Development Of Android-Based Learning Media Integrated Auditory Intellectual Repetition Used By Smart Apps Creator On Material Arithmetic Sequence And Series

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ABSTRACT
Many students use Android or smartphone technology solely for social networking and gaming, but this is not the ideal approach to accelerate learning. The purpose of this research is to investigate the validity, practicability, and efficacy of constructing integrated Android-based learning media Auditory, Intellectual, and Repetition aided by Smart Apps Creator on arithmetic sequences and series material. The R&D approach was used in this study, through of the ADDIE development model. The initial product was validated and amended by material and media professionals. The following phase involved a small-scale experiment with 6 students from MAN 1 Lhokseumawe, followed by a large-scale trial with 21 students from MAN 1 Lhokseumawe. The findings indicated that (1) learning media products based on Android integrated with the AIR model were pronounced very valid based on the results of media experts' assessments with an average of 91.66% and material experts' assessments with an average of 87.5%; (2) Learning media products based on the integrated Android AIR model are stated to be very practical based on the results of small-scale assessments with an average of 90.88%, large-scale assessments with an average of 83.73% obtained from the results of student response questionnaires, and observer's assessment assessing teacher activity with an average of 91.66% and student activity with an average of 87.5%; (3) Android-based learning media products integrated with the AIR model based on the results of the material mastery test with an average of 90, 47% stated very effectively. Based on that description, it can be concluded that there are very valid, very practical and very effective learning applications based on the Android paradigm integrated into the AIR model.
Keywords: Android, Smart Apps Creator, Learning Media, AIR Model

1. INTRODUCTION

Mathematics holds significant importance in daily life and necessitates proficiency among students throughout all levels of education, ranging from basic to postsecondary. Therefore, the study of mathematics necessitates consistent engagement due to its pervasive role as a fundamental catalyst across other disciplines. (Anisa, et al., 2020: Anisa, et al., 2020: Hidayati, 2023). According to Suardi (2018), the mathematics learning process entails the individual's endeavor to embrace behavioral changes that go beyond mere memory techniques, but rather foster a deeper understanding that enables pupils to effectively tackle and resolve difficulties. the role of a teacher as an instructor remains crucial in the field of education. In order to enhance the learning experience for students, it is imperative for teachers to exhibit creativity during the instructional process, thereby preventing the emergence of monotony and boredom in learning. Based on the aforementioned issues, there is a need for educational tools to solve challenges encountered throughout the learning process. This is an endeavor to enhance learning resources and mitigate obstacles encountered during the learning process, specifically through the utilization of information and communication technology, such as smartphones or Android technology.

During the period of October 2022 to December 2022, a study conducted at MAN 1 Lhokseumawe revealed that a significant number of pupils predominantly utilised Android technology or smartphones for the purposes of social networking and engaging in gaming activities. The prevalence of smartphone usage among students has witnessed a notable surge, leading to a growing concern regarding the potential development of addictive behaviours within this demographic. Nevertheless, its utilisation remains suboptimal for expediting the process of acquiring knowledge. In order to address this issue, it would be advantageous to integrate smartphones into the realm of education, thereby enabling students to engage in unrestricted learning utilising their existing mobile devices. According to (Budiman, Haryanti, and Azzahrah 2021: Arliza, Setiawan, and Yani, 2019) The proliferation of digital technology at an accelerated pace has resulted in widespread familiarity with Android-based smartphones or mobile phones among individuals of all age groups, ranging from youngsters to adults. The use of Android devices has become intricately intertwined with various aspects of daily life. On a daily basis. The exponential growth of technology necessitates that individuals possess the capacity to effectively adapt to and embrace contemporary technological advancements in order to avoid becoming marginalised. The adaptation of supporting facilities in learning activities is vital to align with the technological advancements in the era of computerization. Hence, within the realm of educational experiences, it is imperative to implement modifications that are rooted in innovation, taking into account the prevailing practises that were previously in place. In the realm of education, the use of innovation assumes a significant role as a pedagogical approach.

