Jurnal Kependidikan:
Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran
https://e-journal.undikma.ac.id/index.php/jurnalkependidikan/index

Vol. 11, No. 2 : June 2025
E-ISSN: 2442-7667
pp. 643-653
Email: jklppm@undikma.ac.id

Development of An Structural Analytic Synthetic (SAS)-Based Learning Application to Enhance Early Reading Skills in Islamic and General Primary Schools

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Abstract: This study aims to develop an Android-based educational application grounded in the Structural Analytic Synthetic (SAS) approach to enhance early reading skills among first-grade students in both Islamic (Madrasah Ibtidaiyah/MI) and general (Sekolah Dasar/SD) primary schools. This research uses the Research and Development (R&D) method with the Borg and Gall's model. The subjects of this study were grade 1 elementary school students using research instruments in the form of interviews, expert validation sheets, and initial reading test questions, while the data analysis technique used inferential statistics with the stages of normality test, homogeneity test and mean difference test. The results of the study indicate that the validation test conducted on learning media experts showed that the first test had a validation of 4.15 which is in the good category, the second test had a validation level of 5.85 which is in the very good category so that the average of tests one and two showed a validation level of 4.50 which is in the very good category. The validation test conducted on language experts showed that the first test had a validation level of 4.25 which is in the good category, the second validation test had a validation level of 4.58 which is in the very good category, while the average of the second test was a validation level of 4.41 which is in the very good category. The results confirm the SAS-based application as a viable tool to boost early literacy in first-grade students.

Article History
Received: 30-03-2025
Revised: 02-05-2025
Accepted: 28-05-2025
Published: 25-06-2025

Key Words:
Early Reading Skills; Elementary Education; Structural Analytic Synthetic (SAS); Reading Intervention.

How to Cite: Sunanih, S., & Maulidah, N. (2025). Development of An Structural Analytic Synthetic (SAS)-Based Learning Application to Enhance Early Reading Skills in Islamic and General Primary Schools. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran, 11*(2), 643-653. doi:https://doi.org/10.33394/jk.v11i2.15477

https://doi.org/10.33394/jk.v11i2.15477

Introduction

Mastery of reading skills at higher levels greatly depends on the quality of early reading instruction in the first-grade of both Islamic (Madrasah Ibtidaiyah/MI) and general (Sekolah Dasar/SD) primary schools (Ali & Asrial, 2022; Nurani et al., 2021; Rofi'i & Susilo, 2022; Septiana Soleha et al., 2021). Reading instruction in first and second-grade provides the foundational basis for students' reading proficiency. Therefore, it is important for educators to pay attention to and enhance reading skills at the 1st-grade level of MI or primary school. In addition to reading skills, numerical skills also require attention, as these skills are crucial in supporting students' daily lives (Huljannah Arianto et al., 2024; Nurjanah et al., 2015).

The development of reading skills in first-grade MI and primary school children is very efficient, considering that at the age of 1-5 years, the child's brain is in a sensitive phase, making it easier for them to understand various aspects related to daily life. The age of first-grade MI and primary school students is an optimal period for reading instruction

Vol. 11, No. 2 : June 2025
E-ISSN: 2442-7667
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(Darmiyanti & Budiasih, 2016), because at this stage, children more quickly master reading skills (Heinstock, 2002).

Reading skills are a crucial ability for students, because through reading, students can acquire new knowledge and develop better ideas and opinions (Sa'adah, 2023). Reading holds a fundamentally essential position in every learning process. However, reading is a complex activity because it involves various processes such as vision, cognition, psycholinguistics, and metacognition (Kurniaman & Noviana, 2016). Therefore, students cannot perform reading activities well if they do not learn it correctly, especially for primary school children who are just getting to know letters and reading (Suriani et al., 2016). Although reading is a complex and quite challenging activity for early childhood children or first-grade MI and primary school students, this does not mean that the skill cannot be taught. First-grade MI and primary school students can master reading skills through a gradual process, starting with basic reading instruction.

