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DEVELOPMENT OF DIATONIC SCALE ANDROID-BASED APPLICATION TO INCREASE INTEREST AND LEARNING OUTCOMES OF ELEMENTARY SCHOOL

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Abstract
When learning music about diatonic scales takes place, students are less interested in learning and have difficulty, especially in distinguishing major and minor scales. The goal of this research is to create an android-based diatonic scales application. Furthermore, the purpose of this research is to examine the impact of the produced application on student interest and learning outcomes. This study used the Research and Development (R&D) research method in conjunction with the ADDIE development model with 5 research stages, namely analysis, design, development, implementation, and evaluation. The data collection techniques used in this study were expert validation questionnaires, user response questionnaires for android application learning media, and tests. The results of the material and language expert validation test received a score of 84.21% and the media expert validation received a score of 86.67%. Meanwhile, the practicality test results from the one-on-one trial scored 93.33, the small group trial 86.56%, and the field trial 92.33%. In addition, the effectiveness test showed an increase between before and after the use of android applications in learning. Thus, it can be concluded that this android-based application learning media is effectively used in the learning process so that it can increase student interest and learning outcomes.
Keywords: *android application; diatonic scales; learning interest; learning outcomes*

Abstrak
Ketika pembelajaran seni musik mengenai tangga nada diatonis berlangsung, para siswa kurang berminat dalam belajar dan mengalami kesulitan khususnya dalam membedakan tangga nada mayor dan minor. Penelitian ini bertujuan untuk mengembangkan aplikasi berbasis android tangga nada diatonis. Selain itu, tujuan penelitian ini untuk mengetahui efektivitas dari aplikasi yang telah dikembangkan terhadap minat dan hasil belajar siswa. Penelitian ini menggunakan metode penelitian *Research and Development* (R&D) dengan model pengembangan ADDIE dengan 5 tahap penelitian, yaitu *analysis, design, development, implementation,* dan *evaluation.* Teknik pengumpulan data yang dilakukan pada penelitian ini yaitu dengan menggunakan angket validasi ahli, angket respon pengguna media pembelajaran aplikasi android, dan tes. Hasil uji validasi ahli materi dan bahasa mendapatkan nilai sebesar 84,21% dan validasi ahli media mendapat nilai sebesar 86,67 %. Sementara itu, hasil uji kepraktikan dari uji coba satu-satu mendapat nilai sebesar 93,33, uji coba kelompok kecil sebesar 86,56%, dan uji coba lapangan sebesar 92,33%. Selain itu, uji efektivitas menunjukkan adanya peningkatan antara sebelum dan sesudah penggunaan aplikasi android dalam pembelajaran. Dengan demikian, dapat disimpulkan bahwa media pembelajaran aplikasi berbasis android ini efektif digunakan dalam proses pembelajaran sehingga dapat meningkatkan minat dan hasil belajar siswa.
Kata Kunci: aplikasi android; tangga nada diatonic; minat belajar; hasil belajar.

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Introduction

When learning music about diatonic scales takes place, students are less enthusiastic in learning and have difficulty, especially in distinguishing major and minor scales. This is due to learning media that does not support music learning in elementary schools. As in research

Noviyanti, Respati, & Pranata (2021) states that teachers do not have attractive media in implementing the music learning process. This causes music learning activities at school to tend to be monotonous, and does not stimulate students to learn. Whereas in line with research according to Sudarmo, Rasmita, & Satria (2021) that the selection of appropriate learning media and technology is one aspect that supports the achievement of learning objectives. This is also in line with other research that assisted by digital technology can make teachers more professional and confident in teaching (Julia, Supriyadi, & Iswara, 2019; Bullock, 2013). This occurs due to limited time, energy and teacher competence in designing and developing a medium for music learning. This causes students to be less interested in learning about diatonic scales. So that students also find it difficult to understand learning material, especially when distinguishing songs with major or minor diatonic scales. Therefore, it is necessary to create interesting media to pique pupils' interest for learning music and also to increase students' knowledge about the difference between major and minor scales. This needs to be followed up because if left unchecked, students will not be enthusiastic in learning music and will have difficulty understanding the material of major and minor diatonic scales.

There are many studies on learning major and minor diatonic scales that have been conducted by researchers. The results of previous research by Harmila, Pangestika, & Khaq (2021) stated that based on observations made, teachers still use the lecture method in teaching material in class, thus making students less interested and tend to get bored when learning. In addition, learning references are still limited, such as only utilizing available media, especially books and student worksheets. The accessibility of learning media, especially in cultural arts and skills learning materials, is also not accessible. This makes practice and learning boring. On the topic of learning music in class V, especially on the material of scales, often experience difficulties in the absence of depictions or learning media. In addition, Atabek & Burak (2020) stated that teachers in elementary schools have insufficient musical experience. Most of pre-administration teachers don't have the foggiest idea how to play instruments other than recorders; they don't get vocal preparation, and have not gotten music preparing beyond what is given at school. This causes music learning, especially scales, to not run optimally. Another study stated that they realized that learning by learning from students' preferred music can be a challenge for teachers, who needed to get out of the safe haven of a predetermined major/minor-based hypothetical music schedule very much made up with the rules of a normal rehearsal period, and after some thought took on the challenge of the shadowy universe of investigation, uncertainty, fascination, and surprise by creating a major and minor music learning medium (Davidson & Lupton, 2016; Björk, Ruthmann, Granfors, Högväg, & Andersson 2021).