The utilisation of learning media is a highly valuable technique in facilitating students' comprehension of diverse concepts beyond their existing knowledge. Media learning that utilises Android software falls under the classification of interactive multimedia. This form of multimedia is developed through the utilisation of technology and applications, allowing users to manipulate and navigate the content in accordance with their preferences and desires. The utilisation of this Android application has revolutionised the approach to learning in the contemporary era. In contrast to traditional methods of direct and location-specific learning, this application enables students to engage in learning activities from any location. The application offers interactive quizzes that students can complete, thereby fostering curiosity and capturing their attention. The curiosity and attention of students may be stimulated by a sense of interest. The use of learning materials presented in diverse and engaging formats can enhance students' cognitive abilities and mitigate the occurrence of misinterpretations. In the context of mathematical education, an illustrative instance pertains to the acquisition of knowledge in the field of sequences and arithmetic series. According to (Hardiyanti et al. 2013: Hartati, 2021) There exist multiple challenges that students have when engaging with the content pertaining to sequences and series. Specifically, these challenges encompass the identification of the formula for the nth term of an arithmetic sequence, comprehension of the notion of the initial term, and grasping the problem at hand. Arithmetic sequences and series are fundamental concepts in mathematics. These mathematical constructs involve a sequence of numbers in which the difference between consecutive terms remains constant. An arithmetic sequence is a specific type of sequence in which each term. According to (Mustika, et al., 2018: Kurniawan, 2022).

The AIR (Auditory, Intellectually, Repetition) learning model is a pedagogical approach that has been found to be effective in enhancing students' performance in mathematics sessions and developing their ability to respond to questions. According to this particular learning paradigm, the effectiveness of problem-solving can be enhanced by focusing on three key factors. These factors include the auditory modality, which involves the utilisation of the sense of hearing in the learning process through activities such as listening, speaking, presenting, debating, expressing viewpoints, and providing responses. The concept of intellectual capacity entails the necessity of honing cognitive abilities through activities that involve logical reasoning, creative thinking, problem-solving, construction, and practical application. Repetition is a fundamental aspect of the

learning process, as well as a deeper and broader understanding of problem-solving. In the continuous process of education, educators must possess the capability to optimise the effectiveness and efficiency of learning. In addition to this, the requirement for learning techniques and media significantly impacts the academic achievements of students. Consequently, it is imperative for educators to possess the ability to select learning methods and media that effectively facilitate the desired learning outcomes.

According to (Prokoso, 2020) The Smart Apps Creator is a software tool that enables the creation of mobile applications for many platforms like Android, iOS, EXE, and HTML5 formats. Notably, it eliminates the need for programming code in the development process. Smart Apps Creator may also be utilised for the development of multimedia mobile applications in the domains of education, marketing, and gaming. This platform enables the creation of captivating mobile applications that can effectively enhance students' creativity through instructional means. Teachers and educators are expected to demonstrate innovation in their instructional practises by utilising learning media that effectively convey abstract concepts. Additionally, the incorporation of models that complement the use of learning media is crucial to prevent student disengagement and apathy during the learning process. Many students perceive mathematics lessons as a formidable adversary. The implementation of Android-based learning media, employing the Auditory, Intellectual, Repetition (AIR) model, is anticipated to facilitate students' academic progress. By utilising this approach, students are likely to develop a heightened interest in mathematics, hence fostering their enthusiasm for the subject. Moreover, this instructional method has the potential to enhance the overall learning experience, rendering it more pleasurable for both students and educators alike.

Based on this presentation, researchers will carry out research with the title Development of Learning Media Based on Android, Integrated Auditory, Intellectually, Repetition (AIR) assisted by Smart Apps Creator on Arithmetic Sequences and Series Material.

