

# Student Responses and Effectiveness of Android Media as Chemistry Learning Media During the Covid-19 Pandemic

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## ABSTRAK

Pandemi covid 19 menyebabkan pembelajaran tidak dapat dilaksanakan secara tatap muka melainkan melalui daring dengan menggunakan smartphone. Penelitian ini bertujuan untuk menganalisis efektivitas media android sebagai media pembelajaran kimia pada masa pandemi. Jenis penelitian ini merupakan penelitian kualitatif dengan menggunakan metode studi literatur dari jurnal ilmiah. Metode analisis data yang digunakan adalah deskriptif kualitatif. Metode sistematis ini menggunakan pedoman dan diagram alir PRISMA. Metode pengumpulan data menggunakan metode non tes yaitu observasi dan wawancara. Teknik analisis menggunakan analisis kualitatif. Hasil dari kajian respon dan efektivitas media android digunakan sebagai pertimbangan untuk penggunaan media android sebagai media pembelajaran yang cocok pada masa pandemi. Subjek pengkajian terhadap jurnal ilmiah terakreditasi sinta 1 sampai dengan sinta 6 antara tahun 2011 dan 2021. Pada artikel ini dibatasi penggunaan media android dalam pembelajaran kimia SMA. Hasil kajian jurnal ilmiah menunjukkan bahwa sebagian besar siswa memberikan respon yang sangat baik terhadap penggunaan media android dalam pembelajaran kimia. Efektivitas dari implementasi pemanfaatan media berbasis android terhadap pembelajaran kimia dapat meningkatkan motivasi peserta didik, hasil belajar kognitif, kemampuan pemecahan masalah, berpikir kritis, literasi sains, serta aktivitas peserta didik. Simpulan menunjukkan media android cocok digunakan sebagai media pembelajaran pada masa pandemi.

## ABSTRACT

The Covid 19 pandemic has prevented learning from being carried out face-to-face but online using a smartphone. This study aims to analyze the effectiveness of android media as a chemistry learning medium during a pandemic. This type of research is qualitative research using the study of literature from scientific journals. The data analysis method used is descriptive qualitative. This systematic method uses PRISMA guidelines and flowcharts. Methods of data collection using non-test methods, namely observation and interviews. The analysis technique uses qualitative analysis. The study results of the response and effectiveness of Android media are used to consider using Android media as a suitable learning medium during a pandemic. The subject of the study was Sinta 1 to Sinta 6 accredited scientific journals between 2011 and 2021. This article limits the use of android media in high school chemistry learning. The results of scientific journal studies show that most students respond very well to the use of android media in chemistry learning. The effectiveness of using Android-based media for chemistry learning can increase student motivation, cognitive learning outcomes, problem-solving skills, critical thinking, scientific literacy, and student activity. The conclusion shows that Android media is suitable for use as a learning medium during a pandemic.

## 1. INTRODUCTION

Science and technology developing very fast must be utilized in the learning process. The process of using technology in learning can be applied to learning media. Learning media are hardware and software created and developed for learning needs and to increase the effectiveness of learning (Kartini & Putra, 2020b; Rahayu et al., 2022; Uy et al., 2017). Learning through mobile phones has experienced rapid

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development along with advances in science and technology (Abbas et al., 2020; Chusna & Utami, 2020). The use of android devices in learning is increasingly widespread, and their use is increasingly widespread for students (Nazar et al., 2020; Prastyo et al., 2021). The use of instructional media adds to the attractiveness and enjoyment of the learning process, which is expected to increase the motivation and interest of students in learning (Lestari et al., 2018). One of the lessons that can use technological media is chemistry. Chemistry is a science often associated with substances' essential properties. Therefore, teaching chemistry starts from simple concepts to more complex concepts. Chemistry learning includes aspects that can be seen with the senses in the form of concrete facts and aspects that cannot be seen with the senses that can only be understood by logic. However, in reality, learning chemistry has yet to achieve optimal results. Students still need help understanding chemistry material (Ayona & Hidayah, 2021; Nazar et al., 2020). Chemistry includes factual knowledge, concepts, procedures, and metacognitive. During a pandemic like now, learning cannot be done face-to-face. Learning is only done online via a smartphone (Lutfi et al., 2021). Classics in chemistry learning make students bored and uninteresting (Hatimah & Khery, 2021; Jofrisha & Seprianto, 2020). In addition, using only ordinary modules can make it challenging for students to understand chemistry material, including macroscopic, microscopic, and symbolic aspects (Fatma & Partana, 2019). In efforts to support online learning during a pandemic, learning media that are suitable and make it easier for students to understand chemistry material are needed. In online learning, teachers only use smartphones in learning by sending modules or material summaries via WA or Google Classroom (Nazar et al., 2020; Y. D. Putri et al., 2021). The modules given to students still need to make students feel that easy to understand chemical material with multiple representative characteristics. Therefore, analyzing the need for learning media suitable for online learning during a pandemic is necessary, making it easier for students to understand chemistry material.

