Received : 24 February 2023
Revised : 12 April 2023
Accepted : 15 April 2023
Online : 24 April 2023
Published: 30 June 2023

DOI: doi.org/10.21009/1.09114

Developing Android Based *My Science App* Learning Media with a SETS Approach on The Topic of the Solar System in Elementary Schools

Fita Permata Sari[a)], Arief Budhiman[b)], Herry Prasetyo[c)]

PGSD, STKIP Majenang, Cilacap, Indonesia

✉: [a)]fitapermata@gmail.com, [b)]arief.edusains@gmail.com, [c)]herry19mait@gmail.com

Abstract

This study aimed to develop an android-based My Science App learning media with the Science, Environment, Technology, and Society (SETS) approach for elementary school students on the solar system. The subject in this study were 23 sixth-grade students of SD Negeri Salebu 03 Majenang. This type of research is Research and Development. The initial stage of the study was observing the learning media used in learning, then developing the design and producing the android-based My Science App learning media with the SETS approach. The resulting learning media can help students understand learning material. The results of the feasibility assessment of learning media by media experts obtained 93.75% with very feasible criteria, and the evaluation by content experts got 96.25% with very feasible criteria. This research produces appropriate learning media for solar system topics.

Keywords: developing android, learning media, the solar system

INTRODUCTION

The Covid-19 pandemic has hit worldwide, including Indonesia. It harms all sectors, including the education sector. Education plays an essential role in realizing the progress of the nation. Educating is also a means of shaping character (Arifudin & Raza 2022). Through education, a person's character is formed from the processes of changing mindsets and behavior for the better. In addition, education is also a means of developing 21st century skills (Gunadi et al. 2022) but in early 2020 the Covid-19 pandemic hampered the change process, so the Indonesian Ministry of Education and Culture as the holder of education control ordered to eliminate face-to-face learning and replace it with distance learning. This requires teachers to be more active and creative in providing material to students appropriately to develop the character and skills of 21st-century students.

The 21st-century brings a widespread change, namely the rapid development of Science and Technology (IPTEK). The rapid growth of technology impacts all aspects of life, including education. It challenges the education world to prepare students with 21st-century learning skills by utilizing technology. Teachers, as the frontline of education, must adjust and master the application of science and technology in the teaching and learning process.

The implementation of the 2013 curriculum demands the performance of innovative and creative learning with the integration of technology in every learning. Teachers are required to be creative in finding and collecting learning resources, as well as making teaching materials needed to help students learn to achieve learning objectives in accordance with the curriculum. By the Graduate Competency Standards and Curriculum Content Standards of 2013, the learning principle is to utilize information and communication technology to improve the efficiency and effectiveness of learning (Kemendikbud

2016). Thus, teachers as educators must be able to integrate technology as a media and knowledge resource in the learning process.

Learning resources are information presented in various forms, such as prints, videos, software formats, or formats that students or teachers can use. Learning media is a form of teaching and learning that involves students and teachers using learning resources both in and outside the classroom. Learning resources that students in learning activities usually use are as teaching materials in package books (Sari 2020).

Based on the results of an interview with a sixth-grade teacher at SD Negeri Salebu 03, teachers during the Covid-19 pandemic teachers only gave assignments to students. Teachers and students rarely use Android as a learning resource in class, even though they can operate Android devices properly, even under parental supervision. However, the availability of facilities and human resources has yet to be optimally utilized in science learning.

Science learning should present information and facts to students and provide practical value about everyday life (Edwin & Henk 2019). Science learning is an interaction between educational subjects and objects consisting of objects and events, processes, and products. Interaction with objects can occur directly or indirectly when direct interaction with things is impossible. Not all natural science symptoms and phenomena can be observed directly with the naked eye. Therefore, it requires tools to turn something abstract into the concrete.

One of the science subjects for elementary school students is the solar system. The concept of the solar system is closely related to real life. In the solar system topic, the basic competence (BC) that must be achieved by BC 3.7 is that students can explain the solar system and the characteristics of members of the solar system and BC. 4.7, students are able to model the solar system. The solar system covers concepts that cannot be seen by the naked eye (abstract) and phenomena that require observation. Therefore, the students must pay attention to what they are learning. The students stated that if the teacher uses visual media, both teaching and learning science can be more effective (Afriza & Nasution 2022). A large amount of science material was not comparable to the allocation time; moreover, it was still teacher-centered which affected the level of learning difficulty (Khadka et al. 2022). The solutions for those matters are giving appropriate time allocation and supporting the student-centered learning approach. To achieve these basic competencies (BC), students need tools in the form of learning media that can motivate and improve their understanding so that students have no misconceptions about it.

