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Demonstration-Based Learning Videos on the Topic of Substance Changes in Elementary Schools

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ABSTRAK

Media pembelajaran yang kurang menarik menyebabkan rendahnya minat belajar siswa. Maka diperlukannya media pembelajaran yang konkret sesuai dengan tahap perkembangan siswa. Tujuan penelitian ini adalah untuk menciptakan video pembelajaran berbasis demonstrasi yang valid dan praktis pada topik perubahan wujud benda di kelas V sekolah dasar. Jenis penelitian ini adalah penelitian pengembangan dengan menggunakan model 4D. Subjek penelitian ini adalah 2 ahli materi, 2 ahli media, 2 praktisi, dan 5 siswa. Metode yang digunakan dalam pengumpulan data penelitian ini adalah metode rating scale dengan instrumen berbentuk rating scale rentang 1-4. Data yang diperoleh kemudian dianalisis dengan menghitung indeks validitas penilaian ahli serta menghitung rata-rata respon praktisi dan siswa. Hasil analisis menunjukkan indeks validitas ahli materi memperoleh skor terendah sebesar 0,84 dan skor tertinggi 1 dengan kategori sangat valid. Sedangkan indeks validitas ahli media memperoleh skor terendah sebesar 0,67 yang berada pada kategori valid dan skor tertinggi 1 yang berada pada kategori sangat valid. Rata-rata secara keseluruhan skor respon praktisi yaitu 3,82 dan respon siswa yaitu 3,78 dengan kategori sangat baik. Berdasarkan hasil analisis tersebut, media video pembelajaran berbasis demonstrasi pada topik perubahan wujud benda di kelas V sekolah dasar dinyatakan valid dan layak digunakan dalam proses pembelajaran.

ABSTRACT

Less attractive learning media causes low interest in student learning. So, the need for concrete learning media following the stages of student development. This study aimed to create a valid and practical demonstration-based learning video on changing objects in the fifth grade of elementary school. This research is development research using the 4D model. The subjects of this study were two material experts, two media experts, two practitioners, and five students. The method used in data collection in this study is the rating scale method with an instrument in the form of a rating scale ranging from 1-4. The data obtained were analyzed by calculating the validity index of expert judgment and calculating the average response of practitioners and students. The analysis results showed that the material expert's validity index obtained the lowest score of 0.84 and the highest score was 1 with the very good category. The media expert validity index got the lowest score of 0.67 in the good category, and the highest score was 1, which is in the very good category. The overall average score of the practitioner's response was 3.82, and the student response was 3.78, which was in the very good category. Based on the results of this analysis, demonstration-based instructional video media on the topic of changing objects in fifth-grade elementary schools were declared good and suitable for use in the learning process.

1. INTRODUCTION

Learning science content at the elementary school level is planting basic science concepts to determine the surrounding environment and solve natural phenomena in everyday life. Student interest in participating in the learning process requires innovation in designing learning to have the interest and motivation to learn. Science learning will be more meaningful and varied if you use learning media to convey teaching material because it can increase student motivation and student learning outcomes(Rosinah, 2020; Wahyuningtyas & Sulasmono, 2020). Then, in science learning, students should be active in learning and allowed to experience and discover for themselves the meaning of the material

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being taught(Lusidawaty et al., 2020; Meo et al., 2021; Prananda et al., 2020). Science learning is expected to be an arena for students to learn about themselves and their surroundings to apply it in their daily lives. Based on this, science learning can use media according to student characteristics that involve students actively to experience and discover the meaning of the material being taught.

