Animation Videos Promote Health Education for Children and Adolescents

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ARTICLE INFO	ABSTRACT
	This research is oriented toward developing animated video-based digital media as a medium for promoting and campaigning for healthy living and sedentary behavior. The research method used in this study is Design Based Research, which consists of three main stages: needs analysis, design, and development. The needs analysis stage is carried out through a review of research results and literature review studies regarding digital media in education. The next stage is digital media design, starting with classifying material regarding sedentary behavior. The product development stage consists of four stages: design, animate, composite, and render. The final stage is a media validation test carried out to see the feasibility of the animated video media that has been developed. The results of expert validation and validation of animated video-based digital media are categorized as good so that the animated videos that have been designed are suitable for use as learning media to promote and campaign for healthy living to reduce sedentary behavior.

1. Introduction

Technological developments in learning are related to 21st-century learning, focusing on computer use and technology literacy, information, and communication [1,2]. The development of digital technology in the learning process has developed such a fast technology has an innovative role in education [3]. This causes a shift in the learning process from traditional learning to digital-based learning [4]. The concept of digitization is in line with developments in the era of the industrial revolution 4.0, which has now developed into an era of super-intelligent society, namely entering society 5.0, the trend of digitalization in various fields has been used, one of which is in the field of education [5].

Digitalization in education continues to experience developments that affect patterns and strategies in learning, learning systems that have changed to electronic learning, which is a model that uses technology in the learning process [6,7]. Various media can be used in the learning process,

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digital media, mobile learning, audio-visual media, etc. One of the media that is often used is mobile learning, which is one of the trends that continues to grow in the field of education [8,9].

The growing trend of using smart phone influences the use of mobile learning, anyone must be kept from smart phone, wherever and whenever everyone is very dependent on the use of smart phone [10]. Two sides affect the use of smart phone, namely the positive and negative sides. On the positive side, all information will be obtained more quickly. In contrast, the positive side tends to be people who become night and addicted to using smart phone, especially children and adolescents [11]. Children and adolescents can spend hours using smart phone. This affects their lifestyle, which tends to be unhealthy due to a lack of physical activity or what is commonly referred to as a sedentary lifestyle. A sedentary lifestyle is a relaxed lifestyle, sitting, lying down, reading, watching television, and playing on smart phone [12]. A sedentary lifestyle occurs in someone too lazy to move due to convenience in various fields, namely technology, transportation, and household appliances. This lifestyle makes a person less mobile and physically active [13], this person rarely does a physical activity or does little movement.

This research aims to develop digital media for children and adolescents and campaign for sedentary behavior. Children and adolescents tend to spend more time using smart phone. Therefore, researchers choose to develop mobile learning in the form of animated videos. This animated video will contain sedentary behavior and its impact on health, in addition to educating children and adolescents so they can change their mindset and lifestyle in a better direction.

2. Methodology

Design-Based Research is used to develop an animated video about sedentary behavior. This Research is in the form of a design to produce a digital media product. The design is carried out by conducting a needs analysis from various sources, including a literature review and relevant research results. The design for the development of digital animation videos can be seen in Figure 1.
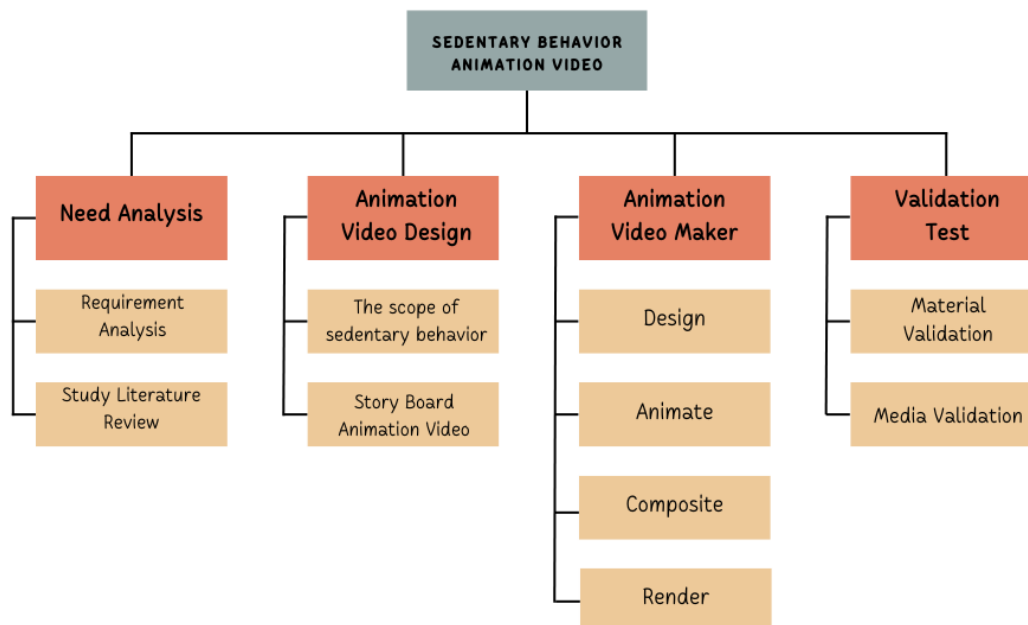

