The Development of Science Note Learning Media for Alternative Energy Sources Theme in Islamic Elementary School

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Abstract

This research aims to develop Science Note, a learning media for alternative energy source themes, for Islamic elementary school students. The product was developed following the ADDIE model, consisting of the following stages: 1) preliminary study, 2) development of Science Note media, and 3). product effectiveness test. The data were analyzed qualitatively and quantitatively. In this study, the product was developed through several stages: (a) searching for real condition data and conducting needs analysis, (b) designing the Science Note, (c) Validating the product by involving media and material experts, and teachers, (d) Revising the product based on validators' feedbacks. The subject of this research was the 4th grade of MI Ma'arif and MI Noborejo. Validation showed that Science Note media had a score of 3.77 (very good), and by the individual trial test with a score of

3.62. The effectiveness of science note media was tested using the t-test and it was obtained a tailed sig (2) of 0.000. p = 0.00 < 0.05. These results indicate that the Canva Science Note media is effective in the learning achievement of class VI Madrasah Ibtidaiyah students.

Keywords: science note learning media, alternative energy sources, islamic elementary school

INTRODUCTION

Broad access to learning sources and poor parental control when using smartphones may significantly affect students' learning patterns. During the Covid-19 pandemic, smartphones facilitated students' and workers' activities at home and it may allow learning media developed (Mella-Norambuena et al., 2021). Teachers and the government are demanded to be adaptive to optimally support learning activities. Schools should start to innovate to provide students with meaningful learning processes using media accessible to students. One of the efforts made to ensure a meaningful learning process was by involving half of the students in a conventional, pre-pandemic learning process in shorter lesson hours (Kemendikbudristek, 2022).

This semi-online learning model becomes interesting and meaningful if it is supported by learning media that can present material briefly and easily for students to understand. Today's students, as digital natives, have different learning styles that demand teachers to prepare their teaching methods and materials optimally for the classroom learning process. Teachers are expected to adapt to these changes by designing more optimal learning media (Wulandari et al., 2022). It is necessary to provide

students with creative and innovative learning media (Pito, 2018). This statement is by the words of Allah SWT in the Qur'an Surah *An-Nahl* verse 44, namely:

الْبَيِّنٰتِ الزُّبُرِۗ وَاَنْزَلْنَآ اِلَيْكَ الذِّكْرَ لِتُبَيِّنَ لِلنَّاسِ ا لَ اِلَيْهِمْ لَعَلَّهُمْ

This means, " *We have sent down to you the Qur'an, that you may explain to mankind what has been revealed to them and so that they may think* " (Surah An-Nahl 44).

The need analysis result involving students in MI Ma'arif Mangunsari and MI Ma'arif Noborejo revealed that they needed practical, interactive learning media with attractive visualizations to learn science subjects. The 4th-grade classroom teacher's observation noticed several obstacles during the semi-online learning activities, including the demands on students to master the same amount of materials with fewer lesson hours. During the pandemic, the lesson hour was shortened following the government's policies (Hendri, 2020). In this regard, students are required to learn independently to keep up with the basic competencies they should master. The teacher reported that the existing book for science learning was impractical to support students' independent learning due to limited visualization and text-dominant books. Some books present the material in different subchapters based on the predetermined subthemes.

The homeroom teacher stated that the current student book was a thematic book containing some subjects, causing students to find it difficult to memorize technical terms, resulting in misconceptions and misunderstandings in the Natural Science subject. This condition adversely affects the evaluation and independent learning process.

The need analysis result reveals the need for a learning media with audiovisual features. Some book-based learning media have been developed in previous studies, including comic strips, e-books, and pop-up books (Barsihanor et al., 2020; Mochamad & Fariyatul Fahyuni, 2020). While the comic strip is reported to have a good performance, it is not suitable for the water cycle topic due to its inability to demonstrate the process.

In addition to Canva, PowerPoint (PPT) can also be used to create visualizations in the delivery of science materials, especially Alternative Energy Sources. However, PPT has not been able to display visual graphics in the form of videos properly (Baker et al., 2018; Hew et al., 2020). Microsoft Office Power Point is an office application program slide show type (worksheets which are changing objects) are used to present concepts and arguments that you want to show to others

Ease of access to the product should also be taken into account. In this study, the smartphone allows students to access the developed product, i.e., *Science Note*, easily as it does not require large memory and is internet-based. The product was developed using Canva, a popular online design application. So that, this research used Canva to make Science Note is presented the learning themes.

