

## Implementation of flipped learning with flipbook media assistance on learning outcomes and critical thinking abilities

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### ABSTRACT

This research was conducted as a sort of classroom action research with two learning cycles to examine whether flipped learning aided by flipbook media may enhance students' cognitive learning outcomes and critical thinking skills. This research's population consisted of tenth-grade Madrasah Aliyah Al Misri Curahmalang students for the academic year 2021-2022. Methods for collecting data include interviews, tests, observations, and documentation. The classical completeness of cognitive learning outcomes increased from 19% in the first cycle to 97% in the second cycle, according to the research findings. Whereas critical thinking abilities were acquired in the first cycle, just one student met critical criteria. In contrast, six students exceeded crucial criteria, and twenty students exceeded critical criteria in the second cycle. Based on the analyzed research findings, it is possible to conclude that flipped learning aided by flipbook media can enhance students' cognitive learning outcomes and critical thinking skills.



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## INTRODUCTION

Flipped learning is an instructional approach that integrates technology-based learning strategies. Flipped learning is a method in the teaching and learning process that deviates from the usual approach. Specifically, in this learning system, students focus on researching the lesson topic before the class begins, and classroom activities involve completing assignments and discussing materials or issues that students have yet to comprehend. It aligns with Ahmed's perspective [Ahmed \(2016\)](#) that flipped learning is a learning style that shifts from classroom lectures to engaging in various activities. This activity is self-directed learning, resulting in a shift in the educator's role from being a communicator to that of a coach and facilitator. This method has garnered the attention of educators and observers due to its potential benefits. Flipped learning empowers students to adapt independently inside and outside the classroom ([Julinar & Yusuf,](#)

2019). Flipped learning can be implemented through online learning platforms such as Personal Computers and Android devices.

One learning media that can be utilized is the flipbook media, which both students and researchers will use. According to [Parlin et al. \(2015\)](#), flipbook learning media is a medium that presents information by displaying a sequence of materials in the form of a digital electronic book that can be flipped, resembling a physical book. This flipbook media is software for converting PDF files, images, and text into a book-like format ([Susanti, 2020](#)). This media can be utilized individually or in small groups but limited to 4-5 individuals. The flipbook to be created is an interactive form that allows for a correlation between it and students through its elements. It can transition from one image page to the next, so when the pages are flipped quickly, the images appear animated, turning into a simple yet captivating book ([Damayanti & Raharjo, 2020](#)).

Cognitive learning outcomes are students' skills after acquiring knowledge ([Muga et al., 2018](#)). Cognitive learning outcomes are also the skills students acquire after engaging in learning activities. Typically, the success of learning is assessed based on its outcomes. Successful learners achieve the learning objectives ([Hidayah & Pujiastuti, 2016](#)). Therefore, cognitive learning outcomes play a significant role in the educational system, given that a central portion of learning activities involves thinking and remembering exercises.

Critical thinking ability is a fundamental skill that students should possess. Having critical thinking skills will aid in addressing both simple and complex problems ([Setiana & Purwoko, 2020](#)). Critical thinking skills are necessary for individuals to manage various challenges encountered in communal and individual life ([Fithriyah et al., 2016](#)). Therefore, critical thinking skills are crucial to implement within the educational system. Given that through critical thinking, students can think logically and make informed decisions and choices based on acquired data.

Several issues were identified based on the interview results with the science teacher. These include the incomplete achievement of the minimum competency criteria as indicated by the scores in the mid-semester assessment, where many students received scores below the minimum competency criteria. Another issue is the educator's limited guidance for students to think critically. Educators have requested students to pay more attention to lessons, and due to minimal guidance in expressing ideas, students appear passive and are not accustomed to critical thinking. Lack of understanding during the learning process has led to the intended learning outcomes not being achieved. Furthermore, the knowledge imparted by the teacher remains conveyed straightforwardly. In such cases, a difference and modification in the learning process are necessary to make it more creative and engaging for students.

Based on the description above, this research aims to determine whether flipped learning with flipbook media assistance can enhance students' cognitive learning outcomes and critical thinking abilities. This research also provides learning media suitable for the flipped learning strategy. Indirectly, flipbooks also contribute to helping improve learning outcomes and critical thinking.

## METHOD

### Type of Research

The type of research conducted is classroom action research, which consists of two cycles. Each cycle comprises planning, action, observation, and reflection phases. The term classroom action research refers to a form of action research applied in teaching and learning activities in the classroom to improve the teaching and learning process to enhance or refine teaching practices to be more effective ([Farhana et al., 2019](#)).

