

The Validity of Contextual-Based Learning Videos of Wave Material to Improve Student's Critical Thinking, Creative, Collaboration, and Communication Skill

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Abstract—This study aims to produce a valid contextual based learning video of wave material. This research uses the ADDIE development model which consists of five stages, namely analyze, design, development, implementation, and evaluation. The instruments used to test the validity of contextual-based learning videos were expert learning validation instrument, physicist validation instrument, and linguist validation instrument. The learning expert validation instrument was assessed by a learning expert, the physicist's validation instrument was assessed by a physicist, and the linguist's validation instrument was assessed by a linguist. The validity data analysis refers to the Aiken's V coefficient. The learning video is declared valid if it is in the valid category, namely ≥ 0.6 . Based on the results of the validation, it was found that the average value of the validation of learning experts was 0,75, the average value of validation of physicists was 0,74, and the average value of linguist validation was 0,87. So the contextual-based learning video of the wave material developed is valid both in terms of construct, content, and language feasibility. This means that the contextual-based learning video of wave material is suitable for use in the learning process so that it can improve student's critical thinking, creative, collaboration, and communication skill.

Keywords—video; contextual; wave; critical thinking, creative thinking, collaboration, communication skills; validation

I. INTRODUCTION

The education system changes all the time. This is necessary for the renewal and improvement of human quality^[1]. Education is one of the factors that plays an important role in human life and the nation^[2]. Education is expected to create new human beings who are more developed and superior^[3]. Education graduates should have sufficient abilities to exist in the 21st century^[4]. In the 21st century various fields of rapid progress, including education^[5]. Through education, students can develop their abilities and potential in order to be able to face the era in the 21st century^[6]. Education should also be able to improve the quality of students by having various skills. There are four skills needed in the 21st century, namely ways of thinking, ways of working, tools for work, and global life skills^[7]. These skills must be fulfilled by cultivating higher order thinking skills including critical and creative thinking, as well as communication and collaboration skills^[8]. To practice these skills, learning should be student-centered, teamwork, and learning related to the content of everyday life^[9].

To obtain good quality education, one of the ways is the government to make changes to the curriculum. The latest curriculum used in learning is the 2013 curriculum. Competence in the 2013 curriculum refers to the 21st century competencies that are needed by students in facing the challenges of the 21st century that are global in nature^[10]. The 2013 curriculum follows and adapts to changes in science and technology, philosophical, psychological, and sociological^[11]. The 2013 curriculum makes student-centered learning^[12]. Thus, students become active and motivated in learning, especially learning physics.

Physics learning aims to develop student's thinking skills^[13]. Physics learning trains students to think and act like scientists^[14]. The training is intended to facilitate comprehension of physics concepts as a whole^[15]. By training students to think like scientists, students will realize that physics is not just a collection of facts and formulas^[16]. Rather, learning physics is a process of obtaining information through systematic discovery, scientific attitudes, and critical thinking processes to obtain scientific products^[17]. In the process, physics learning should also be able to motivate, provide aspirations and challenges, and encourage students's creativity^[18].

One of the learning concepts in the 2013 curriculum is contextual learning^[19]. Contextual learning is closely related to 21st century learning, because 21st century learning is learning that has context, related to community life, student-centered, and collaborative^[20]. Contextual learning is learning that links the material studied with the real life of everyday students, both in the environment, family, school, community and citizens with the aim of finding the meaning of these materials for life^[21]. Contextual learning has the following characteristics: 1) Learning is carried out in an authentic context, namely learning that is directed at the achievement of skills in the context of real life or learning carried out in a natural environment, 2) Learning provides opportunities for students to do meaningful tasks, 3) Learning is carried out by providing meaningful experiences to students, 4) Learning is carried out through group work, discussions, correcting each other between friends, 5) Learning provides opportunities to create a sense of togetherness, work together, understand each other deeply, 6) Learning is carried out actively, creatively, productively, and emphasizes cooperation, and 7) Learning is carried out in a pleasant situation^[22]. Learning also involves seven main components, namely (1) constructivism, (2) asking, (3) inquiry, (4) learning society, (5) modeling, (6) reflection, and (7) authentic assessment^[23].

