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DEVELOPMENT OF MOTION GRAPHIC VIDEO ON CLASS XI COLLOID MATERIALS TO INCREASE STUDENTS' INTEREST IN LEARNING

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ABSTRACT

Colloidal material is an abstract material that causes students to have difficulty learning it. The difficulty of colloidal material causes students' interest in learning to decrease. This research aims to produce motion graphic video-based learning media on colloid system material to increase students' interest in learning. This research uses research and development (R&D) methods with a 4-D model, which consists of four stages, namely define, design, develop, and disseminate. However, this development is limited to the development stage only. The product was reviewed by the supervisor and four peer reviewers and then validated by one material expert and one chemist. The quality of the media was assessed by four reviewers (high school/MA chemistry teachers) and responded to by 10 high school/MA students. The Linkert scale is used as a product quality assessment questionnaire sheet and the Guttman scale is used as a student response questionnaire sheet. The product produced in this research is a chemistry learning video on colloid system material. The assessment results from material experts obtained an ideal percentage of 80% and were included in the good category. The results of the media expert assessment obtained an ideal percentage of 85% and were included in the very good category. The assessment results from the reviewers (four SMA/MA chemistry teachers) obtained an ideal percentage of 91.36% and were included in the very good category. The results of the responses of ten high school students obtained an ideal percentage of 95%. Based on the assessment results, it can be concluded that the motion graphic video developed can be used as an alternative learning media for colloid system material to increase interest in learning

Keywords: chemistry learning media, colloid system, learning interest, motion graphic video

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1. INTRODUCTION

Technological developments in the Industrial Revolution 4.0 era have many benefits and challenges, especially for the world of education (Suryaman, 2021). The Industrial Era 4.0 has many benefits, especially in the field of education, with these many benefits indirectly requiring educators and education personnel to be able to operate properly and correctly so that education can develop more rapidly (Aspi, 2022). The use of technology in education can create a learning process that is more effective, innovative, creative, and more efficient in the learning process (Andini et al., 2021). Technology in education can be used as a learning medium, learning resource, learning aid, and the like (Susanti, 2020). The emergence of advanced technology has caused many changes in the field of education, such as changes in the quality of planning, implementation, and evaluation toward an even better direction. Using technology that is currently developing in the world of education can help the development of the educational process (Ira Restu Kurnia & Sunaryati, 2023).

Technological developments cannot be used instantly in education, that is, teaching staff, especially teachers, need to adapt and learn so that they can be used in the learning process, based on research in the field, almost 50% of teachers still lack understanding and use of technology in education (Rasmani et al., 2023). Awareness of the importance of using technology for education needs to be increased in each teacher, to create educational mechanisms that are more interesting, and efficient, and can attract student interest (Rudini & Saputra, 2022). One use of technology in education that needs to be developed by teaching staff is the use of the latest learning media through existing technological developments (Wahyono, 2019). Learning media are all means used by educators or teachers to convey learning messages or information even when they are used without the teacher's presence or presence (Zahwa & Syafi'i, 2022). It is hoped that good use of media in the learning process will be able to revitalize students' interest in learning which has decreased due to the COVID-19 pandemic (Fauzi & Yusuf, 2022). Students' interest in learning needs to be increased using media according to technological developments, to change the mindset of students who think that the learning media used by teachers is boring so that students' interest in learning gets worse (Siregar et al., 2022). As an educator, you need understanding and knowledge regarding the use of technology as a learning medium so that learning material can be conveyed and distributed well and not boring so that student's interest in learning can develop well (Shofiya Launin et al., 2022).

