Developing Underwater Video Media in Learning Basic Swimming Techniques

I Gede Suwiwa¹, I Ketut Budaya Astra², Septyan Pemardo Pasaribu³

¹ Universitas pendidikan Ganesha, Indonesia; gede.suwiwa@undiksha.ac.id
² Universitas Pendidikan Ganesha, Indonesia; budaya.astra@undiksha.ac.id
³ Universitas Pendidikan Ganesha, Indonesia; septyan.pemardo.pasaribu@undiksha.ac.id

ARTICLE INFO

Keywords:
Basic techniques; Learning; Swimming; Video media

ABSTRACT

The purpose of this research was to develop instructional video media for basic swimming techniques using the ADDIE model. The development aims to (1) identify the feasibility level of the media through the responses of experts (2) the effectiveness of the media developed. The data were collected by using questionnaire and a field testing. The result of experts’ judges showed that content experts 64% (enough), learning media experts 76% (good) and learning design experts 78% (good). The results of the study were based on the responses of individual students 83% (good), small group 98.67% (very good), and large group 89.42% (very good). The students’ swimming performance was assessed based on distance, hand, feet, breathing, and coordination movements. The result of field testing showed that students’ swimming performance after the implementation of underwater video media was better than before the implementation (Sig.2-tailed=.001). Thus, the underwater video media is suitable to be used in teaching basic swimming technique based on the result of expert and field testing. This development research is expected to help in making, using and creating creative learning and to solve problems, especially in the material of swimming theory and practice.

This is an open access article under the CC BY-NC-SA license.

Corresponding Author:
I Gede Suwiwa
Universitas pendidikan Ganesha, Indonesia; gede.suwiwa@undiksha.ac.id

1. INTRODUCTION

Swimming is one part of the curriculum and is included in learning, specifically in physical education (PE). According to Wahyudi et al. (2021), physical education (PE) is one of the compulsory subjects in schools. The parties involved in this swimming lesson are students, teachers, and infrastructure. The infrastructure facilities in question include: swimming pools, surfboards and buoys. Sports and health physical education teachers have very heavy duties and responsibilities from these
elements. Physical education teachers, sports, and health are the most essential aspects of achieving learning success. Therefore, sports and health physical education teachers must have sufficient abilities and skills so that swimming lessons can be conveyed to students and meet the curriculum or goals set.

In PE, swimming is the most of courses that require practice. But, Covid-19 created a gap in the learning process because there are specific things that cannot be conveyed in the learning. Learning cannot run optimally because teachers cannot assist directly considering learning takes place online (Gherheș et al., 2021; Jeong & So, 2020). Movements carried out in the water (underwater) are often left untouched in the explanations of PE teachers; therefore, it is very important to be able to facilitate the learning of prospective PE educator students with relevant learning media. Through the media, students will see examples and further will be able to mimic the movements to be trained. Besides that, there are many facts in the field of PE teachers who do not have a background in swimming athletes who are unable to teach basic swimming techniques specifically to help students master the technique properly and correctly (Olstad et al., 2021).

Looking at the problems of teaching swimming during online learning, a visual media needs to be developed to support the teaching and learning process of swimming basic techniques. Video is a type of learning media can be used for the learning process and significantly improved the teaching and learning process (Heri et al., 2020; Winslett, 2014). Therefore, the current study was aimed at (1) developing an underwater video media, (2) testing the quality of the underwater video media through experts’ judges, and (3) the effectiveness of an underwater video media towards students swimming ability.

This study raised the development of video media for learning basic swimming techniques. The material was chosen because the basic swimming technique is the basis of the existing swimming material. Arifin (2013) states that before learning to swim, students should get to know the styles of swimming that are generally used. These styles include: 1) freestyle, 2) butterfly, 3) backstroke, and 4) breaststroke. These four styles are the styles of swimming that are competed in swimming championships. If students are familiar with the style of swimming, then the next step is to start with how to recognize water and what to do if they want to learn to swim.

