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# Application of Learning Module Flipbooks With A STEAM Approach to Improve Scientific Attitudes and Collaboration Skills

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**Abstract**

The purpose of this study was to apply the learning module flipbook with the STEAM approach in the philosophy of education course to improve students' scientific attitudes and collaboration skills. This study is experimental in nature and only uses one sample class. The subjects used in this study were Chemistry Education students at Jambi University who were taking chemical philosophy lectures. The utilization of the STEAM method in the learning module flipbook serves as the independent variable in this study, while the students' scientific mindset and teamwork abilities serve as the dependent variables. The data collection technique used in this study was a questionnaire to obtain information about students' scientific attitudes and collaboration skills. The results showed that the application of the learning module flipbook with the STEAM approach in the philosophy of education course was effective in improving students' scientific attitudes and collaboration skills with a significance value of 0.00.

*Keywords:* Scientific Attitudes; Collaboration Skills; STEAM.

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## 1. Introduction

The world of education will continue to develop along with technological advances and the methods and media used. The world of education integrates technology in learning as a form of effort to adapt to technological advances (Sungkono & Ekaputra, 2023). In the current technological era, where technology is very important for education, lecturers as facilitators in lecture activities must continue to use various media to improve learning both inside and outside the classroom. The skills possessed by lecturers and students to continue to adapt to technology can make learning more meaningful (Haryanto et al., 2023). Student involvement in learning activities will indirectly help in acquiring new skills and increasing understanding of the material presented in lecture activities. One of the efforts to increase student involvement is with interesting learning models, approaches, and media. The use of learning media affects the improvement of student skills (Fuldiaratman & Ekaputra, 2023).

Flipbook is a simple learning tool that can improve understanding of subject matter. The flipbook application can have a positive impact on learning outcomes and increase learning activities (Yulaika et al., 2020). Flipbook-based learning media can improve results and activeness in learning activities carried out (Febriyanti & Mayarni, 2022). Animations and images can be inserted into the flipbook application sequentially, making it interesting to use. Flipbook media that can combine video, audio, and text can attract students' attention and motivation to learn (Arisandhi et al., 2023).

Based on the results of field observations and interview results at the Jambi University Chemical Education Study Program students who have attended philosophy of education lectures, it shows that the STEAM approach in philosophy of education courses is still rarely applied in lecture activities. The STEAM approach that prioritizes student creativity in solving problems is deemed necessary to be applied to improve students' ability to solve problems encountered not only in class, but also outside the classroom. The potential for scientific attitudes and student collaboration in completing lecture projects has not been maximally measured.

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Module development activities in the form of flipbook media that incorporate the STEAM approach in it are expected to improve student learning outcomes. Learning in philosophy of education lectures using the PjBL model with the STEAM approach is expected to be able to explore the potential for scientific attitudes and student collaboration in completing lecture projects to the fullest, because this is considered important in preparing to face the demands of a rapidly changing future. Skills provision is very important to be able to adapt (Ekaputra & Widarwati, 2023). Thus, in order to enhance students' capacity for scientific attitudes and teamwork in the philosophy of education course, a flipbook learning module using a STEAM approach was applied in this study.

## 2. Literature Review

### *2.1. Filpbook*

Interactive flipbook applications, which can be equipped with video and audio, can increase learning motivation (Dewi & Ayu, 2022). Flipbook-based module media has the advantage of flexibility in operation because it can be done anytime and anywhere, and is more interesting because it can include text, images, and videos (Waliulu & Palembang, 2022). The operation of flipbook media is relatively easy and practical because it can be done online or offline (Amaliyah et al., 2023). Flipbook media can make making concepts that are difficult to understand in learning easier to understand (Ekaputra et al., 2024). Therefore, flipbook applications that are able to present images can help strengthen students' visual memory.

### *2.2. STEAM Approach*

The STEAM approach is a learning approach that encourages students to become scientists, recognize and apply simple technology, be able to solve problems, have aesthetic or beauty values in producing work, and be able to think logically that can be measured in solving problems (Hasanah, 2021). The application of PjBL-STEAM facilitates students to independently construct knowledge through projects and improve critical thinking skills (Sulastri & Cahyani, 2021). STEAM learning makes students more skilled in solving problems, thinking systematically, working scientifically, creatively, and critically (Mu'minah, 2021). The advantages of the STEAM approach facilitate diverse learning needs, improved learning processes, active participation of learners, and self-reflection through learner-based assessment (Thoma et al., 2023).