The solution for optimizing learning requires the help of appropriate learning media to support learning according to the material's and students' characteristics. Media influences learning effectiveness (D. P. E. Putri & Muhtadi, 2018). One of the media that can support online learning is mobile-based media. The large use of smartphones in Indonesia influences mobile-based learning media. Indonesia is the fourth largest smartphone user in the world. In smartphones used in Indonesia, the most widely used operating system is Android (Pusparini et al., 2017). The use of Android-based learning media is one of the trends in learning in the 21st century. Smartphones and tablets can have the power to enhance the learning experience and can improve cognitive, affective, metacognitive, and socio-cultural aspects. The use of Android-based learning media is not limited by time and place, so it is more flexible and makes it easier for students to learn at any time and at any time (Jazuli et al., 2018; Yektyastuti & Ikhsan, 2016a; Zuhdi, 2021). The use of Android-based learning media can adjust the needs of students, with the hope that the benefits of using Android-based media can be felt by students directly (Nazar et al., 2020). The use of mobile learning-based learning media or Android learning media allows students to access learning materials without being bound by time and place. Using mobile or Android-based learning media creates an attachment between teachers and students. The advantage of mobile devices is a challenge that must be utilized as a learning media. So this mobile device can be developed as a learning medium that can influence the learning process (Prastyo et al., 2021; Rahmawati & Partana, 2019; Yektyastuti & Ikhsan, 2016a). Previous research findings state that using mobile learning-based android learning media has many advantages that can replace computer-based learning media (Lathief Dwi Putra & Nurafni, 2021; Prastyo et al., 2021). Using mobile learning-based media that is easy to carry anywhere makes it easy for students to understand the subject matter (Ayona & Hidayah, 2021).

The results of the development of android media on IUPAC compound nomenclature material received a very good response from students (Kartini & Putra, 2020b). Using android learning media on solubility material and solubility results can improve student learning outcomes (R. S. Putra et al., 2017). The use of android learning media for twelfth science students shows an increased understanding of higher concepts (Hatimah & Khery, 2021). The use of game-based android media makes students feel entertained and provides enthusiasm for student learning so that students feel happy during learning and that student learning outcomes experience increase (Lutfi et al., 2021). Research related to Android media has been carried out a lot. However, based on needs analysis, Android learning media is needed, making it easier for students to learn anytime and anywhere. This research aims to analyze the effectiveness of android media as a chemistry learning medium during a pandemic. The existence of android learning media helps increase student motivation in learning and can improve student learning outcomes. The analysis was carried out by examining the existing literature on student responses and the effectiveness of android media in learning chemistry. The results of the analysis of the studies carried out regarding the response to the effectiveness of Android media will be used as recommendations for using Android learning media in online learning to make it easier for students to understand chemistry.

## 2. METHOD

This qualitative research uses the method of studying literature from scientific journals. The data analysis method used is descriptive qualitative. This systematic method uses PRISMA guidelines and flowcharts. The PRISMA guide includes a checklist of 27 items and a four-phase flow chart outlining key items for transparency in a literature review. Methods of data collection using non-test methods, namely observation and interviews. The analysis technique uses qualitative analysis. Eligibility criteria, studies need to be peer-reviewed and published in scientific journals. Eligible studies must also be published with teacher participation in international and national journals and be empirical (editorials and monographs excluded). The study must also answer at least one of the review research questions. The data used is a source that comes from the internet. To search for journal sources, Google Scholar uses the appropriate keywords. The keywords used to find journal sources are android media, student responses, effectiveness, and chemistry learning. Screening to select studies for inclusion, the following criteria were applied sequentially to the article abstracts. The first criterion, studies were published between 2014 and 2022. This criterion is used so that the journals used are still relevant to current conditions, with a minimum of the journals referred to being the last eight years. The second criterion, studies are published in accredited national scientific journals of Sinta 1 to Sinta 6. This criterion ensures that the journal used is a reputable journal with an index of Sinta 1 to Sinta 6 and can be trusted to be used as a reference. The third criterion is Android-based learning media. This article is limited to the use of Android-based learning media. It is due to analyzing the use of Android learning media in learning. The fourth criterion of learning is studied in chemistry learning. This article is limited to learning chemistry. Therefore, the journal used as a reference is related to learning chemistry. So, from the journal analysis, it can be linked to the use of android learning media for chemistry learning. A total of 30 articles were retained after screening.

