JPPIPA 11(1) (2025)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Development of the Android Application Geography Science in Al-Qur'an (Geoscienqu) as a Learning Media for Geography to Enhance the Pancasila Profile Character of High School Students in Banda Aceh

Mice Putri Afriyani[1*], Rahmi Sofyan[2], Rossa Afriza[1], Aulia Margareta Prakatiwi[1]

[1] Department of Geography Education, Universitas Syiah Kuala, Banda Aceh, Indonesia.
[2] Department of Early Chilhood Education, Universitas Syiah Kuala, Banda Aceh, Indonesia.

Received: September 30, 2024
Revised: November 20, 2024
Accepted: January 25, 2025
Published: January 31, 2025

Corresponding Author:
Mice Putri Afriyani
m.putriafriyani@usk.ac.id

DOI: 10.29303/jppipa.v11i1.9306

Abstract: Learning media is something that educators must prepare to improve the quality of learning. Apart from that, the improvement of student character based on Pancasila must also be fostered by an educator in students. Student dependence on smartphones cannot be avoided, which has an impact on student character. Therefore, digital-based learning media is needed with a student Pancasila character approach. This research aims to develop the Geography Science in Al-Qur'an (GeoScienQu) Android application as an innovative geography learning medium, focusing on improving the character of high school students in Banda Aceh. This application is designed by integrating geography learning contained in the Al-Qur'an as a source of knowledge, and strengthening student character. The research results of the validity of the Geoscienqu application media before repairs were 86% and after repairs the results were 96.59%. Testing the effectiveness of the Geoscienqu application for material validation was 96.48% with very feasible criteria. Meanwhile, the practicality test of the Geoscienqu application in a small group was 86.75% and the practicality test in a large group was 88.25% with very practical criteria. Thus it can be concluded that the Geoscienqu application can be used as a learning medium to increase students' Pancasila profile.

Keywords: Geography science in the Al-Qur'an; Geoscienqu android application; Learning Media

Introduction

Education in Indonesia plays a strategic role in shaping the character of students as the next generation of the nation. High school is not only a place to acquire academic knowledge but also an important stage in the formation of students' character and moral values. This aligns with the opinion of Piaget (1950), a developmental psychologist, who stated that the high school stage is a time when students experience significant cognitive development. In addition, Gardner (1983), in his theory of multiple intelligences, also emphasizes the importance of character and moral development as an integral part of education. Gardner believes that education should not only focus on cognitive aspects but also on the moral and emotional aspects of students.

The world of education has allocated a significant portion to knowledge but has overlooked the main purpose of education, which is to develop knowledge, moral attitudes, and skills in a balanced manner (E. Siregar et al., 2023). The current decline of the Indonesian nation is not only caused by a moral crisis but also by an ethical crisis rooted in the lack of character education (Sitoris et al., 2022). Education is not merely a transfer of knowledge (Febriati et al., 2022), but is more broadly a process of cultural formation (enculturation), where the most important aspect is the cultivation of character and

How to Cite:
Afriyani, M. P., Sofyan, R., Afriza, R., & Prakatiwi, A. M. (2025). Development of the Android Application Geography Science in Al-Qur'an (Geoscienqu) as a Learning Media for Geography to Enhance the Pancasila Profile Character of High School Students in Banda Aceh. *Jurnal Penelitian Pendidikan IPA*, *11*(1), 1139–1148. https://doi.org/10.29303/jppipa.v11i1.9306

personality to advance towards a more progressive and civilized nation and society (Amir et al., 2024).

In the era of globalization and information technology, the use of technology in the learning process has become a necessity that cannot be overlooked. The development of technology facilitates the learning process for teachers and students and has a positive impact on the world of education. Technology plays a role as a facilitator in providing learning materials. It can design learning strategies, resources, and media to enhance the learning environment (Ningsih et al., 2024).

Android is one of the most widely used software in this era of globalization. Android is an operating system used on mobile phones (Haq et al., 2023) based on Linux, which is intended for use with various mobile devices such as tablets (Novaliendry et al., 2021). Because the Android operating system is open source (free to use) (El-Sofany et al., 2014; Sofyan et al., 2020), one of its advantages is that it is easy to develop. Students can learn independently more easily with the help of Android applications (Hasyim et al., 2020).

Android applications as learning Media can be an innovative solution to enhance the effectiveness of geography education (Rombe, 2024). The use of media in geography learning is essential because many topics are difficult to explain solely through verbal or written means. In the subject of geography, there are many materials that need to be visualized and connected to the realities of actual life (Larasaty, 2024). By utilizing the potential of technology, learning can be presented in an interactive and engaging manner, thereby stimulating students' interest and understanding of the subject of geography (Norsidi, 2024). The development of information and communication technology as a tool that can evolve according to the demands of the times to offer new things for education (Bali et al., 2019). In line with this, Robson et al. (2003) explain that in applying technology to the education sector, two basic conditions are required: the technology must make teaching strategies more effective, and the technology must always be available and accessible. One of the latest learning media that is very easily accessible is mobile learning, or learning through mobile phones.

The advantages of utilizing mobile learning in the learning process include helping students improve their literacy and numeracy skills, encouraging both independent and collaborative learning, assisting in overcoming barriers to using ICT, eliminating the formal aspects of learning, helping students maintain focus for extended periods, and boosting learners' self-confidence (Ghavifekr et al., 2015). Mobile learning that is widely used is learning through Android devices, which is increasingly popular and widespread among students and university students. However, the development of geography learning applications should not only present geographical information but also provide character values that align with the principles of Pancasila as the foundation of the Indonesian state. The integration of Pancasila values in geography education is expected to shape students' character to be of high quality, patriotic, and responsible (Aryani et al., 2022).