The challenges in learning music as in previous studies are the lack of use of learning media and the lack of ability of elementary school teachers in teaching music. To overcome these challenges, this research provides a solution by developing an android application on music material, especially on diatonic scale material. Different from previous research, the aim of this study is to develop and assess the effectiveness of an android-based application for teaching major and minor diatonic scales in music. This research focuses on the following two things: research questions: (1) How is the development of diatonic scale android application? (2) How is the effectiveness of diatonic scale application in learning? To answer all these questions, several steps were taken in this research. With the development of android applications and effectiveness tests, it is hoped that it can be a solution to overcome the difficulties of students in learning music, especially in diatonic scale material.

Research Methods

This research method uses the Research and Development (R&D) research method. R&D is a research method that is used to create products and test their efficacy (Dwitiyanti, Kumala, & Widiyatun, 2020). This research uses the ADDIE development model developed by William Lee. The ADDIE development model is suitable for creating learning media because it is systematic and easy to understand. The ADDIE development model has five stages, which are as follows: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation. This research seeks to develop an android application of diatonic scales.

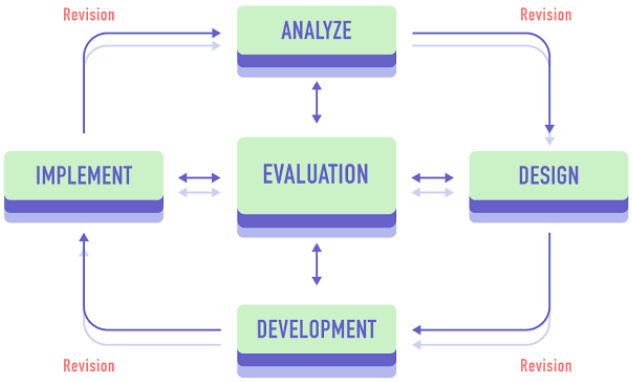

Figure 1. ADDIE Development Model

The subjects of this study were fifth grade students from two schools in Sumedang Regency. According to Sadiman (2005) the number of test subjects consists of one-on-one trials of 2 students, small group trials of 9-20 students, and field trials of 30 students. The practical test in this study was conducted on 47 students which included: One-on-one trial of 2 students, small group trial of 15 students, and field trial of 30 students. While the effectiveness test was carried out on 22 students. The criteria for selecting students who participated in this study were all 5th grade students at the school who had never learned music using an android application.

The research was conducted in two elementary schools in Sumedang Regency, West Java. Research activities were carried out in the odd semester of the 2023/2024 school year in fifth grade. The selection of schools as research sites was based on several considerations, namely: 1) There has never been research that examines the android application at the school 2) School conditions are relevant to research needs, 3) Grade V teachers have never implemented learning using android applications in music subjects.

In this development research, the research procedure is based on the ADDIE model development research model which includes 5 stages, namely: 1) Analysis, at this stage of the analysis is done by conducting a needs analysis, then identifying problems that exist in schools and finding solutions to existing problems. Identification of needs is carried out by conducting interviews with the fifth grade teacher regarding obstacles during music learning. After identifying the needs, it can be concluded that there are several problems, namely learning feels monotonous because it only uses books and songs. This makes students understand less material, especially on diatonic scale material. Thus, the solution that researchers make is to develop learning media in the form of android applications with diatonic scale material. 2) Design, at this design stage, researchers formulated the content of the material and then made a product design in the form of an application mockup through Microsoft Word 2019. The term mockup includes a real picture or realization, facilitating the revision process,

presentation media and also to save budget. In other words, application mockups aim to dynamically simulate models (Falcone & Garro, 2019). In addition to making application mockups, researchers also compiled a learning implementation plan and research instruments. The content in the app is made according to the learning objectives and students' needs. The app mockup was created by conceptualizing the app first, then designed into a picture of the material and features that will be displayed on each screen of the app. The app mockup design was created using Canva app, while the app mockup design was created using Microsoft Word app. The material in the app is organized according to the learning objectives. 3) Development, In the development stage, researchers using the Mit App Inventor website, created Android applications. MIT App Inventor is an electronic and free Android application improvement instrument with a graphical UI (Top & Gökbulut, 2022). Meanwhile, the design of the application uses the Canva application. Canva is a finished plan instrument that is easy to utilize and proper for the experts and fledglings (Gehred, 2020). Then, the learning video was created using the CapCut app. The CapCut application is widely used and should be utilized as a video editing tool, particularly in learning videos (Silvia, Fahyuni, & Nadlif, 2023). The Mit App Inventor website is used as an application development website, the Canva application is used as an application for designing, and the Capcut application is used as a learning video editing application. The selection of the Mit App Inventor website, Canva application and Capcut application is based on the fact that the three software can be accessed online, free, and relatively easy to use. After the application has been made, then the application is exported to an android application and only needs to be installed on a cellphone. Then proceed to the expert validation test stage by material and language experts, and media experts. The criteria used for expert validation and the qualifications of material, language, and media experts involved in the validation process are a lecturer who is an expert and experienced in his field. 4) Implementation, the implementation stage is carried out by conducting an application trial process to one-on-one trial groups, small group trials, and field trials at the intended school. After that, all students from each group were given a user response questionnaire to assess the application that had been tested previously. Students are directed to rate the application from each criterion from 1 (not feasible) to 5 (very feasible). The criteria assessed are from the usability and appearance aspects, material aspects, and benefit aspects. 5) Evaluation, in the evaluation stage, the learning media evaluation is done by user to decide the practicality and viability of the learning media. The criteria assessed are from the usability and appearance aspects, material aspects, and benefit aspects. User response questionnaires contribute to determining the practicality and feasibility of learning media, because the results will be calculated and produce an assessment of the applications that have been developed.