Beginning reading ability is a linguistic skill that encompasses various activities, such as pronunciation of symbols, phoneme recognition, sound differentiation in the environment, reading, syllable construction into words, and matching words with pictures (Garnasih et al., 2022). Erlina and Iswara (2023) defines early reading as the activity of recognizing symbols and sounds of language, and associating them with meaning in the sequence of letters. According to that opinion, it is clear that early reading skills in first-grade MI and SD students play a crucial role in the development of good reading abilities in the subsequent stages. Therefore, teachers who instruct first-grade MI and SD students must pay attention to basic reading skills so that students can master them well.

In relation to the beginning reading skills, the researcher obtained information from primary school teachers in Tasikmalaya that beginning reading skills are the main learning program when students enter the first-grade of MI and SD. Referring to that information, the researcher conducted observations in seven Madrasah Ibtidaiyah and Primary schools in Tasikmalaya to evaluate the beginning reading skills of first-grade students. In this study, the researcher conducted interviews with 12 teachers who teach in the first-grade of Madrasah Ibtidaiyah and Primary schools. The researchers found that first-grade students at MI and SD in Tasikmalaya do not yet have adequate beginning reading skills. According to educators, this phenomenon occurs because first-grade students have not yet mastered reading and arithmetic skills at the beginning of the school year. Therefore, at the first-grade level, many students still experience difficulties in basic reading as well as in basic numeracy.

In addition, another factor contributing to the low initial reading skills of first-grade MI and SD students in Tasikmalaya is that students only learn initial reading at school. They seldom possess the awareness to independently learn reading and arithmetic at home with their parents. The majority of students, after returning home from school, immediately engage in play activities, either with peers or using their phones, which only involve games or watching videos on YouTube.

To address this issue, one of the solutions that can be implemented is using the initial reading method, particularly through the application of the Structural Analytical and Synthesis (SAS) method. Various methods can be applied to improve children's early reading skills, such as the SQ3R method, which instructs readers to survey, question, read, reflect, and review. The Glen Doman method is also a technique for rapid reading learning (Swandary, 2022).The researcher chose to use the SAS method because this method is very suitable for early reading instruction, especially in the first-grade of MI and primary school. At this level, students are unable to read and calculate proficiently. Through the application of the SAS method, students can learn the basics of reading in a simple way. The SAS

method serves as an initial step in improving students' reading skills, particularly in the 1st grade of MI and primary school (Farhurohman, 2019). The application of the SAS method begins with introducing complete sentences, then breaking them down into words, further into letters, and finally reassembling them into complete sentences (Kusmaningsih, 2021), so this method can be used to teach students how to read.

According to the results of several previous studies, the SAS method has been proven effective in improving students' early reading skills. However, the conventional implementation of the SAS method may not be optimal if it is only carried out at school (Siki et al., 2024). The researchers identified that one of the factors contributing to the low early reading skills of first-grade MI and SD students in Tasikmalaya is the limited learning time at school, while at home, students are more focused on playing with electronic devices.

This study aims to overcome the problems that exist in elementary schools in the city of Tasikmalaya, namely the low initial reading ability of students. One way that researchers have done to overcome this problem is by trying to develop an initial reading application based on SAS. This SAS-based application is very suitable for implementation with first-grade MI and SD children, considering Jean Piaget's cognitive development theory which states that children at this age are in the Concrete Operational stage (7-11 years). At this stage, the child is capable of logical reasoning, however they have not yet fully developed abstract thinking (Marinda L, 2020). Therefore, the SAS-based application allows students to learn empirically through direct observation of reading materials. In addition, this application will be equipped with interesting features that can motivate students to continue learning, thereby optimizing their learning outcomes.

Research Method

The Research and Development (R&D) method was employed, as it is specifically designed to produce and validate educational products, whether through the refinement of existing tools or the creation of entirely new ones (Sugiyono, 2019). The R&D model used in this study followed the ten-step framework proposed by Borg and Gall (Borg and Gall, 1989). However, this study was conducted up to the fourth stage, focusing on the development and validation of the initial product version. The early stages involved gathering data through interviews with teachers and direct classroom observations in selected MI and SD schools across Tasikmalaya, Indonesia. This formative phase informed the initial prototype design of the SAS-based early reading application. Subsequent validation was conducted through expert evaluations involving media specialists, language experts, classroom practitioners, and student representatives.