### Research Subjects

The research subject is the research boundaries where the researcher can determine the objects, things, or people to which the research variables are attached. The entire object where several sources or informants can provide information about problems related to the research to be carried out is called the research subject. The subjects of this research were class X students at Al Misri Curahmalang Rambipuji High School for the 2021-2022 academic year. The research sample taken was 32 students.

## Data Analysis

The data obtained is analyzed using quantitative and qualitative data analysis techniques. Quantitative analysis is employed to analyze the data obtained from students' cognitive learning outcomes in each cycle. Quantitative analysis is calculated using the following formula. The average cognitive learning outcomes of students are calculated using [Formula 1 \(Harefa, 2020\)](#), and classical achievement percentage is calculated using [Formula 2 \(Putri & Hasbiyati, 2019\)](#):

$$\bar{X} = \frac{\sum x}{N} \quad (1)$$

$$P = \frac{f}{n} \times 100\% \quad (2)$$

Meanwhile, qualitative analysis is conducted on the student's critical thinking abilities obtained from the observation sheet, which encompasses eight indicators of critical thinking. Thus, the maximum score that each student can achieve is 32. [Formula 3](#) analyzes the data ([Ramadhanti & Agustini, 2021](#)).

$$\text{Critical Thinking Skills} = \frac{\text{The obtained score}}{\text{The maximum score}} \times 100\% \quad (3)$$

## RESULTS AND DISCUSSION

### Results of Cycle I Research

#### *Planning*

During the planning phase of Cycle I, activities for the instructional action are designed. The following is the proposed activity plan to be implemented in Cycle I: (1) The researcher utilizes flipped learning with the assistance of flipbook media in biology instruction; (2) Creating a Lesson Implementation Plan; (3) Preparing observation sheets for use during group discussions to assess students' critical thinking abilities; (4) Formation of groups is done through a counting method; (5) Developing and preparing instructional materials, including student worksheets and individual post-test questions.

#### *Implementation of Action*

##### 1. Initial Activity

At the beginning of the learning session, the researcher greets the students and then guides them to pray. Subsequently, the researcher takes attendance, provides an introduction, and communicates the learning objectives or fundamental competencies to be achieved—the scope of the material to be studied is outlined in the previously distributed flipbook.

##### 2. Core activity

The steps of biology learning using flipped learning with the assistance of flipbook media can be described as follows:

- a. The researcher provides a brief explanation to the students about the discussed material.
- b. The researcher provides Worksheets for each group.
- c. The researcher facilitates students and guides them in group discussions.
- d. The researcher guides students in presenting the discussion results and allows other students to respond.

##### 3. Final Activity

After all the learning processes concluded, the researchers and the students summarized the material studied. Students were administered a pre-prepared post-test at the end of the second meeting in Cycle I. The following are the outcomes of the plant world learning in Cycle I, which can be observed in [Table 1](#).

**Table 1.** Analysis of Cognitive Learning Outcome Data, Cycle I

No.	Category	Frequency
1	Number of Students	32
2	Total	1810
3	Average Cognitive Score	57
4	Classical Mastery Score	19%

### ***The Implementation of Observation***

The third stage of the research involves observing or monitoring students' critical thinking abilities conducted during the discussion activity using assisted media, namely flipbooks, within the context of flipped learning. This observation activity is facilitated by colleagues who act as observers. The observation sheet includes various aspects of critical thinking elements, comprising eight question items. The results of the students' critical thinking observation in Cycle I are presented in [Table 2](#).

**Table 2.** Results of Critical Thinking Observation, Cycle I

No.	Category	Frequency
1	Very Critical	0
2	Critical	1
3	Fairly Critical	5
4	Less Critical	26

### ***Reflection***

There was an improvement based on the observation evaluated in Cycle I, but this improvement did not meet the predefined success criteria. Despite some students appearing hesitant, they began interacting with their peers within their groups and bravely expressed their opinions, enhancing the learning process. However, this improvement cannot be considered as optimal. The researcher continued the research in Cycle II to implement changes and improvements in the instructional approach.