One of the learning media that can help students is mobile learning. According to Chan et al. (2022), mobile learning can properly utilize mobile phones that were initially only used for telephone or the internet. Mobile phones can be used as complete learning tools and resources that contain subject matter, practice questions and are equipped with various features such as search, jump to, and back. One of the considerations in developing Android as a media and learning resource is that the operating system base used is open source.

Mobile learning-based learning media has been widely developed, for example, by Ariani et al. (2014), which produce Chemo-Edutainment-based learning media that have educational value and are entertaining and fun for users. In addition, Budhiman et al. (2021) also developed an interactive science learning media based on adobe flash. However, interactive science learning media created only for particular material and questions in the application cannot be added and updated. Benali & Ally (2020) also developed Android-based software in the research to produce mobile phone-based learning media. Still, the developed application is only compatible with the operation of the froyo version of the Android system. At the same time, the Android operating system primarily embedded in smartphones today is the Kitkat version.

Mobile learning has three advantages; facilitating technology transfer, increasing students' desire to learn, and increasing mobility in the learning process regarding information and evaluation (Lai 2019). Students will also have an easier time accessing lessons anywhere and anytime, commonly called distance learning (Traxler 2018). In line with the research conducted by Cahyani et al. (2022), the developed media is practical, unlike ordinary devices, because Android has a large amount of storage, local memory, and operating units such as computers (Kibona & Rugina 2015). In terms of students, they can work independently, supported the fact that almost every student owns an android-based smartphone so it can be utilized to keep the learning process in the classroom (Lin & Tsai 2021).

Teachers need to find ways to make learning exciting and fun. Teachers must be able to choose the suitable media as a learning resource appropriate to the learning objectives and student characteristics and support the delivery of material that is facts, concepts, principles, or generalizations (Yusuf 2021).

The concept of science is straightforward to understand because it is close to humans (Holzinger 2021). Science learning aims for students to have seven abilities: to develop curiosity, a positive attitude, and awareness of the interrelationships between science, environment, technology, and society. The relationship developed a learning approach with the SETS (Science, Environment, Technology, and Society) approach.

SETS is an approach that focuses on learning about the environment by uncovering and uncovering the causes of problems and the possibilities that can cause future problems. The SETS approach emphasizes student activities for learning to know, learning to do, learning to be, and learning to live together. Students must be active in learning and the teacher serves as a facilitator. The science learning objectives will be achieved by combining mobile knowledge and SETS. The advantage of the application that has been developed compared to other learning media is that this application has been integrated with the SETS approach.

In the SETS approach, there is a conscious desire to provide the best for human life, which also impacts other things. Because if it is only related to human interests, other organisms may not have the opportunity to live together, except for those considered beneficial. This becomes more worrying when dealing with greedy people, mean, have bad attitudes, and the like, who are the primary targets for implementing the SETS approach to improve their behavior.

The learning implications of the SETS approach and approach, if implemented seriously, will certainly benefit various parties, the students themselves, educators, and society (Binadja 2006). Furthermore, the SETS vision and approach allow for maintaining positive values of education, religion, culture, and character (Binadja 2007). This opinion is reinforced by Wedyawati (2014) that learning science with the SETS approach makes a more profound contribution to responsiveness to the environment. So that SETS can provide an essential role in self-learning and the environment.

By applying the SETS approach to elementary school and equivalent, students between the ages of 6-12 years (normal conditions) have different abilities in capturing messages. Therefore educators are expected to be able to use more straightforward language when taking examples to show how to think using the SETS approach should start from real objects that are close to their daily lives. Daily examples around students will make it easier for students to understand when it must be related to the concepts students want to learn (Binadja 2007). So that, science learning is appropriate when using the SETS approach in its application in schools. This is supported by Sarie et al. (2016), which state that the SETS approach aligns most with the nature of science learning.

Based on the background outlined, developing Android-based My Science App learning media with a SETS approach in schools in science learning, especially on solar system materials, is important.