Fig. 1. Sedentary behavior animation video development flow

i. Need Analysis

Needs analysis is a stage related to needs-related analysis in developing digital media. This stage aims to explore the design and development of the necessary digital media. This stage is carried out as a basis for designing and developing digital media, at this stage, it is carried out by conducting studies from various literature and research results which are then analyzed and processed to become the basis for designing and developing digital media.

ii. Design

The design is a stage that is carried out based on the results of a literature study that has previously been carried out. In this stage, there were two parts, namely the scope of sedentary behavior and the classification of sedentary behavior, each of which designed a design that would be further developed. Furthermore, the research team designed digital media products, namely video animation of sedentary behavior.

iii. Making Animated Videos

Making animated videos is the core stage of this research process, namely the stages of developing sedentary behavior animated digital media video media products. There are four stages in making an animated video, namely design, animate, composite, and render.

iv. Validation

The validation test involved two experts, namely material experts and media experts. The validation test stage is carried out by validation experts so that they know the feasibility of the product being developed. After the validation process, product improvements are carried out according to input from the validation team. Product improvements resulting from validation assessments are carried out to produce ideal digital media products so that they can solve problems regarding sedentary behavior in children and adolescents.

3. Results
3.1 Needs Analysis

Researchers conducted a preliminary study regarding the use and needs of digital media at the level of children and adolescents by conducting a survey regarding digital media that is often used daily in the learning process. The survey results are presented in Table 1.

Table 1
Types of media used by children and youth

| No	Types of media	Total	Percentage
1	e-book	56	11,6%
2	Flipbook	90	18,6%
3	Interactive Video	227	47,0%
4	Interactive Game	110	22,8%

The survey results show that the media most used by children and remakes is digital interactive video media as many 227 respondents (47.0%), a small proportion of 110 respondents (22.8%) use interactive games, 90 respondents (18, 6%) use flipbook digital media, and 56 respondents (11.6%) use e-book digital media. The results of the study show that the most widely used digital media is digital interactive video media, this shows that children and adolescents prefer digital interactive video media. This aligns with the results of research conducted by UNESCO in 2020 regarding animated videos used as digital media in promoting health.

Research conducted by UNESCO shows that animated videos are a medium used to support innovative learning processes [14]. The results of research conducted on children aged 6-9 years regarding good nutrition for children using nutritional cartoon animation videos showed that children have a good perception of the use of nutritional animation videos. The animated videos developed can be used to conduct nutrition education for children [15].

3.2 Make Animated Video

Making digital media developed is a sedentary behavior animated video. Animated video is a medium that combines audio and visual media to attract students' attention, can present objects in detail, and can help understand difficult lessons [16,17]. Animated videos can comprehensively describe and explain the material to audiences [18]. The animated video that was developed contains sedentary behavior material, the material presented starts with what sedentary behavior is, what types of activities are included in sedentary behavior, and how to reduce habits related to sedentary behavior. The video developed aims to educate children and adolescents regarding sedentary behavior and its impact on health. The video development stage consists of 4 stages: design, animation, composite, and rendering.

The initial stage designs, this stage creates visual object assets that become motion graphic material. Making assets in the form of visual objects is made using the Adobe Illustrator CC application, the process of creating assets can be seen in Figure 2. The assets are made as visual objects that describe sedentary behavior. The initial stage designs, this stage creates visual object assets that become motion graphic material. Making assets in the form of visual objects is made using the Adobe Illustrator CC application, the process of creating assets can be seen in Figure 2. The assets are made as visual objects that describe sedentary behavior.
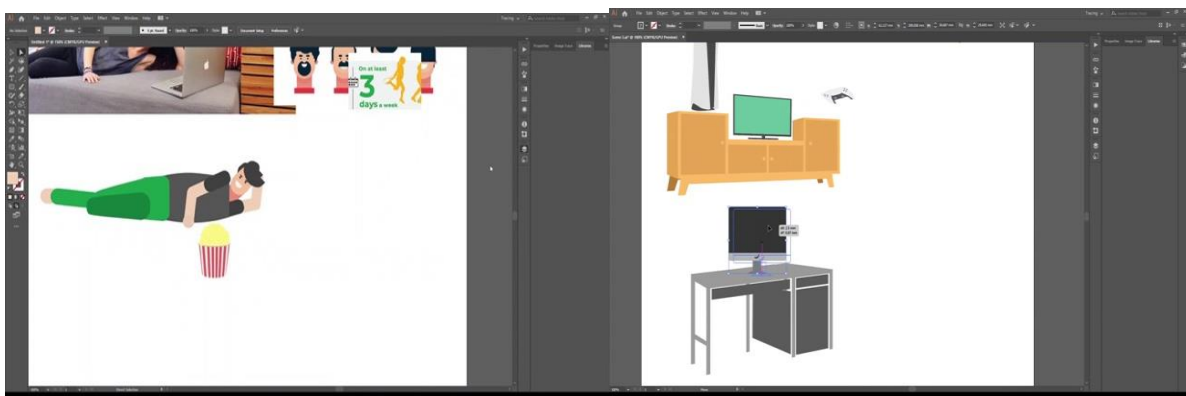
Fig. 2. Sedentary behavior animation video visual object assets