## 3. RESULT AND DISCUSSION

### Result

The results of the analysis of 23 journal articles were maintained. Fifteen journals used the development method, five used the experimental method, one used the action research method, and one used the meta-analysis method. One journal used a qualitative descriptive method. Student responses to the use of android-based learning media in chemistry learning are presented in [Table 1](#).

**Table 1.** The Results of The Analysis of Student Responses to Android Media from Previous Research

Research	Year	Research Location	Chemical Material	% good student response to android media
Ketut Sepdyana Kartini , I Nyoman Tri Anindia Putra	2020	SMAN 4 Denpasar	The IUPAC nomenclature of inorganic compounds	83.07 %
Septina Restu Nurhalimah, Suhartono, Ucu Cahyana	2017	SMAN di Jakarta dan Bogor	Colligative Properties	80.00 %
Isma Ramadhani Lubis, Jaslin Ikhsan	2015	SMAN 11 Yogyakarta	Buffer solution	86.60 %
Rizki Suhendar Putra, Nanik Wijayati dan F. Widhi Mahatmanti	2017	SMAN 1 Lemahabang Cirebon	Solubility and solubility product	80.05 %
Arifin Harianto, Suryati, Yusran Khery	2017	SMAN 1 Labuapi	Redox and Electrochemistry	86.35 %
P S Putra, N B Asi, M E Anggraeni and Karelius	2020	SMAN 2 Palangkaraya	Electrolyte and Nonelectrolyte Solutions	96.00 %
Valdo Ayona, Rusly Hidayah	2021	MAN 2 Mojokerto	Chemical Bonds	86.30 %

The test results on the android media for compound nomenclature material at SMAN 4 Denpasar received a very good response from students. The test results from the research that has been carried out based on the results of the student response questionnaire in chemistry learning IUPAC nomenclature material for inorganic compounds using Android learning media obtained an average percentage of 76.41% in the first beta test, which is categorized as good while in the second beta test it was obtained the average percentage is 83.07% which is in the very good category ([Kartini & Putra, 2020b](#)). The same

results were also obtained from students' responses to the material colligative properties of solutions with the help of android-based learning media at one of the Public High Schools in Bogor and one of the Public High Schools in Jakarta. The results of testing student responses in small-scale trials showed that Android learning media developed according to student needs and a media feasibility score obtained 79%. In comparison, a score of 80% was obtained in large-scale trials. (Pusparini et al., 2017). The results of testing the android media for buffer solution material at SMAN 11 Yogyakarta showed that the android media in trials on students in the learning and material aspects scored 86.6%. In comparison, the display and operational aspects of the media received a score of 84.27% (Lubis & Ikhsan, 2015).

The response of SMA Negeri 1 Lemahabang students in Cirebon Regency to the use of android media for the solubility material and the solubility product gave a student response score of 80.05%. It shows that students respond well to the use of android media. The questionnaire results show that the media presentation makes students interested in reading it, with a score of 74.76%. Students who feel happy learning using Android media obtain 79.52%. Using android media in learning makes it easy for students to understand the lesson, with a score of 80.95%. The use of android media makes students' curiosity get a score of 80.95%. Using android media makes it easier for students to understand chemical material, scoring 88.10% (R. S. Putra et al., 2017). The results of testing the android learning media on redox and electrochemical materials at SMAN 1 Labuapi showed a student response of 86.35%, stating that android media was feasible to use as a learning media (Harianto et al., 2019). The test results on the android media for electrolyte and nonelectrolyte solutions at SMAN 2 Palangkaraya show that student responses to the developed android media get a score of 4.8 out of a maximum score of 5 or 96% (P. S. Putra et al., 2020). The results of testing the android media material for Chemical Bonds at MAN 2 Mojokerto also showed very good student responses to android-based learning media with a percentage of 86.3% (Ayona & Hidayah, 2021). The analysis of research on the use of Android media shows that most students respond positively to the use of Android media in learning. This is supported by the fact that research on student responses to android media for various chemical materials and in various regions has given a good response. The results of the analysis of the effectiveness of Android media on student motivation from previous studies are presented in Table 2.

