 5. *Student Response Questionnaire Results*

| Kriteria Angket | Rentang Skor | Frekuensi | Presentase |
|---|---|---|---|
| **Sangat Baik** | $rerata\ skor > 3.83$ | 0 | 0% |
| **Baik** | $3.2 < rerata\ skor \leq 3.8$ | 8 | 36.4% |
| **Cukup** | $1.8 < rerata\ skor \leq 3.2$ | 14 | 63.6% |
| **Kurang** | $1.2 < rerata\ skor \leq 1.8$ | 0 | 0% |
| **Sangat Kurang** | $rerata\ skor \leq 1.2$ | 0 | 0% |
| **Jumlah** | | 22 | 100% |

From the results of the questionnaire on student responses to the FliCKu learning model, 36.4% of students stated that the FliCKu learning model was good or effective in learning. 63.6% of students stated that the FliCKu learning model was effective enough to be used in learning.

c. Analysis of increasing students' cognitive abilities based on Bloom's taxonomy

In the pre-test and post-test there are 7 multiple choice questions where there are 1 question C1, 1 question C2, 2 questions C3, 2 questions C4, and 1 question C5. Where the pre-test questions are given before learning begins, in the pre-test students do not really understand the material and have not been able to work on the questions given. Post-test questions are given after the implementation of the FliCKu learning model, it is possible for students to understand the material and be able to work on the questions given. The cognitive criteria of students according to Junaidi (2017) can be seen in the table below.

Table 6. *Cognitive Criteria*

| Presentase | Kriteria |
|---|---|
| $80\% < P \leq 100\%$ | Sangat Tinggi |
| $60\% < P \leq 80\%$ | Tinggi |
| $40\% < P \leq 60\%$ | Sedang |
| $20\% < P \leq 40\%$ | Rendah |
| $0\% < P \leq 20\%$ | Sangat Rendah |

1. cognitive level C1

At the cognitive level C1 is the lowest level in the cognitive level of Bloom's taxonomy, where students are able to recall the material they have learned. In the pre-test and post-test questions, there is only 1 question with the cognitive level of C1 being number 1 in the pre-test and post-test questions.

1. Jika suatu cahaya putih dilewatkan suatu kisi difraksi maka warna cahaya yang mengalami deviasi paling dekat terhadap bayangan pusat adalah....
   a) Jingga
   b) Merah
   c) Kuning
   d) Hijau
   e) Biru

Figure 2. *Question C1*

Table 7. *C1 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 8 | 36.4% |
| 1 | 14 | 63.4% |

In question number 1 students are asked to be able to name the symptoms or colors that appear on the soap bubbles. In the pre-test question number 1, only 14 students were able to answer correctly, and 8 other students had not been able to answer question number 1 correctly. This happened because students could not remember the material they had learned because they only studied independently at home.

On the results of the students' ability to answer the post-test questions get satisfactory results, the post-test results can be seen in Table 8.

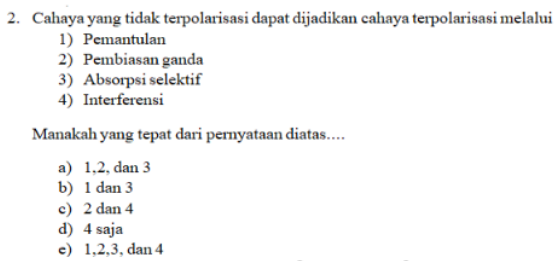
Table 8. *C1 Post-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 0 | 0% |
| 1 | 22 | 100% |

In Table 8 shows all students with a percentage of 100%, have been able to answer the question of cognitive level C1. From the average pre-test and post-test on cognitive level questions C1 obtained a percentage of 81.8%, this shows the ability to solve cognitive level questions C1 on light wave material is categorized as very high.