Strengthening character education through the Pancasila student profile for teachers is very important because children today live in the digital age, and even if we look at the conditions in the field, there has been an increasing decline in the character values of students (Karmedi et al., 2021). In order for the character of students to be able to develop well in accordance with the values of Pancasila, providing strengthening character education through the Pancasila student profile for teachers in learning media is one of the things that can be done (Sulastri et al., 2022).

In addition, the values of Pancasila as the foundation of the Indonesian state need to be deeply integrated into the educational process, including in geography learning in high schools (Sipuan et al., 2022). Students can build a strong moral and ethical foundation, learn to appreciate differences, work together, and act with integrity (Anita et al., 2024).

Students' character based on Pancasila is the key to shaping a generation that possesses national identity, patriotism, and resilience in facing the changes of the times. The importance of integrating geographical science and the values of Pancasila serves as a driving force for the development of the Android application "Geoscienqu." This application is designed to provide solutions related to these issues. Through an innovative approach, this application not only presents geography material in an engaging and interactive way but also integrates relevant teachings from the Quran within the context of geography. This will provide a new perspective that incorporates elements of spirituality into geography learning. By utilizing Android technology as a learning medium, it is hoped that the "Geoscienqu" application can stimulate students' interest in geography. The interactive features, animations, and multimedia content presented in the application will help students better understand abstract geography concepts, allowing them to connect their learning with the reality around them.

The novelty of this study lies in the following aspects: a) Integration of Al-Quranic Values in Geography Learning: This study develops a learning application that connects geographical concepts with spiritual and moral values contained in the Al-Quran, providing a holistic approach that has not been widely explored before; b) Use of Android-Based Digital Technology. The Geoscienqu application presents innovation in geography learning methods by utilizing Android technology, which facilitates student access to interactive learning materials anywhere and anytime; c). Improving the Pancasila Character Profile: This study not only focuses on mastering academic material, but also aims to shape student character based on Pancasila values, such as mutual cooperation, religiosity, and love of the homeland, which are important parts of character

education in Indonesia; d) Local Context of the Sharia-based Aceh Province.

By involving high school students in Banda Aceh, this study pays attention to the local cultural and religious context, thus producing results that are relevant to be applied in education based on strong local values. This research offers a new approach to geography education based on technology, spirituality, and character, which has not been widely implemented at the secondary school level.

Based on the problem description above, the author has developed a learning medium in the form of an Android application named GEOSCIENQU (Geography Science in the Qur'an). This Android application presents learning media with Islamic characteristics, featuring an attractive visual design about the geographical knowledge contained in the Qur'an. The objectives of this research are: a) To examine and evaluate the feasibility of the "Geoscienqu" application as a learning medium for geography to enhance students' Pancasila character; b) To examine and evaluate the effectiveness of the "Geoscienqu" application as a learning medium for geography to enhance students' Pancasila character; c) To examine and evaluate the practicality of the "Geoscienqu" application as a learning medium for geography to enhance students' Pancasila character.

Theoretical Basis

Learning media are tools that can be used by teachers to deliver lessons. Learning media can be defined as anything that can be used to convey messages to recipients and to stimulate the thoughts, feelings, attention, and interests of students so that the learning process can take place (Haudi, 2021).

Mobile learning from a technological perspective, it is the transmission and reception of educational material through portable mobile devices. This device has the ability to access the internet, search for and receive content, answer questions in forums, and try WAP or GPRS technologi (Katayeva, 2023).

Method

Model and Research Design

This research is a type of development research, or Research and Development (R&D), which aims to develop a new product or improve an existing product Sugiyono (2019) explains that the research and development model is a scientific method for researching, designing, producing, and testing the validity of the produced products. The research/development design used is the development of an Android-based application, with the model presented being an application that contains geography material in the form of the solar system, integrated with the Quran, designed based on the science of geography in the Quran.

Research Subject

Subject of Development

In this study, the subjects of development are experts (expert judgment), consisting of content experts and media experts. The content experts include one Islamic religious leader (Ustadz), a lecturer, and a teacher who serve as sources of information. The media expert consists of one lecturer from the Information Systems department at Syiah Kuala University.

Subject of the Trial

Product testing is conducted in two groups: small group testing and large group testing.

Data Collection Techniques

The data collection techniques used are as follows:

Interview

In this interview stage, the author will interview several research subjects to obtain the necessary data for developing the "Geoscienqu" application. The interviews will be open-ended, broadly structured around the research variables.

Observation

Observation is used as one of the data collection techniques when assessing the implementation and effectiveness of the developed product on children's abilities. The observation conducted is a structured observation using a Likert scale (S. Siregar, 2019).

Questionnaire

The survey technique is used to assess the quality of the "Geoscienqu" application in terms of content, appearance, and ease of use, filled out by a large group.

Data analysis

Data analysis is first conducted through instrument and product validity testing.

Validity Test

The validity of the observation instruments and questionnaires, as well as the products in this research, is tested using observation sheets and questionnaires, along with media products that will later support the assessment of the feasibility, effectiveness, and practicality of the learning media (Hutabri, 2022).

The validator values are then added up to obtain an average percentage, so that the criteria or level of validity of the product being developed can be determined, based on the provisions in Table 1 and Table 2 (Yati et al., 2023).

Table 1. Weight of Validity Assessment (Sugiyono, 2019)

Category	Score
Very good	4
Good	3
Not good	2

Category	Score
Very little	1

Next, the following validity criteria are presented:

Table 2. Criteria for Validity Level (Rahmata, 2021)

Validity Value	Criteria of Validity
85-100%	Very valid, or can be used without revision.
70-85%	Valid, or usable but needs minor revisions.
50-70%	Not valid enough, it is recommended not to be used as it requires major revisions.
0-50%	Not valid, or not allowed to be used.

