

Flipbook Maker Based E-Module in Hand, Foot and Nail Care Courses

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ABSTRAK

Tujuan pembelajaran perawatan tangan, kaki dan kuku bagi siswa pendidikan tata rias dan kecantikan belum memadai dan belum optimal. Oleh karena itu perlu adanya inovasi dalam pembelajaran khususnya materi pembelajaran perawatan tangan dan perawatan kaki. Modul berbasis TIK adalah solusi untuk mengatasi masalah ini. Penelitian ini bertujuan untuk mengembangkan media pembelajaran e-modul berbasis flipbook maker di jurusan tata rias dan kecantikan. Metodologi yang digunakan adalah Research and Development (R&D) dengan prosedur Four D melalui tahapan define, design, develop dan diseminasi. Subyek penelitian adalah 3 ahli media dan 3 ahli materi. Sedangkan subjek penelitian dalam uji praktek adalah 2 orang dosen dan 20 orang mahasiswa jurusan tata rias dan kecantikan. Data diperoleh dengan menggunakan instrumen tes untuk menguji keefektifan dan instrumen nontes untuk menguji validitas dan kepraktisan proses penelitian. Analisis data menggunakan perhitungan V Aiken untuk validasi produk, rumus persentase untuk kepraktisan dan keefektifan. Hasil penelitian menunjukkan terdapat perbandingan yang signifikan pemahaman siswa tentang perawatan tangan, kaki dan kuku dengan menggunakan media pembelajaran e-modul berbasis flipbook maker. Berdasarkan semua analisis tersebut disimpulkan bahwa e-modul berbasis flipbook maker dinyatakan valid, praktis dan efektif sebagai salah satu media pembelajaran mata kuliah perawatan tangan, kaki dan kuku.

ABSTRACT

The learning objectives of hand, foot and nail care for students of makeup and beauty education is not sufficient and not optimal. Therefore, there is a need for innovation in learning, especially hand care and foot care learning materials. ICT-based modul is solution to overcome this problem. This study aims to develop e-module learning media based on flipbook maker in the department of cosmetology and beauty. The methodology used is Research and Development (R&D) with the Four D procedure through the stages of define, design, develop and disseminate. The research subjects were 3 media experts and 3 material experts. While the research subjects in the practical test were 2 lecturers and 20 students of the department of cosmetology and beauty. Data were obtained by using test instruments to test the effectiveness and non-test instruments to test the validity and practicality of the research process. Data analysis uses V Aiken calculations for product validation, percentage formulas for practicality and effectiveness. The results of this research show there is a significant comparison of students' understanding of hand, foot and nail care using flipbook maker-based e-module learning media. Based on all these analyzes it was concluded that the e-module based on flipbook maker was stated to be valid, practical and effective as one of the learning media for the hand, foot and nail care course.

1. INTRODUCTION

Current technological progress is something that cannot be avoided in human life, because technological progress will go according to scientific progress (Ivanovic et al., 2018; Ngafifi, 2020; Yamin & Karmila, 2020). Technological advances are currently a challenge that can increase the knowledge and skills of students in the world of education because they can improve their self-quality. The current quality of education has a great influence on the future, because they are aware of the importance and

function of technology in life, especially in the world of education, so that the quality of education today has a great influence in the future (Garba et al., 2015; Jamun, 2019; Uno et al., 2021).

Media is a tool that can be used to channel messages or convey messages to students so that learning objectives are achieved so that the material presented can be received easily and the learning process becomes effective and efficient (I. P. Astuti et al., 2020; Fahmi et al., 2019; Wibowo & Pratiwi, 2018). Currently there are many media that can be used to support the learning process such as utilizing YouTube, Google and other electronic media, while the media used is electronic media such as e-modules to facilitate the learning process (Riananda, 2016; Sulistiani, S., Kartimi, K., & Sahrir, 2022). Hand care and foot care is one of the learning materials in the Department of Cosmetology and Beauty, Padang State University. Hand and foot care can be referred to as manicure and pedicure. Clean hands and feet and fingernails are a supporting element of a person's overall appearance, which can be seen from the cleanliness of the fingernails, beautifying and caring for the hands and feet will make the appearance fashionable and fashionable (Dewi, I. P., & Adri, 2020; Mardhiati, 2019).

E-module is a tool such as an ICT-based module, where the advantage is that it makes it easier to use, such as a display that contains images, videos, audio, links that can access material and animations that are equipped with tests/quizzes (Alfitriani & Hutabri, 2017; Li et al., 2013; Suarsana & Mahayukti, 2013). This flipbook maker-based e-module is suitable for use in today's students because it relies on technology. This is evidenced by the existence of previous studies such as research stated that the use of e-modules based on flipbook maker was able to improve student learning outcomes in learning so that it was suitable for use in the learning process for Hand, Foot and Nail Care courses (Maisyaturrahma, 2021). The use of e-module learning media based on flipbook maker in the Hand, Foot and Nail Care course is ideal when applied today because on average all students carry out activities using mobile phones that can be taken anywhere (Gustinasari et al., 2017; Mishra et al., 2017).