Previous similar research that has been carried out in the research of Wahyudi et al. (2021) who studied PE learning experiments using Zoom for swimming material. The results of this study indicate that online learning using the Zoom application can be applied in PE by the way the teacher packs it in such a way to attract students’ interest in learning by explaining using PPT and showing videos during online learning. In addition, which can be used to demonstrate movements in the psychomotor realm (practical). After being analyzed, the research conducted by Wahyudi et al. (2021) is still too useful because doing swimming lessons via Zoom with PPT media is not an innovation. Other things are needed that can convey material that requires motion and modeling. On this basis, this development will be a complement to existing research.

Not only as development in PE, but this research also aims to enrich the treasures of educational science, especially in PE. A good wealth of references will make it easier for future researchers to study similar topics. In addition, teachers in schools are expected to be able to use the development made as a medium in their learning. Because PE learning cannot be done only using theories. The right media is also needed, such as the Underwater Video Media in Learning Basic Swimming Techniques developed.

2. METHODS

Design

The development of underwater video media in this lecture on the theory and practice of basic swimming learning used the ADDIE model. In developing video-based learning media using the ADDIE model, the development procedure carried out consists of several stages. To be more complete, here are the stages in developing video-based learning media. The stages in developing the ADDIE model of instructional video media are as follows.

1. The Analyze Stage.
The analysis here was the first step and became the basis for developing underwater video media for swimming theory and basic learning practices. In this study, needs analysis was conducted through interview with PE instructors.

2. Planning Stage
This phase is implemented after the analysis process is completed (Adanan et al., 2020). This stage was the design planning stage of selecting and determining the design made and starting to design the instructional video media script. Designing a product was conducted in two stages, namely selecting and implementing the software used, and developing a storyboard.

3. Development Stage
At the development stage, it was done by developing instructional video media. The development stage was the stage for compiling the course material that has been prepared and the collection of the required subject matter and materials for making media as supporting aspects such as text, images, animation, audio, and video. The development of the subject matter was carried out by using various sources of source books that are relevant to health material in PE subjects. Meanwhile, the collection of images, audio, and video was obtained through self-creation, personal archives, and downloading via the internet and direct capture in the field.

4. Implementation Stage
After the development stage, the implementation stage was carried out which was a concrete step to implement the learning video media that has been made. This means that at this stage everything that has been developed will be set in such a way as to suit its role or function so that it can be implemented. In implementing the product, the steps carried out were as follows: a). Coordinate with the study program and other class lecturers who teach so that there is good collaboration between lecturers and research. b). Prepare the tools needed in the application of media such as computers/laptops, LCDs, speakers and so on. c). Install media onto DVD, print DVD cover and test learning video media.

5. Evaluation Stage
The evaluation stage aimed to see the extent to which the products made can achieve predetermined goals and objectives. At this stage, an assessment of the media resulted from the validity of three experts, namely content experts, instructional media experts, and learning design experts. Each expert would be given an assessment instrument according to their area of expertise. After the revision was carried out, the next trial would be carried out by individual trials, small group trials, and large group trials.

Data Analysis
In this development research, three data analysis techniques were generally used, namely qualitative descriptive analysis techniques, quantitative descriptive analysis, and inferential analysis. This qualitative descriptive analysis technique was used to process data from the review results of subject experts, subject design experts, instructional media experts and student trials. This data analysis technique was carried out by grouping information from qualitative data in the form of input, response, criticism, and suggestions for improvement contained in the questionnaire. The results of this analysis are then used to revise the product being developed.

The result of expert judges then collected and analyzed using descriptive statistics to identify the mean score. A set of category was also developed by adopting category developed by Darmaji et al., (2019) in identifying the qualification of the mean score based on as can be seen in table 1.

Table 1. Category of Perception
3. FINDINGS AND DISCUSSION

In the analysis step, interview was conducted with four PE instructor. The result of interview identified three important point. Those are: (1) lack of media in teaching swimming; (2) lack of knowledge of basic swimming technique; and (3) lack of capability of developing a media for teaching swimming. The results of the interviews also found that teachers expected visual-based learning media to be used during the online learning period. The results of the analysis stage provide a strong basis for the need for the development of video media to support the teaching and learning process.

Next, on the stages of developing, the media were producing storyboards and flowcharts as the basis for developing media products, integrating swimming basic technique material and making videos, editing and producing. The developed media is supported with audio and visual image. The audio was to give explanation of the technique being taught meanwhile the visual image was to give proper example to the students on how to swim using freestyle, backstroke, Breaststroke and butterfly. Besides that, the media also contain explanation and example of the correct hand, feet, breathing and coordination movements.