Contextual-based physics learning can be delivered using learning media^[24]. One of the learning media is video. Instructional videos are an effective medium for use in learning^[25]. Video is a picture in frame, where frame by frame is projected through the projector lens mechanically so that the screen looks alive^[26]. Video provides students with unexpected experiences, show real things that are not possible to see at first, analyze changes over a certain period of time, provide students with experiences of experiencing a certain situation, and, present presentations of case studies about real life that can trigger discussion students^[27]. In addition, video also makes it easier for students to learn abstract material and overcome the limitations of space and time, such as wave material. The applications of wave in everyday life are numerous. Not all students can see it directly. By using contextual learning videos, events in everyday life related to wave material can be presented directly.

To produce a quality learning video, it is necessary to do a quality test. The first determinant of the quality of learning product development is its validity^[28]. A product is said to be valid if the product is sufficiently developed and all product components are consistent with each other^[29].

Based on the explanation that has been given, the developer developed contextual-based learning video on wave material to improve student's critical thinking, creative, collaboration, and communication skills. The purpose of this study was to determine the validity level of the contextual-based learning video developed.

II. METHOD

This type of research is a development research that is a research method used to produce educational products, and to test the effectiveness of these products^[30]. The model used in this development is the ADDIE development model. The ADDIE model is developed systematically and rests on the theoretical foundation of learning design^[31]. This model is arranged programmatically with for systematic activities in an effort to solve learning problems related to learning resources according to the needs and characteristics of students. The ADDIE model consists of five stages, namely: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation^[32]. While the sample of this study is a contextual-based learning video of wave material.

To test the quality of contextual-based learning video, a validation instrument is needed. The validation instrument consists of 3 sets, namely the content validation instrument, the construct validation instrument, and the language validation instrument. These three instruments were assessed by 3 experts in their respective fields. For content validation instruments assessed by physicist,

construct validation instruments were assessed by learning experts, and language validation instruments were assessed by linguist.

The data analysis of the validity of the video was carried out using a Likert scale, with a score (5) for very good answer, a score (4) for a good answer, a score (3) for an adequate answer, a score (2) for a poor answer, and a score (1) for a very less answer.

The validity category is based on the Aiken's V coefficient. The validity value is given by using the Aiken's V formula, namely :

$$V = \frac{\sum s}{[n(c - 1)]}$$

Where :

s = r – lo

Information :

lo = the lowest number of validity assessments

c = the highest number of validity assessments

r = number given by the validator

n = number of validator

The validity category of the product developed can be seen in Table 1.

Table 1. Validation Categories

Value	Criteria
≥ 0,6	Valid
< 0,6	Invalid

Based on Table 1, it can be seen that the contextual-based learning video is said to be valid if the validation value is ≥ 0.6, and invalid if the validation value is < 0.6 [33].

III. RESULT AND DISCUSSION

Contextual-based learning video is validated by 3 experts according to their expertise, namely 1 learning expert, 1 physicist, and 1 linguist.

When the validation was submitted, there were several suggestions given by validators. The validator's suggestions are presented in Table 2.

Table 2. Summary of Validator Suggestions

Suggestion	Follow-up
Replace the recorded voice instructions for using the video with the original voice of the video maker	The recorded voice instructions for using the video have been replaced with the original voice of the video maker
Fix the case example with 1 quantitative question and 1 phenomenon / qualitative question	The case example has been replaced with 1 quantitative question and 1 phenomenon / qualitative question
Instructions for opening insights, group study, and self-study are simplified and the background is made more	Instructions for opening insights, group study, and independent study have been simplified and

Suggestion	Follow-up
attractive	the background has been made more interesting
Before videos 1, 2, and so on, the introduction "video1" should be made, and so on	Preface "video1", "video 2" and so on have been made, before video 1, 2, and so on are shown
Provide background music for the clues in the scene for insightful, group study, and independent study	Background music has been given for the scene section to guide insight, group study and independent study
Tidy up the background music cuts as the music changes	Already tidied up the background music cuts when the music changes
The video language is corrected according to good and correct Indonesian	The video language has been fixed according to Indonesian which is good and correct

Based on the suggestions from validators in Table 2, improvements have been made to produce a valid contextual-based learning video.