Students' interest in learning can be grown or increased by sorting and choosing the right learning media (Nurfadhillah et al., 2021). As an educator, it is necessary to use or select media that will be used to help increase students' interest in learning (Magdalena et al., 2021). Many types of media can be used for the student learning process, one type of learning media that can increase interest in learning and motivate students to be more persistent in learning is video media (Putri et al., 2022). Learning media in the form of videos can stimulate students' increased interest in learning because video media is an audio-visual media that is quick and easy for students to remember. Apart from that, video media is not limited by space and time, so if there is a part that is not understood, it can be played back. Return (Fadillah & Bilda, 2019). Learning media in the form of videos that contain audiovisuals and are equipped with unique illustrations are motion graphic videos (Gamizar Naufal Rafif et al., 2021). Motion graphic videos are videos with a simple presentation that contains information that is easy to understand, making it easier for students to understand the material (Aprianto & Saputro, 2019). Motion graphic video displays that are not monotonous and have a shorter duration can make it easier for students to gain an understanding of what the teacher wants to convey, besides that a shorter duration can reduce students' boredom when studying a scientific field, thereby increasing students' interest in learning (Yati & Rahmah, 2023).

Good motion graphic videos can attract students' attention because they are informative, entertaining, and accompanied by audio that can improve mood (Kusumadinata et al., 2019). Teachers can use motion graphic videos as alternative learning media that can increase students' enthusiasm for learning (Tartila & Mahsusi, 2021). However, based on observations from the field, it was found that the majority of teachers create videos by recording or as presentations, this is because most applications for making videos are paid and teachers lack attention to creative, innovative aspects, as well as teachers' lack of ability to use applications. to make videos (Shofiyah et al., 2021). The emergence of artificial intelligence (AI) or what we know as artificial intelligence can make it easier for teachers to create learning media in the form of videos, apart from being more practical, there are now many sites that provide editing services using AI for free (Heiden & Tonino-Heiden, 2021). AI can make the teacher's work easier in creating learning videos, only requiring the desired data or commands (Harris & Tantimin, 2022).

Colloidal material is material in chemistry subjects that is categorized as material that is considered difficult to understand, this difficulty is due to the abstractness of colloidal material itself (Pradilasari et al., 2019). Colloidal material is a material that requires good analytical skills to understand (Agustiana & Miterianifa, 2019). Apart from that, colloidal material is said to be abstract because colloidal material has many scientific concepts (Ardian et al., 2021). In the learning process of colloid material, the emphasis is often placed on memorization and practice questions, this can affect students' understanding and can give rise to students' misconceptions (Parera et al., 2022). With motion graphic videos on colloidal material, it is hoped that it will facilitate students' understanding because video media can present objects or events in the natural environment that students cannot reach directly during the learning process (Banu et al., 2022).

Based on the problems previously explained, this research aims to develop video motion graphic learning media on colloid system material and test its quality, so that it can be used to support the learning process in schools. Apart from that, this development is expected to increase students' interest in learning, especially in chemistry subjects.

2. RESEARCH METHODS

The type of research used is Research and Development (R&D). R&D is a research method used to produce certain products accompanied by testing the effectiveness of the product being developed. This research is a needs analysis that was developed to meet the needs of the community by testing its effectiveness so that it functions well (Sidik, 2019). Development research has many models that can be used in research.

The 4-D model is the research model used by researchers in this research. The 4-D model consists of four stages, namely defining, designing, developing, and disseminating, but product development in this research only reached the development stage. The define stage is the initial stage in conducting this research, this stage is used to define and determine the basic needs of why it is necessary to carry out development research (Tegeh et al., 2019). The design stage is the stage for determining and designing learning media based on problems found in the learning process (Suseno et al., 2020). The development stage is the stage aimed at creating a draft device from the results of input and suggestions from experts as well as data from product trials (Sarah et al., 2019). The steps taken in this stage are consultation with the supervisor before being validated and assessed by experts. The experts in this research are one material expert lecturer and one media expert lecturer. The revised product was based on suggestions and input from experts, then assessed and validated by four SMA/MA chemistry teachers (reviewers) and responded to by ten students in class XI MIPA majoring.