![Figure 1. The Design of Underwater Video Media](image-url)

After the media is developed, it is then tested and evaluated. The implementation and evaluation of the media developed were conducted through expert judges and field testing. In terms of expert judges, there were three experts involved. They were media expert, design expert and learning expert. The result of expert judges can be seen in table 2.

| Expert                | Evaluation Score | Qualification |
|----------------------|-----------------|---------------|
| Content              | 64              | Enough        |
| Instructional Media  | 76              | Good          |
| Learning Design      | 78              | Good          |
| Overall              | 72.76           | Good          |

Source: Darmaji et al., (2019)
From table 2, it can be seen that in terms of content, the average value given by the expert is 64, which means that in terms of content, the underwater video media is in enough category. In terms of instructions and design, the average scores obtained are 76 and 78 which belong to good qualification.

The media developed was field tested. In conducting a field test, an experiment design was used. The media was used to teach basic swimming skills in one selected high school in Buleleng, Bali. The design of the experiment was pre-test posttest design. The students’ swimming skill was assessed in terms of distance and the movements. There were thirty-six students involved in this process. The result is presented in table 3.

| Components Assessed | Pretest | Posttest |
|---------------------|---------|----------|
| Freestyle Distance  | M=57.50 | M= 65.55 |
| Sd.= 15.14          | Sd.= 12.40 |
| Backstroke Distance | M=42.77 | M= 51.11 |
| Sd.= 16.01          | Sd.= 15.07 |
| Breaststroke Distance | M=60.55 | M= 67.08 |
| Sd.= 13.97          | Sd.= 11.54 |
| Butterfly Distance  | M=46.94 | M= 53.88 |
| Sd.= 16.22          | Sd.=14.29 |

From table 3, it can be seen that the average distance achieved by students before the implementation of underwater video media with freestyle is 57.50 meters, backstroke is 42.77 meters, breaststroke is 60.55 meters and butterfly is 46.94 meters. The students then were introduced and taught with underwater video media. After the implementation of underwater video media, the students’ swimming distance was reassessed. The results showed that the distance achieved by students were improved. The distance of freestyle is 65.55 meters, backstroke is 51.11 meters, breaststroke is 67.08 meters, and butterfly is 53.88 meters. A paired sample t test was conducted to find if the distance difference was significant or not. Before conducting the t test, a normality distribution of the data was also assessed. The result can be seen in table 4.

| Pair               | Normality (Kolmogorov-Smirnov) | Mean | D F | t test Sig. (2-tailed) |
|--------------------|---------------------------------|------|-----|-----------------------|
| Freestyle Pretest  | .099                            | -8.05556 | .001 |
| Freestyle Posttest | .081                            |       |     |                       |
| Backstroke Pretest | .200’                           | -8.33333 | .001 |
| Backstroke Posttest| .200’                           |       |     |                       |
| Breaststroke Pretest| .154                           | -6.52778 | 35  |
| Breaststroke Posttest| .151                           |       |     | .002                  |
| Butterfly Pretest  | .122                            | -6.94444 | .001 |
| Butterfly Posttest | .092                            |       |     |                       |

Values of higher than .05 in normality test indicates that the data are normally distributed (Pallant, 2016). Thus, a paired sample t test can be continued. Table 4 gives the information about the difference of distance between pairs. The difference of distance is -8.05 for freestyle, -8.33 for backstroke, -6.52 for breaststroke and -6.94 for butterfly. A significant difference is indicated if the value of Sig. (2-tailed) is lower than .05. From table 4, it can be seen that the value of Sig. (2-tailed) for all pairs are lower than .05. This means that the difference of distance between pretest and posttest is significant. It can be said that the implementation of underwater video media was significantly improved the swimming distance.
Besides assessing the underwater video media based on the distance, the movements of hands, feet, breathing and coordination. The result can be seen in Table 5.