Learning expert assesses the feasibility aspects of the instructional video construct. The validation of learning experts aims to produce contextual-based physics learning videos that are in accordance with the 2013 curriculum and the characteristics of the physics material. The results of the validation of the contextual-based physics learning video according to learning experts can be seen in Table 3.

Table 3. Learning Expert Validation Analysis

Aspect	Average Rating Score	Criteria
Construct feasibility	0,75	Valid

Based on Table 3, it can be seen that the contextual-based physics learning video is valid. Each component is assessed by experts. The results of the assessment for each component can be seen in Figure 1.

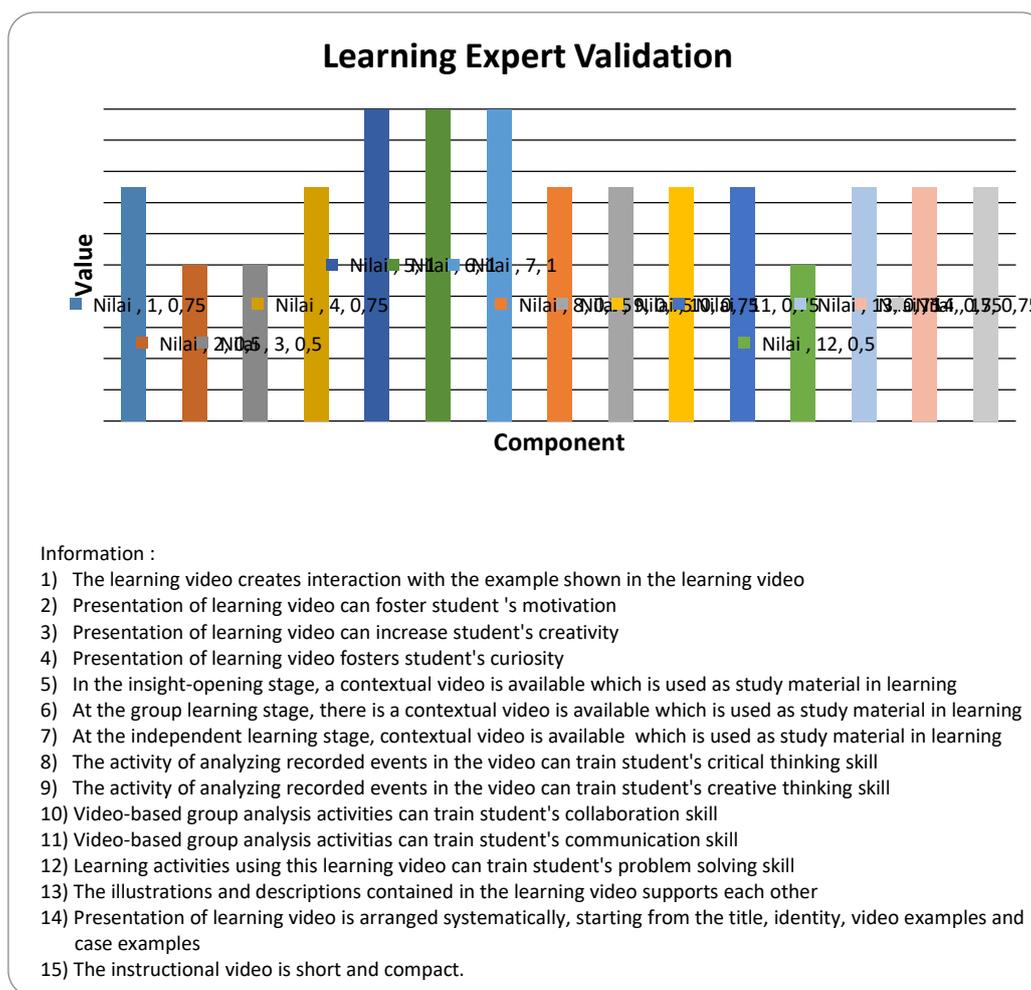


Figure 1. Evaluation Result of Construct Feasibility Component

Based on Figure 1, it can be stated that the value of each component of the construct feasibility is 0,75; 0,5; 0,5; 0,75; 1; 1; 1; 0,75; 0,75; 0,75; 0,75; 0,5; 0,75; 0,75; and 0,75. The average component value is 0,75. This shows that the contextual-based physics learning video on the feasibility aspect of the construct is valid.

Meanwhile, physicist assess the feasibility aspect of the learning video content. Physicist validation aims to produce contextual-based physics learning videos that are in accordance with physics material and do not cause misconceptions. The results of the validation of the contextual-based physics learning video according to learning expert can be seen in Table 4.

Table 4. Physicist Validation Analysis

Aspect	Average Rating Score	Criteria
Feasibility of the content	0,74	Valid

Based on Table 4, it can be seen that the contextual-based physics learning video is valid. Each component is assessed by expert. The results of the assessment for each component can be seen in Figure 2.