## 3. Research Method and Materials

This study employed an experimental design with a single sample group. The utilization of the STEAM method in the learning module flipbook serves as the independent variable in this study, while the students' scientific mindset and teamwork abilities serve as the dependent variables. A questionnaire was utilized in this study's data collection method to gather details regarding students' attitudes toward science and their ability to collaborate both before and after the STEAM-focused learning module flipbook was implemented.

The method used in this research is experimental research with one sample group. The independent variable in this study is the application of the learning module flipbook with the STEAM approach, while the dependent variable used in this study is the scientific attitude and collaboration skills of students. The instruments used in this study were scientific attitude questionnaire sheets and student collaboration skills. The data collection technique used in this study is a questionnaire to obtain information about the scientific attitudes and collaboration skills of students before and after the application of the learning module flipbook with the STEAM approach. The normalcy of the difference between the questionnaire findings obtained before and after learning with flipbook media is next examined. A parametric test using a paired-samples t test is carried out to evaluate the study hypothesis if the test findings indicate that the sample class is normal. Students' attitudes toward science and their ability to collaborate with others can be enhanced by using the learning module flipbook media in conjunction with the STEAM method, provided that the results of the hypothesis test are less than 0.05.

## 4. Results and Discussion

Before the learning module flipbook media with the STEAM approach is applied to the research class, students are asked to fill out a scientific attitude questionnaire and student collaboration skills. The initial questionnaire

distribution aims to determine the level of scientific attitudes and initial collaboration skills of students in the sample class. After students fill out the scientific attitude questionnaire and initial collaboration, students are given the application of the learning module flipbook media with the STEAM approach in lecture activities. Students look enthusiastic about the learning module flipbook media with the STEAM approach used. Students think that the media developed is very interesting and helps students in understanding the philosophy of education lecture material. After the application of the learning module flipbook media with the STEAM approach, students fill out a scientific attitude questionnaire and final collaboration skills. Completing the scientific attitude questionnaire and the final collaboration ability aims to determine the effectiveness of the applied media. The results of the scientific attitude questionnaire and collaboration skills of the initial students are presented in Table 1.

**Table 1.** Initial scientific attitude and collaboration ability results

| Variable | Indicator | Value |
|---|---|---|
| Scientific Attitude | Asking questions | 71.43 |
| | Reading learning resources | 69.05 |
| | Using learning media | 67.86 |
| | Listening to other people's opinions | 70.24 |
| | Considering other people's ideas | 70.24 |
| | Checking the truth of opinions | 70.24 |
| | Activeness in discussion | 72.62 |
| | Responsibility with assigned tasks | 70,24 |
| Collaboration | Leading discussion activities | 72.62 |
| | Ability to work together | 64.29 |
| | Ability to position oneself | 73.81 |
| | Ability to convince group members | 69.05 |

Based on the data in Table 1, it shows the average results of the initial scientific attitude of 70.24 and initial collaboration of 69.94 The results of the questionnaire filling are classified as low because they are still below 75, so it is necessary to do treatment to improve the scientific attitude and collaboration skills of students in the sample class. This research focuses on the application of learning module flipbook media with the STEAM approach in lecture activities to improve students' scientific attitudes and collaboration. The selection of flipbook media in flipbook learning is because flipbook media is an attractive media for students because it can be integrated in various media and practical to use. Flipbook media is an attractive learning media for students because it can present printed books in digital form (Rahmawati et al., 2017). The application of the STEAM approach in this study is expected to improve students' scientific attitude abilities. The STEAM approach is an approach used to generate science and technology-based ideas by thinking and discovering new things (Nurhikmayati, 2019).

After the application of the learning module flipbook with the STEAM approach, students returned to fill in the scientific attitude and final collaboration skills. The purpose of filling out the scientific attitude questionnaire and the final collaboration ability is to determine whether there is an increase in the scientific attitude and collaboration ability of students in the sample class. The results of scientific attitudes and final collaboration are presented in Table 2.