The formula to determine the validity criteria (%) is

$$\text{Validitas} = \frac{\text{TSe}}{\text{TSh}} \times 100\% \quad (1)$$

TSe (Total Empirical Score) = total score from the validation questionnaire.
TSh (Total Maximum Score) = total maximum score of the validation questionnaire.

Feasibility Analysis

The data analysis technique to determine the feasibility of the "Geoscienqu" application as a geography learning medium is through descriptive statistical analysis. Descriptive statistics are used to analyze data by describing or depicting the collected data as it is, without intending to draw conclusions that apply universally or generalizations (Sugiyono, 2019). The results obtained from the data analysis are used as references to revise the application that has been developed. The survey results were analyzed using criteria with a scale of 4 to interpret the measurement results, also referred to as assessment. This scale of 4 was then categorized to evaluate validity, as shown in Table 3.

Table 3. Scale Categories

Score Value	Interpretation
4	Very deserving
3	Worthy
2	Less deserving
1	Not worthy

The score obtained is converted into a value on a 4-point scale as explained in table 4.

$$\text{Eligibility percentage } \% = \frac{\text{Score Obtained}}{\text{Ideal maximum scorel}} . 100\% \quad (2)$$

Table 4. Assessment Categories (Arikunto, 2019)

Achievement Presentation (x)	Interpretation
$76 \leq x \leq 100\%$	Worthy
$56 \leq x < 76\%$	Quite decent
$40 \leq x < 56\%$	Not worthy
$0 \leq x < 40\%$	Not feasible

Practicality Analysis

The practicality analysis is based on the responses from teachers and students in a small group trial. Below is the rating scale for the teacher and student response questionnaire for positive and negative statements in Table 5.

Table 5. Guidelines for Assessment of Response Questionnaires

Negative score	Positive score	Interpretation
1	4	Strongly agree (SA)
2	3	Agree (A)
3	2	Don't agree (DA)
4	1	Strongly disagree

Table 6. Practicality Level Criteria

Practical Value (%)	Practicality Level
85-100	Very practical, or can be used without revision
70-85	Very practical, or can be used without revision
50-70	Not practical, it is recommended not to use it because it needs major revisions.
0-50	Not practical, or should not be used

The formula for determining (%) practicality criteria is:

$$\text{Practicality} = \frac{\text{SRe}}{\text{SRh}} \times 100\% \quad (3)$$

SRe (Empirical Average Score) = average value of practicality questionnaire results SRh (Maximum Average Score) = maximum total average of the practicality questionnaire.

Result and Discussion

Development of Android Application Based Learning Media

The initial stage carried out in developing teaching media based on the Android application is determining the teaching material. In making teaching materials about the atmosphere that are integrated with the Al-Quran, starting from making PPT. This PPT file is then converted into APK form, which is an application that can be downloaded and installed on an Android smartphone.

The media and materials that have been developed are then tested for validity through a validation questionnaire filled out by two validators each, media experts and material experts. The results of media and material expert validation are described below.

Media Validation Results

Validation of the research "Development of the Geography Science in Al-Qur'an (GeoScienQu) Android Application as a Geography Learning Media in Improving the Pancasila Profile Character of Banda Aceh High School Students" was carried out by a validation process by a team of validators consisting of lecturers and teachers. This validator team was selected based on their competence and expertise in the field of geography education as well as their understanding of

the integration of Pancasila character values in the learning process.