2. LITERATURE REVIEW

According to (Prokoso, 2020) The Smart Apps Creator is a software tool that enables the creation of mobile applications for many platforms like Android, iOS, EXE, and HTML5 formats. Notably, it eliminates the need for programming code in the development process. Smart Apps Creator may also be utilised for the development of multimedia mobile applications in the domains of education, marketing, and gaming. This platform enables the creation of captivating mobile applications that can effectively enhance students' creativity through instructional means. Teachers and educators are expected to demonstrate innovation in their instructional practises by utilising learning media that effectively convey abstract concepts. Additionally, the incorporation of models that complement the use of learning media is crucial to prevent student disengagement and apathy during the learning process. Many students perceive mathematics lessons as a formidable adversary. The implementation of Android-based learning media, employing the Auditory, Intellectual, Repetition (AIR) model, is anticipated to facilitate students' academic progress. By utilising this approach, students are likely to develop a heightened interest in mathematics, hence fostering their enthusiasm for the subject. Moreover, this instructional method has the potential to enhance the overall learning experience, rendering it more pleasurable for both students and educators alike.

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3. METHOD

This study employs the Research and Development (R&D) methodology for the purpose of development research. Rustandi (2021:58) claims that research and development (R&D) serves as a research methodology employed to generate specific items and evaluate their efficacy. In order to acquire the outcomes of a specific product, a requirements analysis study is employed, and to assess the efficacy of the product in order to facilitate its integration within the broader community. The R&D method is a research approach aimed at generating novel goods or enhancing current ones to align with the educational objectives of a specific scientific field. Development studies primarily centre on the examination of design, encompassing various aspects such as the creation of design models, development of teaching materials, utilisation of media, and exploration of learning processes within the realm of education. The utilisation of research and development methodologies has been extensively employed in the domains of natural science and engineering. The research methodology employed in this study pertains to the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development paradigm.

The participants in this study consisted of class XI MIA students from MAN 1 Lhokseumawe school. The research involved two types of research objects, specifically a small-scale sample of 6 students selected from the classes. The purpose of the product trial design is to gather data that can be utilised to assess the feasibility and efficacy of the manufactured product. This section provides an overview of the experimental design employed in the study, as well as information regarding the test subjects included in the research. 1) Evaluate the proficiency of media specialists and subject matter experts through testing. 2) Assess the reactions and answers provided by students through testing. The participants in this study were categorised into three groups: 1) Media Expert Respondents, 2) Material Expert Respondents, and 3) User Respondents.

The research employed the questionnaire approach as the primary data collection tool. The

questionnaire approach is employed for the purpose of assessing the efficacy of the generated quiz media. The target audience for this questionnaire comprises individuals with expertise in media, materials, as well as high school and master's level students. The purpose of administering

questionnaires to material experts and material specialists is to assess the degree of validity and appropriateness of the material. The purpose of the student questionnaire is to assess the feasibility and efficacy of quiz-based educational tools.

4. RESULTS

A. Media expert validation results

The objective of evaluating these two media experts is to determine the suitability of the Android-based learning media interface prior to its adoption in field trials. At this juncture, media professionals also proffer recommendations for enhancing the visual aesthetics of the medium. The findings of media specialists indicate that the learning media generated achieved a high level of validity, with an average score of 91.6% across all aspects. This places it within the category of "very valid." The category under consideration is evident through the mean score achieved in the display design aspect, which amounts to 74 out of a possible maximum score of 80, resulting in a percentage of 92.5%. Similarly, the average score attained in the programme operation aspect is 23 out of a maximum score of 24, equating to a percentage of 95.8%. Furthermore, the average score obtained in the Navigation aspect is 21 out of a maximum score of 24, corresponding to a percentage of 87.5%. Lastly, the average score in the usefulness aspect is 36 out of a maximum score of 40, yielding a percentage of 90%.