METHODS

This is development research that develops and produces Android-based My Science App learning media with the SETS approach. This procedure is a development of Borg and Gall which was adopted by Sugiyono (2014). It consists of four stages: introduction, product design, design validation, and product trial.

The subject of this research is the sixth graders in the academic year of 2021/2022. There are twenty-three students: fifteen male and eight female students. Moreover, the object is My Science App Android-based learning media with the SETS approach.

The app developed was then validated by experts and tested on students. The validation was performed to ensure the developed application can be used properly. The questionnaire used is a modified Likert scale. In the topic/instrument table entered into the questionnaire, such as user-friendliness, display text, and images. The expert validation questionnaire sheet was intended to determine the eligibility and legibility of Android-based My Science App learning media. Validation was obtained from four experts: two media experts and two material experts consisting of two lecturers and two teachers.

The product trial was carried out once in the form of data on student responses to learning media. Product trials were conducted on class VI students consisting of 23 students. After using the android-based My Science App learning media with the SETS approach, students responded in a questionnaire sheet to assess the learning media used. Operational trials are carried out after experts have evaluated and approved the learning media. In the operational trial, feasibility was measured with a readability questionnaire. The model implementation is carried out in real conditions. Five aspects are assessed: visual; navigation icon; language; attractiveness; material clarity.

The eligibility test questionnaire is used to determine the eligibility level of Android-based My Science App learning media with the SETS approach to be utilized in everyday use in learning. This questionnaire consists of statements on several aspects of the assessment that have been adjusted to the material eligibility questionnaire filled out by experts selected as respondents. Aspects assessed are appearance, navigation icons, language, attractiveness, and clarity of topic. The eligibility test questionnaire uses a modified Likert scale: strongly agree with a score of 4, agree with a score of 3, disagree with a score of 2, and disagree with a score of 1. Respondents from the eligibility test consist of 2 material experts, two media experts. The eligibility level criteria for android-based learning media with the SETS approach are presented in TABLE 1.

TABLE 1. Criteria for the level of validation results (Sugiyono 2014)

Criteria	Description
1.00-50.00	Not satisfied
50.01-70.00	Neutral
70.01-85.00	Satisfied
85.01-100	Very satisfied

RESULTS AND DISCUSSION

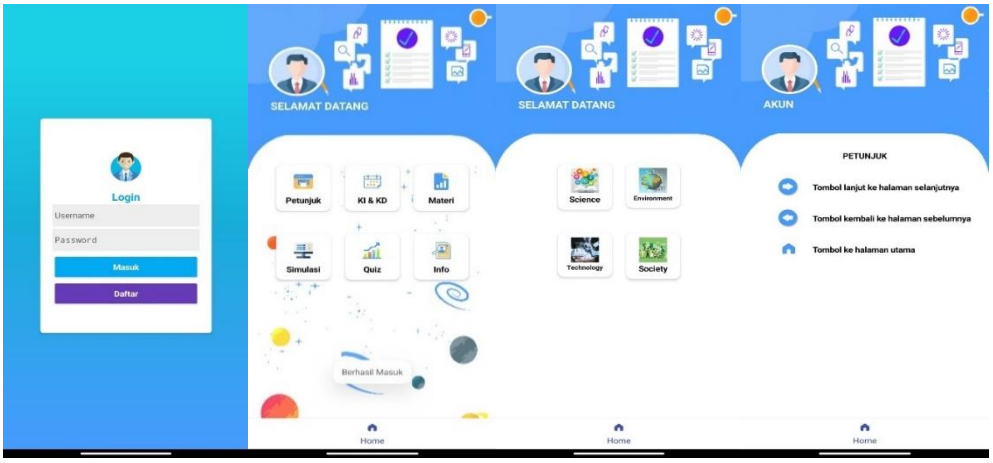
Result

The learning media developed in this study is Android-based with the SETS approach. Before android-based learning media with the SETS approach is tested on students, the learning media must be assessed by experts. Therefore, based on research procedures, measuring the eligibility of developing android-based learning media with the SETS approach can be seen from the validation sheets assessed by experts, material experts, and media experts. The results of the assessment of media experts can be seen in TABLE 2.