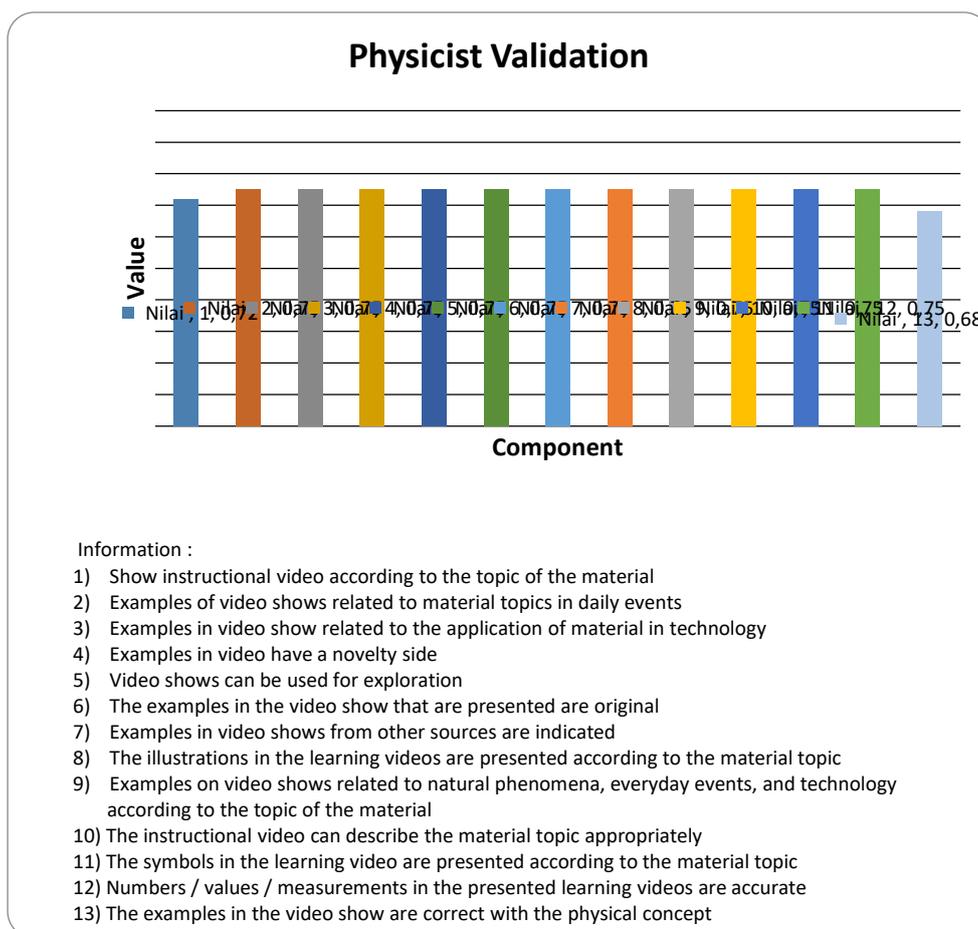


Figure 2. Results of the Assessment of the Content Feasibility Component

Based on Figure 2, it can be stated that the value of each component of the content eligibility is 0,72; 0,75; 0,75; 0,75; 0,75; 0,75; 0,75; 0,75; 0,75; 0,75; 0,75; and 0,68. The average component value is 0,74. This shows that the contextual-based physics learning video on the aspect of the feasibility of the content is valid.

And for linguist assesses the feasibility aspects of the learning video language. The linguist validation aims to produce contextual-based physics learning videos that are in accordance with the rules of Indonesian that are good and correct. The results of the validation of the contextual-based physics learning video according to learning expert can be seen in Table 5.

Table 5. Linguist Validation Analysis

Aspect	Average Rating Score	Criteria
Language	0,87	Valid
Feasibility		

Based on Table 5, it can be seen that the contextual-based physics learning video is valid. Each component is assessed by expert. The results of the assessment for each component can be seen in Figure 3.

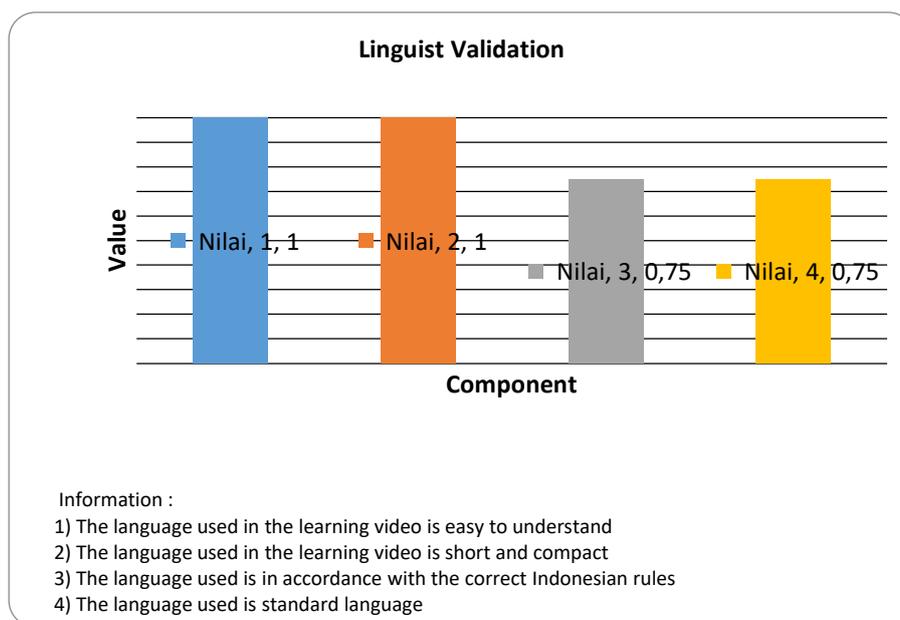


Figure 3. Language Feasibility Component Assessment Results

Based on Figure 3 it can be stated that the value of each language eligibility component is 1, 1, 0,75, and 0,75. The average component value is 0,875. This shows that the contextual-based physics learning video on the feasibility aspect of the language is valid.

Before the contextual-based learning video is used in the learning process, a validation test is first carried out. This validation test aims to assess whether or not the contextual-based learning video is appropriate for use in schools. After the validation test was carried out by learning experts, physicists, and linguists, it was found that the contextual-based learning video was valid. This means that this product is used in the learning process. By developing quality videos, it is expected that student's critical thinking, creative, collaboration, and communication skills will improve.

IV. CONCLUSION

Based on the results of the study, it was found that the results of the validation assessment by learning expert validator was 0,75, physicist was 0,74, and linguist was 0,87 and in the valid category. This means that the contextual-based learning video of wave material is suitable for use in the learning process.