B. Material expert validation results

The purpose of evaluating these two media specialists is to examine the appropriateness of the content in Android-based educational media prior to its utilisation in field trials, specifically during the implementation phase. During this phase, specialists in the field of materials also offer recommendations for enhancing the quality of educational content on Android-based learning platforms. The findings regarding the validity of the material expert indicate that the learning medium generated achieved a high level of validity, with an average score of 87.5% across all aspects. This categorises the material as "very valid."
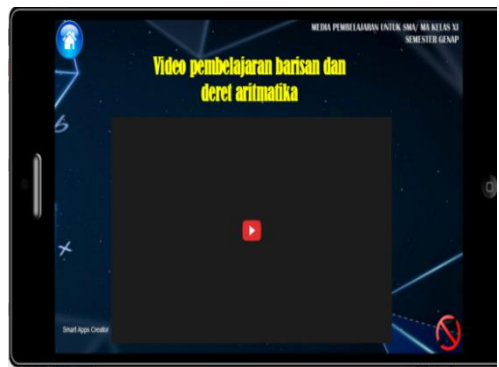
Media Expert Revision

The following revisions are based on comments and suggestions from two media experts regarding the product being developed, including the following:
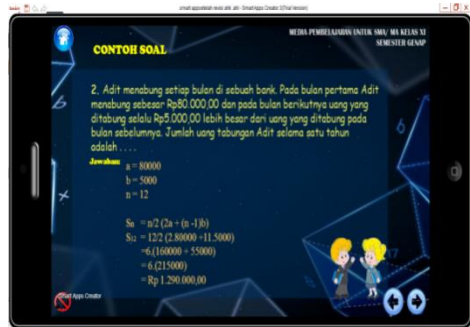
Table 1. comments and suggestions from two media experts

No	Before revision	After revision

here are no video links accessible online	
Added video link so it can be accessed online	
Change the color of the text to stand out more than the background color	

Material Expert Revision

The following revisions are based on comments and suggestions from two material experts regarding the product being developed, including the following:
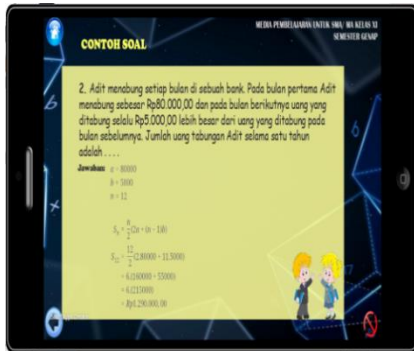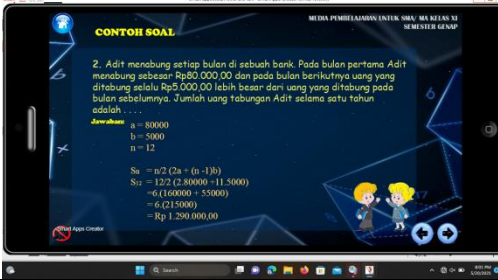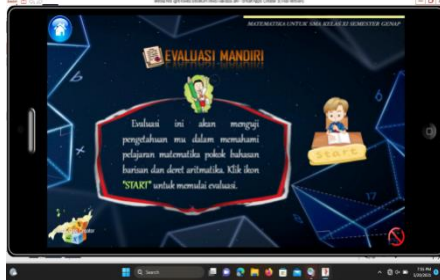
Table 2. comments and suggestions from two media experts

No	Before revision	After revision
	There are no example questions	
	Added because there are too few example questions	