However, in reality, learning science content in elementary schools is of a low quality. Based on PISA (the program for international student assessment) in 2018 published by the Organization for Economic Cooperation and Development (OECD), stated that Indonesia's scientific ability is ranked 71 out of 79 countries participating in PISA with an average score of 389, which is below the International average score of 500 (Hewi & Shaleh, 2020). It happens because of problems in science learning which result in low student learning outcomes. Some problems in the science learning process; 1) the lack of understanding of students in the teaching and learning process can result in less than optimal learning outcomes, 2) scientific literacy is still very low because there is no student participation to play an active role in learning 3) students feel bored in participating in the learning process, 4) learning is still focused on the teacher (teacher-centered) and does not involve students actively, 5) the lack of use of learning media. In addition, based on the results of a preliminary study conducted on 9-12 November 2020, which showed that 90% of teachers stated that using media other than books in teaching in the form of instructional videos (Aiman & Ahmad, 2020; Handayani & Dewanti, 2020; Meo et al., 2021; Prananda et al., 2020; P. I. Yunita & Astawa, 2019). However, 80% of the teachers stated that the learning videos were not made by themselves but were obtained from YouTube. 50% of the teachers stated that the contents of the learning videos in material exposure were not accompanied by direct material demonstrations, especially on science concepts that required practicum. It shows the teacher's lack of desire, creativity, and innovation to design a lesson to activate students' learning. If this is allowed, it will certainly result in a lower quality of human resources and science learning in Indonesia in the future.

Efforts that can be made to overcome these problems are to develop a learning media that can concretely teach science material. Jean Piaget's theory that children aged 7-12 years are at the concrete operation stage capable of using operations and logic for real objects only (Anditiasari & Dewi, 2021). Therefore, the material for elementary school children can be packaged in learning video media. Learning is more real, especially on changing the shape of objects in the fifth grade of elementary school. Learning media is a tool or intermediary that can use to facilitate the learning process to streamline communication between teachers and students (Efanudin & Wibawa, 2017; Wahyuningtyas & Sulasmono, 2020; Yuanta, 2019; P. I. Yunita & Astawa, 2019). Video media is one type of audio-visual media that can describe a moving object along with sound (Melinda et al., 2017; Yuanta, 2019). It can present information, describe a process, explain concepts, demonstrate a procedure, teach skills, and influence attitudes. Instructional videos are one of the learning media that can visualize the subject matter or messages to be conveyed in learning so that learning is more meaningful (Agustiningsih, 2015; Lo et al., 2020; D. Yunita & Wijayanti, 2017). Learning videos are easier for students to understand because students can both hear and see the events or material being taught.

Learning videos that are made so that students can hear and see an event in a real way according to the characteristics of elementary school students is a demonstration-based learning video. Demonstration-based learning videos are a combination of moving and sound images that contain how to do or do something through electronic technology (Andriawan & Suparman, 2015). Appropriate demonstration-based learning videos are developed. Created demonstration-based learning video products that are feasible and effective for learning media for elementary school students. New media support student learning motivation improve student learning outcomes (Anam et al., 2019; Sulfemi & Nurhasanah, 2018). The demonstration-based learning video developed is different from the previously developed learning video. The content of this demonstration-based learning video is equipped with an opening, activities linking the material with the student environment, giving students problems according to the material, practicum, concluding practicum and answering the problems given, giving assignments as a follow-up to learning, and closing. This demonstration-based learning video paying attention to learning aspects, material aspects, media quality aspects, language use aspects, and media display aspects to make it easier for students to understand the material on the video and attract students' interest in learning. The purpose of this study was to create a valid demonstration-based learning video and to find out the teacher's response and student's response to the instructional video on the topic of changing objects in the fifth grade of elementary school.

2. METHOD

This research is research on the development of learning media made in demonstration-based learning videos. Development research aimed to focus on producing and developing products suitable for

use, and the following student needs to resolve learning problems with the product being developed (Tegeh & Kirna, 2013). This study used the 4D model, which has four stages: (1) define, (2) design, (3) development, and (4) disseminate (Diani, 2015). The selection of this development model is based on the consideration that the 4D model development design is carried out (Tegeh et al., 2019). The subjects of this study were two material experts, two media experts, two practitioners, and five students. The selection of trial subjects for experts and practitioners is based on competence and expertise according to their respective fields. The minimum qualification of expertise at the S1 level. Student selection is adjusted to the level that is the target of media production. The material expert consists of two lecturers who are competent in science. Media experts consisted of two lecturers who are experts in the field of media/design. Practitioner consists of two teachers who already have teaching experience in elementary schools and five students currently taking education in fifth-grade Elementary School.