| Components Assessed | Pretest     | Posttest    |
|---------------------|-------------|-------------|
| Hands               | M=3.13      | M=3.66      |
|                     | Sd.= .930   | Sd.= .632   |
| Feet                | M=2.77      | M=3.75      |
|                     | Sd.= .831   | Sd.= .649   |
| Breathing           | M=3.27      | M=3.69      |
|                     | Sd.= .848   | Sd.= .576   |
| Coordination        | M=2.75      | M=3.16      |
|                     | Sd.= .840   | Sd.= .845   |

There were five scales used to assess students’ movements. In Table 5, the students’ mean scores in pretest were 3.13 for hand movement, 2.77 for feet movement, 3.27 for breathing movement, and 2.75 for coordination movement. After the implementation of underwater video media, the students’ score became 3.66 for hand movement, 3.75 for feet movement, 3.69 for breathing movement, and 3.16 for coordination movement. The test was continued with normality test and paired sample t test as can be shown in Table 6.

| Pair               | Normality (Kolmogorov-Smirnov) | Wilcoxon Sign Rank Test | Asymp. (Sig-2 tailed) |
|--------------------|--------------------------------|-------------------------|-----------------------|
| Hand Pretest       | .001                           | 1                       | 14                    | 21                    | .001                      |
| Hand Posttest      | .001                           | 0                       | 27                    | 9                     | .001                      |
| Feet Pretest       | .001                           | 0                       | 13                    | 23                    | .001                      |
| Feet Testt         | .001                           | 0                       | 13                    | 23                    | .001                      |
| Breathing Pretest  | .001                           | 0                       | 14                    | 22                    | .001                      |
| Breathing Posttest | .001                           | 0                       | 14                    | 22                    | .001                      |
| Coordination Pretest| .001                         | 0                       | 14                    | 22                    | .001                      |
| Coordination Posttest| .001                      | 0                       | 14                    | 22                    | .001                      |

The result of normality test showed that the data are not normally distributed (< 0.05). Therefore, a non-parametric test was conducted to identify the significant mean difference between pretest and posttest. A Wilcoxon Sign Rank Test was used to identify the result. There are three ranks namely negative which indicated a decreased score, positive which indicates an improved score and ties which indicates no decreased score nor improved score. The result of Wilcoxon sign rank test showed that 1 negative rank, 14 positive rank and 21 ties in terms of hand movement. In terms of feet movement, there is no negative rank, 27 positive ranks and 9 ties. For breathing movements, 0 negative rank, 13 positive ranks and 23 ties were identified. No negative rank, 14 positive ranks and 22 ties were identified in the score of coordination movements. Table 6 also presents the result of Asymp. (Sig-2 tailed) as the indicator of significant mean difference between pretest and posttest. A value of lower than .05 indicates that the mean difference is significant.

The development of video media in this study aims to support the teaching and learning process in online situations. With the video, students can observe and learn directly the basics technique of swimming. From the results of expert judges, in general the developed media is in good category (Mean score=72.76). A good learning media will help students understand the learning content and will have a positive impact on the achievement of the desired competencies (Ren, 2017). A good and interesting learning media will also increase student motivation in learning (Puspitarini & Hanif, 2019).
digital and electronic learning media can also support the implementation of online learning during this pandemic (Coman et al., 2020)

The result of field testing confirmed that there was a significant mean difference before and after the implementation of underwater video media in terms of distance, and movements of hand, feet, breathing and coordination (Sig. 2-tailed < .005). This indicates that the media was effective to improve the students’ basic swimming skill. The use of media for teaching sports has been conducted and showed a positive result. Sheng and Sheng (2018) found that students’ offensive understanding ability and defensive understanding ability in basketball was improved greatly after the implementation of multimedia teaching system with video. Furthermore, the use of digital media in physic education greatly offer opportunities to improve the quality of the learning when the media is designed based on the courses objectives (Greve et al., 2020).

The results of the development of the underwater video media show that the media can be used to support the learning process of basic swimming techniques and has been proven to be able to improve students’ basic swimming skills through the results of expert judges and direct implementation in the field. By using the media developed learning becomes more interesting and interactive. This directly influences the learning outcomes. The media developed in this study is still far from perfect. Improvements are needed both in terms of content, design and instructions. Further study is acknowledged to develop a learning media for teaching different subjects of physics education and integrated a more complex features in the media developed such as virtual reality.

