

## Development of Walking Analysis Learning Media Based on an E-Book Guide

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### Abstrak

Penelitian pengembangan yang dilakukan ini bertujuan untuk menghasilkan sebuah produk dalam bentuk *e-book guide* yang bermanfaat sebagai media dalam analisis berjalan dan pencegahan cedera saat olahraga. Penelitian ini menggunakan metode penelitian berupa *Research and Development (R & D)*. Total sampel penelitian pada uji coba kecil sebanyak 10 sampel, dan uji coba lapangan sebanyak 100 sampel. Sampel telah menyetujui pengambilan data dengan mengisi *informed consent* dan bersedia mengikuti penelitian dari awal hingga akhir. Berdasarkan hasil dari penelitian ini, hasil validasi kelayakan media *e-book guide* memperoleh presentase 93,75% untuk materi dan 87,5% untuk media. Hasil dari tingkat penerimaan produk ini oleh mahasiswa Ilmu Keolahragaan Universitas Negeri Semarang menunjukkan angka 51,85% dari total sampel dengan keterangan bahwa sampel puas oleh produk. *E-book guide* ini berisi dari beberapa materi, antara lain seperti : gerak dasar; gerak lokomotor; gerak non lokomotor; gerak berjalan; analisis gerak berjalan; cedera serta penanganan; dan materi terakhir yaitu saran dan rekomendasi. Untuk penelitian selanjutnya, dapat membahas terkait efektivitas media pembelajaran berbasis *flipbook* terhadap tingkat pengetahuan mahasiswa.

### Abstract

The development research carried out aims to produce a product in the form of an *e-book guide* that is useful as a medium for walking analysis and preventing injuries during sports. This study uses a research method called *Research and Development (R & D)*. The total sample size in the small trial was 10, and the full sample size in the field trial was 100. The sample has agreed to data collection by filling out *informed consent* and is willing to participate in the study from start to finish. Based on the results of this study, the *e-book guide* media feasibility validation results obtained a percentage of 93.75% for material and 87.5% for media. The results of the level of acceptance of this product by Sports Science students at Semarang State University showed a figure of 51.85% of the total sample being satisfied with the product. This *e-book guide* contains several materials, including basic movements; locomotor motion; non-locomotor motion; walking motion; gait analysis; injuries and handling; and the last material is suggestions and recommendations. For further research, we can discuss the effectiveness of *flipbook*-based learning media on the level of student knowledge.

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## INTRODUCTION

Technological advances have a very significant effect on the order of human life, and education is no exception (Faiz et al., 2020). One way is to maximize the reliability of technology as an educational medium to produce better output, especially in the field of education (Sriyanti et al., 2020). The research by Nefrita, (2019) & Putra & Mayangsari, (2015) demonstrated that the use of media in learning may improve students' activeness and that students are more engaged and driven to master the content. Conversely, the use of learning media that has not changed leads to learning to be passive. The learning method used must be able to hone creative and innovative thinking skills (Ariani & Yolanda, 2019).

E-book-based interactive media is an electronic-based learning media or digital book that allows readers to communicate and interact both ways (Jannah et al., 2017). E-books, in addition to being read on a smartphone, can also be read on a computer. Despite this, e-books retain intellectual property rights, so there remains a law protecting every e-book work. An e-book can also be interpreted as a digital book that presents information in the form of text, images, video, audio, and other forms of multimedia that can be opened through laptops, computers, and smartphones. The function of the e-book itself as a means of learning. This can be seen from the activities of educators who began to write educational books and publish them not only in printed form but also as e-books.

The use of learning media during the learning process is expected to influence the learning experienced by students to achieve learning goals (Rodhiah & Roza, 2020). The proper use of science and technology is expected to be able to solve problems related to science, especially in the field of sports, that support the progress of a field, especially in the fields of sports and health (Irawan et al., 2021). It is also useful to assist in learning the motion of walking. Since walking is a movement that practically everyone engages in daily, it begs the question of how the justification and factors for walking are presented. Gait analysis is a subset of the study of human gestures that focuses on how humans walk (Muro-de-la-Herran et al., 2014).