## **Results of Cycle II Research**

### ***Planning***

The planning activity is the initial step in Cycle II. The following is the instructional design that will be executed in Cycle II:

1. Groups will be formed heterogeneously based on the results of the post-test from Cycle I. Each group will consist of both high-achieving and lower-achieving students. It is expected that the high-achieving students can assist their peers in group collaboration.
2. Compiling and preparing observation sheets for monitoring the implementation of learning related to students' critical thinking abilities during group discussions.
3. Preparing and organizing student activity sheets.
4. Preparing the post-test questions for Cycle II.

### ***Implementation of Action***

#### **1. Opening Activity**

In the introductory activity, the researcher starts the lesson with a greeting, takes attendance, provides an introduction, and communicates the learning objectives or fundamental competencies to be achieved, along with the scope of the material, per the previously distributed flipbook.

#### **2. Core Activity**

In the second activity, the researcher forms four heterogeneous groups. Subsequently, the researcher distributes the learning activity sheet to each group and asks the students to pay attention to the steps of the work process. During the discussion time, the researcher guides the students and reminds them of the rules of discussion, which are as follows:

- a. Students must bravely express their opinions.
- b. When solving problems, collaborative work is needed to find solutions.
- c. Willing to share thoughts and respect classmates' ideas.
- d. If facing difficulties, students should ask questions.

In the subsequent activity, each representative of the dragon group presents the outcomes of their discussion while the other groups observe, respond, and provide input to other groups.

3. Final Activity

After this action is completed, the researcher and students conclude the material that has been studied. At the end of the second meeting in Cycle II, students are given a prepared post-test. The following are the results of the plant world learning in Cycle II, which can be observed in Table 3.

Table 3. Analysis of Cognitive Learning Outcome Data in Cycle II

No.	Category	Frequency
1	Number of Students	32
2	Total	2940
3	Average Cognitive Score	92
4	Classical Mastery Score	97%

**The Implementation of Observation**

The following are the results of observations on students' critical thinking in Cycle II during meetings 1 and 2, as presented in Table 4.

Table 4. Observations on Critical Thinking in Cycle II

No.	Category	Frequency
1	Very Critical	6
2	Critical	20
3	Fairly Critical	6
4	Less Critical	0

**Reflection**

Based on the post-test results of students in Cycle II, students' cognitive learning outcomes also showed improvement, as evident from the achieved percentage score of 97%, which was anticipated. Furthermore, based on the observations conducted in Cycle II, students' critical thinking abilities improved. Students could focus and analyze problems, find and present information, express their opinions, respect others' viewpoints, and select appropriate solutions in problem-solving. This improvement is considered quite substantial and has fulfilled the success criteria set by the researcher.