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REFERENCES

- [1] T. Heldina and H. Alberida, "Students' Creative Thinking Skills at SMAN 1 Basa Ampek Balai, International Journal of Progressive Sciences and Technologies (IJPSAT)", vol. 24, no. 2, January 2021, pp 472-475.
- [2] L. Fitriyani and Y. Wiyatmo, "Pengembangan Media Pembelajaran Vlog (Video Blogging) Pada Materi Usaha Dan Energi Untuk Menumbuhkan Kemandirian dan Meningkatkan Penguasaan Konsep Fisika Siswa Kelas X SMA Negeri 2 Ngaglik", Jurnal Pendidikan Fisika, vol. 6, no. 5, 2017.

- [3] I. R. Nugroho, and B. Ruwanto, "The Development Of Physics Learning Media Based On Social Media Instagram As Self Learning Resources To Improve Motivation And Achievement On Physics Learning Of The Eleventh Grade Student Of Senior High School", *Jurnal Pendidikan Fisika*, vol. 6, no. 6, 2017.
- [4] Asrizal, Festiyed, and R. Sumarmin, "Analisis Kebutuhan Pengembangan Bahan Ajar IPA Terpadu Bermuatan Literasi Era Digital Untuk Pembelajaran Siswa SMP Kelas VIII", *Jurnal Eksakta Pendidikan*, vol. 1, no. 1, Mei 2017.
- [5] W. Febriatika and H. Alberida, "Students' Critical Thinking Skills at SMAN 7 Tebo", *International Journal of Progressive Sciences and Technologies (IJPSAT)*, vol. 24, no. 2 January 2021, pp. 476-479.
- [6] M. Jannah, A. Putra, Hufri, W. S. Dewi, and S. Y. Sari, "Validitas dan Praktikalitas LKPD Berbasis *Scaffolding* Pada Materi Pengukuran dan Vektor Untuk Kelas X SMA/MA", *Pillar Of Physics Education*, vol. 12, no. 4, 2019.
- [7] G. Ron, "Purposeful Use of 21st Century Skills in Higher Education", *Journal of Research in Innovative Teaching*. Vol. 9, 2016.
- [8] R. S. Sarmi, Ratnawulan, and Gusnedi, "Learning Media Analysis In The Development Of Integrated Science Teacher Book With Theme The Energy In The Life Using Type Integrated Of 21st Century Learning", *Journal of Physics: Conf. Series* 1185, 2018.
- [9] E. Prihadi, "Pengembangan Keterampilan 4C Melalui Metode Poster Comment Pada Mata Pelajaran PAI dan Budi Pekerti". *Passion of the Islamic Studies Center JPI_Rabbani*, 2018.
- [10] M. Khoiriah and A. Kholiq, "Validitas Perangkat Pembelajaran Fisika Berbantuan E-Book Literasi Sains Pada Materi Fluida Dinamis", *Inovasi Pendidikan Fisika*, vol. 9, no. 1, Februari 2020.
- [11] Festiyed, "Studi Pendahuluan Implementasi Kurikulum 2013 Dalam Mengintegrasikan Pendekatan Saintifik Melalui Model Inkuiri dan Authentic Assesment Dalam Pembelajaran IPA di Kota Padang" *Semirata*, 2015.
- [12] Aristiyaningsih and Budiharti, "Peningkatan Sikap Peka Terhadap Lingkungan Sekitar Melalui Project Based Learning", *Prosiding Seminar Nasional Fisika dan Pendidikan Fisika (SNFPPF) Ke-6*, Vol. 6, No. 1, 2015.
- [13] V. R. Nasution, R. A. Widestra, and Yulkifli, "Validity of Student Worksheets using Inquiry Based Learning Models with Science Technology Society Approach for Physics Learning, *International Journal of Progressive Sciences and Technologies (IJPSAT)*", vol. 25, No. 1, February 2021, pp. 63-68.
- [14] N. N. Aini, S. Kusairi, and M. Diantoro, "penguasaan Konsep Fluida Statis Dalam Pembelajaran Kolaboratif Dengan Penilaian Formatif", *Jurnal Pendidikan : Teori, Penelitian, Dan Pengembangan*", vol. 2, no. 10, 2017.
- [15] W. Fakcharoenphol, J. W. Morphew, J. P. Mestre, "Judgments of Physics Problem Difficulty Among Experts and Novices", *Physical Review Special Topics—Physics Education Research*, 11 (2), 2015.
- [16] I. A. Ojediran, D. I. Oludipe, and O. J. Ehindero, "Impact of Laboratory-Based Instructional Intervention on the Learning Outcomes of Low Performing Senior Secondary Students in Physics", *Creative Education*, 5, 2014.
- [17] Kemendikbud, *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 59 Tahun 2014 Bagian C PMP FIS-Minat SMA*, Kemendikbud : Jakarta, 2014.
- [18] Asrizal, Arnel, Hidayati, and Festiyed., "Penerapan Model Pembelajaran Penemuan Mengintegrasikan Laboratorium Virtual dan Hots untuk Meningkatkan Hasil Pembelajaran Siswa SMA Kelas XI", *Prosiding Seminar Nasional Hibah Program Penugasan Dosen ke Sekolah (PDS)Universitas Negeri Padang*, 2018.
- [19] P.T. Andiko, S. Rohiat, and Elvinawati, "Hubungan Implementasi Contextual Teaching And Learning (CTL) Dengan Hasil Belajar Peserta didik Mata Pelajaran Kimia Di Kelas X MIA SMA Negeri 8 Kota Bengkulu", *Jurnal Pendidikan dan Ilmu Kimia*, 3(1):70-75, 2019.
- [20] Asrizal, A. Amran, A. Ananda, Festiyed, and R. Sumarmin, "The Development Of Integrated Science Instructional Materials To Improve Students' Digital Literacy In Scientific Approach", *Jurnal Pendidikan IPA Indonesia*, 2018, pp 442-450.
- [21] K. Komalasari, "Pembelajaran Kontekstual : Konsep Dan Aplikasi", Bandung : Refika Aditama, 2010.
- [22] M. Muslich, "Pendidikan Karakter", Jakarta : Bumi Aksara, 2011.
- [23] Rusman, "Model-Model Pembelajaran : Mengembangkan Profesionalisme Guru", Jakarta : Rajagrafindo Persada, 2012.