Each individual has a different gait (Hustinawaty et al., 2012), and these characteristics are then used to identify them. Gait analysis can be defined as a thorough study of walking motion in humans using observations and translations from people who have competence in the field of mechanics. The technique of walking alone is not difficult, but a good and correct gait needs to be considered to avoid injury. Lulić et al., (2010) explain that sports biomechanics is a science that applies the principles of mechanics to the structure of the human body at the time of doing sports. Biomechanics itself is very involved in walking mechanisms, especially in walking motion and the impact resulting from gait (Sebastian et al., 2020).

This research will be more interesting when this analysis can be integrated into an interesting and innovative medium. The product that will be developed later is an e-book guide, which is a medium to provide exposure and useful information in the directing and walking information space

that is analyzed using a Dartfish application device version 8.0. The purpose of this study is to create a medium that can be used as a guide in analyzing a walking motion to prevent injuries.

## **METHOD**

In this study, the author used a research method in the form of Research and Development (R & D). This development research aims to produce a product in the form of an e-book guide that is useful as a medium for walking analysis for the prevention of injuries during sports. The total number of samples that participated in this study in small trials was 10 samples, and in field trials, it was 100 samples. The sample has agreed by filling out an informed consent form and is willing to follow this study from the beginning to the end.

This research has passed the Health Research Ethics Commission of Semarang State University with Number 204/KEPK/EC/2022. There are seven stages in this study: 1) conducting preliminary research and information gathering, including field observations and literature reviews; 2) developing the initial product in a blueprint (a prototype); 3) obtaining evaluations from test and measurement experts; 4) testing the biomechanics in a small group, and 5) carrying out the first product revision based on product revisions resulting from expert evaluations and small group trials. This revision is used to improve the initial product made by the researcher; 5) field trials; 6) revision of the final product carried out based on the results of field trials; and 7) the final result in the form of a product, namely an e-book guide as a medium in the analysis of walking motion in preventing injuries in sports.

## **RESULTS AND DISCUSSION**

In this study, the media produced was in the form of a FlippingBook-based electronic guidebook and could be accessed via a <https://online.fliphtml5.com/lsmts/oxof/#p=6>. This application is an application that is not only fixated on writing but can include moving animations, learning videos, and audio (Nufus et al., 2020). Flipbook is an animation made of a stack of paper resembling a thick book, but the page depicts the process of moving animation (Simatupang & Sormin, 2020; Maynastiti et al., 2020). This has led to flipbooks only being accessible online. This e-book guide consists of several materials, including basic motion; locomotor motion; non-locomotor motion; walking motion; analysis of walking motion; injuries and treatment; and the last material suggestions and recommendations.

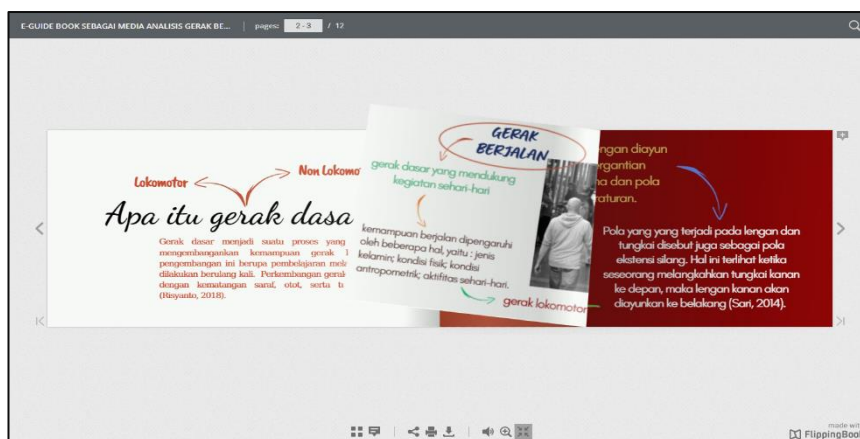


Figure 1 Display E- FlippingBook Website-Based Walking Motion Guide

This learning medium was created using a 3D design process that included definition, design, and development (Sriwahyuni *et al.*, 2019). Based on research conducted by Yulaika *et al.*, (2020), "define" becomes a development in the form of raising problems and analyzing these problems to create solutions. In this study, the problem found was a lack of research related to walking motion, which resulted in output in the form of an e-book guide related to walking motion. This is supported by the results of interviews conducted, where Sports Science students stated that they needed media that was designed interestingly and interactively when discussing walking movements. Through this research, the author developed a flip-book-based walking motion learning medium. The author has conducted research related to the analysis of walking motion in students of Sports Science at Semarang State University to support the content of the material in the flipbook. At this stage, the material that will complement the contents of the flip book is arranged in such a way as to attract the reader.