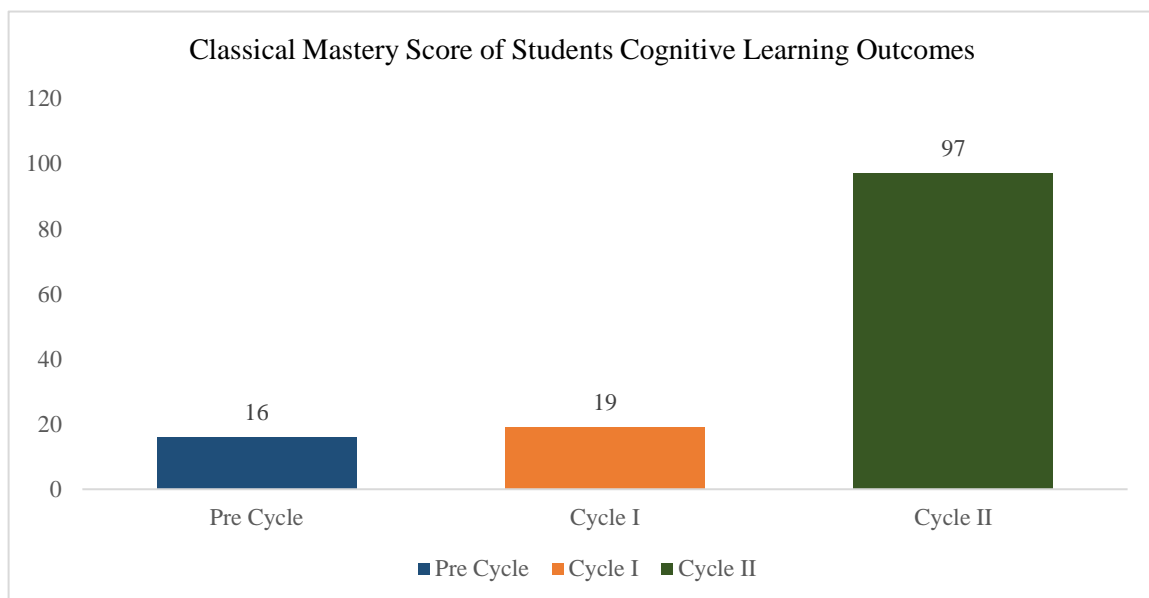
**Discussion**

Ahmed (2016) explains that flipped learning is a learning style that shifts from classroom lectures to engaging in various activities. This activity is characterized by independent learning, resulting in a shift in the educator's role from being a communicator to becoming a coach and facilitator. Meanwhile, the researcher's role involves providing a specific topic or material to be discussed as a prompt. This prompt can be delivered through online learning through flipbook media. The time required for teaching and learning activities becomes more effective and efficient through flipped learning. The material can be effectively conveyed, and students have ample time to delve into and explore the content. In the implementation phase, there were a total of four meetings conducted. During this stage, the researcher conveyed the material using flipbook instructional media for the topic of the plant world, aiming to enhance students' cognitive learning outcomes and critical thinking abilities.

The results of the responses from students in class X MA Al Misri regarding this flipped learning using flipbook media show that students are interested and motivated in the learning

activities. The teaching and learning activities become engaging and not monotonous. Students become more active in asking questions and responding to topics related to the plant world, making the material more accessible for them to comprehend. It aligns with [Manullang et al. \(2019\)](#) that implementing flipped learning in education holds advantages, such as fostering active learning within the classroom and cultivating students' self-confidence when speaking in front of the class. It is due to students gaining insights and mastering the material, allowing them to speak confidently.

The following is the analysis of students' cognitive learning outcomes and critical thinking abilities in Cycle I and II. Many students' learning activities are consistently tied to problem-solving and critical thinking. Consequently, cognitive learning outcomes play a crucial role in determining students' success in learning. An observable enhancement in students' cognitive learning outcomes can be observed by measuring the improvement in cognitive learning outcomes between Cycle I and II. The data collected by the researcher from the post-test results in each cycle, following the implementation of actions in each cycle, indicates that 97% of students completed Cycle II with a score above the minimum completion criteria of 75. Consequently, students' cognitive learning outcomes have significantly improved through flipped learning with the assistance of flipbooks. [Figure 1](#) compares students' cognitive learning outcomes between the pre-, Cycle I, and Cycle II.



**Figure 1.** Graph of the Comparison of Students' Cognitive Learning Outcomes

Based on the graph in [Figure 1](#) above, the classical mastery score for cognitive learning outcomes in the pre-cycle is 16%. However, in Cycle I, the classical mastery score for students' cognitive learning outcomes is 19%, while in Cycle II, it increases dramatically to 97%. The significant improvement between Cycle I and Cycle II results from the topic of the plant world covered in Cycle I. This topic involved comparing and explaining the characteristics of mosses, ferns, and angiosperms, which proved relatively challenging for students to comprehend. Only 19% of students achieved mastery, while 81% did not. On the other hand, the topic covered in Cycle II focused on the roles of mosses, ferns, and angiosperms, and it was considerably more accessible for students to understand. As a result, 97% of students achieved mastery, with only 3% falling short.