**Table 2.** Initial scientific attitude and collaboration ability results

| Variable | Indicator | Value |
|---|---|---|
| Scientific Attitude | Asking questions | 88.10 |
| | Reading learning resources | 90.48 |
| | Using learning media | 91.67 |
| | Listening to other people's opinions | 89.29 |
| | Considering other people's ideas | 88.10 |
| | Checking the truth of opinions | 89.29 |
| | Activeness in discussion | 85.71 |
| | Responsibility with assigned tasks | 88.10 |
| Collaboration | Leading discussion activities | 89.29 |
| | Ability to work together | 91.67 |
| | Ability to position oneself | 90.48 |
| | Ability to convince group members | 90.48 |

Based on the results of the scientific attitude questionnaire and the final collaboration presented in Table 2, the average scientific attitude was 88.84, which means an increase in scientific attitude of 18.60 and collaboration ability of 90.48, which means collaboration ability has increased by 20.54. These results show that students' scientific attitudes and collaboration have increased. The increase in the ability of scientific attitudes and collaboration of sample class students is due to the application of the learning module flipbook media with the STEAM approach. The indicator with the highest value in the final scientific attitude variable is in using learning media. This is due to the use of flipbook media that is attractive to students, complete, practical, and integrated with various types of learning media can make the use of flipbook media in learning increase. This is in accordance with research (Mirnawati & Fabriya, 2022) which states that the use of flipbooks can improve students' reading literacy. The advantages of the flipbook application include being practical and easy to use (Arianty et al., 2022).

In the collaboration variable, the highest value was obtained in the ability to work together indicator with a value of 91.67. These results are in accordance with research conducted by Nurjanah et al. (2023) which states that the application of STEAM can develop collaboration skills. The high level of student collaboration with the STEAM approach is because students become responsible for the tasks assigned, so that they contribute more to discussions and cooperation with the group (Qomaria & Wulandari, 2022).

Normalcy tests were next performed on the data pertaining to the discrepancy between scientific attitudes and the first and last collaboration. Test one before testing hypotheses is the normalcy test. In Table 3, the normalcy test results are shown.

**Table 3.** The results of the normality test

| Normality Test | Significance Value |
|---|---|
| Scientific Attitude | 0.200 |
| Collaboration | 0.200 |

A significant value of 0.200 was found for both variables based on the normality test findings shown in Table 2. The hypothesis test in this study employs a parametric test, which in this case uses a paired-samples t test, because the normality test results on the scientific attitude and collaboration variables of 0.200 are more than 0.05. A significant value of 0.00 is indicated by the paired-samples t test findings. Since the significant results are less than 0.05, it can be concluded that using flipbook media as part of a learning module in conjunction with a STEAM approach effectively improves students' attitudes toward science and their ability to collaborate with others. These results are in accordance with research conducted by (Ekaputra, 2020) which states that the application of media in learning activities can improve scientific attitudes. The application of learning module flipbook media with the STEAM approach allows students to be directly involved in the learning that is carried out. Student involvement in lectures can make students active (Ekaputra, 2022). In this study, the increase in student activeness and involvement was evidenced by the increase in students asking questions, using flipbook learning media, discussion activities, and thinking critically about new ideas in discussion activities. The study's conclusion is based on the results and discussion that have been provided, and it suggests that using a learning module flipbook in conjunction with the STEAM method in the philosophy of education course can help students develop more collaborative abilities and scientific attitudes.

## 5. Conclusion

The results of the scientific attitude questionnaire and final collaboration obtained an average scientific attitude of 88.84 which means an increase in scientific attitude of 18.60 and collaboration ability of 90.48 which means collaboration ability has increased by 20.54. These results show that students' scientific attitudes and collaboration have increased. The increase in the ability of scientific attitudes and collaboration of sample class students is due to the application of the learning module flipbook media with the STEAM approach. The indicator with the highest value in the final scientific attitude variable is in using learning media. This is due to the use of flipbook media that is attractive to students, complete, practical, and integrated with various types of learning media can make the use of flipbook media in learning increase. In the collaboration variable, the highest value is obtained in the ability to work together indicator with a value of 91.67. The paired-samples t test results show a significance value of 0.00. These results are smaller than 0.05. Therefore, this study shows that the application of the learning module flipbook with the

STEAM approach in the philosophy of education course is effective in improving students' scientific attitudes and collaboration skills. The magnitude of the benefits and influence of the STEAM approach-based flipbook media in learning activities, especially in improving the ability of scientific attitudes and student collaboration, researchers hope that similar learning media can be used in lecture activities, so that the improvement of students' cognitive abilities and skills has increased.

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