The instruments in this research are product validation sheets, product quality assessment sheets, and student response sheets. Product validation and assessment uses a Likert scale questionnaire while student responses are obtained using the Guttman scale. Data analysis techniques include product validation data, product quality assessment data, and student response data. The product validation data obtained is used as a reference in making product improvements. Data from product quality assessment results is collected by changing product assessment data in the form of letters (qualitative data) into scores (quantitative data) using a Likert scale with the conditions that can be seen in Table 1 below (Sugiyono, 2014):

Table 1. Scoring Rules

Description	Score
Very Good	5
Good	4
Enough	3
Less	2
Very Poor	1

The results of the assessment by material experts, media experts, and reviewers (high school chemistry teachers) calculated the average number of each aspect along with all aspects, the average calculation formula is as follows (Ariyanti et al., 2021):

$$X = \frac{\sum x}{n}$$

The scores obtained are then converted into qualitative values based on ideal assessment criteria. The ideal assessment category criteria can be seen in Table 2 below (Istiqlal, 2017):

Table 2. Ideal Assessment Category Criteria

Score Range (i) Quantitative	Qualitative category
X > (Mi + 1.80 SBi)	Very Good (SB)
(Mi + 0.60 SBi) < X ≤ (Mi + 1.80 SBi)	Good (B)
(Mi – 0.60 SBi) < X ≤ (Mi + 0.60 SBi)	Sufficient (C)
(Mi – 1.80 SBi) < X ≤ (Mi - 0.60 SBi)	Less (K)
X ≤ (Mi – 1.80 SBi)	Very Less (SK)

Data from student responses in the form of descriptive data (letters) was converted into qualitative data (scores) using the Guttman scale. The score data obtained is calculated as the percentage of product ideality for each aspect and all aspects. To calculate the ideal percentage (%) the formula is used:

$$\%\text{overall ideal} = \frac{\text{average score of all aspects}}{\text{highest ideal score of all aspects}} \times 100\%$$

3. RESULTS AND DISCUSSION

The research that has been carried out has resulted in a product in the form of a motion graphic video on colloidal material. The research uses the research and development (R&D) method, with a 4-D development model consisting of define, design, develop, and disseminate stages (Thiagarajan et al., 1974). However, this research is only limited to the development stage. The results of this research are described at each stage based on the 4-D method as follows:

1. ***Define***

The define stage includes product needs analysis, material analysis, and curriculum analysis. The needs analysis was carried out to find out current problems in schools. The needs analysis in this research was carried out by interviewing two chemistry teachers at different high schools/MAs. Based on the interview data, it was found that the implementation of the learning process was generally still in physical form such as textbooks, power points, worksheets, and material summaries. The choice of learning media is based on ease of access to learning in class, although this condition tends to reduce students' interest in learning because it can trigger boredom in the learning process.

Curriculum analysis and material analysis are carried out by analyzing KI and KD. The KD used in this research is basic competency 3.14 "grouping various types of colloid systems, and explaining the use of colloids in life based on their properties". This stage aims to obtain material that will be included in the learning media by fulfilling the applicable curriculum provisions. Next, objectives and indicators are created for the material that has been determined so that the material can be distributed properly and correctly. The material used in this research is a colloid system.

2. ***Design***

The design stage is carried out by determining the research design or preparing plans related to research based on the results of the needs analysis from the define stage (Zakaria et al., 2020). Based on the results of interviews with high school/MA chemistry teachers, it was decided to develop learning media in the form of videos in motion graphic format on colloid system material. The collection of colloidal system material that will be included in the media that will be developed is carried out using source material from high school chemistry books, chemistry question books, university chemistry books, and existing chemistry worksheets and learning videos. The next stage is making an initial product design. Making an initial product design begins with making a summary or designing a video scenario related to what will be conveyed in the motion graphic video (Rusdawati & Eliza, 2022).

The components in a video product consist of opening, content, and closing. Making the opening video begins with determining what parts should be in the opening. The opening section consists of a title, greeting, author's name, perception, and learning objectives, one of the opening sections can be seen in Figure 1

Figure 1. opening section

The next process is creating components from the video content. The contents of this video consist of the definition of colloids, types of colloids, easy ways to memorize them, the properties of colloids, and how to make colloids. The presentation of the components of this video content is presented using motion graphic techniques. It is hoped that the motion graphic video created will be able to help students understand the colloid system material because in general colloid material is only emphasized in memorizing theory and practicing questions (Rumape et al., 2023). This video also presents animations or illustrations that are easy for students to find or that students have seen directly in their daily lives so that they can simplify and speed up students' understanding of colloid system material (Febriana & Sasmita, 2022). The addition of these illustrations is also expected to be able to reduce the level of student misconceptions regarding colloid system material which generally only uses memorization methods and practice questions. With this video in the form of motion graphics, it is hoped that it can foster interest in learning and reduce misconceptions in students (Ayuni & Arif, 2023). The video creation process can be seen in Figure 2