2. Cognitive level C2

Cognitive level C2 or students' understanding ability is the second level in Bloom's taxonomy, where students are able to understand the material that has been studied. In the pre-test and post-test questions, there is 1 question with the cognitive level of C2 being in question number 2.



2. Cahaya yang tidak terpolarisasi dapat dijadikan cahaya terpolarisasi melalui
   1) Pemantulan
   2) Pembiasan ganda
   3) Absorpsi selektif
   4) Interferensi

   Manakah yang tepat dari pernyataan diatas....

   a) 1,2, dan 3
   b) 1 dan 3
   c) 2 dan 4
   d) 4 saja
   e) 1,2,3, dan 4

Figure 3. *Question C2*

Table 9. *C2 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 2 | 9.1% |
| 1 | 20 | 90.9% |

In question number 2 with a cognitive level of C2 students are asked to be able to classify the correct answers. In the pre-test question number 2 only 2 students answered the question incorrectly, and 20 other students were able to answer the question correctly. This means that students have been able to understand the questions given. Furthermore, the post-test results can be seen in Table 10.

Table 10. *C2 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 1 | 4.5% |
| 1 | 21 | 95.5% |

In Table 9 it can be seen that almost all students can answer the post-test questions correctly, only 1 student who cannot answer the post-test questions correctly, because the student does not understand the light wave material well. From the average pre-test and post-test on the C2 cognitive level, the percentage obtained is 93.2%, this shows that the ability to solve C2 cognitive level questions on light wave material is categorized as very high.

3. Cognitive Level C3

Cognitive level C3 or applying is the third level in Bloom's taxonomy, where students are able to apply equations to answer questions. In the pre-test and post-test questions, there are 2 questions with the cognitive level of C3 being in questions number 3 and 4.

3. Cahaya dengan intensitas 100W/m$^2$ memasuki suatu polarisator dan analisator. Apabila perbandingan natara intensitas cahaya yang masuk dan keluar analisator adalah 2:1, intensitas cahaya yang keluar dari analisator adalah....
   a) 25 W/m$^2$
   b) 50 W/m$^2$
   c) 75 W/m$^2$
   d) 100 W/m$^2$
   e) 125 W/m$^2$
4. Sebuah celah ganda disinari dengan cahaya yang panjang gelombangnya 640 mm. Sebuah layar diletakkan 1,5 m dari celah. Jika jarak kedua celah 0,24 mm , maka jarak dua pita terang yang berkedatan adalah....
   a) 4,0 mm
   b) 6,0 mm
   c) 8,0 mm
   d) 9,0 mm
   e) 9,6 mm

Figure 4. *Question C3*

Table 11. *C3 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 24 | 54.5% |
| 1 | 20 | 45.5% |

In questions number 3-4 students are asked to be able to implement the equations of polarization and interference. Only 7 students were able to answer the pre-test questions correctly, where question number 3 was in the difficult category. This happens because students who cannot answer, these students do not understand the material well so they cannot apply the equations that have been learned and the pre-test questions are questions to see the students' initial abilities.

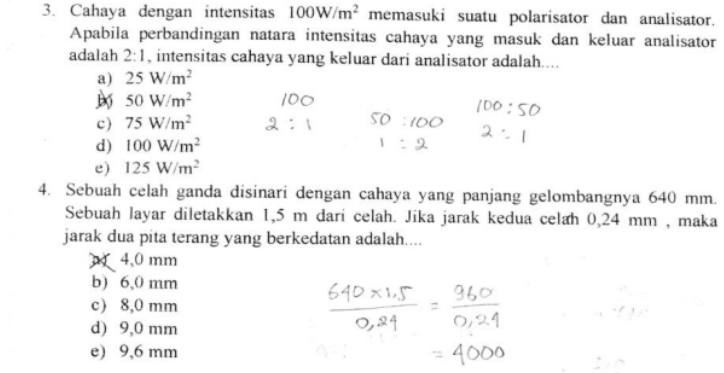
13 students were able to answer the pre-test questions correctly. The other 9 students could not answer the pre-test questions correctly. Question number 4 is also included in the difficult category. Students who cannot answer correctly because these students do not really understand the material and have not been able to apply equations to questions.

