



## Development of Documentary Video Learning Media to Improve Student Learning Outcomes in Invertebrate Materials

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### Abstract

Invertebrate learning should present real objects of observation in the classroom or laboratory. The average learning outcomes of class X students of Senior high school (SMA MIPA) in the 2021/2022 academic year for Invertebrates material is 68 and only 38% achieve KKM or minimum completeness criteria is 70. The value of attitudes and skills of students is also not optimal. The purpose of this study was to analyze the characteristics, validity, practicality, and effectiveness of documentary video learning media on invertebrate material at SMA Negeri 1 Pulokulon, Grobogan Regency. This research is research and development (R&D). Documentary videos are validated by experts and practitioners. Practicality is determined by the responses of students and teachers. The effectiveness of video documentaries was tested with the Pretest-Posttest Control Group Design. Data on attitudes and skills of students were observed by providing an assessment with a rating scale and then an independent t test was carried out. Classical completeness was analyzed by descriptive percentage. the independent t test was used to test whether there was a difference in the posttest mean between the experimental group and the control class. The results showed that the Invertebrates video material was prepared by considering format, content, language, and media engineering aspects, so that it spurred students in discovery learning activities, namely: identifying problems, observing, collecting data, compiling data, communicating, and concluding. The learning device in the form of documentary video learning media on invertebrate material is declared valid in the very good category. Documentary video learning media on Invertebrates material are stated to be practical. with very positive criteria. Documentary videos on Invertebrates are effective on cognitive learning outcomes, attitudes, and process skills.

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## INTRODUCTION

Invertebrate learning should present real objects of observation in the classroom or laboratory. This effort will clearly provide a more meaningful experience than just giving an explanation orally. Media that supports charts and graphs is no longer attractive to digital generation students. Therefore, real objects or at least moving objects are needed so that students are interested and can easily understand invertebrate material.

The complexity of the material and inadequate learning resources make Invertebrate material a scourge for students. The average learning outcomes of class X students of SMA MIPA in the 2021/2022 academic year for Invertebrates material is 68 and only 38% achieve KKM or minimum completeness criteria is 70. The value of attitudes and skills of students is also not optimal. The teacher assesses the critical attitude of students when learning still needs to be improved. When the teacher gives the opportunity to ask questions, only students who are classified as outstanding in class use it to ask questions. Skills in communicating the results of observations also need to be improved. There is no awareness and personal desire for presentations in class.

One way to overcome the above problems is to make learning media in the form of documentary videos. Sanaky (2013: 4), states that learning media is an educational tool or tool that can be used as an intermediary in the learning process to enhance effectiveness and efficiency in achieving lesson objectives. Media that can be used in learning the topic of invertebrates is video documentaries. According to Sanaky (2013: 123), video is an audiovisual medium that contains elements of moving images, sound, and can be displayed via a video compact disk (VCD) medium. This media is able to display learning messages realistically. The results of research by Ma'rifah et al (2015), concluded that documentary videos are able to bring real conditions and not just symbols, so that students

get visualization of objects and biological symptoms and as if they are experiencing field study activities.

The development of documentary videos has not been fully developed by biology teachers in schools. Based on the background above, it is necessary to do research on the development of documentary videos on Invertebrates at SMA Negeri 1 Pulokulon. The purpose of this study was to analyze the characteristics, validity, practicality, and effectiveness of documentary video learning media on invertebrate material at SMA Negeri 1 Pulokulon, Grobogan Regency.

## METHODS

This research is research and development (R&D) at SMA Negeri 1 Pulokulon. Documentary videos are validated by experts and practitioners. Learning using documentary video learning media is applied in the experimental class, while in the control class using Powerpoint media. Intake of experimental and control classes is done randomly. Characteristics are analyzed with a descriptive percentage. Practicality is determined by the responses of students and teachers. The effectiveness of video documentaries was tested with the Pretest-Posttest Control Group Design. Data on attitudes and skills of students were observed by providing an assessment with a rating scale and then an independent t test was carried out. Classical completeness was analyzed by descriptive percentage. the independent t test was used to test whether there was a difference in the posttest mean between the experimental group and the control class.