The data collection method used in this research is the method of a stratified scale or rating scale. The graded scale or rating scale is a data collection tool with a subjective measure made on a scale or level (Werther et al., Ilhami & Rimantho, 2017). The rating scale in this development research uses a range of 1-4. The instrument in this study should meet the requirements of the validity test to reflect a good instrument. The steps are taken to determine the instrument's validity are as follows: 1) Making the instrument grid in the form of a table, 2) consulting the grid with the supervisor, 3) arranging the instrument. The instrument validity grid consists of learning aspects, material aspects, media quality aspects, language use aspects, and media display aspects. Demonstration-based learning video validation instrument presented in Tables 1, 2, 3, and 4.

Table 1. Material Expert Instruments

No	Aspect	Indicator	Number	Total
1	Learning	Learning objectives	1, 2, 3	3
		Delivery of material	4, 5, 6, 7	4
		Motivating quality	8, 9, 10, 11	4
2	Material	The relevance of the material	12, 13, 14	3
		Material selection	15, 16, 17, 18	4
Total				**18**

Table 2. Media expert instruments

No	Aspect	Indicator	Number	Total
1	Media quality	The quality of the displayed video	1, 2, 3, 4	4
		Ease of use	5, 6	2
		Clarity of sound and text	7, 8, 9, 10	4
2	The use of language	The quality of language use	11, 12, 13	3
		The suitability of sentence placement	14, 15	2
3	Media display	Video presentation	16, 17	2
		Layout	18, 19, 20	3
Total				**20**

Table 3. Practitioner response instruments

No	Aspect	Indicator	Number	Total
1	Learning	Learning objectives	1, 2, 3	3
		Delivery of material	4, 5, 6, 7	4
		Motivating quality	8, 9, 10, 11	4
2	Material	The relevance of the material	12, 13, 14	3
		Material selection	15, 16, 17, 18	4
3	Media quality	The quality of the displayed video	21, 22, 23, 24	4
		Ease of use	25, 26	2
		Clarity of sound and text	27, 28, 29, 30	4
4	The use of language	The quality of language use	31, 32, 33	3
		The suitability of sentence placement	34, 35	2
5	Media display	Video presentation	36, 37	2
		Layout	38, 39, 40	3
Total				**38**

Table 4. Student Response Instruments

No	Aspect	Indicator	Number	Total
1	Learning	Delivery of Material	1,2	2
		Motivating Quality	3,4	2
2	Material	Materials Selection	5,6	2
3	Media quality	The quality of the displayed video	7,8	2
		Clarity of sound and text	9,10	2
4	The use of language	The quality of language use	11,12	2
		The suitability of sentence placement	13,14	2
5	Media display	Video presentation	15,16	2
Total				**16**

The data analysis method used in this research is the quantitative descriptive analysis method. The quantitative descriptive analysis method analyzes data based on numbers obtained from the product test results. Quantitative descriptive analysis was used to determine the validity index of expert scores and the average score obtained from the practitioner response assessment sheet and student responses. The data obtained from the product test results are then analyzed to determine the validity of the product being developed. Data analysis was carried out by calculating the validity index of the assessment by material experts and media experts and calculating the average of the total score obtained by each aspect on the practitioner response assessment sheet and student response. The validity index data is then converted to the validity index conversion guideline. The average data is converted to the five-scale conversion guideline to determine the validity category of the product being developed..

3. RESULT AND DISCUSSION

Result

This research is development research that produces demonstration-based instructional video media products on changing the shape of objects in fifth-grade elementary school whose validity has been tested. The product was tested on two material expert lecturers, two media expert lecturers, two practitioners, and five fifth-grade elementary school students to prove the validity of the product. This research was conducted from October 2020 to February 2021. This research used the 4D research model, which has four stages: (1) define, (2) design, (3) development, and (4) disseminate. The description of the results of the development stages is as follows.

Define stage

The defining stage is carried out through needs analysis, student characteristic analysis, analysis of existing learning videos, and curriculum analysis. 50% of the teachers stated that the content of the instructional videos in the form of material exposure was not accompanied by direct demonstrations of the material, especially on the science concept, which required practicum. 80% of teachers said it was very important to develop media in demonstration-based learning videos. Analysis of student characteristics shows that elementary school students are at the stage of concrete operational development, so they need concrete learning media. Analysis of instructional videos found on social media shows that there are still only a few instructional videos for elementary school children who demonstrate or demonstrate a material. The curriculum analysis resulted in the material used in the video on changing the shape of objects in fifth-grade elementary school. Based on the definition stage, it is found that demonstration-based learning videos on the topic of changing objects in fifth-grade elementary school are very important to be developed.