The evaluations focused on assessing the application's instructional quality, language clarity, usability by teachers, and readability for students—providing critical input for refining the initial version and ensuring its practical applicability in the classroom, The subjects of this study were grade 1 elementary school students using research instruments in the form of interviews, expert validation sheets, and initial reading test questions, while the data analysis technique used inferential statistics with the stages of normality test, homogeneity test and mean difference test.

Results and Discussion

Needs Analysis

In this activity, the researcher conducted observations to see the reality on the ground. Based on the results of the observations conducted, the researcher then carried out a needs analysis of the phenomena occurring in the field. During the observations, the researcher

found that teachers who teach in the first grade of MI and primary schools in Tasikmalaya city have the same problem, namely the still low initial reading ability of the students.

The existing problem arises due to several factors, the first being that many students entering primary school have not yet mastered the initial reading skills that they should have acquired during their early childhood education (PAUD). Secondly, there is a lack of engaging learning media that teachers can use to teach students early reading skills. Third, students only learn to read at school, while at home they spend more time playing games on their phones or playing with their friends. Fourth, the method used by the teacher in teaching numeracy to students is still not suitable for implementation. From the existing problems, the researcher then conducted a needs analysis regarding the issues that occurred. This needs analysis was conducted by discussing with classroom teachers and also searching through several studies that have been carried out by other researchers related to the relevant issues identified by the researcher.

Based on discussions with classroom teachers who teach at primary schools and Islamic primary schools in Tasikmalaya city, the researchers found that to address the existing problems, teachers need engaging media that can be used to help students learn to read at the beginning level. The selection of media is crucial because choosing the right and engaging learning media will enable students to understand the material presented effectively (Mus'af, 2023). The media used must also be accessible to students anytime and anywhere, so that students do not only learn basic counting in the classroom, but they can also learn independently at home (Erlina & Iswara, 2023).

Research Planning

1) Establishing Learning Outcomes

Learning outcomes are something that is inseparable from the learning process. Learning outcomes are an expression of educational goals, which are statements about what is expected to be known, understood, and able to be done by learners after completing a period of study. Learning outcomes are abilities acquired through the internalization of knowledge, attitudes, skills, competencies, and the accumulation of work experience Megawati, et al. (2015). The primary schools in the city of Tasikmalaya mostly still use the 2013 curriculum, so the learning outcomes in the 2013 curriculum are included in the Core Competencies and Basic Competencies in the syllabus.

2) Formulating basic competencies

Basic competencies can be defined as a form of mastery by students regarding knowledge, behaviour, attitudes, and skills during the learning process at the educational level (Pramesti, 2019; Sitohang et al., 2022). Basic competencies themselves can be adjusted by considering the characteristics of the students and the characteristics of the region where the students learn. Based on the Grade 1 Primary school syllabus document in the 2013 curriculum, there are basic competencies including the following: Grade 1 Primary school Syllabus 2013.

Table 1. Basic Competencies for First Grade Primary School Curriculum 2013

Theme	Subtheme	Learning Objectives
Theme 1	Subtheme 1	• Recognizing activities for preparing early reading. • Analyzing vowel and consonant sounds. • Identifying vocabulary.
	Subtheme 2	• Recognizing activities for preparing early reading. • Analyzing vowel and consonant sounds. • Identifying vocabulary.
Theme 2	–	• Recognizing activities for preparing early reading. • Analyzing vowel and consonant sounds.

		• Identifying vocabulary related to daily activities.
Theme 3	–	• Identifying vocabulary related to day and night events.
Theme 4	–	• Identifying vocabulary through expressions of gratitude.
Theme 5	–	• Recognizing activities for preparing early reading. • Identifying vocabulary through expressions of apologizing, giving praise, and asking for help.
Theme 6	–	• Identifying vocabulary through expressions of apologizing, giving praise, and asking for help.
Theme 7	–	• Identifying vocabulary through expressions of apologizing, giving praise, and asking for help.
Theme 8	–	• Identifying vocabulary through expressions of apologizing, giving praise, and asking for help.

