

Development of an Android-Based Al-Qur'an Edu-Game to Improve Al-Qur'an Memorization for Elementary School Students

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Abstract: The development of increasingly sophisticated educational technology is an opportunity, especially in the world of education, because it can be utilized in the learning process in the form of interactive learning media in the subjects of Islamic Religious Education and TBTQ (Complete Reading and Writing Al-Qur'an). This research aims to develop media in the form of an Android application to improve students' memorization of the Al-Qur'an at elementary school level. This research method uses a development research approach with a 4D model (define, design, develop, disseminate). Data collection techniques were carried out by observation, interviews, tests and questionnaires. Data analysis techniques use qualitative and quantitative descriptive analysis. Based on the research results, it was found that media testing by media experts obtained a score of 93.75%, material experts 100%, learning experts 97.43%. The results of the limited test at SD N Pandanpuro 2 obtained a score of 88.06%. The field test results at SD N Purworejo were 77.37%, SD N Kaliurang 1 was 79.85%, and SD N Banteng was 83.92%. From the overall test results, it can be said that the application developed is in the feasible category for implementation.

Abstrak: Perkembangan teknologi pendidikan yang semakin canggih merupakan suatu peluang khususnya dalam dunia pendidikan, karena dapat dimanfaatkan dalam proses pembelajaran berupa media pembelajaran interaktif pada mata pelajaran Pendidikan Agama Islam dan TBTQ (Tuntas Baca Tulis Al-Qur'an). Penelitian ini bertujuan untuk mengembangkan media berupa aplikasi android dalam meningkatkan hafalan Al-Qur'an siswa di tingkat sekolah dasar. Metode penelitian ini menggunakan pendekatan penelitian pengembangan dengan model 4D (define, design, develop, disseminate). Teknik pengumpulan data dilakukan dengan observasi wawancara, tes, dan angket. Teknik analisis data menggunakan analisis deskriptif kualitatif dan kuantitatif. Berdasarkan hasil

penelitian diperoleh bahwa pengujian media oleh ahli media memperoleh skor sebesar 93,75%, ahli materi 100%, ahli pembelajaran pembelajaran 97,43%. Hasil uji terbatas di SD N Pandanpuro 2 diperoleh skor sebesar 88,06%. Hasil uji lapangan di SD N Purworejo sebesar 77,37%, SD N Kaliurang 1 sebesar 79,85%, dan SD N Banteng sebesar 83,92%. Dari keseluruhan hasil uji dapat dikatakan bahwa aplikasi yang dikembangkan termasuk kategori layak untuk diimplementasikan.

INTRODUCTION

The development of increasingly sophisticated technology is an opportunity for all humans to make the best use of the functions of technology, especially in the field of education. The use of technology in the world of education is no longer taboo, because currently educators also have to keep up with changes, namely using technology in the learning process, including using Canva, Quizizz, Educaplay, and so on. Educators can use Canva as a web-based learning

media to make the learning process more interesting. Quizizz and Educplay are web tools that can be used to carry out assessment tests or interactive games during the learning process which of course have been prepared by educators in advance (Kartiwi & Rostikawati, 2022). However, during the learning process an educator will certainly face difficulties, one of which is independent learning activities. Because the use of web-based media cannot be accessed by all ages, except for middle or high school students in presentation activities who already understand how to operate the media (Amaliyatul Ulya & Ahmad Arifi, 2021; Annisa & Erwin, 2021; Kartiwi & Rostikawati, 2022; Masito et al., 2023).

Media is anything that is capable of channeling or intermediaries that someone uses to share messages or information related to knowledge, skills and attitudes. In the world of education, media is used during learning, which means that learning media is a set of tools used by educators and students to convey material or messages in the learning process in the classroom and outside the classroom (Wulandari et al., 2021). The use of learning media will be very useful and easy to use if it suits the needs of elementary school students, so that it will improve their learning outcomes (Putri Zaharah et al., 2024). The objectives of learning media include making the learning process easier, making the learning process more efficient, becoming an intermediary who is able to deliver learning material in accordance with predetermined learning objectives, helping to increase learning concentration during learning in class and outside of class (Ahmadi et al., 2021; Amaliyatul Ulya & Ahmad Arifi, 2021; Kafah et al., 2020; Nawi et al., 2020; Rahmayani et al., 2021; Resmanti et al., 2024).

