

Effect of Flipbooks on Science Learning among Secondary School Students in Dindigul District, Tamil Nadu, India

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ABSTRACT A flipbook, traditionally a sequence of printed images generating a motion illusion when flipped, assumes a more interactive, digitally-simulated format in the contemporary context. This technology, frequently employed for educational purposes and online publishing, fosters engaging and interactive experiences. The present study aimed to investigate the effect of flipbooks in facilitating the learning of science among secondary school students. The research design chosen for this investigation was the single group pre-and-post-test experimental group design. A group of 30 students, selected through purposive sampling techniques, constituted the sample of the study. To assess the achievement, a multiple-choice question was employed. Statistical techniques such as the Shapiro Wilks Test, t-test, mean and standard deviation, were employed. The study revealed an enhanced student understanding of flipbooks following an intervention, compared to the pre-intervention stage. The conclusion drawn was that flipbook media could effectively enhance students' science learning attainments.

INTRODUCTION

The progression of education, coupled with the incorporation of educational technology and information communication technology, has initiated substantial changes in the field of learning and knowledge dissemination (Wahyuni et al. 2018). Not only have these developments transformed individual learning approaches, but have also radically altered the instruments and methodologies of education, encompassing learning mediums and the comprehensive teaching approach (Safitri et al. 2021). At its core, education is a purposeful effort that seeks to guide and develop individuals across their lifetime, aiming to create a generation defined by its spiritual, intellectual and personal attributes (Linda et al. 2018). In this perspective, education is viewed as a complex endeavour, process, result, and area of study, symbolising a deliberate and ongoing dedication to meeting the requirements of life.

Education holds a crucial position in the all-rounded growth of students, including the improvement of spiritual and emotional intellect, the attainment of knowledge, and the proficiency in key skills (Saraswati and Linda 2019). The education sector is rapidly transforming, lead-

ing to several modifications aimed at improving the standard of education. To realise this objective, several key advancements are required, including improvements in the calibre of teachers, curriculum design, inventive teaching methods, and the upgrade of educational facilities and infrastructures (Hardiansyah and Zainuddin 2022). These concerted endeavours are essential in advancing the education sector and confirming its effectiveness in catering to the changing demands of society.

The flipbook presents various benefits as it provides a range of presentation formats, such as PDFs, image clips, videos and animations. Furthermore, it integrates template layouts, background configurations, control buttons, navigation bars, and hyperlinks, all of which combine to create an engaging flipbook display (Maf'Ula et al. 2017). The interactive flipbook combines science and SDGs education, preparing young learners for responsible future involvement in sustainable development (Aji et al. 2022). Notably, as observed by Hidayatullah and Rakhmawati (2016), this flipbook creator mimics the tactile experience of navigating a traditional book via its animation effects. This effect, where pages seem to flip akin to those in a physical book, introduces a physical aspect to

the reading, even when engaged via digital mediums like computers, laptops, or smartphones. The employment of flipbooks as a learning aid for students has seen a substantial rise in popularity lately. Educators are leveraging flipbooks to boost academic results and involve students in the education process. Hence, the use of flipbooks not only captivates student interest but also bolsters their learning outcomes (Maghfiroh et al. 2020). A significant advantage of employing flipbooks in education is their ability to display educational content through text, sentences, and visuals (Marwan and Yuliantri 2023).

The study indicated that the POKUS Flipbook was successful in boosting the interest in literacy among elementary school students (Lishetiyana et al. 2023). The study revealed that the employment of flipbook media positively affected the interest of middle school students in history lessons (Marwan and Yuliantri 2023). The application of the flipbook as a learning medium significantly influenced the learning outcomes of class 12 multimedia students (Bayhaki and Untari 2023). The study found that students viewed the flipbook-based e-modules as suitable, practical, and efficient for their learning process (Diana et al. 2023). The study found that employing problem-based learning flipbook e-modules significantly boosted students' critical thinking abilities and fostered a positive attitude towards problem-solving (Endaryati et al. 2023). Utilising a flipbook as a learning medium enhanced student motivation and performance in biology studies (Adnyana 2023). The research discovered that flipbook-based multimedia learning is highly feasible and efficient in the learning process (Nurdin and Hindriana 2023). The study indicated that students rated the flipbook learning approach in sports physiology as efficient and beneficial during the COVID-19 pandemic (Susanto et al. 2022). The study revealed that utilising a flipbook-based science module enhanced students' independent learning abilities in science (Setianingrum et al. 2022). The study enhanced science learning outcomes for primary school students by developing the flipbook as a learning medium (Hardiansyah 2022). The study discovered an improvement in student learning outcomes after using the flipbook pertaining to the traits of living organisms (Rah-