The next stage is animating, in the animating stage, the visual object assets that have been made are moved using the Adobe After Effects CC application. The animation process for visual object assets is carried out so that objects can move and be more alive in the developed animation video.

The visual object assets for sedentary activities that have been created are then moved using the Adobe After Effects CC application, the animation process is shown in Figure 3.
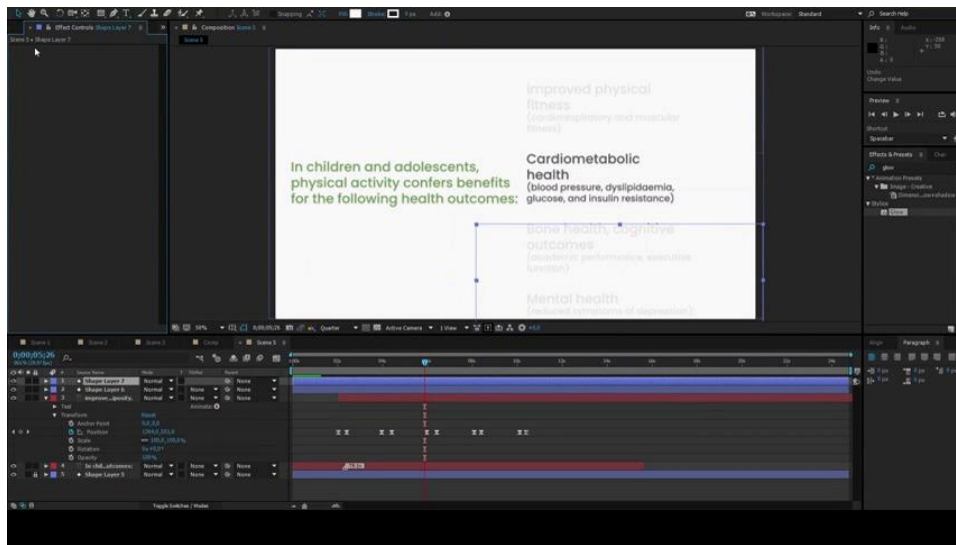

Fig. 3. Animate stages on sedentary behavior video animated visual object assets

The next stage is compositing, compositing is the stage that is carried out after the animating process. Visual object assets that have been edited using the Adobe After Effects CC application will then become part of the scene, and the scene is moved to be combined into a complete video series. Composite stages in making animated videos can be seen in Figure 4.
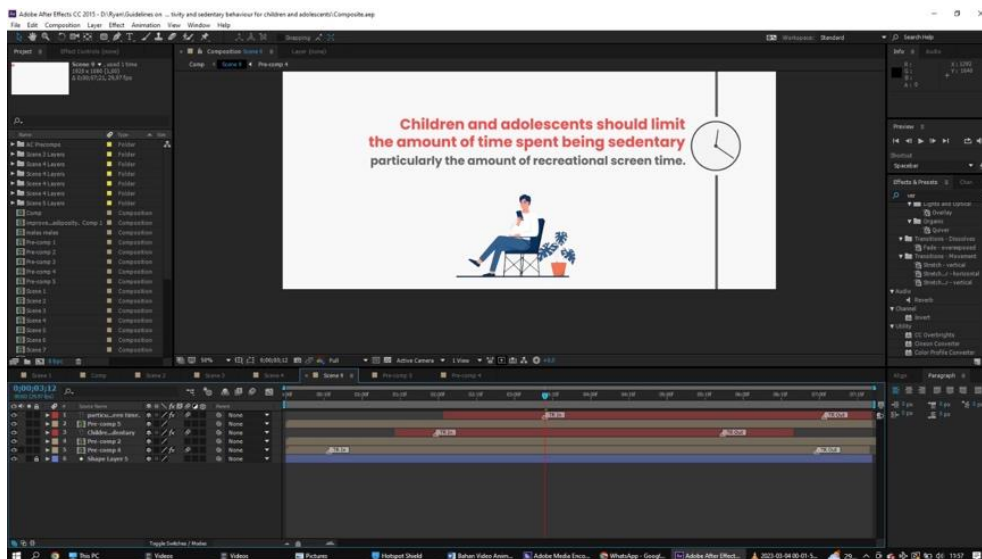