An expert validation questionnaire was employed to collect data in this study. and an android application media user response questionnaire. The use of expert validation questionnaires and user responses is to obtain product feasibility data. In addition, there is the use of tests to see the expansion in understudy interest and learning results when utilizing the android application media.

Data analysis in this study can be separated into two types, namely qualitative analysis and quantitative analysis. Data obtained in the form of explanations or information is qualitative data, while data obtained based on test results in the form of numbers is qualitative data (Nugraha & Solihin, 2017). Qualitative analysis is used when describing the development of android applications, starting from the analysis stage to the evaluation stage. While quantitative analysis is used on data from the results of filling out instruments by media

experts, material and language experts, application user responses, learning interest questionnaires and the results of pretest and posttest questions. The quantitative analysis used is a type of descriptive statistical analysis. The likert scale measurement design is used as a criterion for assessing the feasibility of the application. The data that has been obtained from the questionnaire of learning interest and learning outcomes, then analyzed quantitatively using IBM SPSS Statistic 27 software by conducting a normality test, an average difference test (t-test), and an N-Gain test.

The score acquired from the expert test's feasibility assessment will be determined utilizing the following formula:

$$NP = \frac{R}{SM}\ x\ 100\%$$

(Purwanto, 2013)

Description:

NP = Average value in percentage (%) provided

R = The total score received from each facet.

SM = Maximum overall score.

The value can be calculated by dividing the value obtained fr om the results of filling out the questionnaire with the maximum score of the assessment, after which the result is multiplied by 100%. Then, the percentage results are entered according to the media feasibility category. The media eligibility criteria can be seen in Table 1. Media eligibility categories are divided into 5 categories as in Table 1 (Riduwan, 2015; Widarti, H. R., Rokhim, D. A., & Kadafi, 2023). Category achievements are obtained according to the number of percentages resulting from the assessment that has been carried out.

Table 1. Media Feasibility Category

Percentage of Eligibility	Category Achievement
81 - 100%	Very Feasible
61 - 80%	Feasible
41 - 60%	Feasible Enough
21 - 40%	Less Feasible
0 – 20%	Not Feasible

Result and Discussion

This research is focused on developing a product in the form of an attractive diatonic scale android application studying media to improve student interest and learning outcomes. The study's findings are divided into many themes, which are as follows.

First stage, analysis. From the analysis process, there is a problem that students lack interest in learning, especially in learning music on diatonic scales. This results in student learning outcomes that are not maximized, because students have difficulty identifying major and minor diatonic scales. Students are less interested in learning on the material of the diatonic scale due to the absence of engaging media in learning, so that learning is less interesting for students. Thus, as a solution, researchers designed an android-based application. The selection of android applications as a solution is based on the fact that today students prefer things related to technology. In addition, students in the school studied often

carry cellphones. This android application is packaged with an attractive design, complete material, varied application features, and easy to use applications.

As in the research conducted by Mokambu, Malabar, & Ardini (2023) that the analysis conducted by initial research, mainly interviews which attempted to acquire data on areas of needs analysis. In addition, in accordance with the findings of the research analysis by Hasan, Sakdiyah, Mustofa, & Tuzzahra (2021) that one of the reasons for failure during the learning process is that teachers have not made extensive use of learning media.

Second stage, design. At the design stage, the results obtained from the analysis stage are then managed into media design in the form of application mockups which aim to describe the application to be produced. This android application will contain learning objectives, learning materials, learning videos, quizzes, and a simple piano. Application mockups are made using the Canva and Microsoft Word 2019 applications. Figure 4 depicts the application mockup design.

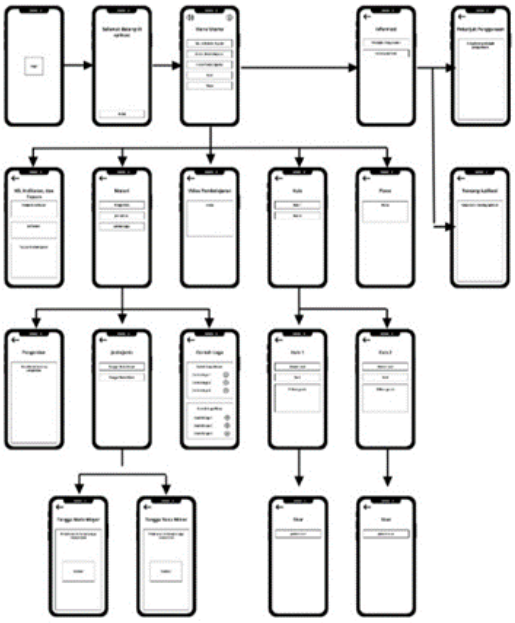

Figure 2. Application Mockup

In the research carried out by Novaliendry, Darmi, Hendriyani, Nor, & Azman (2020) In the design stage, an attractive appearance design is carried out on Android-based learning media which aims to make students feel interested and comfortable when using learning media. Then, the way the product is depicted between the research conducted by Izzah, Pradoko, & Syukur (2021) and this research is slightly different, the learning media design stage consists of making a flowchart. However, both equally serve to describe the product being developed.