The author uses the Canva application to compile material, which is then downloaded in pdf form. The document is converted to pdf and then uploaded to the FlippingBook website to be converted into flipbook format. The next stage of development is development, where stage is filled by validation carried out by experts and trials in the field. This study collaborated with two validators to assess whether the contents of the flip book were worthy of circulation or not. The selected validators consist of material expert validators and media expert validators. According to Handayani *et al.*, (2017), material expert validators provide value in aspects related to the clarity and accuracy of the content of the material. Meanwhile, media experts provide assessments related to aspects of appearance, language, and attractiveness. After the validation results are obtained, the data is considered a revision in the learning media product. Following these three stages, the flip book was distributed to UNNES Sports Science students in the class of 2020. At this stage, students will be given a link to the flipbook and can fill out a questionnaire related to their level of satisfaction and suggestions and enter information related to the flipbook as a whole.

### 1. E-Book Eligibility

The feasibility assessment of this medium uses two experts from Test and Measurement on behalf of Dhias Fajar W. P., M. OR., and a digital literacy expert, Limpad Nurrachmad, M. Pd. The following is the result of the e-book feasibility assessment.

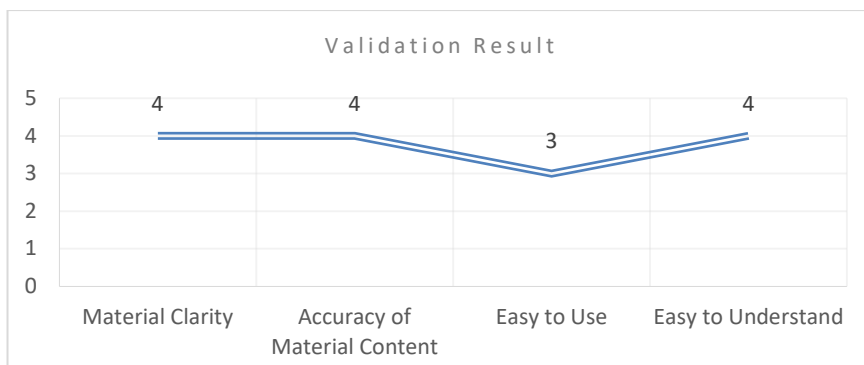


Figure 2 Material Expert Validation Results

Based on figure 2, it was found that the material clarity indicator showed a value result of 4, which was in the "very feasible" category. The average rating for indications of the correctness of the content is 4, which belongs to the category of "very worthy". The value indicated by the easy-to-use indicator is 3 and is in the category of feasible. The average score on the easy-to-understand indicator is 4, which is in the category of very worthy.

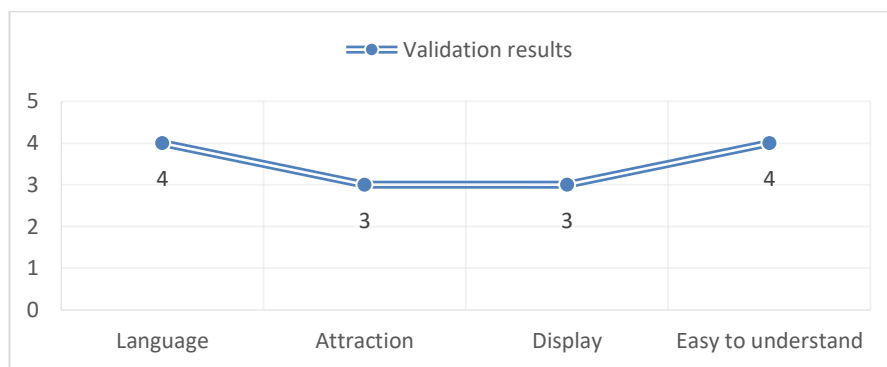


Figure 3 Media Expert Validation Results

The results of media expert validation based on figure 3 show that the value of 4 for the language indicator, which is in the category, is very feasible. On the attractiveness indicator, the resulting value is 3, which is in the category of feasible. The value indicated by the display indicator is 3 and is in the decent category. The resulting value on the easy-to-understand indicator is 4 and is in the category of very worthy.