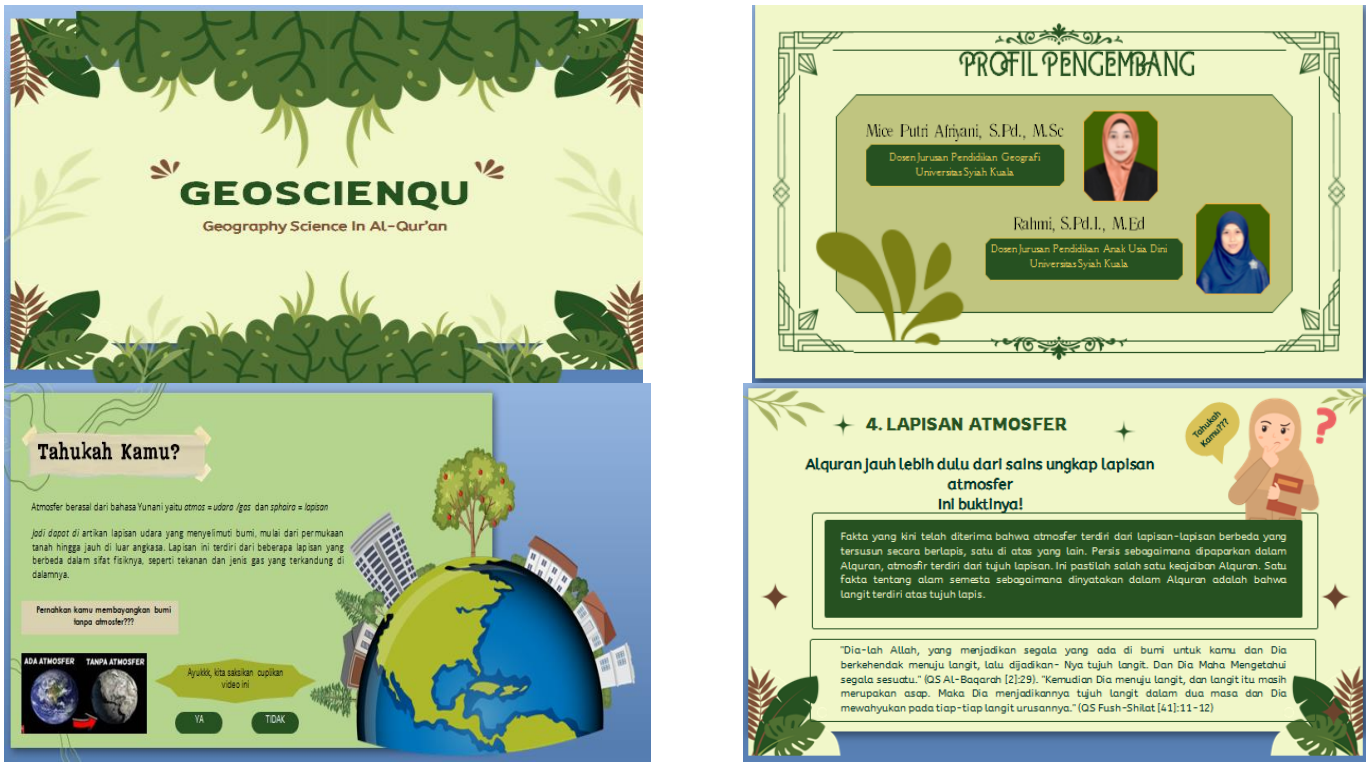

Figure 1 Example of the GEOSCIENCEQU application display

This validation process aims to ensure that the GeoScienQu application not only meets the pedagogical standards required in geography learning but is also effective in integrating Pancasila values in accordance with the applicable curriculum. The lecturers, who have an academic background in at the first stage of education and educational technology, focus on validating the theoretical and pedagogical aspects of this application. They evaluate whether the media presented in the application is in accordance with educational principles and curriculum and is adequate to support student character development in accordance with the Pancasila profile.

Meanwhile, the teachers involved as validators put more emphasis on the practical aspects of using this application in the classroom. They assessed the ease of use of the application, the relevance of the content to learning conditions at Banda Aceh High School, as well as the potential of this application in increasing students' learning motivation and understanding of geography material which is integrated with the values of the Al-Qur'an and Pancasila.

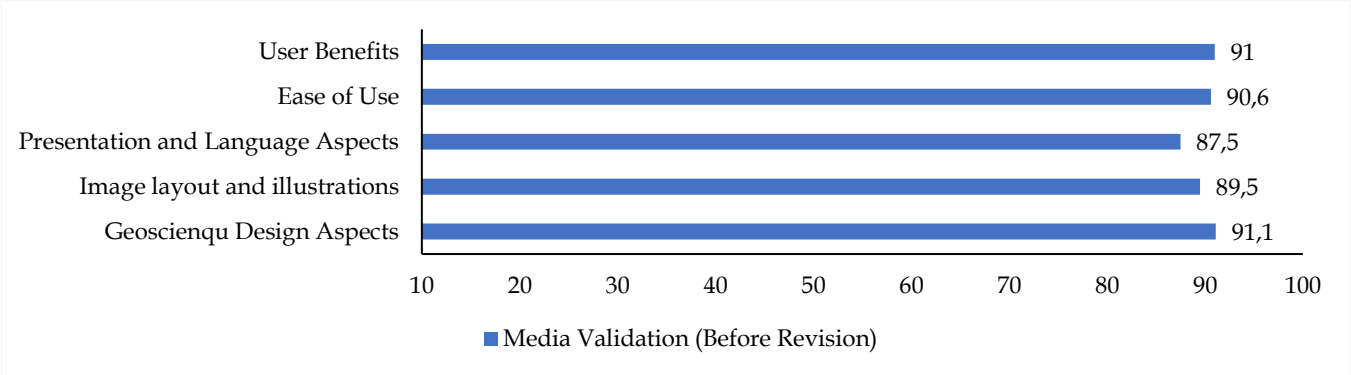

Figure 2. Media expert validation (before revision)

The results of this first stage of validation provide valuable input for improving the GeoScienQu application before it is tested further on Banda Aceh High School students. With collaboration between lecturers and teachers as validators, it is hoped that this application can become an effective learning media and be able to contribute to the development of student character in accordance with the Pancasila profile.

In the second stage of research validation "Development of the Geography Science in Al-Qur'an (GeoScienQu) Android Application as a Geography Learning Media in Improving the Pancasila Profile Character of Banda Aceh High School Students", an improvement process was carried out based on input obtained from validators consisting of lecturers and teachers. In the first stage, the validator team provided various input and suggestions to improve the GeoScienQu application. In this second stage, the improvement process focuses on implementing the recommendations provided by the validator. The lecturers and teachers, with their expertise in education and teaching practices, provided detailed feedback on various aspects of the application, including content, interface design, and user-friendliness methods. From the lecturer's side, the improvements made include improving geographic media so that it is more in line with the latest learning theories and more effective integration with Pancasila values.