Third stage, development. At this stage is an activity that contains the manufacture of previously designed products in the form of diatonic scale android applications. After making an application mockup that has been adapted to the material, the next is to make the background of the application, the background of the learning video, and the logo that will be used for the application using the Canva application. After that, proceed to the application creation process using the Mit App Inventor website. In addition, there are learning videos that will be loaded in the application using the Capcut application. All of these applications are easily accessible online and can be used for free.

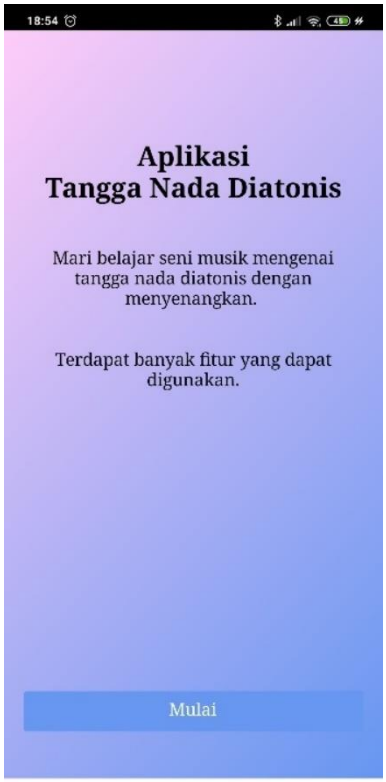

Figure 3. Initial View of the Application

Figure 4. Main Menu Display

Figure 5. Information Display

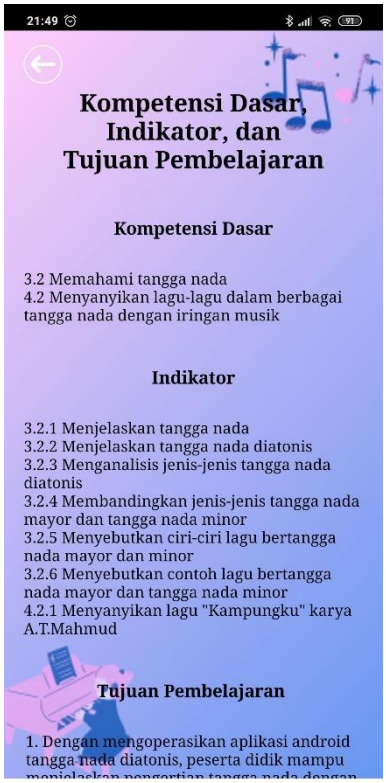

Figure 7. Display of KD, Indicator, and Purpose Menu

Figure 8. Display of Learning Materials Menu

Figure 9. Display of Learning Video Menu

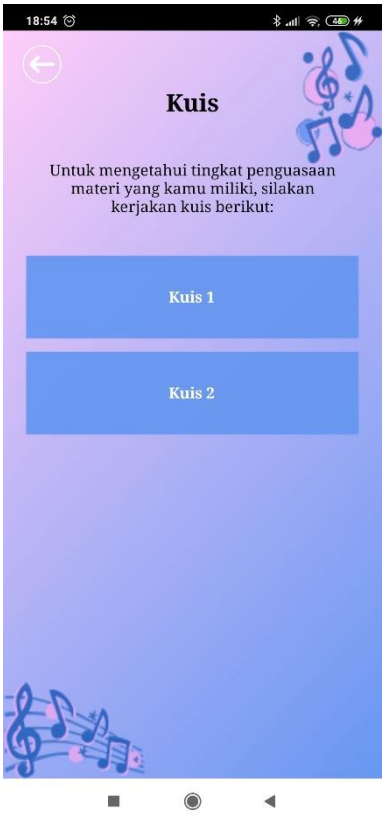

Figure 9. Quiz Menu Display

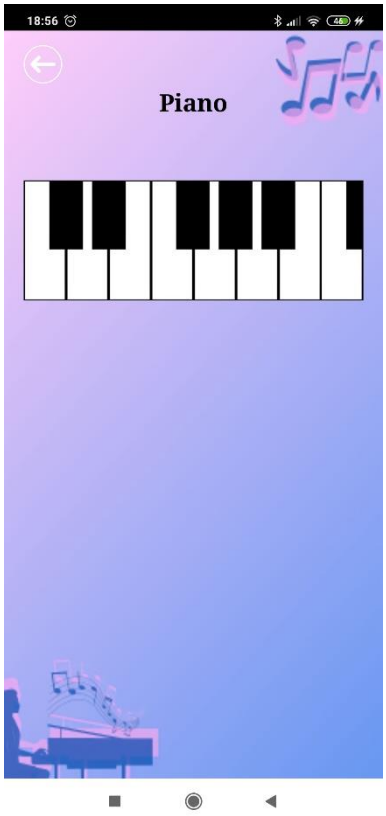

Figure 10. Piano Menu Display

The results of application development on the initial display can be seen in Figure 3 which displays a welcome sentence and there is a button to start the application. Furthermore, Figure 4 displays five menus that can be selected. Figure 5 displays directions for utilizing the application and about the application. Figure 6 displays the KD, indicators, and learning objectives used. Figure 7 displays options consisting of understanding, types of diatonic scales, and song examples of each type of diatonic scale. Figure 8 displays a learning video that is directly connected to Youtube. Figure 9 displays two quizzes that can be selected. Meanwhile, Figure 10 displays a simple piano that can be played.