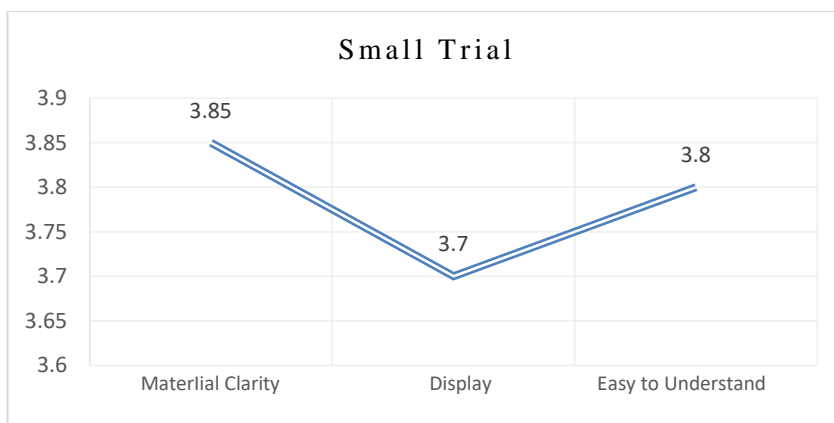


Figure 4 Small Trial Results

In the small trial phase (gb.4) consisting of 10 samples, it can be concluded that this e-book guide product is very feasible for field trials with the suggested revisions. The average overall score obtained from the three aspects of the assessment is 3.78, which qualitatively falls into the category of "Very Decent". While the average score in the material clarity assessment is 3.85, it gets a score of 3.7 in the display aspect and a value of 3.8 in the easy-to-understand aspect.

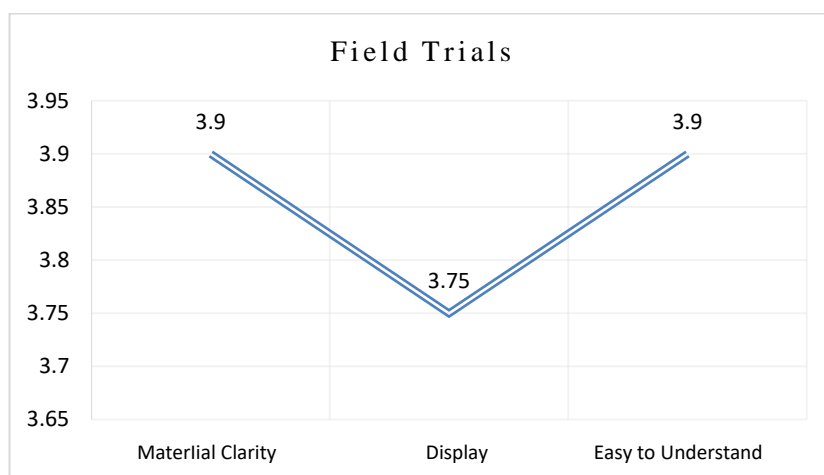


Figure 5 Field Trial Results

In the large trial phase (gb.5) consisting of 100 samples, it was concluded that this e-book guide product is very feasible for field trials with revisions according to suggestions. The average overall score of the three aspects of the assessment is 3.85, which qualitatively falls into the "Very Decent" category. The average of the assessments on the material clarity aspect, namely 3.9, in the display aspect assessment, is 3.75, and the easy-to-understand aspect assessment, gets a score of 3.9.

## 2. Acceptance of Learning Media for Walking Motion Analysis

The results of this study are in the form of FlippingBook-based learning media products, material validation, validation of walking motion analysis, and the level of satisfaction of Sports Science students with flipbooks. This research was conducted by disseminating a flip book with the title "E-Book Guide as a Medium for Walking Motion Analysis" to sports science students in batch 20 at Semarang State University.