Studying the Qur'an is a very important learning activity for Muslims. Because in the hadith the Prophet Muhammad SAW said "The best among you (Muslims) are those who learn the Qur'an and teach it" (Irlina, 2019; sunnah.com, 2024). If you look at the meaning of the hadith and relate it to the Islamic Religious Education lessons held at SD N Pandanpuro 2, then learning the Qur'an will certainly not be optimal. Because the Islamic Religious Education learning process in the independent curriculum is only carried out for 3 the lesson time x 35 minutes, 4 the lesson time x 35 minutes in the 2013 Curriculum, and the required extracurricular activity, namely TBTQ (Complete Reading and Writing Al-Qur'an, is only held once a week with a duration of 45 minutes per class. Apart from that, only 8 of the 64 Muslim students can read the Qur'an and the rest are still at the Iqra' level (level in reading the Qur'an for those who are still beginners, usually the iqra level consists of levels 1-6 only after fluent start reading the Holy of Qur'an). In other words, whether in teaching and learning or extracurricular activities, learning the Qur'an cannot be done in a short time, so students are required to study independently.

This independent learning activity can be supported by the SCL (Student Centered Learning) learning method. The change from TCL (Teacher Centered Learning) to SCL (Student Centered Learning) will certainly bring changes in methods, activities and results obtained by students from the learning process. Therefore, there is a need for media that can facilitate students to learn independently, so that students are able to take responsibility for themselves in fostering learning motivation to be more active and independent in the learning process. As according to Oishi (2020), self-directed learning (SDL) is defined as learning activities carried out with self-awareness without the help of other people in determining materials, methods, learning resources, as well as evaluating the lessons carried out.

Based on these problems, the idea developed was to develop an Android application-based Al-Qur'an edu-game media to improve Muslim students' memorization of the Al-Qur'an at elementary school level. So far, previous research has existed such as the development of games to improve learning (Ahmad et al., 2024; Cachay-Gutierrez & Cabanillas-Carbonell, 2024; Hafiz Yusoff et al., 2020; Rahmayanti et al., 2020; Setyawan et al., 2020; Zainuddin et al., 2023), development of Android application-based learning media (Gunawan, 2019; Nazar et al., 2020; Rahayu et al., 2018), interactive learning media (Budyastuti & Fauziati, 2021; Okpatrioka Okpatrioka, 2023; Suparlan, 2019; Zuhriyah & Nuriman, 2021), the influence of application use on learning outcomes (Annisa & Erwin, 2021; Puspita Dewi, 2022; Uma et al., 2022),

implementation of learning media in Islamic religious education (Hasmiza & Romelah, 2022; Qodriani et al., 2022; Rachmawati & Rusydiyah, 2020; Tsaniyah et al., 2021).

Based on this explanation, the problem formulation in this research is broken down into two, namely the ability to read and memorize the Al-Qur'an which is still lacking among students and the limited time to study the Al-Qur'an at school in teaching and learning and extracurricular TBTQ (Complete Reading and Writing Al-Qur'an). The novelty in this research is the development of an Al-Qur'an edu-game that combines audio and visuals in one Android version of the application. Games that will be designed in the application include arranging verse fragments, connecting verses, reading verses using audio. The development of this Al-Qur'an edu-game is an innovation that researchers carried out by looking at the Muslim Pro application which contains an electronic Al-Qur'an, prayer times, and readings from various voices of the high priest, as well as the Duolingo application which presents games using audio and audio. visuals include reading sentences using a voice recorder, interpreting words, and composing words heard via audio.

In general, this research is included in the 2017-2045 National Research Master Plan in the social humanities field with digital economy research priorities. This research contributes to helping educators overcome the problem of students' ability to read and memorize Al-Qur'an letters through the development of Al-Qur'an edu-game applications. Studying the Qur'an is a must for Muslims, but if you rely on religious and extracurricular lessons at school alone, of course you won't be able to run optimally because of time constraints. With the development of application-based learning media, it has become important as a learning medium for students that is not limited by space and time (Ahmad et al., 2024; Andarwati & Swalaganata, 2023; Avila, 2022; Cachay-Gutierrez & Cabanillas-Carbonell, 2024; Setyani et al., 2023; Susilo et al., 2023; Yuningsih et al., 2022). This research is also in accordance with the strategic plan of the Islamic University of Indonesia, namely Inclusive Development to Create a Civil Society that is Highly Competitive in Facing the Era of Industry 4.0 and Society 5.0.