Evaluation and game instructions have been written clearly
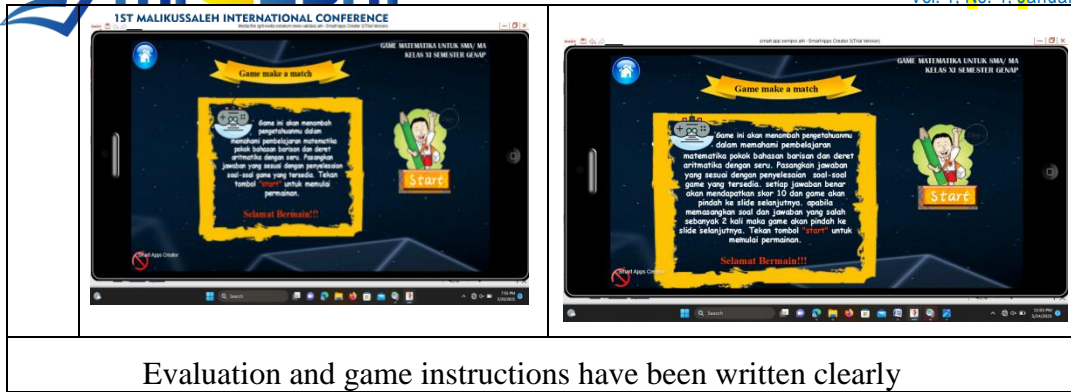
Small Group Student Trial Results

The purpose of this study is to assess the feasibility and viability of the product. The assessment of small groups of students on Android-based learning media products was conducted by a total of six students. This group consisted of three students from class XI MIA 1 and three students from another class. These students were instructed to download, execute, and observe the Android-based learning media, which had been developed and transformed into an application by the researcher. Subsequently, a cohort of six students was requested to complete the assessment instrument questionnaire that had been sent. The arithmetic sequence and series material, when taught using the integrated Android-based learning media Auditory Intellectually Repetition, yields an average result of 90.88%. This approach is considered to be "very practical" according to the given criteria.

Results of student response questionnaires

Following are the results of the responses from the large group of students, totaling 21 people, which can be seen in the following table:

Table 3. Results of large-scale student response questionnaires

No	Inisial Nama	Item Pernyataan												Rata-Rata Keseluruhan
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Z	1	1	1	1	1	1	1	0	0	1	0	1	
2	NPA	1	0	1	1	1	1	1	1	1	1	0	1	
3	FAS	1	0	1	1	1	1	1	1	1	1	1	1	
4	AR	1	1	1	1	1	1	1	1	1	1	1	1	
5	CAS	1	1	1	1	1	0	0	1	1	1	0	1	
6	CFA	1	1	1	1	1	1	1	1	1	1	1	1	
7	YPM	1	1	1	1	1	1	0	0	1	1	1	1	
8	NK	1	1	1	1	1	1	1	1	1	1	1	1	
9	FZAS	1	0	1	1	1	1	0	1	1	0	1	1	
10	WA	1	1	1	1	1	1	1	0	1	0	1	1	
11	MA	1	1	1	1	1	1	1	1	1	1	1	1	83.73015873
12	A	1	1	1	1	1	1	1	0	1	0	0	1	
13	BM	1	0	0	1	0	1	1	1	1	1	1	1	
14	FFA	1	1	1	1	1	1	1	1	1	1	1	1	
15	ZAA	1	1	1	1	1	1	1	1	1	1	1	1	
16	WK	1	1	1	1	1	1	1	0	1	1	1	1	
17	SR	0	1	1	1	1	1	1	1	0	0	0	1	
18	CRH	1	1	1	1	1	1	1	0	1	1	1	1	
19	MK	1	1	0	1	1	0	0	0	1	1	1	0	
20	RZF	0	1	1	0	1	1	1	0	0	0	1	0	
21	ZN	1	1	1	1	1	1	1	0	1	1	0	1	
Jumlah Skor		19	17	19	20	20	19	17	12	18	16	15	19	
Jumlah Nilai		21	21	21	21	21	21	21	21	21	21	21	21	
Skor Rata-Rata		90.4762	80.9524	90.4762	95.2381	95.2381	90.4762	80.9524	57.1429	85.7143	76.1905	71.4286	90.4762	
Rata-Rata Keseluruhan		83.73015873												

$$\text{Mark} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

$$\text{Mark} = \frac{211}{252} \times 100\%$$

$$\text{Mark} = 83{,}73\ \%$$

According to the average outcomes of the evaluation conducted on Android-based mathematics learning media that incorporates auditory intellectual repetition, the arithmetic sequences and series material achieved a score of 83.73%. This information is presented in the table above, and it is worth noting that the practicality level is classified as "very practical".

a) Test instrument results

The assessment's effectiveness was evaluated using a test instrument administered to a sample of 21 students in the ninth grade. Specifically, the students were presented with four descriptive questions as part of the assessment. The table below displays the proportion of student learning outcomes that have been achieved.