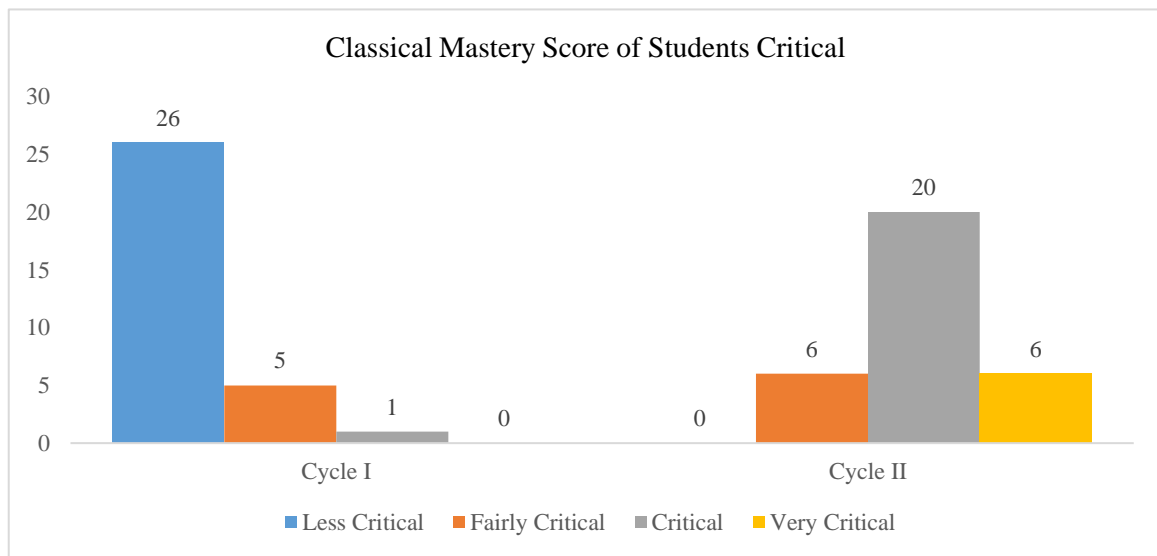
Based on the research outcomes by [Wahyuni \(2018\)](#) it is stated that several students scored below 60% because the questions provided by the teacher were never encountered by students previously. Students also perceived these questions as extremely difficult, believing the teacher had created them. Students are accustomed to questions at the remember and understand levels, so they face difficulties when encountering questions at the apply, analyze, or evaluate levels. Some students even struggle to understand the intention behind these questions. However, the difficulty

lies in the fact that the levels of questions provided by the teacher are aligned with the curriculum demands and the cognitive development of high school-level students.

Furthermore, the data obtained from Cycle I and Cycle II indicate an improvement in students' cognitive learning outcomes, with these results reaching the indicators of success. Hence, implementing flipped learning aided by flipbook media is deemed appropriate in contributing to the success of an instructional process. It aligns with the outcomes of research on the application of flipped learning for enhancing students' learning outcomes conducted by [Triaji et al. \(2022\)](#) which yielded results indicating that 61% of students did not meet the minimum completion criteria using conventional teaching methods in the first cycle. In contrast, in the second cycle, utilizing flipped learning, only 22% of students did not meet the minimum completion criteria. It signifies that flipped learning has a more favorable impact on students' learning outcomes than conventional teaching methods.

This research also demonstrates that using flipbook instructional media can enhance cognitive learning outcomes, consistent with several previous studies that have indicated how using electronic instructional materials in the form of flipbooks can improve cognitive learning results. Some of the previous studies include research conducted by [Andan & Yulian, 2018](#); [Hayati et al., 2015](#); [Wibowo et al., 2018](#); [Yulaika et al., 2020](#)). According to [Yulaika et al. \(2020\)](#), using flipbook learning media can enhance cognitive learning outcomes. This is because students perceive the material to be more comprehensible, aided by visual representations such as images and videos, both in the learning materials and practice questions. Using flipbook teaching materials is considered more effective and efficient, as students can use flipbooks anywhere and anytime according to their needs.

Furthermore, the ability of critical thinking is a fundamental skill that students should possess. By mastering this skill, students can be assisted in addressing simple and complex problems. The enhancement of critical thinking abilities is derived from the observations conducted by the researcher. A comparison of the obtained data regarding students' critical thinking abilities between Cycle I and Cycle II can be observed in [Figure 2](#).



[Figure 2](#). Graph of the Comparison of Students' Critical Thinking Abilities

The graph shows a decrease in data from [Figure 2](#). It indicates the students' critical thinking abilities in implementing flipped learning assisted by flipbook media on the plant world. The results obtained in cycle I show only one student with the criteria 'critical,' 5 students with 'fairly critical' criteria, and 26 students with 'less critical' criteria. Due to the students' conditions, they are still less active during the learning activities, and the classroom atmosphere is not conducive enough. Therefore, the researcher made changes and improvements in the learning process. In Cycle II, there are six students with the criteria 'very critical,' 20 students 'critical,' and six

students with 'fairly critical' criteria. The data shows that this critical thinking ability has already achieved the predetermined success indicator and falls within the "critical" criteria. It aligns with the results of the flipped learning research in enhancing students' critical thinking abilities on photosynthesis conducted by Tresnawati et al. (2022), which found that effective implementation of flipped learning can enhance students' critical thinking abilities.