**Table 2.** The Results of The Analysis of The Effectiveness of Android Media on Student Motivation from Previous Studies

Research	Year	Research Location	Chemical Material	Motivation Improvement Score
Lubis, I. R., dan Jaslin, I.	2015	SMA Negeri 11 Yogyakarta	Oxidation and reduction reactions (Redox)	0.31
Yola Dewi Putri, Rina Elvia, Hermansyah Amir	2021	SMAN 03 Kota Bengkulu	Oxidation and reduction reactions (Redox)	4.3

The results of field trials of android media on salt hydrolysis and buffer solutions at SMA Negeri 11 Yogyakarta showed an increase in the motivation score of 0.31 for the experimental class using android media. Whereas for the control class that did not use android media, there was only an increase in the motivation score of 0.16. It shows that using Android media can increase student motivation in learning. This increase in motivation is because Android media has attractive, practical, and flexible visual appearance characteristics that can be used anytime and anywhere. So that students can repeat the material independently and improve their memory of the material (Lubis & Ikhsan, 2015). The research results on the development of android learning media on buffer solution material at SMA Negeri 3 Bengkulu also show that using Android learning media increases student motivation with a 4.3 out of a maximum score of 5. It shows that the use of android media makes students more interested in learning chemistry because it uses animation, making it easier for students to learn chemistry material (Y. D. Putri et al., 2021). The results of the analysis of the effectiveness of Android media on student activity from previous studies are presented in Table 3.

The use of android learning media can increase student activity. This can be seen from the results of research by (Eli & Sari, 2018), which shows an increase in student activity by 31.02% in the first cycle and increased to 75.75% in the second cycle. With animation in Android media, students try to solve existing problems, so students are more active in learning. Students become more enthusiastic about processing data resulting from the information. Students are also more communicative and present the results of problem-solving. The use of android media for solubility material and solubility products at SMA Negeri 17 Makassar shows that the average score of student activity is 3.48 out of a maximum score of 4. It



shows that the use of android media increases student activity. From this study, 43.44% had very good activity, 53.33% of students had good activity, and 33.33% had moderate activity (Rusdi & Yunus, 2016). The results of the analysis of the effectiveness of Android media on student learning outcomes from previous studies are presented in Table 4.

**Table 3.** The Results of The Analysis of The Effectiveness of Android Media on Student Activities from Previous Studies

Research	Year	Research Location	Chemical Material	Activity Enhancement
Rohaeni Nur Eli dan Sari	2018	SMKN 2 Cimahi	Sistem koloid	75,75 %
Hikmah Rusdi, Sudding, Muhammad Yunus	2016	SMAN 17 Makasar	Kelarutan dan hasil kali kelarutan	Skor 3,4

**Table 4.** The Results of The Analysis of The Effectiveness of Android Media on Student Learning Outcomes from Previous Studies

Research	Year	Research Location	Chemical Material	% Learning completeness / N-Gain
Merra Rorita, Saida Ulfa, Agus Wedi	2018	SMA Panjura Malang	atomic theory	100 %
Maula Najikh Wildana, Kasmui, dan Nuryanto	2020	MAN 1 Kota Semarang	Redox and nomenclature of compounds	84.8 %
Resti Yektyastuti, Jaslin Ikhsan	2016	SMAN 10 Yogyakarta	Solubility and solubility product	90.625 %
Isma Ramadhani Lubis, Jaslin Ikhsan	2015	SMAN 11 Yogyakarta	Buffer Solution	80.31
S. Wardani, L. Lindawati, S. B. W. Kusuma	2017	SMA IT Al Irsyad Purwokerto	Alkane derivatives	85 %
Rizki Suhendar Putra, Nanik Wijayati dan F. Widhi Mahatmanti	2017	SMAN 1 Lemahabang Kabupaten Cirebon	Solubility and solubility product	71
Ketut Sepdyana Kartini dan I Nyoman Tri Anindia Putra	2020	SMA Negeri 4 Denpasar	Compound nomenclature	71.30
Rohaeni Nur Eli dan Sari	2018	SMKN 2 Cimahi	colloid system	84.85