Table 12. *C3 Post-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 4 | 9.1% |
| 1 | 40 | 90.9% |

Only 4 students could not answer question number 3 after learning with the FliCKu learning model. The other 18 students were able to do the post-test questions correctly. Where question number 3 is a question with a difficult level. Students begin to understand the material and can apply equations to problems.

All students were able to answer the post-test questions correctly. Where question no 4 is also included in the difficult category. Students are able to apply equations to problems. From the average pre-test and post-test on the C3 cognitive level, the percentage obtained is 68.2%, this indicates the ability to solve C3 cognitive level questions on light wave material is categorized as high.



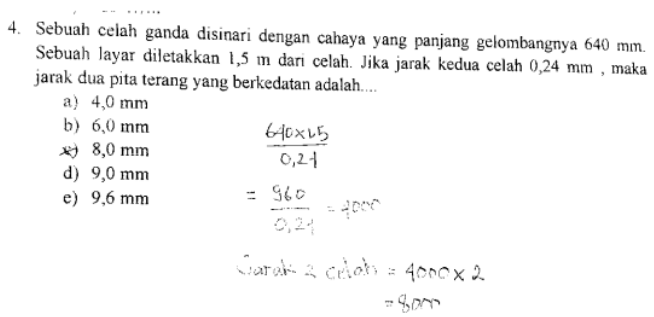
3. Cahaya dengan intensitas 100W/m² memasuki suatu polarisator dan analisator. Apabila perbandingan natara intensitas cahaya yang masuk dan keluar analisator adalah 2:1, intensitas cahaya yang keluar dari analisator adalah....
   a) 25 W/m²
   b) 50 W/m²
   c) 75 W/m²
   d) 100 W/m²
   e) 125 W/m²

100 / 2 : 1 — 50 : 100 / 1 : 2 — 100 : 50 / 2 : 1

4. Sebuah celah ganda disinari dengan cahaya yang panjang gelombangnya 640 mm. Sebuah layar diletakkan 1,5 m dari celah. Jika jarak kedua celah 0,24 mm , maka jarak dua pita terang yang berkedatan adalah....
   a) 4,0 mm
   b) 6,0 mm
   c) 8,0 mm
   d) 9,0 mm
   e) 9,6 mm

$\frac{640 \times 1,5}{0,24} = \frac{360}{0,24}$ = 4000

Figure 5. *Student Pre-Test Answers*


4. Sebuah celah ganda disinari dengan cahaya yang panjang gelombangnya 640 mm. Sebuah layar diletakkan 1,5 m dari celah. Jika jarak kedua celah 0,24 mm , maka jarak dua pita terang yang berkedatan adalah....
a) 4,0 mm
b) 6,0 mm
c) 8,0 mm
d) 9,0 mm
e) 9,6 mm

$\frac{640 \times 15}{0,24}$

$= \frac{960}{0,24} = 4000$

Jarak 2 celah $= 4000 \times 2$

$= 8mm$

Figure 6. *Student Post-Test Answers*

In question number 3, students A and B answered the question incorrectly, students A and B assumed that $\frac{100}{2} = 50$ was the correct answer and students had not been able to apply the light polarization equation, the correct answer was 25 W/m2. The correct steps in solving problem number 3 are:

$$\frac{\frac{1}{2}I_0}{\frac{1}{2}I_0 cos^2\theta} = \frac{2}{1}$$

$$\frac{1}{cos^2\theta} = \frac{2}{1}$$

$$cos^2\theta = \frac{2}{1} \dots (i)$$

$$I_2 = \frac{1}{2}I_0 cos^2\theta \dots (ii)$$

Substitute equation (i) into equation (ii):

$$I_2 = \frac{1}{2} \times I_0 \times \frac{1}{2}$$

$$I_2 = \frac{1}{4} \times I_0 = \frac{1}{4} \times 100 = 25\ W/m^2$$

In item number 4, student A answered correctly but the steps were not correct and student A did not apply the light interference equation. student B is wrong in answering question number 5, student B has not applied the light interference equation. Students A and B also did not pay attention to the units in the problem. The correct steps in question number 4 are:

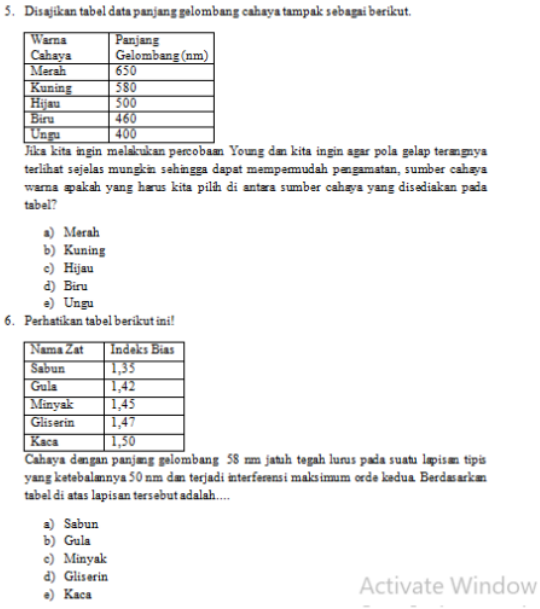
$$\frac{dy}{L} = n\lambda$$

$$y = \frac{1(6,4 \times 10^{-7})1,5}{2,4 \times 10^{-4}}$$

$$y = 4 \times 10^{-3} m = 4mm$$

4. Cognitive Level C4

Cognitive level C4 or analyzing is the fourth level in Bloom's taxonomy, where students are able to analyze questions. In the pre-test and post-test questions there are 2 questions with the cognitive level of C4 being in questions number 5 and 6, questions number 5 and 6 are included in the medium level category.



5. Disajikan tabel data panjang gelombang cahaya tampak sebagai berikut.

| Warna Cahaya | Panjang Gelombang (nm) |
|---|---|
| Merah | 650 |
| Kuning | 580 |
| Hijau | 500 |
| Biru | 460 |
| Ungu | 400 |

Jika kita ingin melakukan percobaan Young dan kita ingin agar pola gelap terangnya terlihat sejelas mungkin sehingga dapat mempermudah pengamatan, sumber cahaya warna apakah yang harus kita pilih di antara sumber cahaya yang disediakan pada tabel?

a) Merah
b) Kuning
c) Hijau
d) Biru
e) Ungu

6. Perhatikan tabel berikut ini!

| Nama Zat | Indeks Bias |
|---|---|
| Sabun | 1,35 |
| Gula | 1,42 |
| Minyak | 1,45 |
| Gliserin | 1,47 |
| Kaca | 1,50 |

Cahaya dengan panjang gelombang 58 nm jatuh tegak lurus pada suatu lapisan tipis yang ketebalannya 50 nm dan terjadi interferensi maksimum orde kedua. Berdasarkan tabel di atas lapisan tersebut adalah....

a) Sabun
b) Gula
c) Minyak
d) Gliserin
e) Kaca



Figure 7. *Question C4*

Table 13. *C4 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 24 | 54.5% |
| 1 | 20 | 45.5% |

In questions number 5-6, students are asked to be able to examine interference questions. As many as 15 students have been able to analyze the pre-test questions, and 7 other students have not been able to analyze the questions given. This happens because these students do not really understand the material, because students only study independently at home.

Only 5 students were able to answer the questions correctly. The other 15 students could not answer correctly, this happened because these students did not understand the material and could not analyze the questions given.