This research result also indicates that the instructional media in a flipbook can enhance students' critical thinking abilities, aligning with the research conducted by (Aprilia, 2021). The utilization of flipbook media in enhancing students' critical thinking abilities significantly influences both educators and students. Educators can facilitate the delivery of content in the science subject by employing flipbook media. Regarding students, it becomes easier for them to comprehend the taught material through flipbook media. Similarly, interactive and enjoyable content within the flipbook media, such as instructional recordings, text, and illustrative examples in images, tests, and various other exercises, proves to be highly efficient in training students' critical thinking abilities.

Based on the graphic from the learning outcomes of cognitive learning and critical thinking abilities, it can be said that the application of flipped learning aided by the media flipbook in the subject matter of the plant world has an impact on the cognitive learning outcomes and critical thinking abilities of students. Because learning using flipped learning, aided by the media flipbook, makes students more engaged in learning activities, they also become more enthusiastic about learning and feel motivated. The material becomes more accessible for students to understand, resulting in an improvement in students' cognitive learning outcomes and critical thinking abilities.

## CONCLUSION

Based on the research results and discussion, it can be concluded that teaching using flipped learning with flipbook media can enhance cognitive learning outcomes. It can be demonstrated by achieving classical mastery in Cycle I, reaching 19%, and in Cycle II, reaching 97%. Flipped learning with the support of flipbook media also improves students' critical thinking abilities. It is evident from the results of students' critical thinking in Cycle I, where one student met the critical criteria. In Cycle II, six students were classified as having very critical criteria, while 20 were classified as having critical criteria.

## REFERENCES

- Ahmed, H. O. K. (2016). Flipped learning as a new educational paradigm: An analytical, critical study. *European Scientific Journal*, 12(10), 417–444. <https://doi.org/10.19044/esj.2016.v12n10p417>
- Andan, D. T., & Yulian, M. (2018). Pengembangan bahan ajar electronic book menggunakan software Kvisoft flipbook pada materi hukum dasar kimia di SMA Negeri 1 Pantou Reu Aceh Barat. *JUPI: Jurnal IPA Dan Pembelajaran IPA*, 2(1), 1–6. <https://doi.org/10.24815/jupi.v2i1.10730>
- Aprilia, T. (2021). Efektivitas penggunaan media sains flipbook berbasis kontekstual untuk meningkatkan kemampuan berfikir kritis siswa. *Jurnal Penelitian Ilmu Pendidikan*, 14(1), 10–21. <https://doi.org/10.21831/jpipfip.v14i1.32059>
- Damayanti, A. N., & Raharjo. (2020). Validitas flipbook interaktif pada materi sistem pernapasan manusia untuk melatih kemampuan berpikir kritis siswa kelas xi sma. *Jurnal BioEdu*, 9(3), 443–450. <https://doi.org/10.26740/bioedu.v9n3.p443-450>
- Farhana, H., Awiria, & Muttaqien, N. (2019). *Penelitian tindakan kelas*. Harapan Cerdas.
- Fithriyah, I., Sa'dijah, C., & Sisworo. (2016). Analisis kemampuan berpikir kritis siswa kelas ix-d SMPN 17 Malang. *Prosiding Konferensi Nasional Penelitian Matematika Dan Pembelajarannya*, 1, 580–590. <https://publikasiilmiah.ums.ac.id/handle/11617/7000>