The results of using android media on the development of atomic theory at Panjura Malang High School can increase students' chemistry learning mastery by 100% (Rorita et al., 2018). Using media role-play games based on android redox material and compound nomenclature at MAN 1 Semarang City gave an average score of 75, which was higher than those who did not use android-based media in the control class with an average score of 67. Using media roles in Android-based play games also increases student learning completeness by 84.8% (Wildana, 2020). The results of the study using android media for solubility material and solubility product at SMAN 10 Yogyakarta gave a higher score of 85.813 compared to a score of 80.226 in a class that did not use android media. The results of using android learning media solubility material and solubility product also show an increase in learning completeness of 90.625% compared to the control class, which is only 80.645% (Yektyastuti & Ikhsan, 2016b). Improved learning outcomes were also obtained using android-based learning media on buffer solution material at SMA Negeri 11 Yogyakarta. The learning outcomes of students who use Android media get an average of 80.31 compared to the control class, which only gets an average score of 77.81. These results indicate that the use of android-based learning media is more effective in improving student learning outcomes (Y. D. Putri et al., 2021). The results of testing the android learning media for alkane-derived compound materials at SMA IT Al Irsyad Purwokerto also show that learning outcomes are higher when compared to students who do not use android-based media in learning. Students learning outcomes using Android-based media obtained an average post-test score of 80.51. There was a significant increase because students only obtained an average pretest score of 34.35 (Wardani et al., 2017). The results of testing the android media at SMA Negeri 1 Lemahabang, Cirebon Regency, on solubility material and solubility product also showed

an increase in student learning outcomes. In testing, the N-gain results were obtained in the experimental class using Android media 0.71 compared to the control class, which only obtained an N-gain of 0.54. The test results also show that the contribution of Android media to student learning outcomes is 60.16% (R. S. Putra et al., 2017). While the results of testing the android media for compound nomenclature material at SMA Negeri 4 Denpasar showed that the experimental class obtained a result of 71.30 compared to a score of 65.54 in the control class. The correlation test results using Android media on learning outcomes show a correlation coefficient of 0.74 and a coefficient of determination of 62.72% (Kartini & Putra, 2020).

An increase in learning outcomes was also obtained from testing android media for colloid material at SMK Negeri 2 Cimahi, action research. In the first cycle, learning completeness was obtained by 72.22%, with an average learning result of 68.97. Then in the second cycle, the learning mastery was obtained by as much as 85.85% with an average result of 74.18. These results show that learning outcomes increase positively due to using Android-based learning media (Eli & Sari, 2018). The results of testing the android media on thermochemical material show a correlation score of the use of android media on learning outcomes of 0.4708. It shows the relationship between the use of android media and learning outcomes in the medium category. At the same time, the price of the coefficient of determination of student learning outcomes is 22.17%. It shows that using Android media significantly influences student learning outcomes (Nugraha, 2020). The results of the analysis of the effectiveness of android media on students' problem-solving abilities from previous research are presented in Table 5.

**Table 5.** The Results of The Analysis of The Effectiveness of Android Media on Students' Problem-Solving Abilities from Previous Research

Research	Year	Research Location	Chemical Material	Problem-solving ability improvement score
Fatma dan Partana	2019	High School in Yogyakarta	Buffer Solution	69.4

The use of android learning media can improve students' problem-solving abilities. The average score of classes that use Android media is 69.4 compared to those that do not use Android-based learning media, which is only 57.4 in the control class. The results of the t-test show differences between classes that use android media in the experimental class compared to classes that do not use android media in the control class (Fatma & Partana, 2019). These results indicate that using Android-based learning media can improve students' problem-solving abilities. The results of the analysis of the effectiveness of android media on students' critical thinking abilities from previous studies are presented in Table 6.