TABLE 2. The Eligibility Analysis Result of Media Experts

Validators	Aspects			
	Software Engineering		Visual Communication	
	Score	%	Score	%
G-1 (first validator)	19	95	18	90
D-1 (second validator)	19	95	19	95
Mean	19	95	18.5	92.5
Criteria	Very Satisfied		Very Satisfied	
Total	93.75			
Criteria	Very Satisfied			

The results of the media eligibility test by two validators obtained an average score of 95% on the software engineering aspect and 92.5% on the visual communication aspect. Based on TABLE 2, the average score of the two aspects is software engineering and visual communication was 93.75% with the "Very Satisfied" criteria. The assessment conducted by media experts explained that android-based learning media with a SETS approach must be presented as attractive as possible to attract students' attention. The display of Android-based learning media with the SETS approach can be seen in FIGURE 1.



1a 1b 1c 1d

FIGURE 1. The Display, after being Revised by Media Experts

FIGURE 1a is the login screen where you have to enter your email and password. Students must register first, then log in. FIGURE 1b is the initial display after students enter the application. Inside there are menus for "Instruction", "Basic Competence", "Material", "Simulation", "Quiz", and "Info". FIGURE 1c is a sub-menu of "Material" which contains SETS. After validation by media experts, the material experts validate android-based learning with a SETS approach. The result of the eligibility analysis is presented in TABLE 3.

TABLE 3. Results of Eligibility Test Analysis by Material Experts

Validators	Aspects			
	Software Engineering		Visual Communication	
	Score	%	Score	%
G-2 (third validator)	31	96.88	8	100
D-2 (fourth validator)	30	93.75	8	100
Mean	30.5	95.30	8	100
Criteria	Very Satisfied		Very Satisfied	
Total	96.25			
Criteria	Very Satisfied			

Based on TABLE 3, it is known that in the eligibility test results of Android-based learning media with the SETS approach, media experts provide an average score of 93.75% with the "Very satisfied" criteria, and material experts provide an average score of 96.25% with the "Very satisfied" criteria.

Operational trials are carried out after experts have assessed and approved the learning media. The media was piloted in terms of legibility to the operational trial class. The operational trial class uses class VI with a total of 23 students. Operational trials are carried out without the learning process since the student has obtained the material. The average value of each aspect of legibility in the limited-scale trial can be seen in TABLE 4.

TABLE 4. The Average Score of Readability Test of Learning Media in Operational Trials

Respondents	Assessment Aspects (%)				
	Visual	Navigation Icon	Language	Attractiveness	Material Clarity
Operational Trial Test	100	100	100	100	100
Criteria	Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied

Based on TABLE 4, the average respondents in the operational trial gave "Excellent" responses to each aspect of the readability test.

Discussion

This research produced an android-based learning media with the SETS approach. Media stages are based on the learning media development process, including product development, product validation, and product trials.

Android-based learning media is an alternative media that can be used in the learning process. Android-based learning media can help students understand the material (Ibrahim & Ishartiwi 2017; Ipin 2018; Rachma et al. 2020). Media in the form of an application used on Android smartphones and its appearance is able to combine text, images, and videos. This is in accordance with the results of research from Safitri et al. (2019), which shows that Android-based learning media is quite helpful for students to be more enthusiastic about doing assignments through their respective gadgets. Features developed in the application My Science App can make it easier for students to learn about the solar system.

The login menu is used to enter the My Science App application. On the login menu, there are two submenus, namely login and register. If you don't have an account, you must register by entering your username and password. The main menu contains learning media features, namely "Instructions", "KI & KD", "Material", "Simulation", "Quiz", and "Info". The main menu is equipped with a "Home" button. The "Instructions" feature contains instructions for using learning media. This feature consists of a next button, a back button, a "Home" button to go to the main menu. The "Instruction" feature is also equipped with an explanation of each feature in the media. The "KI & KD" feature contains Core Competencies (KI) and Basic Competencies (KD) in the 2013 class VI curriculum regarding solar system material. The "Material" feature contains solar system material that has been integrated with environmental, technological, and societal aspects. The appearance of "SETS" feature is equipped with pictures that can attract students' attention. The "Simulation" feature contains an overview of the earth's rotation and revolution. This feature is equipped with Phet and YouTube simulation links related to the rotation and revolution of the earth. The "Quiz" feature contains ten multiple-choice questions. The "Info" feature contains developer data.