## RESULTS AND DISCUSSION

### Results

#### 1. Characteristics

There are four (4) aspects to be considered in the design of the documentary video product developed. Each of its characteristics can be shown in Table 1.

**Table 1.** Characteristics of Documentary Videos

Aspect	Criteria	characteristics
Format	1. Complete documentary video	This video covers 8 phylum in the Invertebrates group
	2. Video Clarity	The video is clear enough with a bit rate of 128 kbps, channels 2 stereo, and an audio sample rate of 48 kHz
	3. The clarity of the narrator's voice	Quite clear
	4. Background support	Supported with instrumental music
	5. Use of letters	Combine various types of letters Adjusted to
Content	6. Conformity of material with basic competencies and indicators	KD 3.9 is directing students to have knowledge in applying classification principles to classify animals into eight phyla based on body shape, body symmetry, body cavity and reproduction. Classify from Porifera to Echinodermata based on body shape, body symmetry, body cavity and reproduction
	7. Material Depth	Adapted to the 2013 KTSP textbook
	8. The truth of the information in the documentary video	Quite complete
	9. Material description in the documentary video	Quite complete
Language	10. language use	In accordance with PUEBI rules
	11. Ease of operation	Easy
Media engineering	12. Media compatibility	Can be played with various players such as windows media player, Media player classic, Winamp
	13. Media management	Can be stored in the form of a CD so that it lasts longer and avoids viruses

**2. Validity**

The validated tools are syllabus, lesson plans, LKPD, and documentary videos. The results of the

validation of the syllabus, lesson plans, worksheets, and documentary videos are shown in Table 2.

**Table 2.** Acquired Score of Syllabus Validation, RPP, LKPD, and Documentary Video

No	Validator	Average	Criteria
1	Syllabus	4,15	Good
2	RPP	4,11	Good
3	LKPD	4,19	Good
4	Documentary videos	4,38	Very good
Average score		4,15	Good

The three validators' assessment of learning tools was in the good and very good categories. Based on this, it means that the syllabus, lesson plan, LKPD, and documentary videos are declared valid and can be used.

**3. Practicality**

The average rating of students on the practicality of documentary videos is 34.11 with very positive criteria. Each student's scoring response to the documentary video is shown in Table 3.

**Table 3.** Practicality of Documentary Videos

	Student Trial								
	1	2	3	4	5	6	7	8	9
Score	29	36	38	36	27	38	37	28	38
Meaning	Positive	Very positive	Very positive	Very positive	Positive	Very positive	Very positive	Positive	Very positive

The researcher also prepared an interview guide to explore the practicality of video documentaries from biology teachers at SMA

Negeri 1 Pulokulon. This guide consists of four questions. The results are presented in Table 4.

**Table 4.** Results of interviews with teachers about documentary videos

No	Question	Answer
1	How is the suitability of the Invertebrata documentary video developed with the 2013 KTSP content standards?	In my opinion, the content of the documentary video and the contents of KI and KD are appropriate
2	How is the image and sound quality of the Invertebrata documentary videos?	Quite good
3	Is the Invertebrata documentary video shown systematic?	It is in the order of Invertebrates
4	What is your input regarding the Invertebrata documentary video to make it better?	To be kept in the school library

**4. Effectiveness**

The affective, skill, and cognitive values obtained were carried out by an independent t-test to

test the two samples that were not related. The results are presented in Table 5.

**Table 5.** Two Difference Test Average Value Attitudes, Skills, and Cognitive

Class	Average			t table	t count		
	Affective	psychomotor	Cognitive		Affective	psychomotor	Cognitive
Experiment	83.53	83.91	80.30	1.995	5.355	4.133	3.660
Control	74.21	75.71	68.22				

Ho: there is no difference between the mean scores of attitudes, skills, and cognition of the experimental and control classes

Ha: there is a difference between the mean scores of attitudes, skills, and cognitive of the experimental and control classes

Value t count attitudes, skills, and cognitive respectively 5.355; 4.133; and 3,660. The t table value is 1.995. Because t count > t table, Ho is rejected, meaning that there is a significant difference between the average attitudes, skills, and cognitive values of the experimental class and the control class. Thus the use of documentary videos is effective on the results of students' attitudes, skills, and cognitive values.