METHODS

This research and development (R&D) was performed using ADDIE model. This method is usually applied to develop and test a certain product. (Cahyadi, 2019) . The ADDIE model's step was shown in Figure 1.

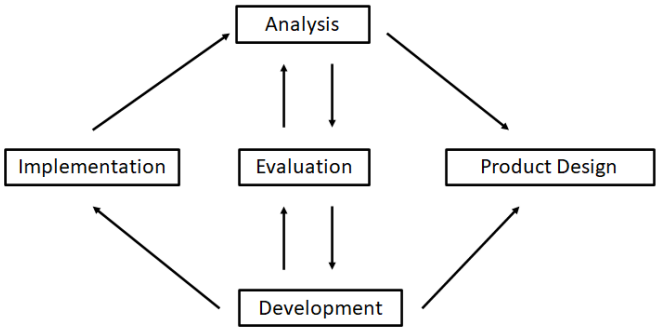

Figure 1. Scheme of ADDIE model

The research subjects were fourth-grade students of MI Ma'arif Mangunsari and MI Ma'arif Noborejo that have done mixed learning activities offline and online. The research instruments used were real condition questionnaires, needs analysis questionnaires, validation assessment sheets, *pretest*, and *post-test questions instruments* as well as individual test sheets (3 respondents), group (8 respondents), and limited (30 respondents). The study was conducted through several stages: 1) preliminary study; 2) *Science Note* media development and 3). product effectiveness test.

The data were obtained in the form of qualitative and quantitative data. Quantitative data was obtained from the score of the class and assessment questionnaire. Meanwhile, qualitative data were obtained from interviews with teachers in schools as well as suggestions, criticisms, and responses from the validators. Data analysis was made by reducing, presenting, and displaying data in the forms of charts, tables, and graphics (Sugiyono, 2016) . The effectiveness of the product was tested using paired sample t-tests for quantitative analysis by one-group pretest-posttest design and t-test.

RESULTS AND DISCUSSION

The need assessment was obtained by observation and interviews with the respondents. Respondents to the questionnaire were class IV teachers, totaling 25 people shown below:

Indicator	Average	Description
Multimedia	3.3	Need
Theme	3.67	Need
Practicability	3.32	Need
Understanding	3.56	Need
Evaluation	3.25	Need
Total	**17.1**	
Average	3.42	

This study developed the Science Note learning media for alternative energy sources for fourth-grade students of Madrasah Ibtidaiyah. The preliminary study revealed that teachers need practical, interactive learning media that are practical, interactive media with attractive visualizations. From the interviews could be found that media learning was used in a little percentage as shown in Table 1.

Table 1. Learning Media usage data

Indicator	Answer	Respondents	Percentage
Media use in classroom	Yess	15	60%
	No	10	40%

After the preliminary study, the next step was to design the material and the media. This stage includes (1) Determining basic competencies, indicators, and materials for alternative energy sources. (2) Conducting material research to enrich the literature in material development. (3) Designing media flow including image *design*, media layout, audio, and

video. (4) Testing Canva app features. By using Canva, the account must be set up before doing the project.

Science Note is a media designed using Canva, which can be accessed through the website *www.canva.com* or the application on *the play store.* The front page of the website was shown in Figure 2.