The SETS approach is contained in the "Materials" feature, which consists of materials and images. The material on the media is the solar system delivered by integrating SETS. This media for elementary school students is focused on the influence of the earth's rotation and revolution on the environment around us and the application of environmentally friendly technologies such as solar panel technology. Media has been developed based on the material contained in the elementary curriculum.

Validation of learning media is obtained from the assessment of validators, media experts, and material experts. The validation results of learning media from media experts obtained an average percentage of 93.75% of very satisfied criteria, and assessments from material experts got 96.25% of very feasible criteria. These results show that validators provide value to Android-based learning media with a SETS approach with "Excellent". This result is in accordance with the research of Firdaus et al. (2020), which states that Android-based learning media with the SETS approach is feasible to use in learning activities based on validity tests. The research results from Azzahra et al. (2022) and Wahyu et al. (2020) also stated that learning media with a SETS approach with good validity and readability are effectively used in learning.

Based on the product validation results, it can be concluded that Android-based learning media materials with the SETS approach "Feasible" are used in elementary school science learning. The quality of Android-based learning media with excellent criteria shows that media is worthy of being used as a source of student learning (Amirullah et al. 2017; Pahlifi et al. 2019).

The media still has a slight improvement. Some media improvements have been adapted to media experts' and material experts' suggestions and input. After the initial product revision was carried out, the product was consulted back to the expert. The results of the media consultation stated that the media could already be used to retrieve research data. The aspects contained in the media validity test, including software, visual communication, content, and linguistics, have been appropriately fulfilled by the assessment of media and materials.

Operational trials were conducted for class VI at randomly selected SD Negeri Salebu 03, considering that students had received solar system material. Operational trial students provide advice as a consideration in improving media.

The results of the recapitulation of the reading test with display aspects reached 100%, aspects of navigation icons with a score of 100%, aspects of language with a score of 100%, aspects of attractiveness with a score of 100%, and aspects of material clarity with a score of 100%. The research results in TABLE 4 regarding a limited-scale test show that Android-based learning media with the SETS approach received very good responses from students and were declared "Eligible". The results of developing Android-based learning media are included in the category of valid and practical use in learning (Hashim et al. 2020; Muhimmatin & Ni 2021).

CONCLUSION

The learning media developed is the Android-based My Science App learning media with the SETS (Science, Environment, Technology, and Society) approach for elementary school students in solar system material based on media development, media validation, and media trials. Media has been successfully developed contextually with the SETS approach in every media feature. The available features are the instruction feature containing instructions for using the application, the CC & BC (core competencies and basic competencies) features containing the core competencies and basic competencies of the solar system material, the material feature containing material integrated with SETS, the simulation feature containing PhET simulations about the solar system, the quiz feature having question training, and the developer feature containing biodata from the developer.

The eligibility results of Android-based My Science App learning media with the SETS (Science, Environment, Technology, and Society) approach for elementary school students on solar system materials were obtained from media experts by 93.75% and material experts by 96.25% with very satisfied criteria. The results of the operational trial as a media legibility test obtained excellent criteria.

REFERENCES

Afriza, DA & Nasution, NEA 2022, 'Comparison of The Learning Outcomes of Junior High School Students Utilizing Audio-Visual and Chart Learning Media to Study Ecosystem', *META: Journal of Science and Technological Education*, vol. 1, no. 1, pp. 46-57.

Amirullah, G & Hardinata, R 2017, 'Pengembangan mobile learning bagi pembelajaran', *Jurnal Kesejahteraan Keluarga dan Pendidikan*, vol. 4, no. 2, pp. 97-102.

Ariani, S, Siahaan, J & Juniadi, E 2014, 'Pengaruh Penggunaam Media Kartu dengan Metode Chemo-Edutainment terhadap Hasil Belajar Kimia Pada Materi Pokok Hidrokarbon Kelas X SMA Negeri 1 Kuripan Tahun Ajaran 2012/2013', *Jurnal Pijar MIPA*, vol. 8, no. 1, pp 27-31.

Arifudin, O & Raza Ali, H 2022, 'Teacher Personality Competence In Building The Character Of Students', *International Journal of Education and Digital Learning (IJEDL)*, vol. 1, no. 1, pp. 5-12, doi: 10.47353/ijedl.v1i1.3.