4. CONCLUSION

The development of video media in this study is can be implemented, it can be seen from the results of experts’ judges that content experts gives 64% (enough), learning media experts 76% (good), and learning design experts 78% (good). The results of the study were based on the responses of individual students is 83% (good), small group 98.67% (very good), and large group 89.42% (very good). This development research is expected to help in making, using, and creating creative learning and to solve problems, especially in the material of swimming theory and practice. Even tough, the media developed is still far from perfect. Improvements are needed both in terms of content, design, and instructions. Therefore, further research is expected to make similar developments more innovative, to improve the quality of PE, especially in swimming materials.

REFERENCES

Adanan, H., Adanan, M., & Herawan, T. (2020). M-webquest development: Reading comprehension of senior high school students in Indonesia. International Journal of Emerging Technologies in Learning, 15(3), 74–92. https://doi.org/10.3991/ijet.v15i03.10628

Arifin, B. (2013). Pengembangan Gerak Dasar Renang untuk Anak Sekolah Dasar. Jurnal Pemikiran dan Pengembangan SD, 1(1).

Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students’ perspective. Sustainability, 12(24), 1–22. https://doi.org/10.3390/su122410367

Darmaji, Astalini, Kurniawan, D. A., Parasdila, H., Iridianti, Susbiyanto, Kuswanto, & Ikhlas, M. (2019). E-Module based problem solving in basic physics practicum for science process skills. International Journal of Online and Biomedical Engineering, 15(15), 4–17. https://doi.org/10.3991/ijoe.v15i15.10942

Gherheș, V., Stoian, C. E., Fărcașiu, M. A., & Stanici, M. (2021). E-learning vs. Face-to-face learning: Analyzing students’ preferences and behaviors. Sustainability, 13(8). https://doi.org/10.3390/su13084381

Greve, S., Thumel, M., Jastrow, F., Krieger, C., Schwedler, A., & Süßenbach, J. (2020). The use of digital media in primary school PE–student perspectives on product-oriented ways of lesson
staging. *Physical Education and Sport Pedagogy*, 0(0), 1–16. https://doi.org/10.1080/17408989.2020.1849597

Heri, Z., Retno, P., & Hasibuan, M. N. (2020). Audio Visual Learning Media Tutorial: Development for Basic Swimming Subject Sports Coaching Education at the Faculty of Sport Science, Medan State University. *1st Unimed International Conference on Sport Science*, 23, 140–142. https://doi.org/10.2991/ahsr.k.200305.040

Jeong, H. C., & So, W. Y. (2020). Difficulties of online physical education classes in middle and high school and an efficient operation plan to address them. *International Journal of Environmental Research and Public Health*, 17(19), 1–13. https://doi.org/10.3390/ijerph17197279

Olstad, B. H., Berg, P. R., & Kjendlie, P. L. (2021). Outsourcing swimming education—experiences and challenges. *International Journal of Environmental Research and Public Health*, 18(1), 1–14. https://doi.org/10.3390/ijerph18010006

Pallant, J. (2016). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*. Open University Press.

Puspitarini, Y. D., & Hanif, M. (2019). Using Learning Media to Increase Learning Motivation in Elementary School. *Anatolian Journal of Education*, 4(2), 53–60. https://doi.org/10.29333/aje.2019.426a

Ren, K. (2017). Role of media in the popularization of physique education in higher school. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(10), 7003–7008. https://doi.org/10.12973/ejmste/78714

Sheng, F., & Sheng, S. (2018). Construction of multifunctional video conversion-based multimedia teaching system for college basketball. *International Journal of Emerging Technologies in Learning*, 13(6), 176–189. https://doi.org/10.3991/ijet.v13i06.8587

Wahyudi, T, et al. (2021). Upaya Meningkatkan Proses Pembelajaran PJOK Materi Renang melalui Aplikasi Zoom pada Masa Pandemi Covid-19 SMK Negeri 1 Sale Rembang. *Journal of Physical Activity and Sports*, 2(3).

Winslett, G. (2014). What counts as educational video?: Working toward best practice alignment between video production approaches and outcomes. *Australasian Journal of Educational Technology*, 30(5), 487–502. https://doi.org/10.14742/ajet.458