Design stage

The design stage is carried out by making design concepts, media concepts, and draft concepts. The video design concept uses a 16: 9 ratio with a size of 1920 × 1080 pixels (1080p), using the MP4 video type with 10-15 minutes which is edited using the KineMaster application. The video is divided into three parts, including; opening, core, and closing. The media concept is to choose the constituent elements of a video, including sound, images, text, music, transitions, effects, animations, and video backgrounds. The video script describes each scene, the narrative, the type of music used, the type of shot, the tools used, and the duration of each scene. The video display design in the demonstration activity section is presented in Figure 1.

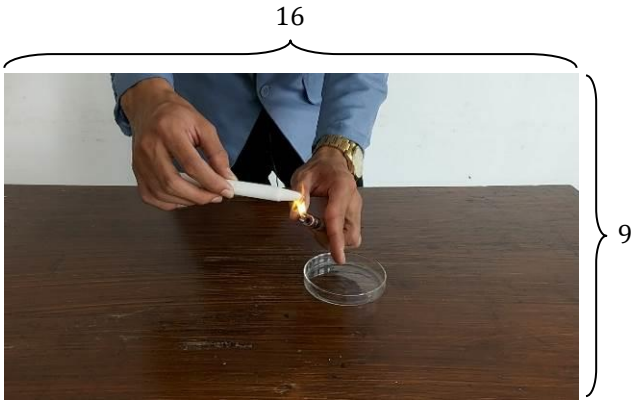

Figure 1. Design video in the demonstration section

Development stage

The development stage is carried out through the production stage, implementation stage, and evaluation stage. The production stage is the process of making demonstration-based learning video media according to the script. The instructional video that is made consists of three broad parts; opening, core, and closing. The video display in the opening section is presented in Figure 2. The video display in the core section is presented in Figure 3. The video display in the closing section is presented in Figure 4.