Table 2. Results of material mastery test scores

No	Student's name	Mark	Information
1	AR	90	Complete
2	MA	100	Complete
3	WK	75	not complete
4	BM	95	Complete
5	ZAA	85	Complete
6	ZN	90	Complete
7	NPA	90	Complete
8	YPN	90	Complete
9	FAS	100	Complete
10	NK	100	Complete
11	CFA	90	Complete
12	S	100	Complete
13	SR	95	Complete

	ZA	90	Complete
15	A	100	Complete
16	FFA	95	Complete
17	CRH	85	Complete
18	MK	95	Complete
19	RZF	95	Complete
20	Z	95	Complete
21	WA	75	not complete

The findings from the conventional percentage evaluation of the Auditory Intellectually Repetition, an integrated Android-based mathematics learning media, indicate a success rate of 90.47% in teaching arithmetic sequences and series. This outcome is classified as "very effective" according to the established criteria.

5. DISCUSSION

The present study focuses on investigating the progress made in the creation of integrated mathematics learning media based on the Android platform. The researchers at MAN 1 Lhokseumawe conducted a study on Auditory Intellectually Repetition, which consisted of five distinct stages: 1) Analysis stage, 2) Design stage, 3) Development stage, 4) Implementation stage, and 5) Evaluation stage. The focus of this study is the creation of mathematical media for Android devices that incorporates auditory cerebral repetition. During the analysis stage, researchers engage in the examination and evaluation of literature, which may encompass sources such as books or prior research studies. The findings of this study indicate that, on average, students possess cellphones; yet, their use within the realm of education is suboptimal. One ongoing issue pertains to students' persistent perception of mathematics as a challenging topic for learning, compounded by the continued utilisation of conventional teaching methods that tend to engender a sense of monotony in the learning process. Subsequently, the researcher proceeds with the design phase, specifically focusing on the development of Android-based learning media. This media takes the form of an application named Beret Arithmetic. During the developmental phase, researchers also generate instruments that will be utilised throughout the course of the research.

Following the design of Android-based learning media, researchers proceeded to further the development phase by creating Android-based mathematics learning media that incorporates Auditory Intellectual Repetition. During the developmental phase, the learning media was subjected to validation by two media specialists and two material experts. The purpose of validators is to assess the viability of media experts and material experts' validation outcomes. Researchers collected data on product viability during the development stage through the administration of validation questionnaires to media experts and material specialists. The assessment conducted by the two media experts based on the factors yielded an average score of 91.6%, indicating a high level of validity. According to the findings of the media expert assessment indicators, it can be inferred that the media produced caters to the educational requirements of students during the learning process. This media is characterised by succinct yet comprehensible text, accompanied by relevant visuals and animations that enhance the understanding of the subject matter. Additionally, it incorporates both offline and online videos to further augment the learning experience. The programme is additionally loaded with assessments and interactive activities to enhance students' understanding of Arithmetic Sequences and Series concepts, while also ensuring their engagement and sustained interest throughout the learning experience. The assessment conducted by the two material experts based on the indicators yielded an average score of 87.5%, indicating a high level of validity. Based on the evaluations conducted by two subject matter experts, it is evident that the Android-based mathematics learning media

effectively facilitates comprehension and cognitive engagement among students. This medium proves

to be conducive in creating a relaxed atmosphere for students to discuss the concepts of Arithmetic Sequences and Series, thereby enhancing their understanding of the material presented within the Android-based learning platform.