METHOD

Research on the development of an application-based Al-Qur'an Edu-Game to improve memorization of the Al-Qur'an in elementary school level students is a type of Research and Development (R&D) research (Sugiyono, 2022). This research uses the 4D development model, which is a research model that consists of four development stages (Maydiantoro, 2021; Thiagarajan et al., 1974), namely the Define stage, namely the needs analysis stage, Design, namely the stage that prepares the conceptual framework of the model and tools being developed, Develop is the development stage which involves validity testing or assessing the feasibility by experts of the product being developed, and Disseminate is the implementation of the product being developed on the real target, namely the research subject.

The development procedure is a sub-chapter that describes the work steps that will be carried out by researchers in creating the product. In this development procedure, the steps for achieving components and the functional relationships between components are explained. The steps used in the 4D development model are as follows.

1. Define stage. At this stage, what is carried out by researchers in developing the Al-Qur'an edu-game is defining and establishing development conditions (Vadilla, 2022). At this stage, the researcher carried out an analysis of students' learning needs and interactive games from other developers which could be an innovation in the development of this Al-Qur'an edu-game.
2. Design Stage. At this stage, the development of the initial form of the product is carried out by people who have expertise in their field, so that the product being developed can be used in accordance with the initial form that has been planned.
3. Development Stage. This stage is the stage for producing a development product which consists of two steps, namely expert appraisal and developmental testing. In this stage, this is done by testing the product being developed with the experts involved. Validation is carried out in two stages of expert validation and field testing which aims to see the feasibility of the

product being developed. This stage can be carried out by observation, interviews and questionnaires that are adapted to the characteristics of the desired data and the subject/respondent (Susilo, 2022). At this stage, the researcher involved several experts, namely material experts, media experts, and learning experts. The material expert validator comes from the supervisor of Islamic religious education, the media expert comes from a lecturer at the Islamic University of Indonesia, and the learning expert is an Islamic religious education teacher. Limited testing will be carried out at SD N Pandanpuro 2, while field tests will be carried out at SD N Kaliurang 1, SD N Banteng, and SD N Purworejo.

4. Dissemination Stage. This dissemination stage is carried out by means of outreach to teachers so that they can use the product being developed to evaluate learning. There are three main stages in distribution, namely validation testing, namely the implementation of the development product to the actual target or target, packaging, and diffusion and adoption, namely the stage for packaging through a guidebook in implementing the development product so that it can be used properly (Maydiantoro, 2021).

The data collection technique used in this research is observation, interviews, tests and questionnaires. Observations in this research were used to see the ability to read and memorize the Qur'an at SD N Pandanpuro 2. Interviews with Islamic religious education teachers were used to find out the extent of the gaps in the field regarding tahfidz learning. The test method is carried out by giving assignments or questions to students to determine students' memorization abilities. The test method consists of pre-test and post-test questions. The pretest is carried out before students are given material exposure through the edu-game application, while the posttest is carried out at the end of the lesson. The questionnaire method is carried out by providing a set of written statements or questions related to the assessment of the edu-game application being developed. Before being used to assess, the instrument is first validated by an evaluation expert through expert judgment, precisely to test the validity of the instrument developed and the construction of the aspects to be measured based on the theory used. The data analysis used in this research is descriptive analysis technique (Sugiyono, 2022).

RESULTS AND DISCUSSION

The results of observations and interviews with Islamic education teachers at the school that was the object of the research showed data on the distribution of students' ability to read the Al-Qur'an as follows.