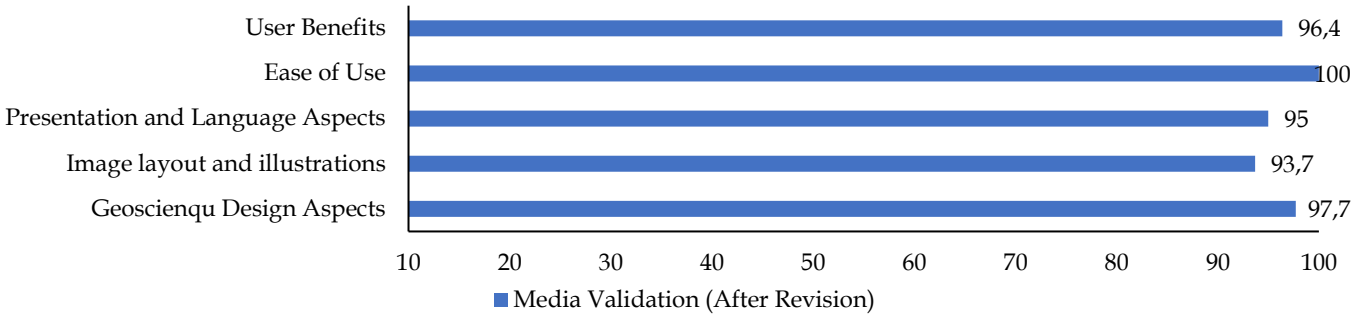

Figure 3. Media expert validation (after revision)

Some of the improvements implemented include adjusting the application interface to make it more intuitive and easier for students to use, as well as adding interactive features that support student involvement in the learning process. Apart from that, the teacher also suggested adding an evaluation element that allows students to measure their understanding directly. The improvements made at this stage aim to improve the quality and effectiveness of the GeoScienQu application in supporting the geography learning process at SMA Banda Aceh. By implementing suggestions and recommendations from validators, it is hoped that this application will not only become a useful tool for students in understanding geography material, but also contribute to character development in accordance with the Pancasila profile.

This improvement process is an important step in ensuring that GeoScienQu meets high educational standards and can be properly integrated into existing learning systems. It is hoped that ongoing validation and improvements will produce applications that are effective and relevant for the educational needs of Senior high school Banda Aceh. In order to improve the values of the Pancasila profile, which include moral and social dimensions, because many previous studies have emphasized more on improving academic learning outcomes and cognitive skills such as critical thinking and independent learning without measuring the values of Pancasila (Darmawati et al., 2023).

After improvements were made, an increase in the validity value of the media developed was obtained. The total validity value obtained increased from 89.59% before improvement to 96.59% after improvement. Every aspect of the media developed is categorized as "Very Appropriate", starting from the design aspect, image layout and illustrations, language presentation aspects, ease of use, and user benefits, all of which received a score of more than 85%. Overall, from the total validity value obtained, it can be seen that the media developed is in the "Very Appropriate" category (> 80%). The results of media validity are illustrated in Figure 4.

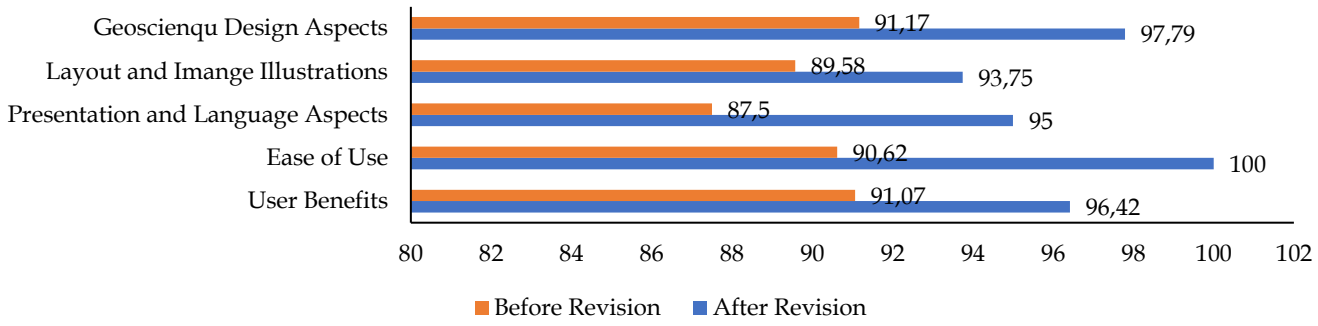

Figure 4. Comparison of media validity before and after revision

Material Validation Results

Based on the instruments given to validators (lecturers and teachers) related to the material contained in the GeoSceienQu application, there are no suggestions for improvement given by material validator experts, so no revisions have been made to the material presented in the GeoSceienQu application. It was found that every aspect assessed from the material validation was included in the "Very Appropriate" category, as was the overall validity, which was valued at 96.48%. The results of the validity of the material are made in graphic form in Figure 5.

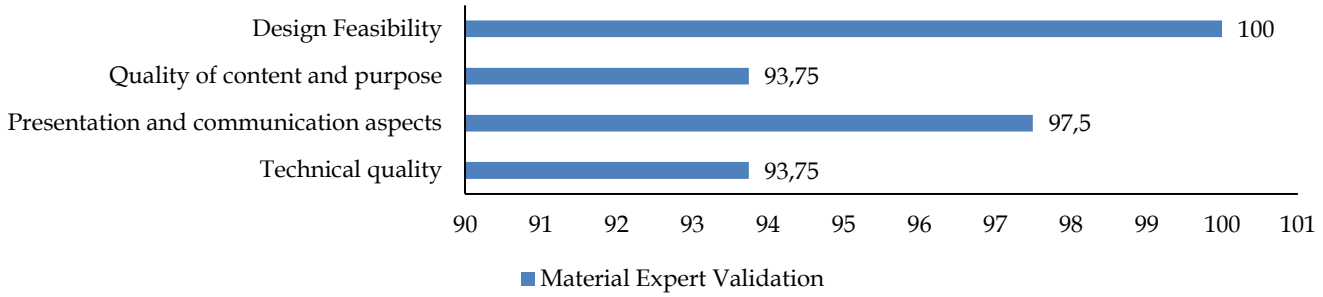

Figure 5. Material validity

Practicality Test

The purpose of the practicality test of learning media is to determine how practical the learning media that has been developed is (Purnomo et al., 2021). The media I created was tested on class X students of SMAN 5 Banda Aceh as a small group consisting of 15 people. This test was carried out to determine the practicality of the Geoscienqu Android Application Media, which was developed on a small scale. This small group trial is aimed at seeing whether or not improvements are needed in terms of the practicality of the media being developed before being tested on a large scale group (Tarigan et al., 2024). After the trial was carried out, the next step was to see the level of practicality of the media through a practicality questionnaire distributed to the small group. The following is a recapitulation of the results of the small group practicality test.