Azzahra, A, Sunaryo, S & Budi, E 2022, 'Pengembangan E-Modul Interaktif Berbasis Pendekatan SETS (Science, Environment, Technology, And Society) Menggunakan Program Lectora Inspire pada Materi Sumber Energi Terbarukan Kelas XII SMA', *Prosiding Seminar Nasional Fisika (E-Journal)*, vol. 10, no. 1, p. 73, https://doi.org/10.21009/03.SNF2022.02.PF.12.

Benali, M & Ally, M 2020, 'Towards a Conceptual Framework Highlighting Mobile Learning Challenges', *International Journal of Mobile and Blended Learning*, vol. 12, no. 1, pp 51-63, https://doi.org/10.4018/ijmbl.2020010104.

Binadja, A 2006, 'Pembelajaran Pendekatan SETS untuk Sekolah Dasar dan yang Sederajat', Laboratorium SETS Unnes, Semarang.

Binadja, A 2006, 'Peningkatan Kesiapan Guru SMA Kota Demak (melalui Visi SETS/Salingtemas) dalam menghadapi sertifikasi', *Makalah Seminar Nasional*, Semarang, Laboratorium SETS Unnes.

Budhiman, A, Subali, B & Supriyadi, S 2021, 'Implementasi Media Pembelajaran IPA Berbasis Adobe Flash CS6 untuk Meningkatkan Kemampuan Metakognisi Siswa SMP', *UPEJ Unnes Physics Education Journal*, vol. 10, no. 3, pp. 216-226, https://doi.org/10.15294/upej.v10i3.55668.

Cahyani, DR, Kurniasih, D, Fadhilah, R 2022, 'Kahoot!-Based Evaluation Instruments on Acid-Base Materials', *Journal of Education and Learning (EduLearn)*, vol. 16, no. 1, pp. 16-24.

Chan, YF, Narasuman, S & Selamat, N 2022, 'Mediating Effects of Mobile Phone Use on the Relationship between Mobile Addiction and Academic Behavior', *International Journal of Instruction*, vol. 15, no. 3, pp. 483-502.

Edwin, K & Henk WDR 2020, 'Science and Values in Undergraduate Education', *Science & Education*, vol. 29, pp. 123-143, https://doi.org/10.1007/s11191-019-00093-7.

Firdaus, F, Suryanti, S & Azizah, U 2020, 'Pengembangan Multimedia Interaktif Berbasis Pendekatan SETS Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar', *Jurnal Basicedu*, vol. 4, no. 3, pp. 681-689, https://doi.org/10.31004/basicedu.v4i3.417.

Gunadi, G, Haryono, H & Purwanti, E 2022, 'The Analysis of 21st Century Learning Implementation and Competency Achievement of Junior High School Students in 3T Regions', *Innovative Journal of Curriculum and Educational Technology*, vol. 11, no. 1, pp. 10-18, doi: 10.15294/ijcet.v11i1.44847.

Hasyim, N, Gani, HA & Hatta, S 2020, 'Android Based Multimedia Learning for Vocational High Schools', *Journal of Educational Science and Technology (EST)*, vol. 6 no. 2, pp 193-204, https://doi.org/10.26858/est.v6i2.14275.

Holzinger, A 2021, 'The Next Frontier: AI We Can Really Trust, Machine Learning and Principles and Practice of Knowledge Discovery in Databases' Communications in Computer and Information Science', *Proceedings, Cham: Springer International Publishing*, vol. 1524, pp. 427-440, https://doi.org/10.1007/978-3-030-93736-2_33.

Ibrahim, N & Ishartiwi, I 2017, 'Pengembangan Media Pembelajaran Mobile Learning Berbasis Android Mata Pelajaran Ipa Untuk Siswa SMP', *Refleksi Edukatika : Jurnal Ilmiah Kependidikan*, vol. 8, no. 1, https://doi.org/10.24176/re.v8i1.1792.

Ipin, A 2018, 'Konsep Dan Aplikasi Mobile Learning Dalam Pembelajaran Biologi', *Jurnal Bio Educatio*, vol. 3, no. 1, pp. 2541-2280.

Khadka, J, Joshi, DR, Adhikari, KP, Khanal & Bishnu 2022, 'Learner-Centered Instruction: Teachers' Practice in Online Class of Mathematics during COVID-19 Pandemic in Nepal', *International Journal of Instruction*, vol. 15, no. 3, pp. 831-852.