Fig. 4. Sedentary behavior animation video composite stages

The final stage is rendering, the rendering process is the final, namely the video export process. The animated videos that have been designed are then combined into one complete video according to the storyboard that was prepared at the beginning of the design. The storyboard is structured as a design for making an animated video, containing an overview of the animated video that will be developed [19]. The video results that have been compiled based on the storyboard design are then made in file form, the resulting file is in the mp4 format at the end. The rendering stages in making a sedentary behavior animated video can be seen in Figure 5.
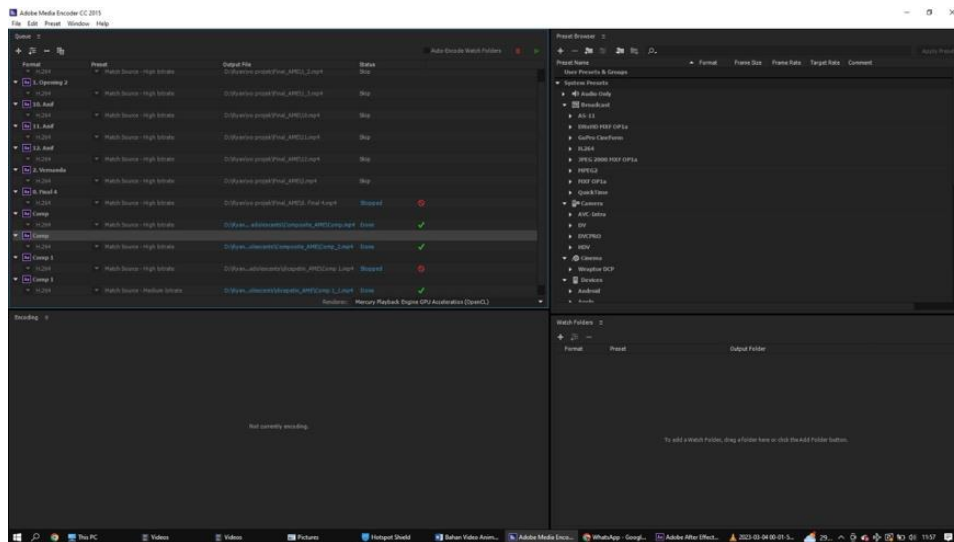
Fig. 4. Sedentary behavior animation video rendering stages

The animated video that has been created has an mp4 format. The animated video illustrates sedentary behavior. The appearance of each slide illustrates sedentary behavior material as a form of education for children and adolescents so they can adapt to a healthier life. An overview of the animated video can be seen in Figure 6.

Fig. 6. Sedentary behavior animation video

3.3 Expert Validation

The animated sedentary behavior video that has been produced to see the feasibility of the animated video is subjected to a validation test. The validation test was carried out in two parts: material validation and media validation. Material validation is carried out related to the material prepared regarding sedentary behavior material. At the same time, media validation is related to the animation developed by the researcher. The results of the material expert validation are presented in Table 2.

Table 2
Material expert validation test results

No	Indicators	Score	Category
1	The breadth and depth of content	4.50	Good
2	Explanation of content	4.75	Very good
3	Explanation of included examples	4.50	Good
4	Sufficiency of included examples	4.00	Good
5	Explanation of the language used	4.75	Very good
6	Suitability of the language with the target	4.50	Good
7	Explanation of information on image illustrations	4.50	Good
Total		32	
Average		4.50	
Category		Good	

Based on material validation that has been carried out by material experts, starting from breadth and depth of content, explanation of material content regarding sedentary behavior, explanations accompanied by examples of a sedentary lifestyle, using language that is clear and easily understood by users, namely children and adolescents, and Use illustrative images to make the animation more interesting. The results of the material validation test showed that the average of the material expert validation results is good, this shows that the animated video developed is feasible for testing. The following validation test is the media expert validation test. The results of the media expert validation test can be seen in Table 3.

Table 3
Media expert validation test results

No	Indicators	Score	Category
1	The suitability of the material with animation	4.75	Very good
2	Suitability of images, colors and visual illustrations	4.50	Good
3	Suitability of text and visual illustrations	4.50	Good
4	Use of font	4.50	Good
5	Motion graphic creativity and dynamism	4.50	Good
Total		22.75	
Average		4.50	
Category		Good	

Media validation tests were conducted to see the feasibility of the sedentary behavior digital video animation media being developed. This is in line with current reports for the need of media [20-35]. Media validation test using several indicators, the first indicator is to see the suitability of the material with the animation being developed. The next indicator looks at the suitability between the images, colors, and visuals made as illustrations in the developed animations. In addition to these illustrations, the validator also assesses the use of fonts and their readability. The last indicator seen

is the creativity of the developed motion graphics. The results of the media validation test showed that the average of the validation results of media experts is good, this shows that the animated video developed is feasible to be tested as one of the digital media used to educate children and adolescents about sedentary behavior.