**Discussion**

The characteristics or characteristics inherent in the developed documentary videos are in accordance with the format, content, language, and media engineering. with is that the content is very complete in peeling invertebrate material. Video has a bit rate of 128 kbps, stereo channels 2, and an audio sample rate of 48 kHz, so the picture looks clearer and doesn't break. A good documentary video requires strategies including choosing the right sources, openness in conveying information, and clear articulation (Nugroho, 2016). The characteristics of this video are also engineered so that it has practical and easy media compatibility and management for teachers and students. Can be played with various players such as Windows Media

Player, Media Player Classic, and Winamp. Invertebrate learning video products can be stored in CD format so that they are more durable and protected from virus attacks.

Research has shown that the device is in a valid category. A learning device is said to be valid if it is in the good and very good category with an acquisition score between 3.5 to 5 (Susialita, 2016). The results of device validation and valid media can be used as a tool to measure whether documentary films are valid and appropriate to be used as learning media in the Invertebrates sub-material (Hayati et al., 2014).

Practicality was gained by asking nine students in a small-scale pilot class to provide an assessment of the Invertebrate videos. By knowing the practicality of a learning video, the product developed has a principle of ease of use, so that teachers and students don't find it difficult when playing it for learning. Video practicality is needed so that there is compatibility in use in class (Erlianti et al., 2017). Student responses to learning with documentary videos were very positive at 86%.

The results obtained in Table 3 show that the documentary videos are stated in very positive criteria. Of the nine students who took part in giving the assessment, there were three students who considered that the documentary video was in the positive criteria, while six students rated the documentary video in the very positive category. The teacher gave a positive assessment of the Invertebrates video. This can be seen from the answers that seem good. The results of the study show that audio-video based multimedia profiles must meet the elements in terms of attractive appearance, coherent facilities, systematic and practical use as well as being a solution to non-implementation of practicum in schools (Rante et al., 2013).

The results showed that the calculated t value was 5.355, with t table 1.995. Because t count > t table ( $5.355 > 1.995$ ) then  $H_0$  is rejected, meaning that there is a significant difference between the mean values of the attitudes of the experimental class and the control class. Documentary video media is one of the media that can be a means of conveying moral messages to listeners or viewers (Luhur and Nasution, 2017). Documentary films can also be used as an effective learning resource for students (Rikarno, 2015). Documentary video

learning using the Discovery Learning (DL) model in class encourages students to engage in investigative activities in the form of identification and characterization of invertebrates (Jalil, 2016).

The observed scientific attitude includes four (4) assessment indicators. These indicators include being curious, diligent, open, and cooperative. First, is the attitude of knowing. Class students using documentary videos with the DL model ask for some unknown material. Videos can be played back from events that have occurred several years before (Widianto et al., 2015). Students looked enthusiastic and happy in participating in the Invertebrates learning process. Previous research reported that 92 percent of students (23 students) responded that it was interesting how the teacher explained lessons using documentary videos, the remaining 8 percent (2 students) said it was not interesting (Andriansyah et al., 2016). Second, is diligent. Perseverance is not easy to give up. The diligent attitude of students in learning DL with documentary videos can be seen when students have to repeatedly take straw soaking water to observe protists. The results of the study show that learning with multimedia can increase listening, observation, and discussion activities in students (Khoiriah et al., 2016). The third is an open attitude. Being open here is accepting people's better opinions. DL learning with documentary videos provides opportunities for students to express their expressions in conveying opinions in public. The same thing was observed by previous research, that the dominant attitudes observed during learning using multimedia were expressing opinions, being responsible, and being open (Cahyani et al., 2014). Fourth is cooperation. This attitude is reflected in completing activities in a compact manner. The use of realia media was able to stimulate the sharing of discussion results throughout the class, which increased by 19.99% (Setiyarini, 2013).