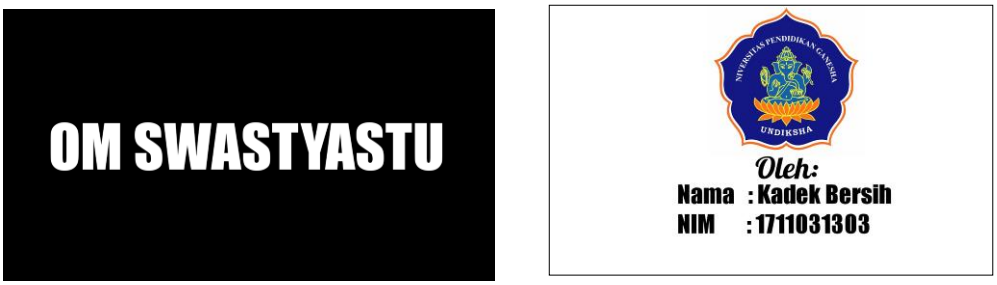

Figure 2. Video Intro in the Opening Section

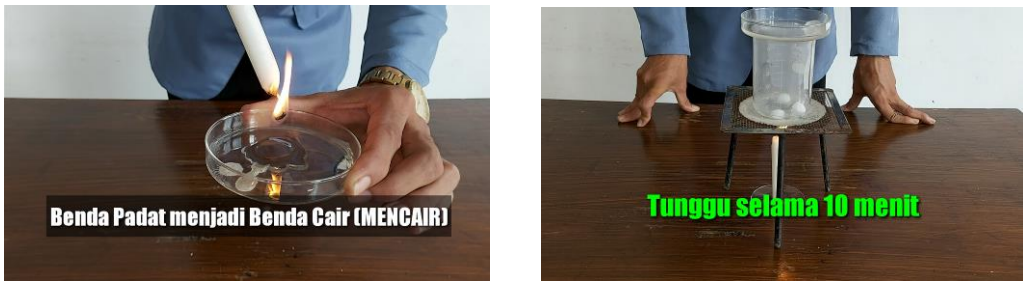

Figure 3. Video practicum at the core

Figure 4. Video Outro in the Closing Section

The implementation of demonstration-based instructional video media was conducted on a limited basis with two material expert lecturers, two media expert lecturers, two practitioners, and five fifth-grade elementary school students. Implementation is carried out by providing demonstration-based learning videos that have been made along with instruments to research subjects to be given an assessment. The following shows the results of the demonstration-based learning video media trial, it can be understood that the material expert validity index obtained the lowest score of 0.84 and the highest score of 1. Guided by the validity index conversion, each material expert's validity score is very good. Meanwhile, the media expert validity index obtained the lowest score of 0.67 in the good category, and the highest score is 1, which is in the very good category. It means that demonstration-based learning videos are good from the expert's point of view. The practitioner's response shows that the learning aspect obtains an average of 3.83, the material aspect obtains an average score of 3.78, the media quality aspect obtains an average of 3.84, the language use aspect obtains an average -The average is 3.84. The media display aspect gets an average of 3.80. Student responses show that the learning aspect obtains an average of 3.75, the material aspect obtains an average score of 3.70, the media quality aspect obtains an average of 3.80, the language use aspect obtains an average of 3.95. The display aspect of the media obtained an average of 3.70. Guided by the five-scale conversion, each aspect of assessing practitioners and students is in the very good category. It means that demonstration-based learning videos are good in terms of practitioner responses and student responses.

In each stage of the learning video development, an evaluation was carried out to perfect the demonstration-based learning video that has been made. The assessment results obtained from the product implementation stage are used to improve the demonstration-based learning videos developed. Some parts of the video are improved based on input from research subjects to produce demonstration-based learning videos that have proven their validity. The results of product implementation, input, suggestions, and comments given by experts and practitioners as consideration for product improvement are presented in Table 5.

Table 7. Feedback, Suggestions, and Comments

No	Expert	Feedback, Suggestions, and Comments
1	First Material Expert	(There are no input, suggestions, and comments)
2	Second Material Expert	The use of the word "cover gelas" in the video is incorrect. The right is the “cawan petri.”
3	First Media Expert	1) In general, the video is very good 2) The verb is not yet operational 3) Give training instructions 4) Give relatives and thanks at the end of the video
4	Second Media Expert	In writing the text, it is better not to run out / close to the screen boundaries. It should be given a distance.
5	First practitioner	The learning video that has been made is good. It is necessary to pay attention to the clarity of the voice.
6	Second practitioner	The appearance of learning through video is good enough, maintained, and, if possible, improved.

Disseminate stage

The dissemination stage is carried out by uploading a revised demonstration-based learning video tested for validity via YouTube. It is hoped that the dissemination of demonstration-based learning video media on changing the shape of objects can make teacher easier to find media in the form of demonstration videos to support the learning process. Make it easier for students to understand the material, especially in changing the shape of objects.

Discussion

The development of this learning video is based on the results of the needs analysis in elementary schools, which carried out in Gugus VI, Kecamatan Buleleng with the results; (1) 90% of teachers use instructional media in the form of instructional videos in teaching, (2) 80% of teachers state that the learning videos used are not made by themselves, but are obtained from internet sources, (3) 50% of teachers state that the instructional videos used do not contain demonstration activities in it, but only the presentation of the material, and (4) 80% of teachers stated that demonstration-based learning videos were very important to be developed. The development of demonstration-based learning videos can increase student interest, motivation, and learning outcomes. That demonstration-based learning video

media could support interest, motivation and improve student learning outcomes (Anam et al., 2019; George et al., 2019; Sulfemi & Nurhasanah, 2018). The learning process at school is still carried out conventionally even though it has facilities that support the use of video media (Wisada et al., 2019). Still, due to the limited ability of teachers to develop it, it impacts student learning outcomes and the lack of student interest in learning. For development in making instructional videos, students understand the material presented in the learning videos and improve students learning experiences (Ou et al., 2019; Purbayanti et al., 2020).

The learning videos developed in this study are different from the learning videos that have been developed previously. The contents of this demonstration-based learning video are equipped with openers, activities linking the material with the student environment, giving students problems according to the material, practicum, concluding practicum and answering the problems given, providing assignments as follow-up learning and closing. In addition, this demonstration-based learning video was made by paying attention to aspects of learning, material, media quality, language use, and media display to make it easier for students to understand the video's material and attract students' interest in learning. Thus, this instructional video media can be a solution to problems in the field. It is in line with research which states that demonstration-based learning videos can create an interesting, effective, efficient learning process and increase student motivation (Anam et al., 2019; Andriawan & Suparman, 2015; Sulfemi & Nurhasanah, 2018).