Figure 2. Video Content Creation Process

After the process of creating animations or illustrations for the content components is complete, continue with the dubbing process. The dubbing process is carried out directly using the Kinemaster application. Before carrying out the dubbing process, the researcher makes a script first. The purpose of making the script is to determine the language so that there are no errors in using words that can trigger misconceptions in students. The dubbing process can be seen in Figure 3

Figure 3. Process of Recording and Reviewing Dubbing

After the dubbing process is complete, continue by adding transition effects in the part of the video that has changes in layer appearance. The addition of this transition effect is intended so that the video displayed is not monotonous. The process of adding this effect can be seen in Figure 4

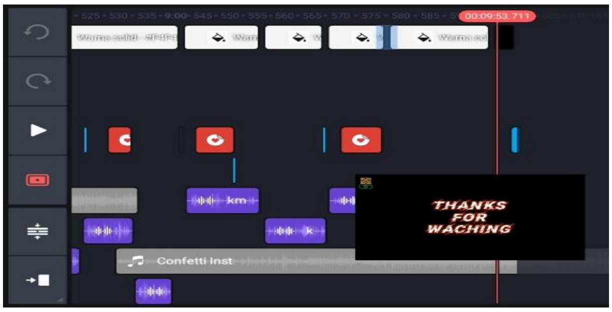

Figure 4. Transition Effect

The next component is the cover. The closing section consists of hopes, prayers, and thanks. The closing image of this mutation graphic video can be seen in Figure 5

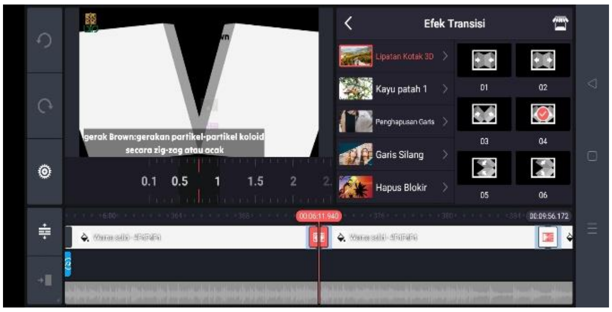

Figure 5. Closing part of the video

3. *Develop*

The development stage is the stage of making and improving the product to make it even better according to the results of suggestions or input from various experts (Sa'diah et al., 2022). The results of product assessments by material experts and media experts regarding product quality can be seen in Table 3 and Table 4.

Table 3. Product Quality Assessment by Material Experts

Assessment Aspects	∑ Score	∑Max Score. Ideal	Percentage of Ideality
Linguistic Aspects	12	15	80%
Material Aspect	10	10	100%
Aspects of Learning Interest	7	10	70%
Total	29	35	80%

Table 4. Product Assessment by Media Experts

Assessment Aspects	∑ Score	∑Max Score. Ideal	Percentage of Ideality
videos	17	20	85%
Total	17	20	85%

Based on Table 3, the product quality assessment by the material expert obtained the good category with an ideal percentage of 80% and was declared feasible by the material expert. Based on the product assessment by media experts in Table 4, it can be concluded that the colloid material motion graphic video is in the very good category with an ideal percentage of 85%. These results state that the motion graphic video includes a good opening, visual, audio, and closing (Ero et al., 2022).