mawati et al. 2022). The research indicated that the usage of a flipbook-based e-module enhanced student learning outcomes for the material on work and energy (Wadah et al. 2022). The study revealed a significant improvement in student learning outcomes following the use of the flipbook maker application (Ulfannura 2022). The study revealed that the use of flipbook-based e-modules had a considerable impact on students' learning outcomes in the topic of transverse waves (Sriyanti et al. 2020). The flipbook improves the science learning outcome, and increases the learning interest and critical thinking skills (Mulyadi et al. 2016; Rasiman 2014).

Objectives

The objectives of this study were:

- ♦ To develop and validate the flipbook media as science learning material for the secondary school students.
- ♦ To find out the effectiveness of flipbook media among secondary school students for learning science subjects.
- ♦ To find out the secondary school students' understanding about flipbook media before and after intervention.

Hypotheses of the Study

The study tests the following hypotheses:

- H0:** Is there a significant difference in the understanding of flipbooks among secondary school students before and after the intervention?
- H0:** There is no significant difference in students' science achievement using flipbooks between a) the pre-test and mid-test, b) the mid-test and post-test, and c) the pre-test and post-test.

METHODOLOGY

The researchers adopted an experimental design to assess the effect of using flipbooks in science teaching. 'M1' refers to pre-test abilities, offering a baseline comparison point. 'M2' signifies post-test abilities after applying the intervention. 'X' is the flipbook treatment. The objective was to see if flipbook usage significantly affected scientific comprehension and ability by comparing M1 and M2.

The experimental procedure began with administering a pre-test to secondary school students to assess their initial understanding of the flipbook. The pre-test consisted of 25 multiple-choice questions derived from the 8th grade syllabus such as light, heat, universe and space science, and organisation of life, previously taught using conventional pedagogical techniques. The ebook or electronic book, downloaded from the Tamil Nadu Textbook Society and school education websites, has been identified by investigators as containing Open Educational Resources videos. These videos have been embedded in a flipbook designed using Canva, then converted via the FlipHTML5 website. After download, the flipbook is shared with students through a WhatsApp group. Flipbook media can also include integrated elements like audio, video and hyperlinks, making the reading experience more interactive and engaging. These digital flipbooks can be accessed on various devices, including computers, tablets, and smartphones. Over a two-month period, an experimental approach was implemented where the subject of science was instructed using flipbook. The researchers guided the instruction of select Science topics via this medium. Halfway through this period, a mid-point assessment was carried out to gauge the students' learning progression via the new teaching modality, the flipbook. This experimental phase concluded with a post-test to evaluate the effectiveness and effect of flipbook-based learning among secondary school students. The experiment carried on for a total of 40 working days. The comparison of pre-test, mid-test, and post-test results facilitated an evaluation of the flipbook's efficacy as a teaching tool.

Sample

The study used a purposive sampling technique to select 30 students (from 8th grade) from a private school in the Nilakottai block, Dindigul district, Tamil Nadu, India. Being a small sample size, the findings may not be generalisable, but it would offer rich, in-depth insights into the effect of the usage of flipbook in teaching science among the selected student group within this particular context.

Instrument/Tool

The researchers constructed a questionnaire regarding the understanding of flipbooks. It comprises 20 items, including both positive and negative elements. The grammar is slightly off. The researchers designed an achievement test consisting of 25 multiple-choice questions. Three different versions of the test were used to assess the students at various stages (pre, mid and post test). These questions were selected from various science topics, including Measurement, Atomic Structure, the Plant Kingdom, and Movements in Animals. Each question was carefully chosen based on an item analysis, which is a statistical method used to identify the effectiveness of each item in the test. This process ensures that each question is effective for the test's purpose, which in this research is the evaluation of students' understanding and knowledge application related to the selected science topics after being taught using flipbooks.