Science process skills in this study consisted of six (6) aspects of observation, namely: (1) preparing tools and materials, (2) observing, (3) classifying, (4) carrying out practicum, (5) communicating, and (6) conclude. First, prepare tools and materials. These skills are synonymous with working in a laboratory. This activity is expected to make students more responsible for their work. The same thing in a recent study shows learning video media can provide motivation to the audience in solving all kinds of problems (Hartanto

et al., 2016). Second, observing. Observation or observation is one step of the scientific method. To be able to carry out observation activities in the field, teachers need to provide learning tools in the form of Student Worksheets (LKPD). The results of this study are in line with previous research that the use of video is effective for investigative activities in reproductive system lessons (Roihana et al., 2018). Third, classify. The ability to group is also charged in Invertebrate material. Simple grouping, for example students are asked to classify groups of porous animals and hollow animals. Students are also required to be able to classify worms, roundworms, and earthworms. Fourth, carry out practicum. Learning designed on Invertebrate material stimulates motivation to carry out practical activities. Practical activities to identify marine animals that have high diversity, especially in the phylum Cnidaria (Reimer et al., 2012). Learning with learning videos can also increase learning activities both in class and in the laboratory (Kurniawati et al., 2013). Fifth, communicate. Communication skills are the needs of students for the 4.0 industrial revolution century. The results of the study reported that the use of documentary videos can improve communication skills through video recordings and exercises (Ponzio et al., 2018). Sixth, conclude. Concluding activities will get new knowledge. In learning activities with documentary videos, activities are trained to pay attention to video displays and class discussion activities in the high category, so that children are able to conclude learning well (Aunillah, 2011).

The results of the independent t test showed that there was a significant difference between the average post-test scores of the experimental and control classes. Thus the use of video documentaries is effective on students' cognitive learning outcomes. This success is of course closely related to the child's interest in studying invertebrate material through documentary videos. The results of the study reported that documentary videos can increase interest in learning, discussing, listening and observing (Hendrico et al., 2014). In addition, documentary videos are a means of education and promotion to find out new insights (Purwanto, 2016). Another advantage is that it can be displayed offline (Sorschag, 2012). Documentary video as a learning medium serves to clarify the presentation of messages so that they are not too verbalistic (in the

form of mere written or spoken words) and overcome the limitations of space, time, and sensory power (Brata and Maureen, 2012). The results of research on the use of multimedia I-invertebrates can overcome difficulties in understanding the concepts of Gastropods, Malacostraca, Asteroidea, Ophiuroidea, and Echinoidea (Widiansyah et al., 2018). These good learning outcomes also affect their concern for the existence of invertebrates in the environment around students. Sensitivity to the surrounding creatures will result in safeguarding the existence of invertebrates in nature. The results of the study show that documentary films can increase awareness of the surrounding environment (Pariury et al., 2017). According to Jalil (2018), this media can clearly display various kinds of images and data. Documentary video media is an alternative media for teachers that can be used in learning with a constructivism approach. The DL model is one of the offers in the 2013 curriculum from the government to be applied in learning because it adheres to the constructivism learning philosophy. Thus the documentary video media that has been developed strengthens the implementation of the 2013 Curriculum learning model.