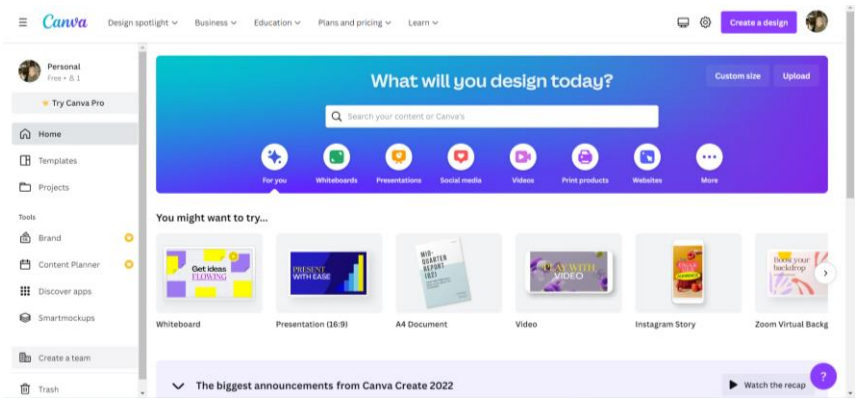

Figure 2. Front page of Canva Website

This media is a development of the presentation *template that has been provided in the application features.* The product was developed through several stages: (1) logging in to the Canva application on the www.canva.com website or downloading the application on the *play store* with the name Canva application. (2) Opening the application and logging in on the application start page with *google, Facebook,* or other social media accounts. (3) Entering the application homepage, browse the layout and select presentation design (4) Start designing by adding some free design elements. (5) Insert the audio and video using the upload feature. (6) Saving and sharing presentation slides by selecting the *"prototype" feature*. (7) Copying the link Canva provided. (8) Opening the www.bit.ly website, entering the copied link, and editing the

product name as desired by clicking *"shortener"*. (9) The link is ready and shareable (10) Product is completed.

The learning media component consisted of 4 sub-components, including Homepage, which presents grade level, material title, media name, IAIN Salatiga logo and navigation buttons for links to the next page that shown in Figure 3.

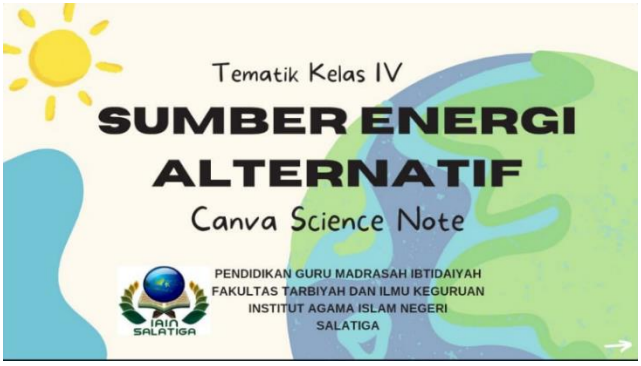

Figure 3. Science Note front page

Material Page, which presents the material along with pictures and videos. Navigation arrows were provided to move to the previous or next page. It was figured in Figure 4.

Figure 4. Material Page

Source: (Research Document, 2022)

Evaluation page, presenting interactive media. On this page, students can *tap* on the 'click here' section to move to the evaluation page in the form of a google form. The evaluation page shown in Figure 5.

Figure 5. Evaluation page

Figure 4. Evaluation page

This media feasibility was validated by material experts, media experts, and teachers. A limited trial using a Likert-scale questionnaire *was also conducted.* Table 2 shown the results of materials and media validators and teachers.

Table 2. Validation Results of Media Experts, Materials, and Teachers

No.	Indicator	Average	Percentage (%)	Description
1	Media Expert	3.77	94%	Highly feasible
2	Material Expert	3.57	87%	Highly feasible
3.	Teacher	3.57	87%	Highly feasible

Science Note media for alternative energy source's theme was developed in several stages including planning and developing media, expert validation, and revision. The product has been tested by media and material validators.

The media and material expert validation scores were 3.77 and 3.49, respectively. Despite several feedbacks from validators, the product was categorized as highly feasible and very good learning media. validators are needed to assess products and research instruments. By obtaining input from the validator, an assessment of the feasibility and suitability of the material can be obtained. Validators and teachers' feedback are presented in Table **3**.

Table 3. Material Validation Results Table

Media Expert Revision	Material Expert Revision	Information
Put a *watermark* on the product,	Instructions or commands in each video	Has been revised
Use a font that is not too standard	Add a cheerful-looking character	Has been revised
Pay attention to font consistency		Has been revised
Use brighter color		Has been revised
Changed the "click here" sign with an image so it's easier to operate		Has been revised

A limited trial was conducted to test the learning media feasibility. Development research is research that goes through a formative stage, as stated by (Tessmer, 1997) says that formative assessment includes three steps,

namely one-to-one tryout, group trials, and limited trials. O*ne-to-one trying out* was conducted by involving three 4th-grade students (Cahyono, 2019). After that, the small-group trial was conducted involving eight 4th-grade students (Cahyono & Rozikan, 2022). Lastly, the limited trial was conducted by involving thirty 4th-grade students (Cahyono & Rozikan, 2022). Table 4 below presented the limited trial results of Science Note media learning.