Kibona, L & Rugina, JM 2015, 'A Riview on The Impect of Smartphone on Academic Performance of Students in Higher Leraning Institutions in Tanzania', *Journal of Multidisciplinary engineering Science and Thecnology (JMEST)*, vol. 2, no. 4, pp. 673-677.

Lai, C 2019, 'Trends of mobile learning: A review of the top 100 highly cited papers', *British Journal of Educational Technology*, vol. 61, no. 3, pp. 721-742, https://doi.org/10.1111/bjet.12884.

Lin, H, Tsai, S 2021, 'Student Perceptions towards the Usage of AR-Supported STEMUP Application in Mobile Courses Development and Its Implementation into English Learning', *Australasian Journal of Educational Technology*, vol. 37 no. 3, pp. 88-103.

Muhimmatin, I & Jannah, I 2021, 'Aplikasi mobile berbasis android sebagai media tes prior knowledge mahasiswa biologi', *Jurnal Inovasi Pendidikan IPA*, vol. 7, no. 1, pp. 1-11, https://doi.org/10.21831/jipi.v7i1.34335.

Pahlifi, D & Fatharani, M 2019, 'Android-based learning media on human respiratory system material for high school students', *Jurnal Inovasi Pendidikan IPA*, vol. 5, no. 1, pp 109-116, https://doi.org/10.21831/jipi.v5i1.25111.

Rachma, YP, Setyadi, D & Mampauw, HL 2020, 'Pengembangan Mobile Learning Barusikung Berbasis Android pada Materi Bangun Ruang Sisi Lengkung', *Mosharafa: Jurnal Pendidikan Matematika*, vol. 9, no. 3, pp. 475-486.

Safitri, I, Pasaribu, R, Simamora, SS & Lubis, K 2019, 'The Effectiveness of Android Application as A Student Aid Tool in Understanding Physics Project Assignments', *Jurnal Pendidikan IPA Indonesia*, vol. 8, no. 4, pp. 512-520, https://doi.org/10.15294/jpii.v8i4.19433.

Sari, FP, Prasetyo, H & Kuswanto, H 2020, 'Physics comics learning media based on Engklek traditional games on parabolic motion topics to improve creativity', *Journal of Gifted Education and Creativity*, vol. 7, no. 2, pp. 83-89, https://dergipark.org.tr/en/pub/jgedc/issue/55995/714870.

Sarie, FN, Rahayu, ES & Isnaeni, W 2016, 'Pendekatan Contextual Teaching and Learning Bervisi SETS dalam Mengoptimalkan Multiple Intelligence dan Hasil Belajar', *Journal of Primary Education*, vol. 5, no. 2, pp. 81-87, https://doi.org/ 10.15294/jpe.v5i2.12896.

Sugiyono 2014, 'Metode Penelitian Kuantitatif kualitatif dan R&D', Bandung, ALFABETA.

Traxler, J 2018, 'Distance Learning Predictions and Possibilities', *Education Sciences*, vol. 8, no. 1, p. 35, http://doi.org/10.3390/educsci8010035.

Wahyu, DL, Yuhanna, WL & Lukitasari, M 2020, 'Pengembangan Media Bio Pop-Up Book Terintegrasi Science, Environment, Technology, And Society (SETS) Pada Pembelajaran Biologi Materi Daur Biogeokimia', *Jurnal Edukasi Matematika dan Sains*, vol. 8, no. 2, pp. 130-139, http://doi.org/10.25273/jems.v8i2.7442.

Wedyawati, N 2014, 'Pembelajaran IPA Bervisi SETS untuk Peningkatan Prestasi Belajar dan Peningkatan Sikap Tanggap Bencana Siswa Kelas IV SD Swasta & Negeri (SD Kristen Imanuel Nanga Pinoh & SD Negeri 1 Nanga Pinoh)', *Vox Edukasi: Jurnal Ilmiah Ilmu Pendidikan*, vol. 5, no. 2, pp. 115-124, https://doi.org/10.31932/ve.v5i2.133.

Yusuf, N 2021, 'The Effect of Online Tutoring Applications on Student Learning Outcomes during the COVID-19 Pandemic', *Italienisch*, vol. 11, no. 2, pp. 81-88.