The motion graphic video which had been revised based on suggestions or input from media experts and material experts, was then assessed by four SMA/MA chemistry teachers to determine the quality and to obtain suggestions or input based on learning activities in the field (learning process at school) (Munawaroh, 2023). The product assessment results from motion graphic videos according to teacher chemistry can be seen in Table 5

Table 5. Product Quality Assessment by Chemistry Teachers (Reviewers)

Assessment Aspects	∑ Score	∑Max Score. Ideal	Percentage of Ideality
Linguistic Aspects	53	60	88,33%
Material Aspect	40	40	100%
Aspects of Learning Interest	35	40	87,5%
Videos	73	80	91,25%
Total	201	220	91,36%

Based on product quality assessments by SMA/MA chemistry teachers (reviewers) in Table 5, an ideal percentage of 91.36% was obtained in the Very Good category, this shows that the product being developed can be used by educators or students or educators to support the learning process at school (Hayatuz & Nurrayan, 2023).

The data on the results of student responses to motion graphic videos on colloid system material can be seen in Table 6

Table 6. Student Responses

Assessment Aspects	∑Indicators	∑ Score	∑Max Score. Ideal	Percentage of Ideality
Interest in learning	2	18	20	90%
Attention in learning	2	17	20	85%
Learning Motivation	2	20	20	100%
Knowledge	2	20	20	100%
Motion Animation	2	20	20	100%
Total	10	95	100	95%

Based on Table 6, students' responses to the motion graphic video received an ideal percentage of 95% in the Very Good category. This shows that learning videos can be used to increase students' understanding and interest in learning and can be used to support the learning process. (Kolwatin et al., 2023).

4. CONCLUSION

The research carried out produced a product in the form of a motion graphic video on colloidal system material. Based on the assessment of material experts, media experts, reviewers, and student responses, the ideal percentages were respectively 80% in the Good category, 85% in the Very Good category, 91.36% in the Very Good category, and 95% in the Very Good category.

BIBLIOGRAPHY

Agustiana, J., & Miterianifa. (2019). Analisis kemampuan berpikir kritis siswa pada materi koloid. *SPEKTRA : Jurnal Kajian Pendidikan Sains*, *5*(1), 91. https://doi.org/10.32699/spektra.v5i1.80

Andini, A., Hanifah Salsabila, U., Triyana, F., Fitri Arum Sari, K., & Rauv, M. (2021). Pemanfaatan Teknologi Pembelajaran Pendidikan Agama Islam Berbasis Online Masa Pandemik Covid-19. *Jurnal Penelitian Tarbawi: Pendidikan Islam Dan Isu-Isu Sosial*, *6*(1), 12–18. https://doi.org/10.37216/tarbawi.v6i1.356

Aprianto, H., & Saputro, A. (2019). *Motion Graphic " Akhlak " Sebagai Media Edukasi Penyimpangan*. *3*(1), 60–67.

Ardian, Z., Pratiwi, E. A., & Raudhatun, N. Z. (2021). Pembuatan Aplikasi Ar Geokul Sebagai Media Pembelajaran Bentuk Molekul Pada Mata Pelajaran Kimia Di Sma Menggunakan Teknologi Augmented Reality Berbasis Android. *Journal of Informatics and Computer Science*, *7*(2), 68. http://jurnal.uui.ac.id/index.php/jics/article/view/1641/858#

Ariyanti, R., Rosalina, E., & Satria, T. G. (2021). *Pengembangan media smart board pada pembelajaran matematika di kelas iii sd*. *2019*, 88–94. https://doi.org/10.47709/educendikia.v1i3.1147

Aspi, M. (2022). Profesional Guru Dalam Menghadapi Tantangan Perkembangan Teknologi Pendidikan. *Adiba: Journal of Education*, *2*(1), 64–73.

Ayuni, A., & Arif, S. (2023). Analisis Miskonsepsi Ditinjau dari Gaya Belajar dengan Certainty of Response Index. *Jurnal Tadris IPA Indonesi*, *3*(1), 69–82.

Banu, M. E., Tinenti, Y. R., & Tukan, M. B. (2022). *Pengaruh Respon Siswa Tentang Penerapan Pendekatan Contextual Teaching And Learning Yang Mengintegrasikan Media Video Pembelajaran Sub Materi Sifat Koloid Terhadap Hasil Belajar Siswa*. *1*(2), 423–429.