Sedentary behavior is a severe problem in society [36,37], technological developments have a considerable influence as a cause of increased sedentary behavior [38,39]. Digital technology has a significant role in the development of life, technology can have a positive or negative role depending on how it is integrated [40,41]. Animated videos are designed to educate children and adolescents about sedentary behavior. Children and adolescents tend to be very active mobile phone users, which is why animated videos are used [42,43]. Therefore, researchers provide education. Thus, children and adolescents understand how to adopt a healthy life and change sedentary behavior. This is in line with current research regarding physical activity [44-59].

4. Conclusions

We developed digital video animation media based on the analytical studies that had been carried out, the results of the literature review and research showed that digital video animation media videos are used for learning and promoting health. Especially among children and adolescents, because of the intense use of mobile phones, the researchers designed an animated video-based digital media as a tool used to promote and campaign for healthy living and sedentary behavior. The digital media developed in this research is an animated video containing sedentary behavior. The trend of sedentary behavior among children and adolescents is a serious problem, therefore researchers have developed media that can be used to educate children and adolescents about healthy lifestyles. The results of the validation show that the animated digital video media developed is in a suitable category, which means it is appropriate to disseminate to teenagers as a means of educating them about healthy lifestyles.

References
[1] Van Laar, Ester, Alexander JAM Van Deursen, Jan AGM Van Dijk, and Jos De Haan. "The relation between 21st-century skills and digital skills: A systematic literature review." *Computers in human behavior* 72 (2017): 577-588. https://doi.org/10.1016/j.chb.2017.03.010
[2] Garba, Sani Alhaji, Y. Byabazaire, and Abdul Hamid Busthami. "Toward the Use of 21 st Century Teaching-Learning Approaches: The Trend of Development in Malaysian Schools within the Context of Asia Pacific." *International Journal of Emerging Technologies in Learning* 10, no. 4 (2015). https://doi.org/10.3991/ijet.v10i4.4717
[3] Kryukov, Vladimir, and Alexey Gorin. "Digital technologies as education innovation at universities." *Australian Educational Computing* 32, no. 1 (2017): 1-16.
[4] Makhmudjanovna, Tashova Zebo. "BENEFITS OF DIGITAL LEARNING OVER TRADITIONAL EDUCATION METHODS." *Oriental renaissance: Innovative, educational, natural and social sciences* 1, no. 4 (2021): 423-427.
[5] Muktiarni, M., I. Widiaty, A. G. Abdullah, A. Ana, and C. Yulia. "Digitalisation trend in education during industry 4.0." In *Journal of Physics: Conference Series*, vol. 1402, no. 7, p. 077070. IOP Publishing, 2019. https://doi.org/10.1088/1742-6596/1402/7/077070
[6] Muktiarni, M., A. Ana, V. Dwiyanti, A. R. Sari, and J. Mupita. "Digital platform trends in vocational education during the COVID-19 pandemic." *Journal of Technical Education and Training* (2021): 180-189. https://doi.org/10.30880/jtet.2021.13.03.018

[7] Pettersson, Fanny. "Understanding digitalization and educational change in school by means of activity theory and the levels of learning concept." *Education and Information Technologies* 26, no. 1 (2021): 187-204. https://doi.org/10.1007/s10639-020-10239-8

[8] Muktiarni, Muktiarni, Andreas Suwandi, and Azhari Oktavina Wijaya. "Mobile Learning Trend in Vocational High School." In *Proceedings of the 2nd International Joint Conference on Hospitality and Tourism, IJCHT 2022, 6-7 October 2022, Singaraja, Bali, Indonesia*. 2022. https://doi.org/10.4108/eai.6-10-2022.2325688

[9] Muktiarni, Muktiarni, Andreas Suwandi, and Azhari Oktavina Wijaya. "Mobile Learning Trend in Vocational High School." In *Proceedings of the 2nd International Joint Conference on Hospitality and Tourism, IJCHT 2022, 6-7 October 2022, Singaraja, Bali, Indonesia*. 2022. https://doi.org/10.4108/eai.6-10-2022.2325688

[10] Sung, Yao-Ting, Kuo-En Chang, and Tzu-Chien Liu. "The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis." *Computers & Education* 94 (2016): 252-275. https://doi.org/10.1016/j.compedu.2015.11.008

[11] Cha, Seong-Soo, and Bo-Kyung Seo. "Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use." *Health psychology open* 5, no. 1 (2018): 2055102918755046. https://doi.org/10.1177/2055102918755046

[12] Kurdaningsih, Septi Viantri, Toto Sudargo, and Lely Lusmilasari. "Physical activity and sedentary lifestyle towards teenagers' overweight/obesity status." *Int J Community Med Public Health* 3, no. 3 (2016): 630-635. https://doi.org/10.18203/2394-6040.ijcmph20160623