Following the completion of the application creation process, the diatonic scales android application is subjected to a validation test process undertaken by media professionals, material specialists, and linguists. Table 2 shows the results of material and linguistic expert validation. Meanwhile, Table 3 summarizes the results of media expert validation.

Table 2. Material and Language Expert Validation Results

Indicator	Score	Maximum Score
Feasibility of material	30	35
Feasibility of material presentation	25	30
Feasibility of language	25	30
Total Score	**80**	**95**
Percentage (%)	**84,21%**	**100%**

According to the validation of material and language expert validation, the android application learning media development product obtained a validation value with a percentage

of 84.21%. Referring to the validation results, It is possible to conclude that the android application falls into the very feasible category.

Table 3. Media Expert Validation Results

Indicator	Score	Maximum Score
Feasibility of learning media	25	25
Feasibility of media display	40	50
Total Score	**65**	**75**
Percentage (%)	**86,67%**	**100%**

According to media expert validation results, the android application development product received a validation value of 86.67%. Based on the validation results, it is possible to infer that the android application falls into the very feasible category.

Referring to the validation of material and language experts, this android application media requires improvement or revision, namely making it easier to place the language and appearing music images so that it is more interesting.

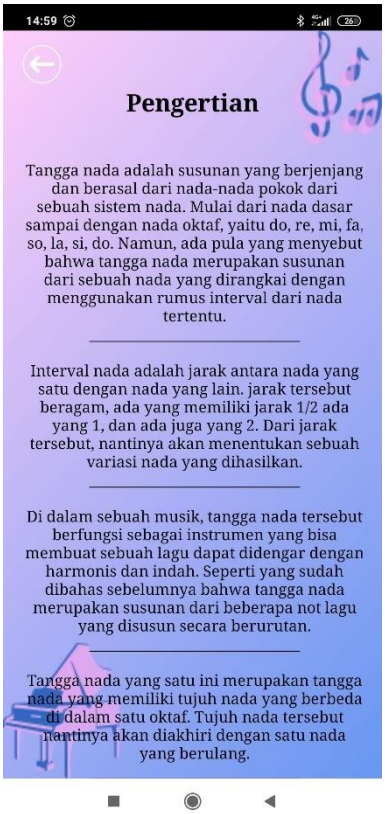

Figure 11. Display of Definition Material Before Revision

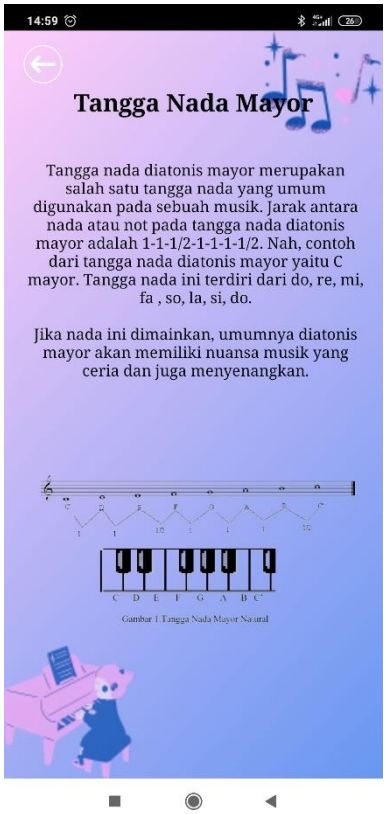

Figure 12. Display of Major Scales Material Before Revision

Figure 13. Display of Definition Material After Revision

Figure 14. Display of Major Scales Material After Revision

There is a display before revision, in Figure 11 displays the content of the material with the language that is still inappropriate and the lack of musical images. Figure 12 displays the content of the scales material whose language is still inappropriate and the lack of musical images. Meanwhile, the post-revision display in Figure 13 displays the content of the material with the use of easier and more appropriate language and there are more musical images. Meanwhile, Figure 14 displays the content of the scales with easier and more precise language and more pictures.

The research conducted by Firdawati, Maison, & Nazarudin (2021) developing an android application but using the Appy Pie application, while this research uses the Mit App Inventor website. Both produce good android applications. In addition, research conducted by Novaliendry et al. (2020) developed the program code and modified some pre-existing algorithms. In contrast to this research, which developed the program from scratch without modifying the pre-existing program. However, it is adjusted to the needs of each.

Fourth stage, implementation. After the application development stage is complete, Then, during the implementation stage, a practicality test is performed in fifth grade. The practicality test is carried out by giving a user response questionnaire to one-on-one trial students as many as 2 people, small group trials of 15 students, and field trials of 30 students.

The one-on-one trial was applied in grade 5 to 2 students. Table 5 shows the outcomes of the one-on-one study. The results of the one-on-one trial of the diatonic scale android application media showed a result of 93.33%. This shows that this android application is included in the criteria very feasible.