Ero, Y., Tinenti, Y. R., & Wariani, T. (2022). Pengaruh Media Vidio Pembelajaran Pada Materi Sistem Koloid Terhadap Hasil Belajar Siswa. *Educatum: Jurnal Ilmu …*, *1*(1), 53–58. https://educatum.marospub.com/index.php/journal/article/view/32%0Ahttps://educatum.marospub.com/index.php/journal/article/download/32/72

Fadillah, A., & Bilda, W. (2019). Pengembangan video pembelajaran matematika berbatuan aplikasi sparkoll videoscribe. *Jurnal Gantang*, *4*(2), 177–182. https://ojs.umrah.ac.id/index.php/gantang/article/view/1369

Fauzi, A., & Yusuf, M. A. (2022). *IMPLEMENTASI METODE PEMBELAJARAN BLENDED LEARNING ERA COVID 19 DALAM MENINGKATKAN MINAT BELAJAR SISWA KELAS VIII PADA MATA PELAJARAN FIQIH DI MTs AL-HUDA SUKOREJO BANYUWANGI*. *2*(1), 21–36.

Febriana, M., & Sasmita, H. F. S. (2022). The Effect of Contextual Online Learning With Practice Videos on Understanding Measurement Materials for Students. *Jurnal Multidisiplin Madani*, *2*(3), 1083–1192.

Gamizar Naufal Rafif, Hamidillah Ajie, & Sastrawijaya, Y. (2021). PENGEMBANGAN VIDEO PEMBELAJARAN BERBASIS MOTION GRAPHICPADA MATA PELAJARAN DDG UNTUK PESERTA DIDIK DI SMK PROGRAM KEAHLIAN MULTIMEDIA. *PINTER : Jurnal Pendidikan Teknik Informatika Dan Komputer*, *5*(2). https://doi.org/10.21009/pinter.6.1.4

Haris, M. T. A. R., & Tantimin, T. (2022). Analisis Pertanggungjawaban Hukum Pidana Terhadap Pemanfaatan Artificial Intelligence Di Indonesia. *Jurnal Komunikasi Hukum (JKH)*, *8*(1), 307–316. https://doi.org/10.23887/jkh.v8i1.44408

Hayatuz, Z., & Nurrayan. (2023). Pengembangan media pembelajaran video animasi pada materi koloid di SMAN 1 Darul Imarah. *Educator Development Journal*, *1*(1), 25–41. https://journal.ar-raniry.ac.id/index.php/edj/article/view/2145

Heiden, B., & Tonino-Heiden, B. (2021). Key to artificial intelligence (AI). *Advances in Intelligent Systems and Computing*, *1252 AISC*(2), 647–656. https://doi.org/10.1007/978-3-030-55190-2_49

Ira Restu Kurnia, & Sunaryati, T. (2023). Media Pembelajaran Video Berbasis Aplikasi Canva Untuk Meningkatkan Minat Belajar Siswa. *Jurnal Pendidikan Fisika*, *9*(3), 1357–1363. https://doi.org/10.31949/educatio.v9i3.5579

Istiqlal, M. (2017). *PENGEMBANGAN MULTIMEDIA INTERAKTIF DALAM PEMBELAJARAN MATEMATIKA*. *2*.

Kolwatin, R. D., Mansur, H., & Dalu, Z. C. A. (2023). PENGEMBANGAN VIDEO PEMBELAJARAN ANIMASI MOTION GRAPHIC UNTUK MENINGKATKAN PENGETAHUAN KONSEPTUAL PADA PEMBELAJARAN TEMATIK SISWA SEKOLAH DASAR. *Journal of Instructional Technology*, *4*(2), 25–35.