[13] Permatasari, Puspita Ayu, M. Rech, A. A. Qohar, and A. Faizal. "From web 1.0 to web 4.0: the digital heritage platforms for UNESCO's heritage properties in Indonesia." *Virtual Archaeology Review* 11, no. 23 (2020): 75-93. https://doi.org/10.4995/var.2020.13121

[14] Permatasari, Puspita Ayu, M. Rech, A. A. Qohar, and A. Faizal. "From web 1.0 to web 4.0: the digital heritage platforms for UNESCO's heritage properties in Indonesia." *Virtual Archaeology Review* 11, no. 23 (2020): 75-93. https://doi.org/10.4995/var.2020.13121

[15] Glorioso, Idelia G., Shannen Faye Q. Arevalo, Maja Bethzaida S. Decena, Theresa Krista B. Jolejole, and Milflor S. Gonzales. "Developing and pre-testing of nutrition cartoon video to promote healthy eating among hearing and deaf and mute children." *Malaysian Journal of Nutrition* 28, no. 3 (2022). https://doi.org/10.31246/mjn-2021-0127

[16] Abdulrahaman, M. D., N. Faruk, A. A. Oloyede, N. T. Surajudeen-Bakinde, L. A. Olawoyin, O. V. Mejabi, Y. O. Imam-Fulani, A. O. Fahm, and A. L. Azeez. "Multimedia tools in the teaching and learning processes: A systematic review." *Heliyon* 6, no. 11 (2020). https://doi.org/10.1016/j.heliyon.2020.e05312

[17] Swerdloff, Mathew. "Online learning, multimedia, and emotions." In *Emotions, technology, and learning*, pp. 155-175. Academic Press, 2016. https://doi.org/10.1016/B978-0-12-800649-8.00009-2

[18] Ou, Chaohua, David A. Joyner, and Ashok K. Goel. "Designing and developing video lessons for online learning: A seven-principle model." *Online Learning* 23, no. 2 (2019): 82-104. https://doi.org/10.24059/olj.v23i2.1449

[19] Wien, Mathias, Jill M. Boyce, Thomas Stockhammer, and Wen-Hsiao Peng. "Standardization status of immersive video coding." *IEEE Journal on Emerging and Selected Topics in Circuits and Systems* 9, no. 1 (2019): 5-17. https://doi.org/10.1109/JETCAS.2019.2898948

[20] Winarni, Rahayu Siwi, and Linna Meilia Rasiban. "Perception of japanese students in using online video as a learning media." *Indonesian Journal of Educational Research and Technology* 1, no. 1 (2021): 15-16. https://doi.org/10.17509/ijert.v1i1.32652

[21] Onasanya, Temitayo Omolara, Gboyega Ayodeji Aladesusi, S. A. Taiwo, Samuel Adenubi Onasanya, and Jameson Taiwo Adeoye. "Effect of Technology-Enabled Video Instruction on Senior Secondary School Students' Performance in Selected Technical Drawing Concept in Ilorin." *Indonesian Journal of Educational Research and Technology* 2, no. 2: 141-148. https://doi.org/10.17509/ijert.v2i2.43559

[22] Millatina, Silmi Nabilah, Rina Maryanti, and Verra Wulandary. "Strengthening literacy of cultural arts and crafts in the material of sculpture for 6th-grade elementary school students through learning video media." *Indonesian Journal of Educational Research and Technology* 2, no. 3 (2022): 189-194. https://doi.org/10.17509/ijert.v2i3.38675

[23] Anggraeni, Risma, and Rina Maryanti. "Implementation of video learning media in Islamic Religious Education subjects." *Indonesian Journal of Multidiciplinary Research* 1, no. 2 (2021): 257-266. https://doi.org/10.17509/ijomr.v1i2.37609

[24] Fadillah, Ine Nur, and Rina Maryanti. "Application of learning videos and Quizizz in increasing students interest in learning English in middle schools." *Indonesian Journal of Multidiciplinary Research* 1, no. 2 (2021): 329-336. https://doi.org/10.17509/ijomr.v1i2.37853

[25] Maulid, Maulana Nur, and Asri Wibawa Sakti. "The effectiveness of learning videos as a source of digital literacy on poster learning in elementary schools." *Indonesian Journal of Multidiciplinary Research* 2, no. 1 (2022): 51-56. https://doi.org/10.17509/ijomr.v2i1.38623

[26] Azizah, Silva Nurul, Asep Bayu Dani Nandiyanto, Verra Wulandary, and Asep Rudi Irawan. "Implementation of video learning media in Islamic Religious Education subjects for Elementary School Students." *Indonesian Journal of Multidiciplinary Research* 2, no. 1 (2022): 91-96. https://doi.org/10.17509/ijomr.v2i1.38635

[27] Olabo, Obielodan Omotayo, Onojah Amos Ochayi, Jimoh Joseph Muhammed, Alimi Emmanuel Adebayo, and Onojah Adenike Aderogba. "Professionals' Verdict on Video Instructional Package for Junior Secondary School Students in Basic Technology." *Indonesian Journal of Teaching in Science* 1, no. 1 (2021): 47-52. https://doi.org/10.17509/ijotis.v1i1.37082

[28] Llupar, Mikee L., Lorie Jean L. Malones, Alden Jay F. Sombria, and Vivencio L. Calixtro. "Development of folk-dance videos for e-learning." *Indonesian Journal of Teaching in Science* 2, no. 1 (2022): 1-6.