RESULT AND DISCUSSION

Table 1 reveals that the criteria for assessing the flipbook are categorised as follows. A score of 10-30 percent is considered 'Poor', 30-60 percent is 'Average', 60-80 percent is 'Good', and finally, a score of 80-100 percent is rated as 'Very Good'. The validation results from design experts, shown in Table 1, reveal a high approval percentage of 93 percent. These results categorise the instructional media design of the flipbook as 'Very Good'. Thus, the flipbook is suitable for trials after addressing the recommendations provided by the validators.

Table 1: Expert validation of flipbooks

Aspect	Score obtained	Maximum score	Percentage	Criteria
Content	23	25	92	Very good
Interface	24	25	96	Very good
Subject suitability	23	25	92	Very good
Videos embedded	23	25	92	Very good
Total	93	100	93	Very good

Table 2 reveals the results of a Shapiro-Wilk normality test for the pretest and post-test data. A normality test checks if the data follow a nor-

mal distribution. For both tests, the data consists of 30 observations ($N=30$). The average score (mean) increased from the pretest to the post-test, going from 22.5 to 29.5, respectively. The median values, measuring the middle score, also increased from the pretest (23.0) to the post-test (30.0). Standard deviation, which measures variability, remained fairly stable at 3.1 for the pretest and 3.14 for the post-test. The minimum and maximum scores also increased, with the range of scores for the post-test (24-36) being higher than the range for the pretest (15-27). The Shapiro-Wilk W value indicates how well the distribution of data matches a normal distribution. The values for the pretest and post-test are 0.948 and 0.970 respectively, while values closer to 1 suggest that the data is normally distributed. The Shapiro-Wilk p -values are 0.151 for the pretest and 0.529 for the post-test, and these values are more than the conventional alpha level of 0.05, suggesting that there is not enough evidence to reject the null hypothesis that the data is normally distributed. Therefore, the researchers can assume normality for both the pretest and post-test scores.

Table 2: Normality test

	<i>Pre-test</i>	<i>Post-test</i>
N	30	30
Mean	22.5	29.5
Median	23.0	30.0
Standard deviation	3.10	3.14
Minimum	15	24
Maximum	27	36
Shapiro-Wilk W	0.948	0.970
Shapiro-Wilk p	0.151	0.529

H_0 : There is no significant difference in students' science achievement using flipbooks between a) the pre-test and mid-test, b) the mid-test and post-test, and c) the pre-test and post-test.

Table 3 reveals that the average (mean) pre-test score was 22.5 and rose to 26.6 for the mid-term exam. Additionally, the standard deviation, which shows the variation or dispersion of scores, went from 3.10 in the pre-test to 2.65 in the midterm, suggesting less variability in the midterm scores than in the pre-test scores. A paired t -test was used to analyse the difference between the two sets of scores. The degrees of freedom (df) value is 29. The t -value is 7.82 and

is paired with a p -value of .000. Since this p -value is less than the typically used cutoff of .05, the researchers can reject the null hypothesis that there is no difference between the pre-test and midterm scores. This suggests a statistically significant increase in scores from pre-test to midterm after using the flipbook-learning tool.

Table 3: Pre and mid test scores of secondary school students

<i>Test</i>	<i>N</i>	<i>Mean</i>	<i>S.D</i>	<i>df</i>	<i>t-value</i>	<i>p-value</i>
Pre-test	30	22.5	3.10	29	7.82	.000
Mid test	30	26.6	2.65			

Table 4 shows that the mean score for the pre-test was 22.5 while it increased, after using the flipbook, to 29.5 for the post-test. The standard deviation, indicating the range of scores, remained relatively consistent (3.10 for the pre-test and 3.14 for the post-test). The t -value of 10.1 is accompanied by a p -value of .001. Since the p -value is less than 0.05, this indicates that the researchers can reject the null hypothesis as there are no differences between pre- and post-test scores. Therefore, there is a statistically significant increase in scores after introducing the flipbook tool (from pre-test to post-test).