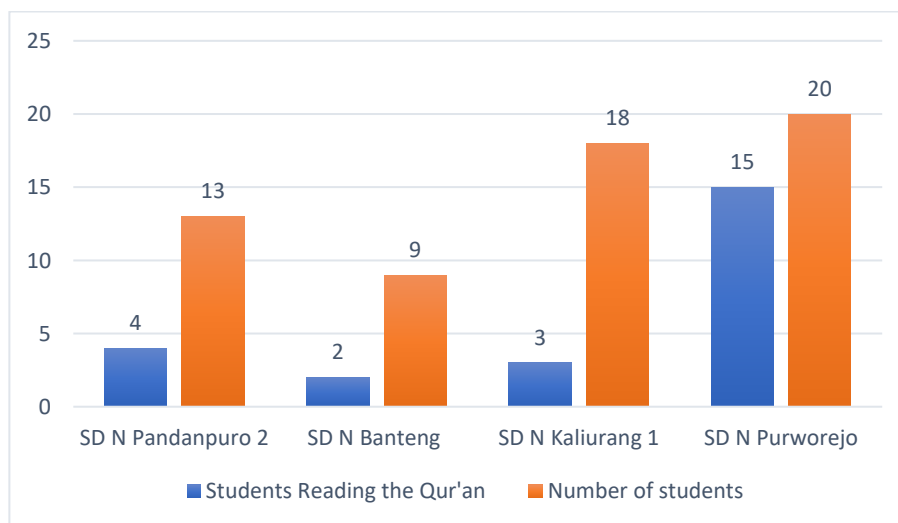


Figure 1. Students' ability to read the Qur'an

From these data, it can be seen that the ability to read the Al-Qur'an is still less than half of the students in class V, except for SDN Purworejo. The four schools are state schools located in Kapanewon Pakem Gugus 1 Hargobinangun.

Research has been carried out according to the 4D development research flow and the following results have been obtained. The define stage, compiling and establishing conditions that can be carried out to support learning, namely by looking at students' learning needs, including determining learning outcomes, learning objectives, and the flow of learning objectives (Vadilla, 2022). In this case, researchers formulated requirements in accordance with the Independent Learning Curriculum from Phases A-C PAI Lessons Al-Qur'an Hadith Elements, namely that students are able to read, memorize, write and understand short suras of Q.S. al-Fatihah, Q.S. al-Ikhlās, Q.S. an-Nas, Q.S. al-Falaq, Q.S. al-'Asr, Q.S. an-Nāsr, Q.S. al-Kausar, Qs. Al-Alaq, QS. At-Tin, QS. Al-Ma'un, and QS. Ad-Dhuha.

The second stage, design, is the development of the initial form of the product which is carried out by people who have abilities in their field. This development uses the Flutter application, namely a cross-platform mobile framework released in 2016 by Google. This application created in Flutter supports iOS and Android users, but this development was designed specifically for Android 12 (Snow Cone), Android 13 (Tiramisu), and Android 14 (Upside Down Cake) (Napoli, 2020; Pamungkas & Imrona, 2020; Tashildar et al., 2020). Android is a Linux-based operating system which includes various components in it which provides an open platform for developers to create interesting works of their own. The GEDUQ application developed is based on Android with a size of 42 MB and can be used offline without internet, except when installing the application to the Android used (Dhita R. L. et al., 2023).

Main course



Instructions



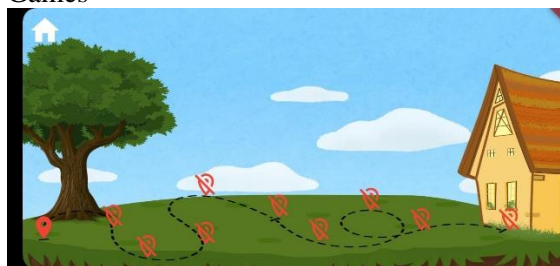
Materials



Questions



Games



Select Character



About

Logos



Figure 2. GEDUQ application display

After producing a product that meets the initial design, a feasibility test is required in the develop stage. This stage, researchers create instruments that are validated by evaluation experts. An instrument is one of the research tools used to collect research data in measuring a research object or variable, in this case what was tested was the Android-based GEDUQ application using a questionnaire with a Likert scale score of 1,2 and 3 (Umami et al., 2021).

After the instrument has been validated, the next step is to carry out a GEDUQ media validation test by experts who are assessed from the media, material and learning aspects. The media expert test was carried out to determine the suitability of the GEDUQ application before a limited test was carried out. The assessment indicators from media experts were text readability, design quality, image quality, audio quality and layout. The material expert test is used to determine the suitability of learning media according to experts in the field of Islamic Religious Education. The indicators used are relevance, consistency and adequacy of the material (Susilo, 2023). The learning expert test is carried out to measure the feasibility of the GEDUQ application in supporting the learning process, the indicators are objectives, activities, methods, learning media, time and evaluation (Rahman Hakim et al., 2019).