[29] Hernawati, Dewi, Asep Bayu Dani Nandiyanto, and Nazeri Muhammad. "The use of learning videos in order to increase student motivation and learning outcomes during the COVID-19 pandemic." *ASEAN Journal of Science and Engineering Education* 1, no. 2 (2021): 77-80. https://doi.org/10.17509/ajsee.v1i2.33370

[30] Dewi, Febriani Anggita, M. Muktiarni, and Jonah Mupita. "Improving knowledge of chicken nugget processing using animated videos for junior high school students." *ASEAN Journal of Science and Engineering Education* 1, no. 3 (2021): 193-198. https://doi.org/10.17509/ajsee.v1i3.38634

[31] Hardiyanti, Novi, Rina Maryanti, Verra Wulandary, and Asep Rudi Irawan. "Knowledge and Actions Regarding Consumption of Instant Noodle in Elementary School Student Before and After the Provision of Educational Video." *ASEAN Journal of Science and Engineering Education* 3, no. 2 (2023): 111-118.

[32] Wahyu, Aqshal Gustiara Mahardika, and Asri Wibawa Sakti. "The effect of the implementation of animated learning videos on increasing students' motivation and learning outcomes in citizenship education during the covid 19 pandemic in junior high schools." *ASEAN Journal of Science and Engineering Education* 3, no. 2 (2023): 139-148.

[33] Barri, Nova Joy C., Dyn Carl D. Lorete, Krizzia Angielou L. Pacifico, and Anamarie G. Valdez. "Video demonstration: Effects on student's metacognitive skills in science." *ASEAN Journal of Science and Engineering Education* 3, no. 3 (2023): 221-228.

[34] Sutanto, Karunia Islami Hartini, M. Muktiarni, and Jonah Mupita. "Utilization of Youtube videos during online learning to increase literacy in English for middle school students." *ASEAN Journal of Educational Research and Technology* 1, no. 1 (2022): 47-52.

[35] Leony, Isabella, M. Muktiarni, and Jonah Mupita. "Utilization of educational video as a media for learning simple accounting for elementary school students' during the covid-19 period." *ASEAN Journal of Economic and Economic Education* 1, no. 1 (2022): 27-34.

[36] Park, Jung Ha, Ji Hyun Moon, Hyeon Ju Kim, Mi Hee Kong, and Yun Hwan Oh. "Sedentary lifestyle: overview of updated evidence of potential health risks." *Korean journal of family medicine* 41, no. 6 (2020): 365. https://doi.org/10.4082/kjfm.20.0165

[37] Frederick, Ginny M., Patrick J. O'Connor, Michael D. Schmidt, and Ellen M. Evans. "Relationships between components of the 24-hour activity cycle and feelings of energy and fatigue in college students: A systematic review." *Mental Health and Physical Activity* 21 (2021): 100409. https://doi.org/10.1016/j.mhpa.2021.100409

[38] Woessner, Mary N., Alexander Tacey, Ariella Levinger-Limor, Alexandra G. Parker, Pazit Levinger, and Itamar Levinger. "The evolution of technology and physical inactivity: the good, the bad, and the way forward." *Frontiers in public health* 9 (2021): 655491. https://doi.org/10.3389/fpubh.2021.655491

[39] Nowak, Paweł F., Agnieszka Bożek, and Mateusz Blukacz. "Physical activity, sedentary behavior, and quality of life among university students." *BioMed Research International* 2019 (2019). https://doi.org/10.1155/2019/9791281

[40] Hoehe, Margret R., and Florence Thibaut. "Going digital: how technology use may influence human brains and behavior." *Dialogues in clinical neuroscience* (2022).

[41] Deb, Sagarmay. "Information technology, its impact on society and its future." *Advances in Computing* 4, no. 1 (2014): 25-29.