The subsequent phase involves the implementation stage, wherein the Android-based mathematics learning media has undergone validation and revision. Subsequently, the researchers proceeded to conduct trials on a limited sample of six pupils. During the pilot study, each participant installed Android-based educational material that had undergone validation. Subsequently, each participant completed an assessment instrument questionnaire. The mean score for the assessment indicators is 90.88%, as determined by the criteria of "very practical".

Following the initial testing on a limited sample size and subsequent revisions, the researcher proceeded to conduct further experimentation on a significantly larger cohort of 21 students. During the implementation of large-scale trials, two observers are assigned the responsibility of monitoring the activity of both teachers and students. Every participant received a teacher activity observation form as well as a student activity sheet. The outcomes of the evaluator's evaluation of the instructor's actions yielded a score of 91.66%, while the evaluator's assessment of the student's activities resulted in a score of 87.5%. Both assessments were deemed to possess a high level of practicality, categorised as "very practical". Following the conclusion of the extensive group trial, every student was provided with a student response questionnaire. The mean score obtained from the extensive student response questionnaire pertaining to the assessment indicators was 83.73%, indicating a high level of practicality as assessed by the participants. Following the completion of the student response questionnaire, the researcher proceeded to administer a set of test instruments in the form of descriptive questions, comprising a total of four inquiries. The test instrument yielded a value of 90.47%, meeting the requirements of "very effective".

The last phase involves the examination of an Android-based mathematics learning media. This media has undergone validation by specialists in the field, using assessment indicators. The average score obtained from this evaluation is 91.6%, indicating a high level of feasibility and validity. The assessment conducted by the two material specialists based on the parameters yielded an average score of 87.5%, indicating a high level of feasibility and validity. Following the acquisition of validation values from experts, researchers proceeded to implement enhancements based on the provided ideas and criticisms. The mean score attained by the small group on the assessment indicators was 90.88%, as per the "very practical" criterion. The indicator yielded an average score of 83.73% for the large group, with the statement being classified as "very practical". Following the completion of the student response questionnaire, the researcher proceeded to administer a set of test instruments in the form of descriptive questions, comprising a total of four questions. The classical completeness percentage yielded a value of 90.47%, accompanied by the qualitative assessment of "very effective."

6. CONCLUSION

Based on the findings derived from the conducted research and development pertaining to the integration of Android-based mathematics learning media with Auditory intellectual repetition on the topic of arithmetic sequence and series, the following conclusions can be drawn:

1. The educational media utilised for mathematics learning on Android devices incorporates auditory intellectual repetition. This media specifically focuses on the topics of sequences and arithmetic series. The generated content adheres to the established requirements, ensuring its suitability for implementation at MAN 1 Lhokseumawe. The product's validity is shown from the assessment conducted by the validator, who concluded that the Android-based mathematics learning media, which incorporates Auditory Intellectually Repetition, is highly

valid for teaching arithmetic sequence and series information. The average value acquired

from the media expert assessment was 91.66%, whereas the average value obtained from the material expert assessment was 87.5%. The adoption of Android-based mathematics learning is deemed worthy of experimentation.

2. The study incorporates an Android-based learning tool, known as Auditory Intellectual Repetition, into the curriculum for arithmetic sequences and series. The practicality of this learning tool is evaluated through student response questionnaires and observer assessments. The findings of the small-scale evaluation, which yielded an average score of 90.88%, were compared to the results of the large-scale assessment, which had an average score of 83.73%. These findings were derived from the analysis of student response questionnaires and observer assessments. The observer assessments evaluated teacher activities, resulting in an average score of 91.66%, while student activities were assessed with an average score of 87.5%. As a result, "very practical" is said about Android-based learning resources.

3. The utilisation of integrated learning material based on the Android platform. The evaluation of the efficacy of Android-based learning media in the context of created arithmetic sequences and series is derived from the outcomes of test instruments, specifically focusing on auditory cerebral repetition. The classical learning completeness rate is 90.47%. "Android-based learning content is therefore deemed to be very effective."

7. ACKNOWLEDGEMENT

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