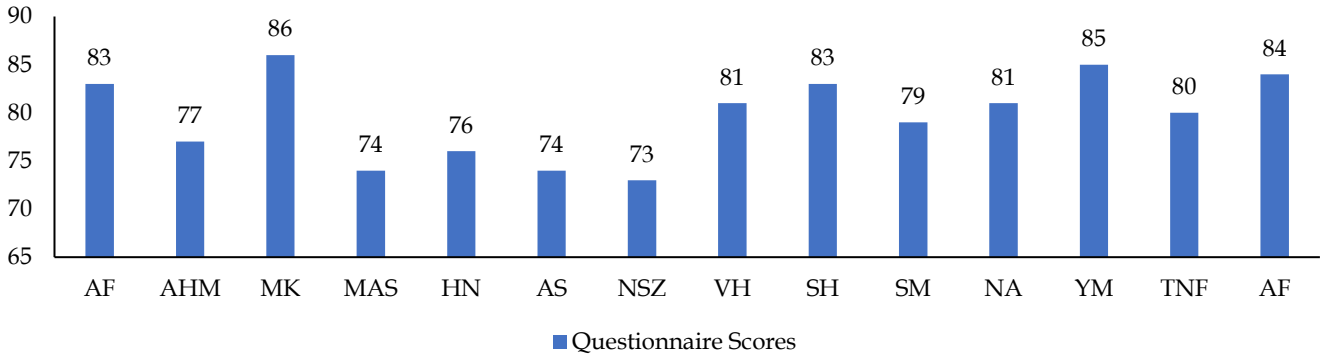

Figure 6. Small group student scores

Based on the table and calculations above, namely the results of practical trials in small groups with research subjects of 15 class X students at SMAN 5 Banda Aceh, an average score of 3.47 was obtained. Furthermore, the percentage level of media practicality is formulated as follows:

$$Practicality\ (\%) = \frac{3,47}{4} \times 100\% = 86.75\%$$

The results of the calculations above can be categorized as the media being developed in the "Very Practical" category, in this case it shows that there is no need for revision or improvement in the practicality of the Geoscienqu application media being developed. So it can be tested directly on large groups.

Next, the Geoscienqu application media developed was tested on class X students of SMAN 14 Banda Aceh in large groups consisting of 19 students and 26 students. This test was carried out to determine the practical effectiveness of the Geoscienqu application media developed by researchers.

The practicality trial was carried out by providing the Geoscienqu application media as a learning tool in class and continued by filling out a practicality questionnaire by class X students at SMAN 14 Banda Aceh. The following are the results obtained from

product trials on class X students at SMAN 14 Banda Aceh.

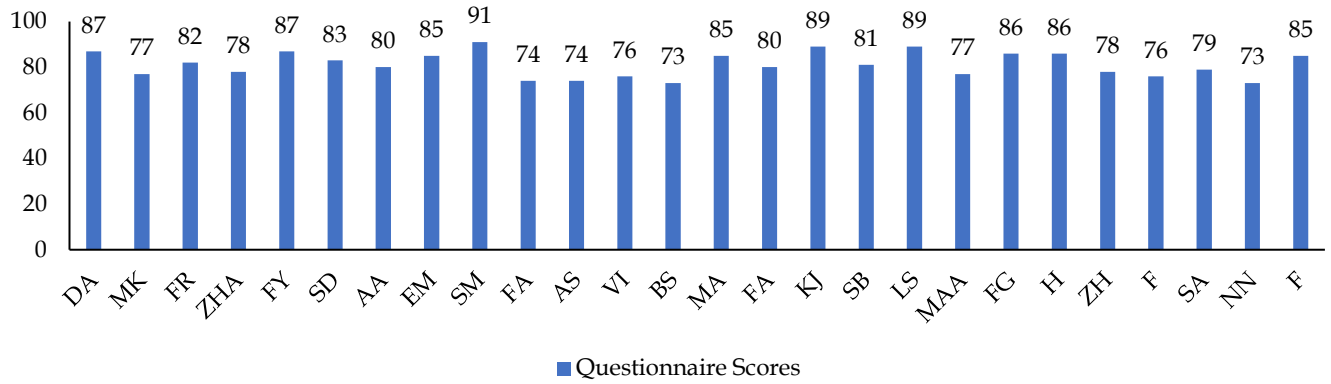

Figure 7. Large group student scores

Based on the table and calculations above, namely the results of practical trials in a large group, namely class X SMAN 14 Banda Aceh with 26 research subjects, an average score of 3.53 was obtained. Furthermore, the percentage level of practicality of Geoscienqu Android application media is formulated as follows:

$$Practicality\ (\%) = \frac{3.53}{4} \times 100 = 88.25\%$$

The results of the calculations above can be categorized as the Geoscienqu Android application media, which was developed as "Very Practical." So, in accordance with the calculations above, it can be concluded that the Geoscienqu Android application media developed is very practical for use as learning media in the classroom. Previous research Alfarizi et al. (2020) found that this Android-based interactive learning media meets the criteria of validity, practicality, and efficacy. The results of this study are further supported by earlier research Andrian et al. (2020), which demonstrates that this media is suitable for use in the learning process.