- Harefa, D. (2020). Peningkatan prestasi belajar IPA siswa pada model pembelajaran learning cycle dengan materi energi dan perubahannya. *Trapsila: Jurnal Pendidikan Dasar*, 2(1), 25–36. <http://dx.doi.org/10.30742/tpd.v2i01.882>
- Hayati, S., Budi, A. S., & Handoko, E. (2015). Pengembangan media pembelajaran flipbook fisika untuk meningkatkan hasil belajar peserta didik. *Prosiding Seminar Nasional Fisika*, 4, 49–54. <https://journal.unj.ac.id/unj/index.php/prosidingsnf/article/view/4810/3587>
- Hidayah, R., & Pujiastuti, P. (2016). Pengaruh PBL terhadap keterampilan proses sains dan hasil belajar kognitif IPA pada siswa SD. *Jurnal Prima Edukasia*, 4(2), 186–197. <https://doi.org/10.21831/jpe.v4i2.7789>
- Julinar, J., & Yusuf, F. N. (2019). Flipped learning model: Satu cara alternatif untuk meningkatkan keterampilan berbicara siswa. *JPP: Jurnal Penelitian Pendidikan*, 19(3), 366–373. <https://doi.org/10.17509/jpp.v19i3.22330>
- Manullang, S., Harunasari, S. Y., & Chairiyati, I. (2019). Meningkatkan keterampilan berbicara siswa dengan pendekatan flipped learning menggunakan Whatsapp. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara*, 1–6. <https://jurnal.stkipkusumanegara.ac.id/index.php/semnara2019/article/view/337/302>
- Muga, W., Oje, M. S., & Laksana, D. N. L. (2018). Hasil belajar kognitif siswa SD dalam pembelajaran kontekstual media Mazi (studi pada siswa SD kelas tinggi). *JET; Journal of Education Technology*, 2(1), 20–25. <https://doi.org/10.23887/jet.v2i1.13802>
- Parlin, I. D. P. L., Iswanto, B. H., & Budi, A. S. (2015). Pengembangan media pembelajaran berbasis Kvisoft untuk meningkatkan pemahaman konsep peserta didik pada materi medan magnet. *Prosiding Seminar Nasional Fisika*, 4(1), 135–140. <https://journal.unj.ac.id/unj/index.php/prosidingsnf/article/view/4685>
- Putri, L. S., & Hasbiyati, H. (2019). Pemanfaatan media pembelajaran berbasis Smartphone pada materi pencemaran lingkungan untuk meningkatkan hasil belajar siswa. *Jurnal Bioshell*, 8(2), 58–60. <https://doi.org/10.36835/bio.v8i2.916>
- Ramadhanti, A., & Agustini, R. (2021). Analisis keterampilan berpikir kritis peserta didik melalui model inkuiri terbimbing pada materi laju reaksi. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, 7(2), 385–394. <https://doi.org/10.33394/jk.v7i2.3458>
- Setiana, D. S., & Purwoko, R. Y. (2020). Analisis kemampuan berpikir kritis ditinjau dari gaya belajar matematika siswa. *Jurnal Riset Pendidikan Matematika*, 7(2), 163–177. <https://doi.org/10.21831/jrpm.v7i2.34290>
- Susanti, L. R. R. (2020). Pengembangan e-modul berbasis software flipbook makero materi peninggalan megalitik Pasemah dalam mata kuliah sejarah Indonesia kuno di FKIP Universitas Sriwijaya. *El-Buhuth: Borneo Journal of Islamic Studies*, 3(1), 11–20. <https://doi.org/10.21093/el-buhuth.v3i1.2790>
- Tresnawati, C., Aryanti, F., & Suhaerah, L. (2022). Flipped learning dalam meningkatkan berikir kritis mahasiswa pada materi fotosintesis dimasa pandemik covid-19. *Biosfer: Jurnal Biologi Dan Pendidikan Biologi*, 7(1), 41–49. <https://doi.org/10.23969/biosfer.v7i1.5752>
- Triaji, A. H., Fitrianna, A. Y., & Zanthly, L. S. (2022). Penerapan model flipped learning terhadap peningkatan hasil belajar siswa pada materi pertidaksamaan irasional. *JPMI: Jurnal Pembelajaran Matematika Inovatif*, 5(3), 813–820. <https://doi.org/10.22460/jpmi.v5i3.813-820>
- Wahyuni, S. (2018). Implementasi pendekatan saintifik pada pelajaran biologi untuk meningkatkan hasil belajar kognitif dan keterampilan sains siswa kelas xi-IPA SMA

- Negeri 2 Lambandia, Kab. Kolaka Timur-Sultra. *Jurnal Pendidikan Biologi*, 9(2), 47–55. <http://dx.doi.org/10.17977/um052v9i2p47-55>
- Wibowo, E., Pratiwi, D. D., Islam, U., Raden, N., Lampung, I., Endro, J., & Putra, Y. (2018). Pengembangan bahan ajar menggunakan aplikasi Kvisoft flipbook maker materi himpunan. *JDesimal: Jurnal Matematika Matematika*, 1(2), 147–156. <http://dx.doi.org/10.24042/djm.v1i2.2279>
- Yulaika, N. F., Harti, & Sakti, N. C. (2020). Pengembangan bahan ajar elektronik berbasis flipbook untuk meningkatkan hasil belajar peserta didik. *Jurnal Pendidikan Ekonomi, Manajemen dan Keuangan*, 4(1), 67–76. <https://doi.org/10.26740/jpeka.v4n1.p67-76>