Table 5. One-on-One Test Results

Indicator	Score	Maximum Score
Usability and Display Aspects	56	60
Material Aspect	48	50
Benefit Aspect	48	50
Total Score	**112**	**160**
Percentage (%)	**93,33%**	**100%**

The small group trial was applied in class 5 to 15 students. The outcome of the small group trial of the diatonic scale android application media showed a result of 86.56%. This shows that this android application is included in the criteria very feasible.

Table 6. Small Group Results

Indicator	Score	Maximum Score
Usability and Display Aspects	391	450
Material Aspect	188	225
Benefit Aspect	200	225
Total Score	**779**	**900**
Percentage (%)	**86,56%**	**100%**

The field trial was conducted in class 5 with 30 students. The outcome of the field trial are in Table 7. The outcome of the field trial of the diatonic scale android application media showed a result of 92.33%. This shows that this android application is included in the criteria very feasible.

Table 7. Field Trial Results

Indicator	Score	Maximum Score
Usability and Display Aspects	829	900
Material Aspect	411	450
Benefit Aspect	422	450
Total Score	**1662**	**1800**
Percentage (%)	**92,33%**	**100%**

In the implementation stage carried out by Damarwan & Khairudin (2017), the trial was carried out in a small group of 30 students, while in this study trials were carried out through three stages, namely one-on-one trials, small group trials, and field trials. This is adjusted to the needs of each research and adjusts to their respective research references.

Fifth stage, evaluation. The evaluation stage is found at all stages of this android-based application development process, starting from analysis, design, development t, and implementation. At the analysis stage, an overall analysis is carried out regarding the things needed by students, while the evaluation is carried out at the design stage by analyzing whether the material and application mockup design made are appropriate and feasible to be poured into an application. At the development stage, the evaluation is carried out with an assessment by material, language, and media experts. At the implementation stage, the evaluation is carried out by practicality testing by students as application users, students assess whether the application is feasible in terms of use, appearance, material, and learning benefits.

The evaluation stage in this study is the same as the final stage in the research conducted by Dwitiyanti et al. (2020) is a stage of application review that is altered in relation to the previous stage. One of these review steps is based on application trials performed by validators and application feasibility assessments via questionnaire distribution.

The last one is effectiveness test of the use of diatonic tone ladder android application learning media to increase student interest and learning outcomes in art learning. The effectiveness test is a test conducted to measure the level of success of media use in improving student learning outcomes. The effectiveness test was attended by 20 fifth grade students by a One-Group Pretest-Posttest Design.

The One-Group Pretest-Posttest Design

O	*X*	*O*
Pretest	*Treatment*	*Posttest*

Figure 15. One-Group Pretest-Posttest

The results of the effectiveness test can be seen in Table 8. Based on the table, it shows the interest and learning outcomes between before and after the application of diatonic scales android application media in learning. There is an increase in the average score of 22 students between the pretest and posttest scores of students' interest and learning outcomes.

Table 8. Effectiveness Test Results of Android Application Media

Average Score Achievement Learning Interest		**Average Score Achievement Learning Outcome**	
Pretest Score	**Posttest Score**	**Pretest Score**	**Posttest Score**
80,18	87,54	31,36	65

After all the data is collected, then quantitative data analysis is carried out by conducting a normality test, an average difference test, and an N-Gain test.

The Shapiro Wilk test was used to determine the normality of the data. If the P value (sig.) is greater than 0.05, H0 is accepted; if the P value (sig.) is less than 0.05, H0 is rejected. The following is the rationale for normalcy test decisions: H0 indicates that the data is normally distributed, but H1 shows that the data is skewed.

Table 9. Normality Test Results for Pretest and Posttest Data on Learning Interest

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Minat Belajar	.149	22	.200*	.913	22	.055
Posttest Minat Belajar	.156	22	.179	.914	22	.056

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A normality test was performed using Shapiro-Wilk based on the findings of the pretest and posttest of students' interest in learning. According to table 9, the learning interest pretest results obtained a P value sig. of 0.055 greater than 0.05, indicating that H0 is accepted and H1 is rejected. H0 is accepted, whereas H1 is denied, because the posttest value of learning interest acquired a P value sig. of 0.056 bigger than 0.05. As a result, the data from the pretest and posttest on student learning interest can be assumed to be normally distributed.

Table 10. Normality Test Results of Pretest and Posttest Data for Learning Outcomes

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Hasil Belajar	.186	22	.046	.939	22	.185
Posttest Hasil Belajar	.193	22	.032	.921	22	.081
a. Lilliefors Significance Correction						

From the pretest and posttest results of student learning outcomes, the normality test was calculated using Shapiro-Wilk. Referring to table 10, the pretest results were obtained with a P value sig. of 0.185 greater than 0.05 which indicates that H0 is accepted and H1 is rejected. While the posttest value of learning outcomes has a P value sig. of 0.081 greater than 0.05 which indicates that H0 is accepted and H1 is rejected. Thus, the pretest and posttest data on student learning outcomes can be concluded to be normally distributed.

The average difference test (t-test) is performed using the One Sample T-Test test based on data that fits the test requirements, namely normal distribution. One Sample T-Test test one sample group for variance (homogeneous). There are testing criteria in place, which state that H0 is accepted if the P value (sig.) is greater than 0.05 and H0 is rejected if the P value (sig.) is less than 0.05. The following decision-making criteria were utilized in the mean difference test: H0 indicates that there is no difference between pretest and posttest in the average score of interest and learning outcomes, while H1 shows that there is a difference between pretest and posttest in the average score of interest and learning outcomes.