Conclusion

Android-based digital learning media GeoScienQu has been successfully developed. The validity or suitability of the GeoScienQu media, as well as the material presented in the SCIQU media, has been assessed by two validators each, a media expert and a material expert. The results of the validity assessment carried out for GeoScienQu comic media received validity values of 93.75%, 93.75%, 95.00%, 100%, and 96.43%, respectively, for the aspects of design, layout and illustrations, presentation and language, ease of use, and user benefits. All of them are in the “Very Eligible” category. Assessing the validity of the material, scores were obtained at 96.43%, 94.64%, and 100% for the contents, presentations, and learning strategies aspects, respectively. All three are also in the “Very Eligible” category. The results of the validity assessment of the GeoScienQu media show that the material and media itself are in the "Very Appropriate" category, so that the GeoScienQu comic media can be delivered to students in class and pass through the next stages of development, namely the Implementation and Evaluation stages. The results of the small group practicality test obtained a practicality level of 87%. The results of media trials in large groups found that the percentage of practicality for each school was 87% and 88.5%. These results show that the media category is very practical. The media effectiveness test results for each school were 79% and 85%, or the effective media category. Based on the results of the research and development that has been carried out, it can be recommended that applications be developed for other materials and for other grade levels.

Acknowledgments
Thank you to Syiah Kuala University for funding this research and all parties who have assisted this research.

Author Contributions
All authors contributed to writing this article.

Funding
This research is funded by Syiah Kuala University, Ministry of Education, Culture, Research, and Technology in accordance with the Research Implementation Task. Agreement [Research Expert Assistant] Fiscal Year 2024. Number: 496 Date May 3, 2024.

Conflicts of Interest
No conflict interest.

References

Alfarizi, S., & Prapanca, A. (2020). Pengembangan Media Pembelajaran Interaktif Berbasis Android pada Mata Pelajaran 3D di SMKN 2 Surabaya. *IT-Edu: Jurnal Information Technology*, *05*(No. 2), 693–701. Retrieved from https://ejournal.unesa.ac.id/index.php/jurnalpendidikan-teknik-mesin/article/view/44273

Amir, A., Akhiruddin, Rani, G., & Kasim, H. (2024).

Peran Guru Dalam Membangun Karakter Siswa Kelas X IPS 1 di SMA Nasional Makassar. *EDULEC: Education, Language, and Culture Journal*, *4*(1), 64–78. https://doi.org/10.56314/edulec.v4i1.215

Andrian, J., & Maksum, H. (2020). Development of Android-Based Learning Media in The Subjects of Planning and Installation Video Audio System. *EDUTEC: Journal of Education and Technology*, *3*(2), 193–203. Retrieved from http://ejournal.ijshs.org/index.php/edu/article/

Anita, Y., Kenedi, A. K., Putera, R. F., Ladiva, H. B., Qolbi, N., Elpina, & Akmal, A. U. (2024). A Flipped Classroom Learning Model Based on Social and Emotional Learning to Improve the Pancasila Student Profile Values in Science and Environment Learning. *Jurnal Penelitian Pendidikan IPA*, *10*(8), 4510–4518. https://doi.org/10.29303/jppipa.v10i8.8357

Arikunto, S. (2019). *Prosedur Penelitian : Suatu Pendekatan Praktik (Cetakan 5)*. Jakarta: Rineka Cipta.

Aryani, E. D., Fadjrin, N., Azzahro', T. A., & Fitriono, R. A. (2022). Implementasi Nilai-Nilai Pancasila Dalam Pendidikan Karakter. *Gema Keadilan*, *9*(3), 186–198. https://doi.org/10.14710/gk.2022.16430

Bali, M. M. E. I., Zuhri, R. A. A., & Agustini, F. (2019). *Ragam Media Pembelajaran: Desain Produksi dan Implementasinya di Madrasah Ibtidaiyah*. Pustaka Nurja.

Darmawati, A. Z., Raharjo, & Azizah, U. (2023). Development of Learning Tools With Flipped Classroom Models to Train Critical Thinking Skills for 4th Grade Elementary School Students. *Studies in Philosophy of Science and Education*, *4*(2), 56–65. https://doi.org/10.46627/sipose.v4i2.280

El-Sofany, H. F., El-Seoud, S. A., Alwadani, H. M., & Alwadani, A. E. (2014). Development of Mobile Educational Services Application to Improve Educational Outcomes using Android Technology. *International Journal of Interactive Mobile Technologies (IJIM)*, *8*(2), 4. https://doi.org/10.3991/ijim.v8i2.3509

Febriati, F., Jaya, D., Nurhikmah, H., & Sujarwo. (2022). English Teaching Materials With Flipped Learning Model in English Course. *Journal of Education Technology*, *6*(4), 643–651. https://doi.org/10.23887/jet.v6i4.45652

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, *1*(2), 175–191. https://doi.org/10.21890/ijres.23596

Haq, M. S., Roesminingsih, E., Setyowati, N. A. D., Ashadi, F., & Anggraini, D. D. (2023). Android-Based Internal Quality Audit Application Development at the Faculty of Educational Sciences State University Surabaya. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 6861–6869. https://doi.org/10.29303/jppipa.v9i9.4512

Hasyim, N., Gani, H. A., & Hatta, S. (2020). Android Based Multimedia Learning for Vocational High Schools. *Journal of Educational Science and Technology (EST)*, *6*(2), 193–204. https://doi.org/10.26858/est.v6i2.14275

Haudi. (2021). *Strategi Pembelajaran*. Padang: Insan Cendekia Mandiri.