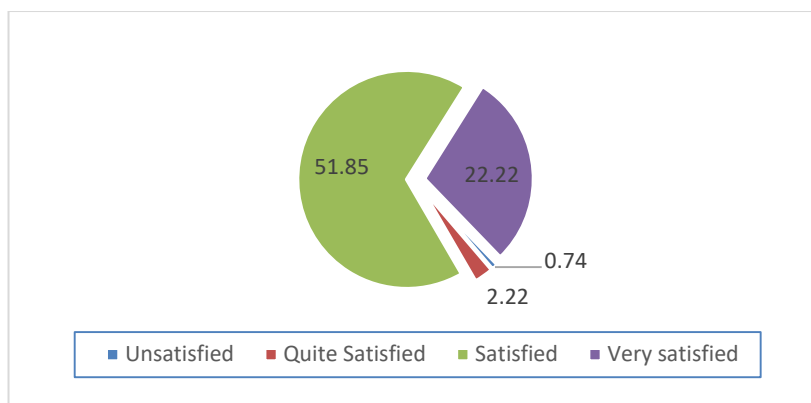


Figure 6 Sample Satisfaction Level Results Against Flip Books

Based on figure 6, it was found that 51.85% of people were in the satisfied category, another 22.22% of children were in the very satisfied category, 2.22% of people and 0.74% of the total population chose "dissatisfied" instead of "quite satisfied." Through the medium of flipbooks, reader interest will increase. The following research conducted by Wahyuliani *et al.*, (2016) found that by using flipbooks, students can hone their creativity to compile material as creatively as possible. The more creative the flipbook is, the more readers will be interested in reading it. Whether it's a school book or a book at home.

The sample stated that they were dissatisfied due to several things, one of which was a flip book that could only be accessed online. This will be an obstacle if someone does not have a compatible device or is in an area that has difficulty accessing the internet due to signals. The website used to convert PDF format into flipbook format in this study is FlippingBook. On this website, there is no menu to create a flip book in exe format so that it can be accessed offline. In addition, this e-book guide has not maximized the features provided by the website. Through the audio-visual feature, the material on the flip book can be accompanied by sound or video that aims to attract readers.

The sample that states satisfaction, is influenced by the content of the material that is interesting and easy to understand when read. This is following the characteristics of flipbooks according to Roemintoyo & Budiarto, (2021), which state that the material in flip books should be attractive, interactive, easy to use, and easy to understand. The material displayed contains an explanation of several things, such as basic motion, non-locomotor motion, locomotor motion, walking motion, walking motion analysis, injuries, and handlers, as well as recommendations related to the prevention of injuries in walking motion. According to Sriyanti *et al.*, (2020), the flip book aims to increase learning motivation so that it will affect learning outcomes. This is exemplified by the process of creating flip books, which are designed to be as appealing as possible and do not contain much writing, as do books in general. Through the results of the questionnaire obtained, it is clear that students are interested in the design displayed, so they have the desire to read the material more than once.

Flipbook-based e-books are made to make it easier to access books so that they can be read anywhere and anytime. This is one of the advantages offered by e-books, especially flipbooks. This advantage is also one of the reasons that the sample considers itself satisfied with the e-book guide. In addition to easy access, this flip book also does not require large memory. through access that does not necessitate a large amount of memory, making this e-book guide accessible on devices with modest specifications Another special feature of this e-book guide is that the form of the material presented is varied and creative; some pictures are following the discussion so that readers become interested and easily understand the discussion of the material given.

## CONCLUSION

Based on the study's findings, it is possible to conclude that this research resulted in the creation of an e-book guide that is based on a flip book and contains information on basic motion, locomotor motion, non-locomotor motion, walking motion, analysis of walking motion, injuries and treatment, and suggestions and recommendations. The results of the validation of the e-book guide's media feasibility obtained a percentage of 93.75% for material and 87.5% for media. The results of the acceptance rate of this product by students of Sports Science at Semarang State University showed 51.85% of the total sample, with the information that the model was satisfied with the product. For further research, it can discuss the effectiveness of flipbook-based learning media on the level of student knowledge.