Table 11. T-test Results Using One Sample T-test

One-Sample Test						
	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pretest Minat Belajar	32.809	21	.000	80.182	75.10	85.26
Pretest Hasil Belajar	13.458	21	.000	31.364	26.52	36.21
Posttest Minat Belajar	48.022	21	.000	87.545	83.75	91.34
Posttest Hasil Belajar	15.769	21	.000	65.000	56.43	73.57

The average difference test was obtained using the One Sample T-test using the pretest and posttest data of student interest and learning outcomes. According to table 11, the learning interest pretest results obtained a P value sig. of 0.000 less than 0.05, indicating that H0 is rejected and H1 is approved. The pretest of learning outcomes yielded a P value sig. of 0.000 less than 0.05, indicating that H0 is rejected and H1 is accepted. The posttest of learning interest yielded a P value sig. of 0.000 less than 0.05, indicating that H0 is rejected and H1 is accepted. Posttest learning outcomes had a P value significant of 0.081 more than 0.05, indicating that H0 is rejected and H1 is accepted.

As a result of the increase in the average value of the pretest and posttest of interest and learning outcomes, it very well may be inferred that there is a distinction of students' interest and learning outcomes before and after the use of the diatonic scales android application learning media.

N-Gain is used to calculate the increase in student interest and learning outcomes (Mutmainnah, Aunurrahman, & Warneri, 2021). The following are the results of the N-Gain test calculation.

Table 12. N-Gain Test Results of Learning Interest

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_skoreminat	22	.00	.85	.3740	.25677
Ngain_persenminat	22	.00	84.62	37.3954	25.67673
Valid N (listwise)	22				

Table 13. N-Gain Test Results of Learning Outcomes

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_scorehasil	22	-.07	.87	.5017	.24466
Ngain_persenhasil	22	-7.14	86.67	50.1734	24.46630
Valid N (listwise)	22				

Based on Tables 12 and 13, the increase in student interest in learning obtained an N-Gain value of 0.3740 which is included in the moderate group. The lowest N-Gain value is 0.00, and the largest is 0.85. Meanwhile, the improvement in student learning outcomes obtained an N-Gain value of 0.5017, placing it in the moderate group. The lowest N-Gain value was -0.07, and the highest was 0.87. In the research conducted by Gnanasagaran, Durga Amat Kamaruddin (2019) tested mobile learning's effectiveness in learning with the implementation of pretest-posttest. The difference with this study is that the effectiveness test in that study consisted of control and experimental groups while this study only consists of one group. However, they both show that the treatment through mobile learning does contribute to better learning.

Conclusion

In conclusion, the two questions asked have been answered in this study. "How is the development of the diatonic scale android application?" This application was developed using the ADDIE development model which includes five stages including 1) at analysis stage the researcher identifies the problem and produces findings that students still have difficulty understanding volume material, 2) at design stage the researcher designs the application mockup, 3) at development stage the overall application development is carried out and validation test by experts, 4) at implementation stage the practical test is carried out on the application, and 5) at the last stage an overall evaluation is carried out. Furthermore, answering the question "How is the effectiveness of the diatonic scales android application in learning?" The results of the effectiveness test of learning media in the form of android applications that have been carried out in grade V elementary schools show that there is an increase in student interest in learning and student learning outcomes seen from the pretest and posttest scores of students after getting learning treatment using the learning media android application of diatonic scales. Thus, the implication of this research is that the use of this android application media can make students' interest in learning increase so that it can improve student learning outcomes.

References

Atabek, O., & Burak, S. (2020). Pre-school and primary school pre-service teachers' attitudes towards using technology in music education. *Eurasian Journal of Educational Research*, *2020*(87), 47–68. https://doi.org/10.14689/ejer.2020.87.3

Björk, C., Ruthmann, S. A., Granfors, M., Högväg, J., & Andersson, S. (2021). The potential of a mixed-methods approach for research on learning to theorise music. *Music Education Research*, *23*(3), 374–390. https://doi.org/10.1080/14613808.2020.1853085

Bullock, S. M. (2013). Using digital technologies to support Self-Directed Learning for preservice teacher education. *The Curriculum Journal*, *24*(1), 103–120. https://doi.org/https://doi.org/10.1080/09585176.2012.744695

Damarwan, E. S., & Khairudin, M. (2017). Development of an Interactive Learning Media to Improve Competencies. *Proceedings of the International Conference on Technology and Vocational Teachers (ICTVT 2017)*, *102*(Ictvt), 24–27. https://doi.org/10.2991/ictvt-17.2017.5

Davidson, R., & Lupton, M. (2016). 'It makes you think anything is possible': Representing diversity in music theory pedagogy. *British Journal of Music Education*, *33*(2), 175–189. https://doi.org/DOI: 10.1017/S0265051716000115

Dwitiyanti, N., Kumala, S. A., & Widiyatun, F. (2020). Using the ADDIE model in development of physics unit convertion application based on Android as learning media. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *10*(2), 125–132. https://doi.org/10.30998/formatif.v10i2.5933