The use of video media in the learning process can certainly improve student learning outcomes. Video media is a media favored by elementary students so that students are motivated to be active in learning, which impacts student learning outcomes. It is supported which states that video media can foster student activities to achieve the learning outcomes they want to achieve (Bayeck & Choi, 2018; Colasante & Douglas, 2016; Putri & Dewi, 2020; D. Yunita & Wijayanti, 2017). The reasons why instructional videos are appropriate to be used as a learning aid that is; 1) Efficient use of time and classrooms, 2) more active learning opportunities for students, 3) videos can help explain the material clearly, especially in a process 4) the learning style of each individual is different so that with video all these aspects are met thus affecting student attitudes, and 5) clarifying the presentation of the message so that it is not too verbalize but realistic (Agustini & Ngarti, 2020; Wisada et al., 2019; Yuanta, 2019). Based on this, instructional video media can help students understand material during the learning process and make it easier for teachers to deliver learning material so that it is effective and efficient to achieve learning objectives.

The use of demonstration-based instructional video media is in line with cognitive learning theory, which emphasizes process rather than learning outcomes (Nurhadi, 2020; Susilowati & Muryati, 2021). Students can directly observe and try the simple experiments in the learning videos through demonstration-based learning videos. It can make it easier for students to understand the material because they see or are directly involved in learning. Demonstration-based learning videos on changing the form of objects developed can support the learning process for students because students can see, hear, and observe the material being learned. Demonstration-based learning video media are following the characteristics of elementary school students in the age of 6-12 years. In elementary school students, students' cognitive development is already at a concrete operational stage, one of which is in the high class. The characteristics of high-grade students is an interest in concrete and practical things. Based on this, elementary school students, especially in the high class, need practical learning media to learn in concrete or real way, such as demonstration-based learning videos.

The product in the form of demonstration-based learning video media on changing the form of objects produced in this study has good criteria. It is suitable for use in the learning process because it fits the aspects of a good instructional video. The test results to experts show that the advantages of demonstration-based learning videos are in the learning aspects, the material aspects, the media quality aspects, the language use aspects, and the media display aspects. The expert judgment shows that each aspect is in the very good category. The aspects of the video assessment viewed by media experts consist of three aspects: linguistic feasibility, presentation, and overall appearance (Permatasari et al., 2019). As well as being reviewed by the material expert consists of three aspects, content feasibility, presenting the content, and linguistic eligibility. Science learning will be very effective if the teacher facilitates students with media in demonstration-based learning videos. Demonstration-based learning videos follow the characteristics of science learning that present a material or science concept concretely so that students can; critically thinking to find a concept, using all senses, actively facilitated by the teacher. The science learning process requires media that students can use to understand the real material being studied and link it in everyday life by emphasizing the process to increase student activity in learning (Fransisca & Mintohari, 2018; Megawati, 2018).

The video development that the supervisor has approved is then implemented in a limited way to two media experts, two material experts, two teachers, and five students to prove the validity of the learning videos that have been made. Implementation is carried out by providing demonstration-based learning videos that have been made along with instruments to research subjects to be given an assessment. The demonstration-based instructional video media developed were in the "very good" category based on the conversion. Demonstration-based learning videos developed are based on the results of preliminary studies that have been carried out with cognitive learning theory. It followed characteristics, good instructional videos, and characteristics of natural science learning in elementary schools. The use of demonstration-based learning video media is believed to attract elementary school students' interest and motivation. This media displays concrete things following the stages of development of elementary school students at the concrete operational stage. Based on this, it is believed that the implementation of demonstration-based learning videos can increase elementary school students' interest and learning outcomes. That demonstration-based learning videos are feasible and effective for learning media for elementary school students. New media to support student learning motivation are active in the learning process..

4. CONCLUSION

Demonstration-based learning video media on changing the form of objects in fifth grade elementary school produced are good and suitable for use in the learning process with a very good category. It can see it from the learning aspects, the material aspects, the media quality aspects, the language use aspects, and the media display aspects which show the advantages of the demonstration-based learning videos developed.

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