## CONCLUSION

The conclusions of this study are as follows. Invertebrates video material is prepared by considering aspects of format, content, language, and media engineering, so that it stimulates students in discovery learning activities, namely: identifying problems, observing, collecting data, compiling data, communicating, and concluding. Learning tools in the form of syllabus, lesson plans, worksheets, and documentary video learning media on invertebrate material are declared valid. The validity of the syllabus, lesson plans and worksheets were in the good category and the documentary videos were in the very good category. Documentary video learning media on Invertebrates material are stated to be practical. The average rating of students on the practicality of documentary videos is 34.11 with very positive criteria. Likewise, the teacher gave a positive response to the use of documentary video media in Invertebrates material. Learning tools in the form of syllabus, lesson plans, worksheets, and documentary video learning media

on invertebrate material are effective for cognitive learning outcomes, attitudes, and skills

## REFERENCES

- Andriansyah, R., Bardi, S., & Harun, M. Y. 2016. Penerapan Model Pembelajaran Inkuiri dengan Menggunakan Video Dokumenter untuk Meningkatkan Hasil Belajar Siswa pada Mata Pelajaran Geografi Kelas XI SMA Negeri 1 Unggul Baitussalam Aceh Besar. *Jurnal Ilmiah Mahasiswa Pendidikan Geografi Unsyiah*, 1(1), 1–11.
- Aunillah, M.T. 2011. Kontribusi Penggunaan Media Film Dokumenter dalam Pembelajaran Geografi terhadap Aktivitas Belajar Siswa Kelas XI IPS Semester Genap SMA Negeri 2 Batang Tahun Pelajaran 2010/2011. *Laporan Penelitian*. Semarang: Universitas Negeri Semarang.
- Brata, G.B.I., & Maureen, I.Y. 2012. Pemanfaatan Media Video Dokumenter Pada Mata Pelajaran Sejarah Tentang Runtuhnya Rezim Orde Baru untuk Siswa Kelas XII IPA Semester 1 SMAN 1 Kraksaan Kabupaten Probolinggo. *Jurnal Unesa*. 1(1): 0-216.
- Cahyani, R., Rustaman, N. Y., Arifin, M., & Hendriani, Y. 2014. Kemampuan Kognisi, Kerja Ilmiah dan Sikap Mahasiswa Non IPA Melalui Pembelajaran Inkuiri Berbantuan Multimedia. *Jurnal Pendidikan IPA Indonesia*, 3(1), 1-4.
- Erlianti, S., Widiyaningrum, P., & Lisdiana, L. 2017. The Development Of Contextual Teaching and Learning Based-Video on Reproductive System Concept for SMA. *Journal of Biology Education*, 6(2), 166–172.
- Hartanto, B., Ardianto, D. T., & Srisanto, E. 2016. Perancangan Video Motivasi Bagi Jemaat Gereja Keluarga Allah melalui Refleksi Kehidupan Sarah Mulyani. *Jurnal Desain Komunikasi Visual Adiwarna*, 1(8), 1-6.
- Hayati, H., Syamswisna, S., & Titin, T. 2014. Etnobotani di Desa Beringin dan Implementasinya dalam Pembuatan Film Dokumenter Manfaat Keanekaragaman Hayati. *Jurnal Pendidikan dan Pembelajaran Untan*, 3(11), 1-20.
- Hendrico, J., H, P. W., & Yudani, H. D. 2014. Perancangan Video Dokumenter Olah Raga Flag Football Sebagai Sarana Promosi di Surabaya. *Jurnal Desain Komunikasi Visual Adiwarna*, 1(4), 1–11.
- Jalil, M. 2018. Peningkatan Aktivitas dan Hasil Belajar Siswa Materi Tsunami Melalui Metode Diskusi Inkuiri disertai Penerapan Media Powerpoint pada Siswa Kelas X SMK Roudlotus Saidiyah. *Genetika*, 1(1), 1-18.
- Jalil, M., Susilowati, S.M.E., Ngabekti, S. 2016. Pengembangan Pembelajaran Model Discovery Learning Berbantuan Tips Powerpoint Interaktif Pada Materi Interaksi Makhluk Hidup dengan Lingkungan. *Refleksi Edukatika*, 6(2), 130-137.
- Khoiriah, K., Jalmo, T., & Abdurrahman, A. 2016. The Effect of Multimedia-Based Teaching Materials in Science Toward Students' Cognitive Improvement. *Jurnal Pendidikan IPA Indonesia*, 5(1), 75–82.
- Kurniawati, A., Isnaeni, W., & Dewi, N. R. 2013. Implementasi Metode Penugasan Analisis Video pada Materi Perkembangan Kognitif, Sosial, dan Moral. *Jurnal Pendidikan IPA Indonesia*, 2(2), 149-155.
- Luhur, M.R. 2017. Representasi Nilai-Nilai Agama dalam Film Dokumenter Indonesia Bukan Negara Islam Karya Jason Iskandar. *Jom Fisip*, 4(2): 1-13.
- Ma'rifah, D. R., Sukirman, S., & Subiantoro, A. W. 2015. Penyusunan Video Karakteristik Vegetasi Pantai Trisik sebagai Alternatif Sumber Belajar Sub-Materi Kekhasan Ekosistem Pesisir Pantai Pasir untuk Siswa SMA, 3(1), 37–40.
- Nugroho, W. 2016. Penciptaan Video Dokumenter "Dinding-Dinding Cagar Budaya Kota Yogyakarta." *Capture : Jurnal Seni Media Rekam*, 3(1), 68-78.
- Pariury, P. P., Ardianto, D. Tr., & Srisanto, E. 2017. Perancangan Audio Visual Sebagai Media Pembelajaran Tentang Relief Panji di Jawa Timur. *Jurnal Desain Komunikasi Visual Adiwarna*, 1(1), 1-12.
- Ponzio, N. M., Alder, J., Nucci, M., Dannenfelser, D., Hilton, H., Linardopoulos, N., & Lutz, C. 2018. Learning Science Communication Skills Using Improvisation, Video Recordings, and Practice, Practice, Practice. *Journal of Microbiology & Biology Education*, 19(1), 1-18.