Kusumadinata, A. A., Ike Atikah Ratnamulyani, & Muhamad Rendi Nurmansyah. (2019). Hubungan Motion Graphic Sebagai Konten Promosi Sekolah di Media Sosial. *Communications*, *1*(2), 77–90. https://doi.org/10.21009/communications.1.2.4

Magdalena, I., Fatakhatus Shodikoh, A., Pebrianti, A. R., Jannah, A. W., Susilawati, I., & Tangerang, U. M. (2021). Pentingnya Media Pembelajaran Untuk Meningkatkan Minat Belajar Siswa Sdn Meruya Selatan 06 Pagi. *EDISI : Jurnal Edukasi Dan Sains*, *3*(2), 312–325. https://ejournal.stitpn.ac.id/index.php/edisi

Munawaroh, N. L. (2023). Pengembangan Bahan Ajar Pendidikan Agama Islam Berbasis Media AudioVisual Pada Kelas X Di SMA Negeri 2 Magetan. *Social Science Academic*, *1*(2), 77–82. https://doi.org/10.37680/ssa.v1i2.3322

Nurfadhillah, S., Ningsih, D. A., Ramadhania, P. R., & Sifa, U. N. (2021). Peranan Media Pembelajaran Dalam Meningkatkan Minat Belajar Siswa Sd Negeri Kohod Iii. *PENSA : Jurnal Pendidikan Dan Ilmu Sosial*, *3*(2), 243–255. https://ejournal.stitpn.ac.id/index.php/pensa

Parera, L. A. M., Toni, S., Naat, J. N., Sudirman, Dewi, N. W. O., Kerihi, E. C. G., & Nenohai, J. A. (2022). Pengembangan Video Pembelajaran Kimia Berbantuan Kinemaster. *Jurnal Beta Kimia*, *2*(2807), 1–23.

Pradilasari, L., Gani, A., & Khaldun, I. (2019). Pengembangan Media Pembelajaran Berbasis Audio Visual pada Materi Koloid Untuk Meningkatkan Motivasi dan Hasil Belajar Siswa SMA. *Jurnal Pendidikan Sains Indonesia*, *7*(1), 9–15. https://doi.org/10.24815/jpsi.v7i1.13293

Putri, S. W., Taufik, L., & Qurniati, D. (2022). Spin Jurnal Kimia & Pendidikan Kimia Pengembangan Media Pembelajaran Kimia Berbasis Video Animasi Untuk Meningkatkan Motivasi Belajar Siswa Sman 1 Wanasaba Development of Chemical Learning Media Based on Video Animations To Increase Learning Motivation of. *Spin*, *4*(1), 58–66. https://doi.org/10.20414/spin.v4i1.5092

Rasmani, U. E. E., Wahyuningsih, S., Nurjanah, N. E., Jumiatmoko, J., Widiastuti, Y. K. W., & Agustina, P. (2023). Multimedia Pembelajaran Interaktif untuk Guru PAUD. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(1), 10–16. https://doi.org/10.31004/obsesi.v7i1.3480

Rudini, M., & Saputra, A. (2022). Kompetensi Pedagogik Guru Dalam Memanfaatkan Media Pembelajaran Berbasis TIK Masa Pandemi Covid-19. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *8*(2), 841. https://doi.org/10.37905/aksara.8.2.841-852.2022

Rumape, O., Pomuato, S. M., Muahamad, E., Ischak, N. I., Salimi, Y. K., Muanandar, H., & Najmah. (2023). Identifikasi Kemampuan Kognitif Siswa pada Materi Koloid. *Jambura Journal of Educational Chemistry*, *5*(1), 36–44.

Rusdawati, & Eliza, D. (2022). Pengembangan Video Pembelajaran Literasi Sains Anak Usia Dini 5-6 Tahun Untuk Belajar Dari Rumah. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *6*(4), 3648–3658.

Sa'diah, H., Zulhendri, Z., & Fadriati, F. (2022). Development of Learning Videos with Kinemaster-Based Stop Motion Animations on Thematic Learning in Elementary Schools. *Journal of Islamic Education Students (JIES)*, *2*(2), 91. https://doi.org/10.31958/jies.v2i2.5615

Sarah, R., Iskandar, F., & Andriyani, R. (2019). *Pengembangan Bahan Ajar Trigonometri untuk Meningkatkan Kemampuan Berpikir Kritis Matematis Mahasiswa*. *2*, 759–763.