Table 14. *C4 Post-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 12 | 27.3% |
| 1 | 32 | 72.7% |

Only 1 student could not answer question number 3 after learning with the FliCKu learning model. The other 21 students were able to do the post-test questions correctly. Where question number 3 is a question with a medium level. Students begin to understand the material and can apply the questions.

11 students were able to answer the post-test questions after direct learning using the FliCKu learning model, the other 11 students could not do the post-test question number 6 . From the average pre-test and post-test on C4 cognitive level questions, the percentage obtained is 59.1%, this shows the ability to solve C4 cognitive level questions on light wave material is categorized as moderate.

5. Cognitive Level C5

At the cognitive level C5 or evaluating is included in the cognitive level of Bloom's taxonomy in the high category. Where students are able to evaluate the questions given. The following table shows the results of students' ability to answer the physics pre-test on light waves at the C5 cognitive level.

7. Berikut ini disediakan data panjang gelombang spektrum gelombang elektromagnetik.

| Nama Spektrum | Interval Panjang Gelombang (nm) |
|---|---|
| Sinar gamma | $(1.0 \times 10^{-4}) - (1.0 \times 10^{-2})$ |
| Sinar X | $(1.0 \times 10^{-2}) - (1.0 \times 10^{1})$ |
| Sinar ultraviolet | $(1.0 \times 10^{1}) - (3.8 \times 10^{2})$ |
| Sinar tampak | $(3.8 \times 10^{2}) - (7.4 \times 10^{2})$ |
| Sinar inframerah | $(7.4 \times 10^{2}) - (1.0 \times 10^{6})$ |

Seberkas sinar dijatuhkan vertikal pada dua celah sempit yang berjarak 0,02 mm. Pola interferensi yang terjadi ditangkap pada jarak 20 cm dari celah. Apabila jarak antara garis terang pertama sebelah kiri dan garis terang pertama sebelah kanan adalah 3,6 mm. Berdasarkan data panjang gelombang spektrum pada tabel di atas, sinar tersebut termasuk ke dalam kelompok....

a) Sinar gamma
b) Sinar x
c) Sinar ultraviolet
d) Sinar tampak
e) Sinar inframerah

Figure 8. *Question C5*

Table 15. *C5 Pre-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 20 | 90.9% |
| 1 | 2 | 9.1% |

In question number 7 students are asked to examine the problem of light interference. Only 2 students were able to answer question number 7

correctly. Question number 7 in the pre-test and post-test is in the difficult category, where students are asked to evaluate the questions given. In the pre-test, almost all students have not been able to evaluate the questions, because the students only study independently at home and do not really understand the material.

Table 16. *C5 Post-Test Results*

| Skor | Frekuensi | Presentase |
|---|---|---|
| 0 | 11 | 50% |
| 1 | 11 | 50% |

In Table 15. 11 students have been able to work on the post-test number 7 which is included in the difficult category, this shows an increase from only 2 students who can do it to 11 students. 11 other students who have not been able to work, this happens because these students have not been able to evaluate the questions given or have not understood the questions given. From the average pre-test and post-test on the C5 cognitive level, a percentage of 29.5% was obtained, this shows that the ability to solve C5 cognitive level questions on light wave material is categorized as still low.

## CONCLUSION

Based on the results of the study, it can be concluded that:

1. The FliCKu learning model can improve the ability of students' cognitive aspects based on the Pired Sample T-Test test.
2. The FliCKu learning model can improve the ability of students' affective aspects based on the results of observations of student activity.
3. Based on the results of the questionnaire on student responses to the FliCKu learning model, it was stated that the FliCKu learning model was quite effective to use.
4. From the results of the analysis of increasing students' cognitive abilities based on Bloom's taxonomy, at the cognitive level C1 shows students are in the very high category. At the cognitive level C2 shows students are in the very high category. At the C3 cognitive level, it shows that students are in the high category. At the C4 cognitive level, it shows that students are in the medium category. At the cognitive level of C5, it shows that students are in the low category.

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