- Purwanto, E. 2016. Perancangan Video Dokumenter “Sarang Burung Walet: Daya Dan Khasiat” Untuk Pembudidayaan Burung Walet. *Jurnal Desain Komunikasi Visual Adiwarna*, 2(9), 1-7.
- Rante, P., Sudarto -, & Ihsan, N. 2013. Pengembangan Multimedia Pembelajaran Fisika Berbasis Audio-Video Eksperimen Listrik Dinamis di SMP. *Jurnal Pendidikan IPA Indonesia*, 2(2), 203-208.
- Reimer, J. D., Foord, C., & Irei, Y. 2012. Species Diversity of Shallow Water Zoanthids (Cnidaria: Anthozoa: Hexacorallia) in Florida.
- Rikarno, R. 2015. Film Dokumenter sebagai Sumber Belajar Siswa. *Ekpresi Seni*, 17(1), 129-149.
- Roihana, R. Z., Pukan, K. K., & Irsadi, A. (2018). Usage Effectiveness of Video and Mama Card In Biology Learning of Human Reproductive System. *Journal of Biology Education*, 7(1), 54–63.
- Sanaky, H. 2013. *Media Pembelajaran Interaktif-Inovatif*. Yogyakarta: Kaukaba Dipantara.
- Sorschag, R. 2012. A Flexible Object-of-Interest Annotation Framework for Online Video Portals. *Future Internet*, 4(1), 179–215.
- Susialita, T. 2016. The Development of Audio-Visual Student Portfolio (LKS) Contextual Teaching and Learning-Based (CTL) on Sound Chapter of Science Subject for Deaf Students. *Jurnal Pendidikan IPA Indonesia*, 5(2), 192–198.
- Widiansyah, A. T., Indriwati, S. E., Munzil, M., & Fauzi, A. 2018. I-Invertebrata as an Android-Based Learning Media for Molluscs, Arthropods, and Echinoderms Identification and Its Influence on Students’ Motivation. *Jurnal Pendidikan Biologi Indonesia*, 4(1), 43–52.
- Widianto, R., Warouw, D. M. D., & Senduk, J. J. 2015. Analisis Semiotika pada Film Senyap Karya Joshua Oppenheimer. *Acta Diurna*, 4(4), 1-9.