**Table 6.** Results of The Analysis of The Effectiveness of Android Media on Students' Critical Thinking Skills from Previous Research

Research	Year	Research Location	Chemical Material	Scores of students' critical thinking skills
S. Wardani, L. Lindawati, S. B. dan W. Kusuma	2017	SMA-IT Al Irsyad Al Islamiyyah Purwokerto	Alkane derived compounds	3.05

(Wardani et al., 2017) The use of android learning media can improve students' critical thinking skills. The effectiveness of the use of android media on students' critical thinking skills shows the results of the critical thinking skills of IT Al Irsyad Purwokerto High School students getting in the good category with an average score of 3.025 (Wardani et al., 2017). The developed android media is games-based android media with an inquiry approach. The results of students' critical thinking skills were tested using indicators of the ability to focus on a question, analyze an argument, ask and answer several questions, and determine actions. From the results of the research conducted, the ability to focus on questions was 3.1, the ability to analyze arguments was 2.95, the ability to ask and answer questions was 3.0, and the ability to determine actions was 3.05. The proper use of Android learning media will improve 21st-century skills, namely problem-solving skills. The increase in problem-solving ability that was carried out was proven by testing the use of learning media in learning in the experimental class, which gave better results when compared to the control class, which did not use android learning media in learning (Fatma & Partana, 2019). The results of the analysis of the effectiveness of android media on student creativity from previous research are presented in Table 7.

**Table 7.** The Results of The Analysis of The Effectiveness of Android Media on Student Creativity from Previous Research

Research	Year	Research Location	Chemical Material	Android media correlativity scores with student creativity
Nugraha	2020	Senior High School in Semarang	Termokimia	0.6167

Based on [Table 7](#) shows that the android-based thermochemical material chemistry comic media can increase student creativity. The results of the study obtained a correlation coefficient of creativity of 0.6167. It shows that the relationship between the media used has a strong relationship with creativity. At the same time, the coefficient of determination of the correlation of creativity is 38.03% ([Nugraha, 2020](#)). It shows that the media used has a great influence on creativity.

### Discussion

This qualitative research uses the method of studying literature from scientific journals. The analysis of research on the use of Android media shows that most students respond positively to the use of Android media in learning. This is supported by the fact that research on student responses to android media for various chemical materials and in various regions has given a good response. Learners use learning media ([Firmansyah et al., 2020](#); [Lathief Dwi Putra & Nurafni, 2021](#)). So, every learning media that will be created and developed must be tested and conducted a questionnaire test to determine students' responses to the learning media that has been developed. It is very helpful to find out the shortcomings of the learning media that have been developed so that they can be used to improve them. Media-based learning is one of the efforts to keep up with the fast development of technology in the 21st century ([Mahardani & Rachmadyanti, 2018](#)). It is consistent with the fact that almost all high school students have cell phones or smartphones, most of which are based on Android. Using mobile learning-based learning media provides the advantage that students can learn or repeat subject matter anywhere and anytime without being bound by time and place. The use of Android-based learning media increases students' curiosity. Therefore, students will be interested in participating in the learning process. Students are more active in learning, so student activity increases. Thus the use of android media will increase student interest and motivation. These results corroborate research that has been conducted ([Lubis & Ikhsan, 2015](#)). Android media can be used anywhere and accessed anytime, giving students more opportunities to repeat the subject matter ([Chaeruman et al., 2020](#); [Nuryadi et al., 2020](#)). This advantage makes it easier for students to understand the subject matter. Therefore, the use of android learning media will improve student learning outcomes. The use of learning media developed with the right approach will be able to increase other results besides learning outcomes. This finding is reinforced by previous research stating that developing chemical comic android media with an inquiry approach can increase student creativity ([Nugraha, 2020](#)). Using games-based android media with a combination of inquiry learning models can also improve students' critical thinking skills ([Wardani et al., 2017](#)). The results of the discussion and analysis of scientific journals show that using android media in learning will make students happy and increase their interest and motivation. With good motivation from students and the convenience of Android media that can be used to study anytime and anywhere, it makes it easier for students to understand chemistry material. Using android media combined with the inquiry learning model will improve students' 21st-century skills, namely critical thinking skills, problem-solving, and creativity. Therefore, android media is suitable for chemistry learning, especially during a pandemic.

### 4. CONCLUSION

Most students responded well to the use of android media in learning. Students gave good responses for many chemical materials as well as from various regions. From the analysis of the effectiveness of android media in learning, it is known that it can increase student motivation and activity in learning. Android learning media can also improve student learning outcomes and students' 21st-century skills, including critical thinking skills and creativity, and problem-solving. From the analysis results, a recommendation can be made that android learning media is suitable for use as a learning medium during a pandemic. Therefore, it is necessary to develop more android media to provide students with many choices in using learning media.

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