Table 4. Limited trial result

No.	Trial	Average	Percentage (%)	Description
1	Individual Test	3.62	91%	Highly feasible
2	Small Group Test	3.57	89%	Highly feasible
3	Large Group Test	3.61	90%	Highly feasible

As shown in Table 4, the feasibility score of the developed product was between 3.5 and 3.7, meaning that Science Note Media was considered a feasible learning media for alternative energy source materials. The next step is about the effectiveness of Science Note media by using quantitative methods.

The product effectiveness was examined using descriptive statistics. It was done by comparing the pre-test and post-test, as shown in Table 5.

Table 5. Descriptive statistics (Pretest and Posttest results)

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	30	51	82	72.47	9,089
posttest	30	60	94	82.37	8,838
Valid N (listwise)	30				

Table 5 presents the pre-test and post-test results, demonstrating students' improvement in understanding the topic. This study is in line with (Kusaeri,

2019) , who reported that learning media developed using Canva exhibited good validity from material and media experts (3.40 and 3.50, respectively). The effectiveness of Science Note media was analyzed using paired sample test. The result showed that Science Note was effective in improving the 4th-grade students' achievement in MI Ma'arif Mangunsari and MI Ma'arif Noborejo. Generally, learning media can help students understand the topic more easily.

Canva is one of the online graphic design applications offering a wide variety of design templates. This application provides its users with a presentation, posters, profile photos, and banner templates, among others (Hapsari & Zulherman, 2021). Canva could help teachers save time designing the learning media and developing learning materials. Canva can be used to develop learning media to help students understand the lessons more easily, thanks to its rich features for displaying text, video, animation, audio, images, and graphics (Kamińska et al., 2019). This application's attractiveness is also helpful to help students focus on the lessons.

In Alternativ energy source's theme, Canva may serve as a learning media capable of displaying audio, and video and can present a visualization that is concise and easy to read (Dabbagh & Castaneda, 2020). It is also easily accessible as it works like power point, but with far richer features. The audio-visual enriching learning environment, nurture exploration, experiments, and discoveries, and encourage students to develop talk, and reveal their mind. Audio-visual silence and audio-visual motion are two types of media audiovisual. Audio-visual content is part important so the

presentation becomes more interesting. Creating content audio-visual requires expertise, particularly in media design and interesting learning.

The other media that similar with Canva was Microsoft Power Point (PPT). PPT often used as media in direct learning that can help teacher and student in visualization of the lesson. But nowadays, canva offers a service to make presentations more attractive from all angles and also increasing educational perspective (Kumar et al., 2019).

Video also can be added to the application, especially for Natural topics. The video player feature in Canva is helpful for teachers in explaining biology or physics-related materials more easily. The expert validation result showed that the developed product was a valid, practical, and effective learning media.

CONCLUSION

The need analysis revealed that teachers need an interactive, practical learning media with attractive visualization for explaining energy materials to the students. Responding to this need, Science Note was developed through several stages: (1) conducting interviews and collecting questionnaire data related to the real school conditions and needs analysis (2) planning for developing the *Science Note media* (3) Validating the product by involving media and material experts (4) and revising the product by taking validators' feedbacks into account. The expert validation score was 3.77 and 3.49 in terms of media and material, respectively. This study conducted formative trials involving individual trials, group trials, and limited trials on fourth-grade students, showing a score of more than 85%.

This result indicates that the developed product was a feasible learning media.

REFERENCES

Arofah, R., & Cahyadi, H. (2019). Pengembangan Bahan Ajar Berbasis ADDIE Model. 3(1), 35–43. https://doi.org/10.21070/halaqa.v3i1.2124

Baker, J. P., Goodboy, A. K., Bowman, N. D., & Wright, A. A. (2018). Does teaching with PowerPoint increase students' learning? A meta-analysis. Computers & Education, 126, 376–387. https://doi.org/10.1016/J.COMPEDU.2018.08.003

Barsihanor, B., Hafiz, A., KMR, G. N., & Budi, I. S. (2020). Pembuatan media Pembelajaran Pop Up Book Bagi guru Madrasah Ibtidaiyah. JMM (Jurnal Masyarakat Mandiri), 4(4), 588–594. https://doi.org/10.31002/TRANSFORMATIKA.V

Cahyono, G. (2019). Interactive Media Development of Procedures for Prayer (Tara Shalat) Based on Adobe Flash in Improving the Skills of Madrasah Ibtidaiyah Prayers. Mudarrisa: Jurnal Kajian Pendidikan Islam, 11(2), 159–182.