Table 4: Pre and post test scores of secondary school students using flipbooks

<i>Test</i>	<i>N</i>	<i>Mean</i>	<i>S.D</i>	<i>df</i>	<i>t-value</i>	<i>p-value</i>
Pre-test	30	22.5	3.10	29	10.1	.001
Post-test	30	29.5	3.14			

Table 5 shows that the average score for the mid-test was 26.6, which increased to 29.53 for the post-test. The standard deviation, indicating the range of scores, increased slightly from the mid test (2.65) to the post-test (3.13), suggesting slightly more variability in the post-test scores compared to the mid-test. A paired t -test has been used to analyse the difference between scores of the two tests. The t -value is 10.45, accompanied by a p -value of .000. Seeing that the p -value is below the conventional level of 0.05, the researchers reject the null hypothesis with there being no difference between the mid-test and post-test scores. Therefore, there is a

statistically significant increase in scores from mid-test to post-test after the use of the flipbook tool.

Table 5: Mid test and posttest scores of secondary school students using flipbooks

Test	N	Mean	S.D	df	t-value	p-value
Mid test	30	26.6	2.65	29	10.45	.000
Post test	30	29.53	3.13			

Effect Size Cohen's d

Table 6 shows that Cohen's d is used to measure the effect size or the magnitude of the difference between pre-test and post-test scores. A Cohen's d value of 1.84 is a substantial effect size according to Cohen's conventions, and suggests a large difference between the pre- and post-treatment results. The positive sign of the t-value and Cohen's d indicates that the post-test scores were higher than the pre-test scores.

Table 6: Paired samples t-test

Test	N	Mean	statistic	df	p	Effect Size
Pre-test	Post-test	Student's t	-10.1	29.0	< .001	Cohen's d 1.84

Note: $H_0\mu_1 - \mu_2 = 0$

Table 7: Secondary school students' understanding about flipbooks for learning

S. No.	Statements	Before treatment (M)	After treatment (M)
1.	The design of the flipbook learning tool is appealing.	3.1	4.57
2.	The material fits the flipbook format.	2.63	4.5
3.	The flipbook tool doesn't work well. *	2.7	1.5
4.	Using the flipbook tool is simple and interesting.	3.43	4.5
5.	Learning is easier with the flipbook.	2.8	4.43
6.	I don't like learning science with flipbooks. *	2.4	1.37
7.	It's hard to understand the teacher with the flipbook.*	2.43	1.77
8.	The quiz is easy to answer.	2.7	4.3
9.	The flipbook's animation helps me study.	2.57	4.17
10.	I find learning with the flipbook confusing. *	2.47	1.6
11.	The flipbook's videos match the learning content.	2.4	4.53
12.	Concepts in the flipbook are easy to grasp.	2.77	4.37
13.	The flipbook can't be used without technology.	2.87	4.3
14.	The flipbook has too much content to motivate study. *	2.9	1.3
15.	The flipbook's guide isn't helpful. *	2.87	1.6
16.	The flipbook's sound isn't distinct. *	2.67	1.6
17.	The flipbook's writing is hard to read. *	3.83	1.43
18.	The flipbook makes learning enjoyable.	3.03	4.47
19.	The flipbook can only be used in specific locations. *	2.9	1.57
20.	The flipbook's language is easy to understand.	2.77	4.63

* Negative Questions

Table 7 shows the results of an experiment measuring secondary school students' understanding of a flipbook learning tool before and after treatment. The areas evaluated included the design, functionality, usage, dependability and overall ease of the flipbook tool. Before treatment, the students did not find the flipbook very attractive (average rating 3.1) or easy to understand (2.77). They found flipbook material poorly fitted to the format (2.63) and many complained that it did not work well (2.7). In addition, the integration of the flipbook tool into teaching was viewed as complicated. After treatment, the students' views significantly improved. They found the design of the flipbook appealing (4.57) and its language easy to understand (4.63). The highest increase was in the match between the flipbook's videos and learning content (from 2.4 to 4.53). Negative questions, including the statement, "I don't like learning science with flipbooks", garnered lower scores after treatment, indicating a decrease in

negative sentiments towards the flipbook. The statement with the largest improvement in awareness was, "The flipbook has too much content to motivate study", which dropped from a pre-treatment mean of 2.9 to post-treatment mean of 1.3. Overall, the results suggest positive effects of the flipbook treatment, with an increase in positive views about this learning tool and a decrease in negative understanding.