Hutabri, E. (2022). Validitas Media Pembelajaran Multimedia Pada Mata Pelajaran Simulasi dan Komunikasi Digital. *Snistek*, *4*(2022), 296–301. Retrieved from https://ejournal.upbatam.ac.id/index.php/prosiding/article/view/5363

Karmedi, M. I., Firman, F., & Rusdinal, R. (2021). Pendidikan Karakter dalam Pembelajaran Sejarah Selama Pandemi Covid-19. *Journal of Education Research*, *2*(1), 44–46. https://doi.org/10.37985/jer.v2i1.45

Katayeva, M. (2023). Analysis And Recommendations On Mobile Learning In The Educational Process. *Scientific Journal of the Fergana State University*, *29*(3), 198–202. https://doi.org/10.56292/SJFSU/vol29_iss3/a40

Larasaty, D. (2024). Systematic Literature Review: Penggunaan Media Pembelajaran Berbasis Visual pada Pembelajaran Geografi Materi Litosfer. *Geodika: Jurnal Kajian Ilmu Dan Pendidikan Geografi*, *8*(1), 75–86. https://doi.org/10.29408/geodika.v8i1.25737

Ningsih, E. R., & Zulfitria. (2024). Pengaruh Teknologi Pendidikan dalam Pembelajaran. *Cendikia: Jurnal Pendidikan Dan Pengajaran*, *2*(5), 518–524. https://doi.org/10.572349/cendikia.v2i5.1644

Norsidi, N. (2024). Efektivitas dan Kelemahan Pembelajaran Interaktif Berbasis Articulate Storyline 3 Pada Mata Pelajaran Geografi di Kelas XII IPS SMA Wisuda Pontianak. *Geodika: Jurnal Kajian Ilmu Dan Pendidikan Geografi*, *8*(1), 32–40. https://doi.org/10.29408/geodika.v8i1.25728

Novaliendry, D., Huda, A., Sanita, D., Putra, D. A., Feiyska Nasution, M. D., Putra, R. S., & Hidayati, R. N. (2021). Android-Based Network Services Application Learning Media for Vocational High Schools. *International Journal of Interactive Mobile Technologies (IJIM)*, *15*(20), 83. https://doi.org/10.3991/ijim.v15i20.23745

Piaget, J. (1950). *The Psychology of Intelligence*. Routledge.

Purnomo, J., & Nuryanto, A. (2021). Pengembangan Media Pembelajaran Berbasis Aplikasi Android untuk Mata Pelajaran Teori Pemesinan Gerinda. *Jurnal Pendidikan Vokasional Teknik Mesin*, *9*(1), 81–86. https://doi.org/10.21831/teknik

Rahmata, A. (2021). Pengembangan E-Comic Matematika Berbasis Pendidikan Matematika Realistik (PMR) Bermuatan Etnomatematika

Materi Aritmetika Sosial. *MATHEdunesa*, *10*(1), 32–44. https://doi.org/10.26740/mathedunesa.v10n1.p32-44

Robson, T., & Hirst, D. G. (2003). Transcriptional Targeting in Cancer Gene Therapy. *BioMed Research International*, *2003*(2), 110–137. https://doi.org/10.1155/S1110724303209074

Rombe, S. (2024). Tinjauan Literatur Sistematis: Desain Pembelajaran Geografi di Era Digital. *El-Jughrafiyah*, *4*(2), 174–184. https://doi.org/10.24014/jej.v4i2.31434

Sipuan, S., Warsah, I., Amin, A., & Adisel, A. (2022). Pendekatan Pendidikan Multikultural. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *8*(2), 815. https://doi.org/10.37905/aksara.8.2.815-830.2022

Siregar, E., Irania, R., Putri, H., Hidayat, R., Rahma, A., Pangestu, A., & Latifah, A. (2023). Efektivitas Pembelajaran Pendidikan Agama Islam Dalam Membangun Moral Siswa. *Unisan Jurnal: Jurnal Manajemen Dan Pendidikan*, *2*(8), 216–220. Retrieved from https://jim.unisma.ac.id/index.php/fai/article/view/16578

Siregar, S. (2019). *Statistik Parametrik untuk Penelitian Kuantitatif Dilengkapi dengan Perhitungan Manual dan Aplikasi SPPS Versi 17*. Jakarta: Bumi Aksara.

Sitoris, R., Aulia, N. F., Akib, H., & Awaru, A. O. T. (2022). Membentuk Karakter Enterperneurship Untuk Mahasiswa. *EDULEC : Education, Language, and Culture Journal*, *2*(1), 1–6. https://doi.org/10.56314/edulec.v2i1.16

Sofyan, H., Isnantyo, F. D., Fu'adi, & Pratama, A. (2020). Online Learning Model in The Pandemic Time COVID 19 at SMK Negeri 1 Saptosari Yogyakarta. *Journal of Physics: Conference Series*, *1700*(1), 012070. https://doi.org/10.1088/1742-6596/1700/1/012070

Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.

Sulastri, S., Syahril, S., Adi, N., & Ermita, E. (2022). Penguatan pendidikan karakter melalui profil pelajar pancasila bagi guru di sekolah dasar. *JRTI (Jurnal Riset Tindakan Indonesia)*, *7*(3), 583. https://doi.org/10.29210/30032075000

Yati, M., Harsiati, T., & Arafik, M. (2023). Validity of Android Application-Based Interactive Media to Improve Literacy. *Jurnal Penelitian Pendidikan IPA*, *9*(10), 8627–8635. https://doi.org/10.29303/jppipa.v9i10.4657