The expert test was carried out by holding a Focus Group Discussion which was held in the KH Wahid Hasyim Building, Indonesian Islamic University on Thursday, September 26 2024 and produced the following data values and analysis.

Table 1. Expert Assessment Results

Aspect	Expert	Total Score	Final Score (%)	Category
Media	A	45	93,75	Feasible
Material	B	33	100	Feasible
Learning	C	38	97,43	Feasible

Based on the results of product assessment tests obtained by experts, we get feedback that can be considered by researchers so that the application becomes more perfect. Media experts responded that this application was good and there were minor revisions that needed to be corrected, namely first, the use of audio in the application used. In this application, the voice for the material and questions in the game uses the audio of Sheikh Misyari bin Rasyid. This must be considered because the GEDUQ application will be patented so as to avoid plagiarizing other people's work, and the target of this application is elementary school students who still have basic skills in reading the Qur'an. Second, clarity in the instructions for using the application which will make it easier for users to play it. The GEDUQ application is an AI-Qur'an application that will make it easier for elementary school students to learn the AI-Qur'an easily and happily. Using the GEDUQ application can be operated using Android Smartphone Versions 12 to 14 offline. Third, adding an assistant to the application makes it easier to use the application and makes it more interactive.

Material experts provide feedback in the form of first, adding audio to the material menu, so that students who are not yet able to read can listen through the audio, however, efforts are made to ensure that the voice actors are not plagiarized. Second, this application is good and would be better disseminated in the KKG PAU (Islamic Religious Education Teacher Working Group) which will help Islamic Religious Education teachers make it easier to use interactive learning media. The learning experts provided feedback in the form of suggestions for using audio

using the Ummi Qur'an method which has been widely used by all groups, especially elementary school students because the pronunciation is clear and easy to understand according to their age.



Figure 2. Media validation test by experts through Focus Group Discussion

Table 2. Score Interpretation

Interval	Category
$0% < NP \leq 25%$	Not feasible
$26% < NP \leq 50%$	Less feasible
$51% < NP \leq 75%$	Enough feasible
$76% < NP \leq 100%$	Feasible

Furthermore, based on the results of the FGD and revision, a limited test was carried out on class V students at SD N Pandanpuro 2, a total of 13 students. Limited testing aims to get direct feedback from users/students regarding the quality of the product being developed. After revising the input provided, field tests were then carried out precisely at SDN Purworejo by 20 students, at SD N Kaliurang 1 by 16 students, and 9 students at SD N Banteng, so that the total research subjects were 58 students in class V at school level. base. Field testing aims to implement the product in the field so that appropriate characteristics are known when learning. The assessment carried out is by giving students time to play the GEDUQ application and a questionnaire using a Likert scale where the scores are 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The results and analysis of the data obtained can be described as follows.

Table 3. Results of Field Test Data Collection

Aspects	Limited Test	Field test %				Average
	%	SD N Pandanpuro 2	SD N Purworejo	SD N Kaliurang 1	SD N Banteng	
The contents of the application make it easier for me to learn short letters	88,46	78,75	81,25	88,89	84,34	
The work instructions in the application that are presented make it easier for me to follow the lessons	84,62	75,00	85,94	88,89	83,61	
The content of the application makes me enthusiastic about learning independently	90,38	77,50	90,63	88,89	86,85	
The contents of the application are easy to understand	76,92	78,75	73,44	80,56	77,42	
The content in the application is interesting	94,23	80,00	87,50	88,89	87,65	
The images presented make it easier for me to understand the material	86,54	70,00	84,38	83,33	81,06	
Instructions for using the application make it easy for me to use the application	86,54	72,50	79,69	88,89	81,90	