DISCUSSION

The experiment found significant shifts in secondary school students' understanding of flipbook media tools post-treatment. Students found the design appealing and easy to understand after treatment, with the strongest growth observed in the appropriateness of a flipbook's videos with great interest in learning the content. The efficacy of flipbooks in enhancing reading motivation is evident. An increased number of students find the flipbook engaging, and they argue that its benefits outweigh any limitations (Azzahra and Hestiana 2021). The integration of information technology in education can enhance learning effectiveness by making materials more accessible (Hattangdi and Ghosh 2008; Levina et al. 2017), including flipbook learning materials with various learning strategies, tailored to specific needs, enables enjoyable, active, and innovative learning which facilitates competence acquisition (Nurhidayati et al. 2018; Ni'mah et al. 2017; Kurniawati et al. 2016; Susanti et al. 2020). The technology-based learning improves the learning outcomes more than the traditional way of learning (Harefa and Purba 2019). Flipbooks boosted interest among students and were easy to use. Flipbooks positively affected the interest of secondary school students. Use of flipbooks enhanced student motivation in learning science and this coincides with the findings of other studies (Lishetiyana et al. 2023; Marwan and Yuliantri 2023; Adnyana 2023). If one considers flipbooks as an educational tool, they seem to foster a more immersive learning environment, which possibly resulted in an elevated comprehension demonstrated by the test scores. The use of flipbooks as a learning tool has shown significant benefits for student learning. Study has found that flipbooks enhanced the students' science learning. The finding suggests the significant potential of flipbook application in fostering educational out-

comes. The results of the studies are in line with the earlier works of Bayhaki and Untari (2023), Diana et al. (2023), Hardiansyah (2022), Rahmawati et al. (2022), Wadah et al. (2022), Ulfannura (2022), Sriyanti et al. (2020), Mulyadi et al. (2016), and Rasiman (2014). The rise in average scores from the pre-test to the post-test signifies an increased understanding of flipbooks among students. This aligns with the findings of previous studies (Hardiansyah et al. 2023; Simatupang et al. 2020). An elaborative analysis of these findings indicates how an educational shift towards more interactive digital tools like flipbooks can potentially improve student learning. Thus, emphasising the importance of integrating these tools into the curriculum and transactions.

CONCLUSION

The study investigated the effect of flipbooks in enhancing the learning of science among secondary school students. The findings revealed a significant increase in students' understanding and uptake of flipbook post-intervention. The impact was evident through statistical analysis revealing a substantial improvement in post-test scores compared to pre-test. Concurrently, this study also revealed the progressive growth in scores between the mid-test and post-test periods. Furthermore, students' understanding towards the use of flipbooks transitioned significantly from an initial phase of uncertainty to post-intervention approval, suggesting increased comprehension and acceptance of this learning tool. In essence, this study confirms the pivotal role of digitalised learning tools like flipbooks can play in improving student engagement, comprehension, and overall learning outcomes. Therefore, it brings to light the need for more blended learning approaches, combining both traditional and technologically innovative methods in teaching. It also encourages further exploration and integration of digital learning media like flipbooks into different subjects and levels of education, with an aim to enhance learning experiences and outcomes across the educational sector.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations can be made. The findings indicate that flipbook media enhances the

learning experiences of secondary school students. Therefore, educators should consider incorporating flipbook media in their teaching strategies to facilitate interactive learning experiences. Training and professional development programs for educators should include sessions on how to utilise technology like flipbook media effectively in their teaching. The study noted the effectiveness of flipbooks in teaching science to secondary school students. This indicates that flipbooks could also be beneficial in other subjects. Further research needs to be conducted to evaluate the effectiveness of flipbooks when applied to other fields, subjects, and educational levels. As the sample size of this study was small, further research should be carried out on a larger scale to validate these findings. This would help in determining whether the positive results of this study are broadly applicable. Schools should consider investing in technology like flipbook media, as the study shows that it can significantly improve students' learning outcomes. Parents should be informed about the effectiveness of flipbook media, so they can also use this tool to support their children's learning at home. Studies could be conducted on the long-term effects of using flipbook media on students' academic performance and interest in learning. Investigate the potential for flipbook media to support distance learning programs, given the ongoing challenges of the epidemic. New learning digital media facilitates and fosters learning in this New Normal Environment.