Shofiya Launin, Wahyu Nugroho, & Angga Setiawan. (2022). Pengaruh Media Game Online Wordwall Untuk Meningkatkan Minat Belajar Siswa Kelas IV. *JUPEIS : Jurnal Pendidikan Dan Ilmu Sosial*, *1*(3), 216–223. https://doi.org/10.55784/jupeis.vol1.iss3.176

Shofiyah, N., Nisak Aulina, C., & Efendi, N. (2021). Peningkatan Kompetensi Pedagogik Guru PAUD dalam Pembuatan Video Pembelajaran Sains Berbasis Smartphone. *Murhum : Jurnal Pendidikan Anak Usia Dini*, *1*, 23–33. https://doi.org/10.37985/murhum.v2i1.29

Sidik, M. (2019). Perancangan dan Pengembangan E-commerce dengan Metode Research and Development. *Jurnal Teknik Informatika Unika St. Thomas (JTIUST)*, *4*(1), 2548–1916.

Siregar, Y. S., Darwis, M., Baroroh, R., & Andriyani, W. (2022). Peningkatan Minat Belajar Peserta Didik dengan Menggunakan Media Pembelajaran yang Menarik pada Masa Pandemi Covid 19 di SD Swasta HKBP 1 Padang Sidempuan. *Jurnal Ilmiah Kampus Mengajar*, *2*, 69–75. https://doi.org/10.56972/jikm.v2i1.33

Sugiyono. (2014). *Metode Penelitian Pendidikan (pendekatan kuantitatif, kualitatif, dan R&D)*. Penerbit Alfabeta.

Suryaman, M. (2021). Arah Baru Pembelajaran Bahasa Indonesia. *Seminar Nasional Pendidikan PPs Universitas PGRI Palembang*, 13–24.

Susanti, S. S. (2020). Pemanfaatan Teknologi dalam Pendidikan Anak Usia Dini STAI Darussalam Lampung. *Azzahra*, *2*(1), 65–75. https://databoks.katadata.co.id/datapublish/2016/08/08/pengguna-

Suseno, P. U., Ismail, Y., & Ismail, S. (2020). *Pengembangan Media Pembelajaran Matematika Video Interaktif berbasis Multimedia*. *1*(2), 59–74.

Tartila, A., & Mahsusi, H. (2021). Jurnal Kajian Budaya, Bahasa dan Sastra, Volume 01 No.04 Tahun (2021). *Kajian Budaya,Bahasa Dan Sastra*, *01*(04), 1–19.

Tegeh, I. M., Simamora, A. H., & Dwipayana, K. (2019). Pengembangan Media Video Pembelajaran Dengan Model Pengembangan 4D Pada Mata Pelajaran Agama Hindu. *Mimbar Ilmu*, *24*(2), 158. https://doi.org/10.23887/mi.v24i2.21262

Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). *Instructional development for training teacher of exceptional children*.

Wahyono, H. (2019). Pemanfaatan teknologi informasi dalam penilaian hasil belajar pada generasi milenial di era revolusi industri 4 . 0. *Proceeding of Biology Education*, *3*(1), 192–201.

Yati, L., & Rahmah, M. (2023). Pengembangan Media Pembelajaran Pendidikan Agama Islam Dan Budi Pekerti Menggunakan Motion Graphic Berbasis Problem-Based Learning. *Jurnal Pendidikan Dan …*, *5*(1), 2096–2114. http://journal.universitaspahlawan.ac.id/index.php/jpdk/article/view/13373%0Ahttp://j ournal.universitaspahlawan.ac.id/index.php/jpdk/article/download/13373/10192

Zahwa, F. A., & Syafi'i, I. (2022). Pemilihan Pengembangan Media Pembelajaran. *Jurnal Penelitian Pendidikan Dan Ekonomi*, *19*(01), 61–78. https://www.journal.uniku.ac.id/index.php/Equilibrium.

Zakaria, M. A., Afriani, V., & Zakariah, M. (2020). *ETODOLOGI PENELITIAN KUALITATIF, KUANTITATIF, ACTION RESEARCH, RESEARCH AND DEVELOPMENT (R and D)*. ayasan Pondok Pesantren Al Mawaddah Warrahmah Kolaka.