Cahyono, G., & Rozikan, M. (2022). The Development of PowerPoint-Based Video Intructional Media for Islamic Education Teachers in MTs Qudsiyyah Kudus. TEKNODIKA, 20(01), 61–77.

Dabbagh, N., & Castaneda, L. (2020). The PLE as a framework for developing agency in lifelong learning. Educational Technology Research and Development 2020 68:6, 68(6), 3041–3055. https://doi.org/10.1007/S11423-020-09831-Z

Hapsari, G. P. P., & Zulherman. (2021). Analisis Kebutuhan Pengembangan Media Video Animasi Berbasis Aplikasi Canva pada Pembelajaran IPA. Pancasakti Science Education Journal, 6(April), 22–29. https://doi.org/10.24905/psej.v6i1.43

Hendri, N. (2020). Merdeka Belajar, Antara Retorika dan Aplikasi. E-Tech, 08(01), XX – XX. https://doi.org/10.1007/XXXXXX-XX-0000-00

Hew, K. F., Jia, C., Gonda, D. E., & Bai, S. (2020). Transitioning to the "new normal" of learning in unpredictable times: pedagogical practices and learning performance in fully online flipped classrooms. International Journal of Educational Technology in Higher Education, 17(1), 1–22. https://doi.org/10.1186/S41239-020-00234-X/FIGURES/9

Kamińska, D., Sapiński, T., Wiak, S., Tikk, T., Haamer, R. E., Avots, E., Helmi, A., Ozcinar, C., & Anbarjafari, G. (2019). Virtual Reality and Its Applications in Education: Survey. Information, 10(10), 318. https://doi.org/10.3390/INFO10100318

Kemendikbudristek. (2022). Terbitkan Surat Edaran, Kemendikbudristek Setujui PTM Terbatas 50 Persen di Wilayah PPKM Level 2. Https://www.kemdikbud.go.id/.

Kumar, J. A., Muniandy, B., & Wan Yahaya, W. A. J. (2019). Exploring the effects of emotional design and emotional intelligence in multimedia-based learning: an engineering educational perspective. New Review of Hypermedia and Multimedia, 25(1-2), 57–86. https://doi.org/10.1080/13614568.2019.1596169

Kusaeri. (2019). Pengembangan Media Audio Visual Berbasis Aplikasi Canva Materi Bangun Ruang Limas. Jurnal Pendidikan Matematika, 5(2), 61–70.

Mella-Norambuena, J., Cobo-Rendon, R., Lobos, K., Sáez-Delgado, F., & Maldonado-Trapp, A. (2021). Smartphone Use among Undergraduate STEM Students during COVID-19: An Opportunity for Higher Education? Education Sciences, 11(8), 417. https://doi.org/10.3390/EDUCSCI11080417

Mochamad, & Fariyatul Fahyuni, E. (2020). E-Comic Strip PAI Upaya Membiasakan Pola Hidup Sehat Islami di Era Covid-19. Al-Tadzkiyyah: Jurnal Pendidikan Islam, 11(2), 259–273. https://doi.org/10.24042/ATJPI.V11I2.6852

Pito, A. H. (2018). Media Pembelajaran dalam Perspektif Al-Qur'an. Andragogi: Jurnal Diklat Teknis Pendidikan Dan Keagamaan, 6(2), 97–117. https://doi.org/10.36052/ANDRAGOGI.V6I2.59

Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R&D.

Alfabeta.

Tessmer. (1997). Planning and Conducting Formative Evaluations. Kogan Page.

Wulandari, T., Mudinillah, A., Islam, A., Batusangkar, N., Tinggi, S., & Islam, A. (2022). Efektivitas Penggunaan Aplikasi CANVA sebagai Media Pembelajaran IPA MI / SD. 2(1), 102–118.