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REFERENCES

- Adnyana ME 2023. Implementation of flipbook learning media to improve motivation and achievement in biology learning in class xii mipa2 students of sman 1 kuta selatan. *Indonesian Journal of Educational Development (IJED)*, 4(1): 23-31.
- Aji SD, Yasa AD, Dewi PK, Kumala FN, Putri AN 2022. Development of e-module flipbook on science learning to support Sustainable Development Goals (SDGs) for Elementary School Students. *QALAMUNA: Journal of Education, Social and Religion*, 14(2): 895-906.
- Azzahra B, Hestiana D 2021. The Effectiveness of Using Flipbook to Increase Reading Motivation. Seminar Nasional Ilmu Pendidikan dan Multi Disiplin, 4(1): 114-117. From <<https://prosiding.esaunggul.ac.id/index.php/snip/article/view/155>> (Retrieved on 20 July 2023).
- Bayhaki MF, Untari RS 2023. The effect of the implementation of flipbook learning media on the learning outcomes of Class 12 multimedia students in Vocational High Schools. *Academia Open*, 8(1): 10-21.
- Diana N, Fauziah F, Sukhor F 2023. Students' perceptions on usability principle and interface design of flipbook as m-learning in higher education. *English Review: Journal of English Education*, 11(1): 293-300.
- Endaryati SA, St YS, Suryandari KC 2023. Problem-based learning flipbook e-module in improving students' critical thinking skills in "Always Save Energy" thematic learning. *International Journal of Elementary Education*, 7(1): 115-123.
- Hardiansyah F 2022. Improve science learning outcomes for elementary school students through the development of flipbook media. *Jurnal Penelitian Pendidikan IPA*, 8(6): 3069-3077.
- Hardiansyah F, Zainuddin Z 2022. The influence of principal's motivation, communication, and parental participation on elementary school teachers' performance. *Al Ibtida: Jurnal Pendidikan Guru MI*, 9(2): 319-334.
- Hardiansyah F, Zainuddin Z, Sukitman T, Astutik C 2023. Development of learning media smart book to improve understanding of elementary school students in science learning. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah dan Keguruan*, 26(1): 72-87.
- Harefa N, Purba LSL 2019. The development of chemistry practicum e-module based on simple-practice. *Jurnal Pendidikan Kimia*, 11(3): 107-115.
- Hattangdi A, Ghosh A 2008. Enhancing the quality and accessibility of higher education through the use of Information and Communication Technologies. In: *International Conference on Emergent Missions, Resources, and the Geographic Locus in Strategy as a part of the 11th Annual Convention of the Strategic Management Forum (SMF), India 2008*, (Vol. 2011, pp. 1-14). Kanpur, India, 8 to 10 May, 2008.
- Hidayatullah MS, Rakhmawati L 2016. Development of flipbook maker-based learning media in basic electronics subjects at SMK Negeri 1 Sampang. *Journal of Electrical Engineering Education*, 5(1): 83-88.
- Kurniawati H, Desnita D, Siswoyo S 2016. Development of 3D PageFlip physics based learning media for vibration and sound wave material. *Journal of Physics Education Research and Development*, 2(1): 97-102.
- Levina EY, Masalimova AR, Kryukova N I, Grebennikov VV et al. 2017. Structure and content of e-learning information environment based on geo-information technologies. *EURASIA Journal of Mathematics, Science and Technology Education*, 13(8): 5019-5031.
- Linda R, Sulistya S, Putra TP 2018. Interactive e-module development through Chemistry Magazine on Kvisoft Flipbook Maker Application for Chemistry Learning in Second Semester at Second Grade Senior High School. *Journal of Science Learning*, 1(2): 21-25.