## REFERENCE

- Ariani, T., & Yolanda, Y. (2019). Effectiveness of Physics Teaching Material Based on Contextual Static Fluid Material. *Kasuari: Physics Education Journal (KPEJ)*, 2(2), 70–81. <https://doi.org/10.37891/KPEJ.V2I2.99>
- Faiz, A., Purwati, P., & Kurniawaty, I. (2020). Construction Of Prosocial Empathy Values Through Project Based Learning Methods Based On Social Experiments (Study Of Discovering Cultural Themes In The Sumber-Cirebon Society). *Ta'dib : Jurnal Pendidikan Islam*, 9(1), 51–62. <https://doi.org/10.29313/TJPI.V9I1.6220>
- Handayani, O. W. K., Macdonald, D., McCuaig, L., Rahayu, T., Budiono, I., Windraswara, R., Fauzi, L., & Siyam, N. (2017). Substitution Program in Indonesia and Australia as Health Promotion Model at Schools. *KEMAS: Jurnal Kesehatan Masyarakat*, 12(2), 183–188. <https://doi.org/10.15294/kemas.v12i2.9204>
- Hustinawaty, Jannah, M., & Rahman, R. F. (2012). Model Berbasis Ekstraksi Untuk Analisis Gaya Berjalan. *Teknologi Informasi Dan Komunikasi (TIK) Untuk Ketahanan Nasional*, 7, 30–37. <http://repository.gunadarma.ac.id/1630/1/Hustinawaty%20kcommit%20siap%20kirim%20silfi.pdf>
- Irawan, F. A., Sutaryono, Permana, D. F. W., Billah, T. R., & Ma'dum, M. A. (2021). Hand, eye, and foot coordination test untuk mendeteksi kemampuan dasar lokomotor. *Journal Of Sport Education (JOPE)*, 3(2), 85–92. <https://doi.org/10.31258/JOPE.3.2.85-92>
- Jannah, N., Fadiawati, N., & Tania, L. (2017). Pengembangan E-book Interaktif Berbasis Fenomena Kehidupan Sehari-hari tentang Pemisahan Campuran. *Jurnal Pendidikan Dan Pembelajaran Kimia*, 6(1), 186–198. <http://repository.lppm.unila.ac.id/id/eprint/5702>
- Lulić, T. J., Sušić, A., & Kodvanj, J. (2010). Biomechanical analysis of walking: Effects of gait velocity and arm swing amplitude. *Periodicum Biologorum*, 112(1), 13–17. <https://hrcak.srce.hr/52679>
- Maynastiti, D., Serevina, V., & Sugihartono, I. (2020). The development of flip book contextual teaching and learning-based to enhance students' physics problem solving skill. *Journal of Physics: Conference Series*,