Aspects	Limited Test	Field test %			Average
	%	SD N	SD N	SD N	
	Pandanpuro 2	Purworejo	Kaliurang 1	SD N Banteng	
The appearance of the application is interesting and makes me happy to learn	86,54	81,25	82,81	88,89	84,87
Reflection, feedback and follow-up in the application made me introspect myself on the results of the learning I had done	80,77	66,25	71,88	77,78	74,17
The GEDUQ application is easy to operate	88,46	73,75	79,69	72,22	78,53
Quizzes, grids, and scoring guidelines (rubrics) are enough to help me test my memorization of short letters	90,38	80,00	68,75	86,11	81,31
The image size in the application is correct	92,31	78,75	71,88	83,33	81,57
The layout of the images and characters is interesting	92,31	78,75	78,13	86,11	83,82
Audio sound can be heard clearly	96,15	83,75	81,25	88,89	87,51
Accompanying music adds a pleasant impression to learning	88,46	75,00	78,13	91,67	83,31
Assistance is useful for guiding application use	88,46	75,00	78,13	86,11	81,92
The language used in the application is communicative	90,38	77,50	82,81	80,56	82,81
The language used in the application is general (not a regional language that students are not yet familiar with)	86,54	82,50	78,13	66,67	78,46
The language is conveyed directly, without causing confusion	84,62	85,00	82,81	77,78	82,55
AVERAGE	88,06	77,37	79,85	83,92	82,30

The limited test at SD N Pandanpuro 2 obtained an average score of 88.06% in the decent category and only 1 out of 13 students was able to complete the 10 question game with a score of 70. Then, the field test at SD N Purworejo obtained an average score 77.37% with a decent category and 11 students who were able to answer 10 questions with an average score of 72. Field test at SD N Kaliurang 1 with an average score of 79.85% and 5 students who were able to complete the game with a score The average was 68. The field test at SD N Banteng received an average score of 83.92% and 3 students were able to complete the game with an average score of 63.

Based on the average field test score, the GEDUQ (Al-Qur'an Educational Game) application is included in the category suitable for use in terms of material, presentation, appearance and language use. However, of the 58 students who were research subjects, only 20 students were able to complete the game with different scores. This is because firstly, there are still students who are not able to read the Al-Qur'an so they are unable to answer the questions given with a limit of 5 times the chance of being wrong. Second, there is vocabulary from pieces of verse whose meaning is not understood by students. Third, students' analytical skills regarding the images given, for example the image of a clock which is interpreted as time, then if the question is which letter explains the image of a clock, namely the Al-Asr letter which means By Time. Fourth, students do not focus on the instructions given which ends up answering questions incorrectly.

As we know, there are various factors that cause learning difficulties, especially for elementary school level students. These factors can come from internal factors, such as the

student's health condition being unfit, tired, lack of sleep, getting sleepy easily, or due to other causes, for example not having had breakfast so they cannot concentrate well. Next are external factors originating from the surrounding environment that do not support the teaching and learning process, such as a family environment where there is conflict, crowded villages, less supportive learning media, less disciplined learning time, learning methods that do not suit the character of the students. who don't like the teacher, or because of the student's personal problems. There are tips for overcoming learning difficulties, including repeating lessons, making the learning place more conducive and comfortable, making lesson summaries, and creating study groups (Budiawan & Afrianto, 2020; Latifah & Rahmawati, 2022; Manea et al., 2020; Naseem et al., 2022; Netson & Ain, 2021; Pebriani et al., 2021; Rohmah et al., 2022). Limitations in this research include that the material developed is limited to certain letters in verses of the Qur'an only. Not all smartphones can operate this application, but only Android versions 12, 13 and 14. Wide-scale trials are still limited to the scope of one district and have not reached several regions or even provinces so the results cannot yet be generalized.

CONCLUSION

Technological developments require the world of education to be able to follow it, so most learning, from planning to learning evaluation, is carried out using technology or media that can make it easier for educators to carry out these activities. So, the GEDUQ application (Al-Qur'an Educational Game) is an alternative for educators in using interactive learning media that can be used by students both in the classroom during the learning process and outside the classroom as an independent activity that can be done without time and place limitations. From the results and analysis of research data, it is concluded that the GEDUQ application is suitable for use and dissemination to the general public, especially elementary school students in phases A-C who can already read the Al-Qur'an because the game is dominated by pieces of Al-Qur'an verses. from the An-Nas letter to the Ad-Dhuha letter. In general, this application is effective for students who have a high interest in independent learning and good ability to read the Qur'an, but there are also disadvantages, namely the limited number of smartphone users who can use this application, because it is only designed for Android version 12, 13, and 14.

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