The source: First Grade Primary School Syllabus, Curriculum 2013.

3) Preparing a Lesson Plan

After determining the learning materials, the next activity is to prepare the lesson plan (RPP) that will serve as a reference throughout the learning process.In the implementation of this research, which begins in the second semester, the material to be created in the lesson plan (RPP) is related to the material in the syllabus from 5 to 8.

4) Preparing Learning Evaluations

Every learning process, learning evaluation cannot be separated, because evaluation is the process of assessing the achievement of goals and revealing issues in the performance of programs/activities to provide feedback for improving the quality of program/activity performance (Basri, 2017). Learning evaluation also functions to collect data related to students' learning outcomes, so that the results of these activities can later be used as students' learning grades, and the results of the assessment can be used as decisions in the field of ongoing education and teaching (Magdalena et al., 2020). The evaluation of learning conducted in this research process is based on the results of achieving the initial counting competency.

Product Validation Test

This research falls under development research, where the development carried out by the researcher involves creating an application for learning basic numeracy. However, the results of the development conducted by the researcher cannot be directly used in the research implementation process; they must first be tested for validity (Maulana, 2022). Validation testing is an activity conducted to measure the suitability of the developed product for use in the research process, or whether it still requires revision or improvement.

Additionally, the validity test can also be used to assess the feasibility of the measurement tools used in the research (Rosita et al., 2021), so that through this validity test, it can later show the degree of accuracy of the developed product (Sanaky et al., 2021). Therefore, to measure the feasibility of the application developed by the researcher, the researcher conducts a validity test by experts, including learning media experts, subject matter experts, and language experts.

1) Learning Media Validity Test

The media learning expert requested to test the validity of the developed application product is Dr. Sarmidi, M. Kom. This test is conducted to assess the feasibility of the initial reading application learning media developed by the researcher, as well as to receive input from learning media experts so that revisions can be made to ensure the developed learning media product is more suitable for application in the research process. The results of the tests that have been carried out are presented in the following data:

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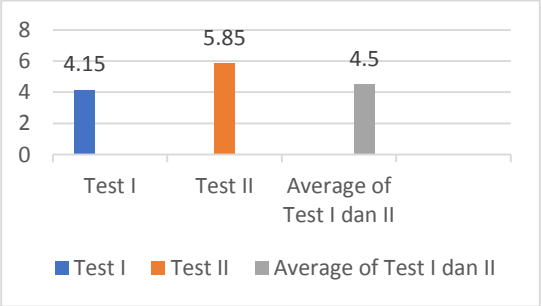

Figure 1. Results of Expert Validation Test for Learning Media

The first test from the learning media expert yielded a total score of 83 points divided by 20, resulting in 4.15. Based on the assessment criteria table, it falls into the **Very Good** category. The result of the second test was a total score of 97 points, which when divided by 20 questions, gives a result of 4.85. Therefore, based on the assessment criteria table, the result falls into the Very Good category. The average calculation of the two tests is 180:40 = 4.50. Thus, if matched with the above assessment criteria table, the developed application product is already Very Good.

After conducting a validity test by media experts, they provided general suggestions and feedback on the developed application, including: (1) the developed application should be equipped with audio for sentences, words, and letters. (2) The application buttons are still often difficult to press, especially the Back button to the previous page. (3) Add interesting images to the application to make it more appealing. Thus, based on the two results of the validation tests, it can be concluded that the application media product developed by the researcher can already be used in the research process, and the inputs from the learning media experts mentioned above have also been improved by the researcher.

2) Language Validity Test

The linguist requested to test the validity of the language used in the developed application product is Dr. Dyah Lyesmaya, S.S., M.Pd. This testing is conducted to evaluate the appropriateness of the language used in the early reading application learning media developed by the researcher, as well as to receive input from the linguist so that revisions can be made to ensure the developed learning media product is more suitable for application in the research process.