Falcone, A., & Garro, A. (2019). Distributed Co-Simulation of Complex Engineered Systems by Combining the High Level Architecture and Functional Mock-up Interface. *Simulation Modelling Practice and Theory*, *97*(August). https://doi.org/10.1016/j.simpat.2019.101967

Firdawati, R., Maison, M., & Nazarudin, N. (2021). Development of Mobile Learning Media on Newton's Laws Using the Appy Pie Application. *Jurnal Penelitian Pendidikan IPA*, *7*(2), 202–206. https://doi.org/10.29303/jppipa.v7i2.599

Gehred, A. P. (2020, April). Canva. *Journal of the Medical Library Association : JMLA*, Vol. 108, pp. 338–340. https://doi.org/10.5195/jmla.2020.940

Gnanasagaran, Durga Amat Kamaruddin, A. H. (2019). The effectiveness of mobile learning in the teaching and learning of probability. *Jurnal Pendidikan Sains Dan Matematik Malaysia*, *9*(2), 9–15. https://doi.org/10.37134/jpsmm.vol9.2.2.2019

Harmila, A. A., Pangestika, R. R., & Khaq, M. (2021). Pengembangan Media Pembelajaran Lift the Flap Book Tangga Nada Peserta Didik Kelas V Sekolah Dasar. *Jurnal Kualita Pendidikan*, *2*(2), 144–150. https://doi.org/10.51651/jkp.v2i2.57

Hasan, A., Sakdiyah, S., Mustofa, A., & Tuzzahra, R. (2021). The Development of Rainbow Spin Learning Media in Social Sciences: ADDIE Development Model. *Proceedings of the 11th Annual International Conference (AIC) on Social Sciences*, *11*, 229–233.

Izzah, N. F., Pradoko, A. M. S., & Syukur, S. W. (2021). The Development of Android Application-Based E-Module Learning Media on the Makassar Flute Learning Material for Year 8 Junior High School Students. *Proceedings of the 4th International Conference on Arts and Arts Education (ICAAE 2020)*, *552*(Icaae 2020), 228–233. https://doi.org/10.2991/assehr.k.210602.045

Julia, J., Supriyadi, T., & Iswara, P. D. (2019). Using Android-based applications to support elementary school teachers to teach songs. *Journal of Physics: Conference Series*, *1318*(1), 1–7. https://doi.org/10.1088/1742-6596/1318/1/012041

Mokambu, F., Malabar, S., & Ardini, P. P. (2023). Development of Adobe Flash Application-Based Learning Media in Class Iv Public Alementary Cchool 4 Talaga Jaya. *Open Access Repository*, *10*(1), 20–31. https://doi.org/https://doi.org/10.17605/OSF.IO/98UKB

Novaliendry, D., Darmi, R., Hendriyani, Y., Nor, M., & Azman, A. (2020). Smart Learning Media Based on Android Technology. *International Journal of Innovation, Creativity and Change. Www.Ijicc.Net*, *12*(11), 715–735. Retrieved from www.ijicc.net

Noviyanti, V., Respati, R., & Pranata, O. H. (2021). Pengembangan Multimedia Tangga Nada Diatonis untuk Pembelajaran Seni Musik di Sekolah Dasar. *PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, *8*(2), 364–377. https://doi.org/10.17509/pedadidaktika.v8i2.35345

Nugraha, R. G., & Solihin, F. K. (2017). Model "Learning Cycle" To Increase Student Critical Thinking on Learning Concept of Ips Learning Environment in Elementary School. *Jurnal Pesona Dasar*, *5*(2), 34–45.

Purwanto. (2013). *Evaluasi Hasil Belajar* (Cet.4). Yogyakarta: Pustaka Belajar. Retrieved from https://pustaka.unm.ac.id/opac/detail-opac?id=38937

Riduwan. (2015). *Dasar-Dasar Statistika*. Bandung: Alfabeta. Retrieved from https://onesearch.id/Record/IOS2726.slims-191299?widget=1

Sadiman, A. S. (2005). *Media Pendidikan : pengertian, pengembangan, dan pemanfaatannya* (1st ed.). Jakarta: PT. Raja Grafindo. Retrieved from http://library.fip.uny.ac.id/opac/index.php?p=show_detail&id=2520

Silvia, F. N., Fahyuni, E. F., & Nadlif, A. (2023). Development of Tajwid Material Learning Video Based on Capcut Application for Elementary School Students. *EDURELIGIA: Jurnal Pendidikan Agama Islam*, *07*(01), 25–36. Retrieved from https://ejournal.unuja.ac.id/index.php/edureligia/article/view/5805

Sudarmo, S., Rasmita, R., & Satria, E. (2021). Investigation of best digital technological practices in millennial classroom innovation: critical review study. *International Journal of Social Sciences*, *4*(1), 98–105. https://doi.org/10.31295/ijss.v4n1.1371

Top, A., & Gökbulut, M. (2022). Android Application Design with MIT App Inventor for Bluetooth Based Mobile Robot Control. *Wireless Personal Communications*. https://doi.org/10.1007/s11277-022-09797-6

Widarti, H. R., Rokhim, D. A., & Kadafi, M. M. (2023). Android-Based Project-Based Learning Integrated Gravimetric Analysis for Chemical Expertise Analysis of Vocational School : Development of Teaching. *IJCER (International Journal of Chemistry Education Research)*, *7*(2), 94–104. https://doi.org/10.20885/ijcer.vol7.iss2.art10