[42] ChePa, Noraziah, Laura Lim Sie-Yi, and Sumayyah Adetunmbi. "Game-based Technology for Elderly with Memory Disorder: Criteria and Guideline of Mobile Psychotherapy Games." *Journal of Advanced Research in Applied Sciences and Engineering Technology* 28, no. 2 (2022): 162-180. https://doi.org/10.37934/araset.28.2.162180

[43] Robinson, Thomas N., Jorge A. Banda, Lauren Hale, Amy Shirong Lu, Frances Fleming-Milici, Sandra L. Calvert, and Ellen Wartella. "Screen media exposure and obesity in children and adolescents." *Pediatrics* 140, no. Supplement_2 (2017): S97-S101. https://doi.org/10.1542/peds.2016-1758K

[44] Reid Chassiakos, Yolanda Linda, Jenny Radesky, Dimitri Christakis, Megan A. Moreno, Corinn Cross, David Hill, Nusheen Ameenuddin et al. "Children and adolescents and digital media." *Pediatrics* 138, no. 5 (2016). https://doi.org/10.1542/peds.2016-2593

[45] Samson, Adebayo Babatunde, and Mercy Adedamola Agboola. "Correlates of physical activity and sedentary behaviour of academic and non-academic staff in University of Ilorin, Ilorin, Nigeria." *Indonesian Journal of Multidiciplinary Research* 2, no. 2 (2022): 381-388.

[46] Abbood, Ali Mohammed Hadi. "Effectiveness of Cooperative Learning Using Multimedia in Some Physical Abilities and Basic Skills for Junior Players in Basketball." *ASEAN Journal of Physical Education and Sport Science* 3, no. 1 (2024): 7-16.

[47] Obafemi, Kayode Ezecheal, Taiye Olayinka Obafemi, and Francis Moodu Yakubu. "Effect of demonstration method on primary school pupils' academic achievement in physical and health education." *ASEAN Journal of Physical Education and Sport Science* 2, no. 2 (2023): 99-104.

[48] Hasanovna, Hakimova Muqaddas. "The Mechanism of Development of Professional and Pedagogical Creativity of Future Physical Education Teachers Based on A Competent Approach." *ASEAN Journal of Physical Education and Sport Science* 2, no. 1 (2023): 17-22.

[49] Ilhomovich, Ibragimov Aziz. "Boxing Training Technology Based on the Level of Physical Development of Children." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022): 1-8.

[50] Al Husaeni, Dwi Novia. "Development Analysis Research on Physical Education by Mapping Keywords Using the Vosviewer Application." *ASEAN Journal of Physical Education and Sport Science* 1, no. 1 (2022): 9-16. https://doi.org/10.56294/dm202282

[51] Sultanto, Muhamad Anggi, Rafly Ikhsanudin Al Afghani, Salsa Dilla Meisya, Isma Afina Salsabila, Shofa Sofia Rohimat, and Mesa Rahmi Stephani. "Physical education online class for students with hearing impairment during covid-19 pandemic." *ASEAN Journal of Community and Special Needs Education* 2, no. 1 (2023): 17-26.

[52] Marcaida, Joseph P. "Physical and mental health struggles during the time of pandemic: An overview of domestic setting." *ASEAN Journal of Community and Special Needs Education* 1, no. 1 (2022): 23-28.

[53] Saodat, Orzukulova. "Organization of Extracurricular Physical Education at School and Its Role in the Physical and Mental Improvement of Students." *Indonesian Journal of Community and Special Needs Education* 3, no. 2: 73-84. https://doi.org/10.17509/ijcsne.v3i2.52175

[54] Apriyatna, F., A. B. D. Nandiyanto, T. Kurniawan, and M. R. Bilad. "Analysis of physical fitness level elementary school students during the covid-19 pandemic." *ASEAN Journal of Science and Engineering Education* 2, no. 1 (2023): 103-110.

[55] Rusyani, Endang, Sidik Permana, and Risti Ragadhita. "Attitudes of high special school students with hearing impairment to online adaptive physical education learning." *Indonesian Journal of Teaching in Science* 2, no. 1 (2022): 29-38. https://doi.org/10.17509/ijcsne.v2i2.39583

[56] Rusyani, Endang, Sidik Permana, and Risti Ragadhita. "Attitudes of high special school students with hearing impairment to online adaptive physical education learning." *Indonesian Journal of Teaching in Science* 2, no. 1 (2022): 29-38. https://doi.org/10.17509/ijcsne.v2i2.39583

[57] Babalola, Ebenezer Omolafe, and Samuel Adenubi Onasanya. "Influence of Online and Physical Classrooms on Students Academic Performance." *Indonesian Journal of Multidiciplinary Research* 4, no. 1: 27-40.

[58] Escomes, Erlvira Lu, Chiarel Jean P. Gutierrez, Ian Paul C. Sarabia, Emy A. Morbo, and Vivencio L. Calixtro Jr. "Factors affecting distance learning of the physical education students of Sultan Kudarat State University, Mindanao, Philippines." *Indonesian Journal of Educational Research and Technology* 1, no. 3 (2021): 87-94. https://doi.org/10.17509/ijert.v1i3.41413

[59] Calixtro Jr, Vivencio L. "Health status and job performance of physical education instructors in higher education institutions." *Indonesian journal of educational research and technology* 1, no. 2 (2021): 71-76. https://doi.org/10.17509/ijert.v1i2.33418