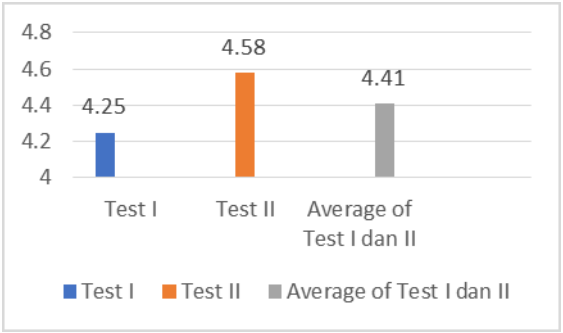

Figure 2. Results of Language Expert Validation Test

The first test from the linguist yielded a total score of 51 points divided by 12, resulting in 4.25. Based on the evaluation criteria table, it falls into the Very Good category. The result of the second test is a total score of 55 points, which when divided by 12 questions gives a result of 4.58. Therefore, based on the assessment criteria table, the result falls into the Very Good category. The average calculation of the two tests is 106:24 = 4.41. Thus, when matched with the above assessment criteria table, the developed application product is rated as Very Good.

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E-ISSN: 2442-7667
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Thus, based on the two results of the language validation tests, it can be concluded that the language in the application media product developed by the researcher can be used in the research process, and the inputs from language experts mentioned above have also been addressed by the researcher.

After the validity test was conducted by language experts, they then provided general suggestions and feedback on the language used in the developed application, namely: (1) in the initial counting learning menu, it should also be complemented with written content in SAS so that it is more apparent that initial counting learning is using SAS. (2) The language used should be more structured. (3) The information in the application must be clarified further. The information in the application needs to be clarified further.

Discussion

This research begins with the first activity, which is conducting observations and analyzing the needs present in the field by the researcher observing at MI and SD in the city of Tasikmalaya. The purpose of this observation activity is to identify existing problems. After the problem analysis results are found, the next step is for the researcher to review previous studies related to similar issues. Only after that does the researcher proceed to design the development of a new product as a solution to the existing problems (Gea et al., 2024).

The results of the observation and needs analysis conducted, the researcher found that the numerical ability of first-grade children in MI and SD in Tasikmalaya city is still relatively low, as only 45% of the total children in one class have good initial reading skills. Based on the results of interviews with the teachers, the problem occurs due to several factors. First, at the beginning of school, students still do not have good initial reading skills. Second, students only learn numeracy at school, and when they are at home, they only engage in activities like playing with peers and using their phones, which results in poor reading skills. Additionally, the inappropriate methods and teaching media used by the teacher also slow down the students' ability to develop good reading skills.

Based on discussions with classroom teachers who teach at primary schools and Islamic primary schools in Tasikmalaya City, the researcher found that to address the existing issues, teachers need engaging media that can be used to help students learn early reading. The selection of media is crucial because choosing the right and engaging learning media will enable students to understand the material presented effectively (Mus'af, 2023). The media used must also be accessible to students anytime and anywhere, so that students do not only learn to read in the classroom, but they can also study independently at home (Erlina & Iswara, 2023).

Based on the needs analysis, the researcher then attempted to develop a learning media in the form of an Android application that can be used by teachers and students to improve students' early reading skills. The application media developed by the researcher refers to a learning method using the Structural Analysis and Synthesis (SAS) method. The SAS method was chosen because several studies have stated that the SAS method can be used to effectively improve students' beginning reading skills.

The next stage involves the researcher conducting the initial development of the application media that will be used in the research process. After the initial development of the application media is completed, the researcher then conducts a validation test with experts to measure whether the application developed by the researcher can be used in the research process or if further improvements are needed.

1) Results of Expert Validation Test for Learning Media

The validation test by the media learning expert requested to assess the validity of the developed application product, namely Dr. Sarmidi, M. Kom. This test is conducted to evaluate the feasibility of the initial reading application learning media developed by the researcher, as well as to receive input from learning media experts so that revisions can be made to better align the developed learning media product for application in the research process. The results of the validation test conducted are explained in the following graph:

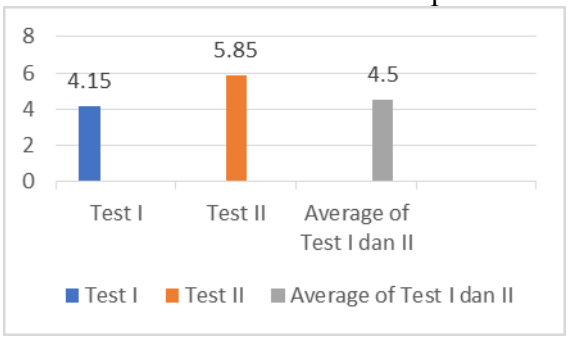

Figure 3. Results of Expert Validation Test for Learning Media

Based on the results of the testing conducted with learning media experts, it can be concluded that the application developed by the researcher falls into the very good validation category, thus the developed application can be used in the research process.

2) Results of Language Expert Validation Test

The language expert validation test was conducted by Dr. Dyah Lyesmaya, S.S., M.Pd. This validation test was carried out twice, and the results of the tests can be seen as follows:

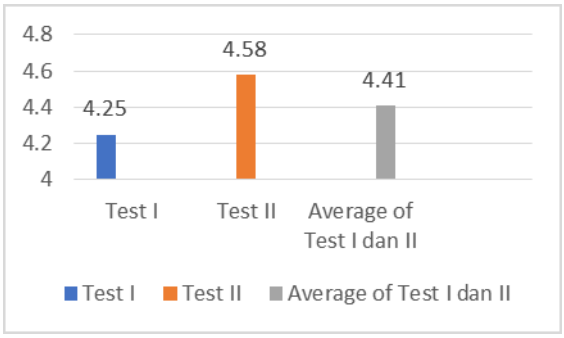

Figure 4. Results of Language Expert Validation Test

Based on tests 1 and 2 and the average scores of tests 1 and 2, it is evident that the language used in the developed application is very good and can be used in the research process. Based on tests 1 and 2 and the average scores of tests 1 and 2, it is evident that the language used in the developed application is very good and can be used in the research process.

The results of the validation tests that have been carried out on learning media experts and language experts show that the application developed has good validation, so that the application developed by researchers can be used in the research process, this is in line with what was stated by (Shanaky et al., 2021) which states that the validation test is a test carried out to measure the research measuring instrument or product developed to what extent it can be used in the research process.

Conclusion

Based on the results of the research that has been done, the research then there are several research conclusions that researchers can describe. First, the validation test conducted on

learning media experts showed that the first test had a validation of 4.15 which is in the good category, the second test had a validation level of 5.85 which is in the very good category so that the average of tests one and two showed a validation level of 4.50 which is in the very good category. Second, the validation test conducted on language experts showed that the first test had a validation level of 4.25 which is in the good category, the second validation test had a validation level of 4.58 which is in the very good category, while the average of the second test was a validation level of 4.41 which is in the very good category. Based on the validation results, it shows that the initial reading application that researchers have developed can be used in the research process.

Recommendation

To build upon the promising results of this study, future research should focus on implementing the SAS-based early reading application in broader, real-world classroom settings. Large-scale trials across diverse school environments—both Islamic (MI) and general (SD)—are needed to assess the long-term impact on students' reading development and to refine the application based on classroom feedback. Future studies could also explore how to integrate the application with home-based learning strategies, especially considering that poor study habits at home were identified as a major barrier to early reading success. Furthermore, potential challenges such as limited access to Android devices, digital literacy among teachers, and varying levels of institutional support must be anticipated and addressed to ensure successful implementation. Expanding the application to include features for numeracy and parental involvement may also enhance its effectiveness and sustainability in early grade education.

The next recommendation is for elementary school teachers who teach in grades one and two to use the beginning reading application that the researcher developed, so that later teachers can train the reading skills of beginner students well, beginning reading skills are important skills for students in grades one and two, this is so that later students can have good reading skills at the next level.

Acknowledgment

The researcher would like to express sincere gratitude to RISETMU, Universitas Muhammadiyah Tasikmalaya (UMTAS), and the Research and Community Service Institute (LP3M UMTAS) for their invaluable support and funding through the RISETMU grant. This research would not have been possible without their guidance and facilitation. The researcher is also thankful to all individuals and institutions who contributed to the successful completion of this study.

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