- Lishetiyan V, Septiani S, Talia DI, Aeni AN 2023. The use of pokus (politics of khulafaur rasyidin) flipbook in increasing elementary students' literacy interest. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 12(2): 458-472.
- Maf'Ula A, Utami SH, Fatchur R 2017. Development of flipbook media on the antibacterial power of plants with medicinal properties. *Journal of Education*, 2(11): 1450-1455.
- Maghfiroh SAMM, Suharman A, Ramadhona R 2020, May. Developing Ethnomatematics-based flipbook in circle material at VIII grade of junior high school. *Pancaran Pendidikan*, 9(2). <https://doi.org/10.25037/pancaran.v9i2.292>
- Marwan M, Yuliantri RDA 2023. Investigating the Impacts of Flipbook Media on Middle School Students' Learning Interests in History. From <<https://scite.ai/reports/10.35445/alishlah.v15i1.3011>> (Retrieved on 13 February 2023)
- Marwan M, Yuliantri RDA 2023. Investigating the impacts of flipbook media on middle school students' learning interests in History. *AL-ISHLAH: Journal of Education*, 15(1): 795-804.
- Mulyadi DU, Wahyuni S, dan Handayani RD 2016. Development of flash flipbook media to improve students' creative thinking skills in science learning in junior high schools. *Journal of Physics Learning*, 4(4): 296-301.
- Ni'mah DTS, Sutrisno S, Shodiqin A 2017. Development of a mathematics module assisted by flipbook maker and Prezi with a cooperative model of the jingling button technique in vocational school opportunity material. *AKSIOMA*, 6(2): 18-27.
- Nurdin A, Hindriana AF 2023. Development of based learning multimedia flipbook on the subject of life organization at SMPIT Al Multazam Kuningan. *Quagga: Journal of Education and Biology*, 15(2): 172-178.
- Nurhidayati A, Putro SC, Widiyaningtyas T 2018. The application of the PBL model assisted by e-modules based on flipbooks compared to assisted by printed teaching materials has an impact on vocational students' programming learning outcomes. *Technology and Vocational: Journal of Technology, Vocational and Teaching*, 41(2): 130-138.
- Rahmawati Y, Komariah K, Kurniawan DT 2022. The development of flipbook based on the Addie Model in science learning for elementary school students. *International Journal of Learning and Instruction (IJLI)*, 4(2): 56-64.
- Rasiman 2014. The effectiveness of resource-based learning assisted by a flip book maker in mathematics learning. *JPKM*, 1(2): 34-41.
- Safitri A, Permata MD, Wilujeng I 2021. The effect of using the e-module assisted by the kvisoft flipbook maker in improving student's critical thinking skills during the covid-19 pandemic. In: *6th International Seminar on Science Education*. pp. 545-551. Yogyakarta, Indonesia, 28 to 29 November, 2020. <https://doi.org/10.2991/assehr.k.210326.078>
- Saraswati S, Linda R 2019. Development of interactive e-module chemistry magazine based on Kvisoft Flipbook maker for thermochemistry materials at second grade senior high school. *Journal of Science Learning*, 3(1): 1-6.
- Setianingrum DA, Pratiwi S, Jumadi J 2022. Development of science module based on flipbook about physics in the respiratory system to improve students' learning independence. *Journal of Science Education Research*, 8(6): 2621-2628.
- Simatupang Nova Irawati, Sormin Elferida 2020. The effectiveness of using flipbook maker to improve the chemistry learning outcomes of senior high school students. *Jurnal Chemistry Education*, 12(1): 26-33.
- Sriyanti I, Almafie MR, Marlina L, Jauhari J 2020. The effect of using flipbook-based e-modules on student learning outcomes. *Kasuari: Physics Education Journal (KPEJ)*, 3(2): 69-75.
- Susanti N, Yennita Y, Azhar A 2020. Development of contextual based electronic global warming modules using flipbook applications as physics learning media in high schools. *Journal of Educational Sciences*, 4(3): 541-559.
- Susanto R, Afandi A, Imawati F 2022. The effectiveness of flipbook learning in sports physiology courses improves student achievement in the course of the pandemic. *JUMORA: Jurnal Moderasi Olahraga*, 2(1): 67-76.
- Ulfannura H 2022. Development of flipbook maker app-based learning resources for high school students. *Jurnal Inspirasi Pendidikan*, 12(2): 86-95.
- Wadah SC, Miriam S, Dewantara D, Suyidno S 2022. The feasibility of e-modules based on flipbook Pdf Professional to improve student learning outcomes on work and energy material. *Geliga Science Journal: Journal of Physics Education*, 10(2): 83-88.
- Wahyuni SI, Noer AM, Linda R 2018. Development of Electronic Module Using Kvisoft Flipbook Maker Application on the Chemical Equilibrium. Proceedings of the UR International Conference on Educational Sciences, 178-189. From <<https://ices.prosiding.unri.ac.id/index.php/ICES/article/view/6417/5804>> (Retrieved on 10 July 2023).

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