- 1481(1), 1–8. <https://doi.org/10.1088/1742-6596/1481/1/012076>
- Muro-de-la-Herran, A., García-Zapirain, B., & Méndez-Zorrilla, A. (2014). Gait Analysis Methods: An Overview of Wearable and Non-Wearable Systems, Highlighting Clinical Applications. *Sensors* 2014, Vol. 14, Pages 3362-3394, 14(2), 3362–3394. <https://doi.org/10.3390/S140203362>
- Nefrita, N. (2019). Implementation Of Phet Learning Media In Efforts To Improve Activities And Physics Learning Outcomes Of Students In Class Xi Sma 4 Pekanbaru. *Jurnal Geliga Sains: Jurnal Pendidikan Fisika*, 7(1), 46–54. <https://doi.org/10.31258/JGS.7.1.46-54>
- Nufus, H., Susilawati, S., & Linda, R. (2020). Implementation of E-Module Stoichiometry Based on Kvisoft Flipbook Maker for Increasing Understanding Study Learning Concepts of Class X Senior High School. *Journal of Educational Sciences*, 4(2), 261–272. <https://doi.org/10.31258/JES.4.2.P.261-272>
- Putra, J. A., & Mayangsari, D. (2015). Aplikasi Pembelajaran Anatomi Tubuh Manusia Pada Siswa Sekolah Menengah Atas Berbasis Multimedia. *Jurnal Teknik*, 5(1), 71–77. [https://www.researchgate.net/profile/Jeffry-Andhika-Putra/publication/329566873\\_Aplikasi\\_Pembelajaran\\_Anatomi\\_Tubuh\\_Manusia\\_Pada\\_Siswa\\_Sekolah\\_Menengah\\_Atas\\_Berbasis\\_Multimedia/links/5c0fbb0aa6fdcc494febff99/Aplikasi-Pembelajaran-Anatomi-Tubuh-Manusia-Pada-Siswa-Sekolah-Menengah-Atas-Berbasis-Multimedia.pdf](https://www.researchgate.net/profile/Jeffry-Andhika-Putra/publication/329566873_Aplikasi_Pembelajaran_Anatomi_Tubuh_Manusia_Pada_Siswa_Sekolah_Menengah_Atas_Berbasis_Multimedia/links/5c0fbb0aa6fdcc494febff99/Aplikasi-Pembelajaran-Anatomi-Tubuh-Manusia-Pada-Siswa-Sekolah-Menengah-Atas-Berbasis-Multimedia.pdf)
- Rodhiah, S. A., & Roza, L. (2020). Hasil Analisis Kebutuhan Pengembangan Ebook Berbasis Multipel Representasi. *Prosiding Seminar Pendidikan Fisika FITK UNSIQ*, 2(1), 143–149. <https://ojs.unsiq.ac.id/index.php/semnaspf/article/view/1395>
- Roemintoyo, & Budiarto, M. K. (2021). Flipbook as Innovation of Digital Learning Media: Preparing Education for Facing and Facilitating 21st Century Learning. *Journal of Education Technology*. 5(1), 8–13. <https://ejournal.undiksha.ac.id/index.php/JET/article/view/32362>
- Sebastian, K. M., Burch, R. F. V., & Rogers, P. (2020). Brain Injuries in American Football: Understanding the Injury, Difficulty in Helmet Optimization, and Current Communication Practices – A Narrative Review. *International Journal of Kinesiology and Sports Science*, 8(4), 34–41. <https://doi.org/10.7575/AIAC.IJKSS.V.8N.4P.34>
- Simatupang, N. I., & Sormin, E. (2020). The effectiveness of using flipbook maker to improve the chemistry learning outcomes of senior high school students. *Jurnal Pendidikan Kimia*, 12(1), 26–33. <https://jurnal.unimed.ac.id/2012/index.php/jpk>
- Sriwahyuni, I., Risdianto, E., & Johan, H. (2019). Pengembangan Bahan Ajar Elektronik Menggunakan Flip Pdf Professional Pada Materi Alat-Alat Optik Di Sma. *Jurnal Kumparan Fisika*, 2(3 Desember), 145–152. <https://doi.org/10.33369/JKF.2.3.145-152>
- Sriyanti, I., Almafie, M. R., Marlina, L., & Jauhari, J. (2020). The effect of Using Flipbook-Based E-modules on Student Learning Outcomes. *Kasuari: Physics Education Journal (KPEJ)*, 3(2), 69–75. <https://doi.org/10.37891/KPEJ.V3I2.156>
- Wahyuliani, Y., Supriadi, U., & Anwar, S. (2016). Efektivitas Penggunaan Media Pembelajaran Flip Book Terhadap Peningkatan Hasil Belajar Siswa Pada Mata Pelajaran Pai Dan Budi Pekerti Di Sma Negeri 4 Bandung. *TARBAWY: Indonesian Journal of Islamic Education*, 3(1), 22–36. <https://doi.org/10.17509/T.V3I1.3457>
- Yulaika, N. F., Harti, H., & Sakti, N. C. (2020). Pengembangan Bahan Ajar Elektronik Berbasis Flip Book Untuk Meningkatkan Hasil Belajar Peserta Didik. *JPEKA: Jurnal Pendidikan Ekonomi, Manajemen Dan Keuangan*, 4(1), 67–76. <https://doi.org/10.26740/JPEKA.V4N1.P67-76>