- [24] P. B. Marsa And Desnita, "Assessing The Effectiveness Of Contextual Based Learning Videos In Waves", *Jurnal Pembelajaran Fisika*, vol. 8 (1), 2020, 95-117.
- [25] S. Hamida & Desnita, "Analisis Kebutuhan Video Pembelajaran Fisika Berbasis Kontekstual Materi Suhu dan Kalor Untuk Pembelajaran Abad 21", *Jurnal Pendidikan Fisika*. Vol.9, No.1, 2020.
- [26] A. Arsyad, "Media Pembelajaran", Jakarta : Pt. Rajagrafindo Persada, 2011.
- [27] A. Prastowo, "Panduan Kreatif Membuat Bahan Ajar Inovatif", Yogyakarta : Diva Press, 2012.
- [28] M. Haviz, "Research and Development : Penelitian Di Bidang Pendidikan yang Inovatif, Produktif dan Bermakna", *Jurnal Ilmiah Ta'dib*, Vol 16, No 1, 2013.
- [29] Rochmad, "Skala Pengukuran Variabel-Variabel Penelitian", Bandung: Alfabeta, 2011.
- [30] Sugiyono, "Metode Penelitian Kuantitatif, Kualitatif, dan R & D", Bandung : Alfabeta, 2012.
- [31] M. Tegeh, N. Jampel, and K. Pudjawan, "Model Penelitian Pengembangan". Yogyakarta : Graha Ilmu, 2014.
- [32] A. M. Branch, "Instructional Design-The ADDIE Aproach." New York : Springer, 2009.
- [33] S. Azwar, "Reliabilitas dan Validitas", Yogyakarta : Pustaka Belajar, 2015.