Based on observations of the results of interviews with Cosmetology and Beauty students, it was found that the use of media used by lecturers used power points in teaching. Students also explained that only some of the lecturers provided video tutorials as well as materials on hand and foot care in teaching hand and foot care. Seeing this phenomenon, it is known that the learning approach previously applied by lecturers has not provided opportunities for students to develop the problem solving skills provided, this e-module in the Hand, Foot and Nail Care course did not exist before. This makes students less self-study who only rely on explanations from lecturers, books and internet services.

Seeing this phenomenon, it is known that the learning approach that was previously applied by lecturers has not provided opportunities for students to develop the problem solving skills provided, this e-module in the Hand, Foot and Nail Care course did not exist before. This makes students less self-study who only rely on explanations from lecturers, books and internet services (Suryaningtyas et al., 2020; Widya et al., 2021). Therefore, there is a need for innovation in Hand, Foot and Nail Care courses, especially learning material for hand and foot care so that students feel happy and can understand the material during learning.

Based on the problems that have been stated above, the researcher wants to develop an e-module learning media based on flipbook maker to improve learning outcomes as well as students' cognitive and psychomotor values in Hand, Foot and Nail Care Courses to suit students' needs regarding e-module learning media. The researchers conducted a study entitled "Development of Flipbook Maker-Based E-Modules in the Care of Hands, Feet and Nails". The purpose of this study was to develop an e-module learning media based on flipbook maker in the Department of Cosmetology and Beauty. The reason of this study based on the not yet optimal achievement of the learning objectives of Hand, Foot and Nail Care for Cosmetology and Beauty Education students.

2. METHOD

The type of research used is Research and Development, which is a research method used to produce certain products, as well as to test the effectiveness of these products (Sugiyono, 2013). This development model has several systematic stages, while the stages in this 4D model include the define, design, develop, and disseminate Thiagarajan stages in 1974 (Putri et al., 2022). Testing the validity of e-module learning media based on flipbook maker is carried out by validators who are in accordance with the field or competent, namely media expert validators and material expert validators. Furthermore, the validator was asked to provide a general assessment and suggestions for the flipbook maker-based e-module learning media being developed, whether the flipbook maker-based e-module learning media that has been made can be said to be valid or invalid (Mawarni & Retnani, 2016).

The data analysis technique used in this research is descriptive analysis where this research calculates the percentage of validation results. The trial was carried out with 10 Cosmetology and Beauty

students who had studied last semester. The research instrument grids are presented in Table 1, Table 2, Table 3, Table 4.

Table 1. Media Expert Validation Instrument Grid

Aspect	Indicator
Didactic Terms	Appropriateness of the selection of learning media that supports the Makeup and Beauty Education Curriculum
	Pay attention to the characteristics of students
	E-module facilitates the learning process
Construction Terms	Clarity display E-module supports hand and foot care materials
	Using simple language
	Have clear learning objectives
Technical Requirements	Have an identity
	Writing uses block letters that are easy to understand
	Images are able to convey the contents of the message effectively
	Appearance has compatibility between pictures and writing

Table 2. Material Expert Validation Instrument Grid

Aspect	Indicator
Theory	Learning outcomes are interrelated with the material displayed
	The order of material coverage is appropriate
	Depth of material description
Language and Readability	The clarity of the e-module display supports hand and foot care materials
	Using Enhanced Spelling
Presentation	Clarity of writing and legibility
	Submission of material in accordance with the objectives
	Material attractiveness
	The order of presentation of the material is appropriate

Table 3. Lecturer Practicality Questionnaire Instrument Lattice

Aspect	Indicator
Ease of use of media	Video learning media is easy to use according to the user's wishes and can be saved
Time effectiveness	Learning Indonesian wedding makeup videos makes students understand the material more quickly and saves time
Media interpretation	The use of media that has been developed can be interpreted by the lecturer
Equivalence	Learning media has the same equivalent so that it can be used

Table 4. Student Practical Instruments Lattice

Aspect	Indicator
convenience	E-Modules can be used at any time by watching video shows and having compatibility with learning material
Time spent in implementation	There is sufficient time allocation for using e-module media in learning
Media appeal	Learning with flipbook maker-based e-modules can arouse students' interest in learning.

The validity test was carried out to determine the feasibility of the flipbook maker-based e-module media and the material contained in the e-module. In this study the data analysis technique used was descriptive analysis, namely by calculating the percentage of validation results obtained from media experts and material experts.

3. RESULTS AND DISCUSSION

Results

The results of this research product are e-module media based on flipbook maker. This learning media was created and designed by the researchers themselves, with the aim that it can be used and developed for students as a tool for lecturers in delivering teaching material and can be used independently by students. Based on the needs analysis, it is necessary to have supporting media to increase cognitive and psychomotor values so that learning objectives are achieved. The learning achievements of the CPMK course that students must achieve are 1) Be able to understand the technique of sequencing hands and feet, 2) Be able to practice hand and foot care by solving problems in practice. The development of learning media in this study, namely the 4D model, was carried out only until the Development stage, because the purpose of this research was only limited to developing and producing a valid learning media to be implemented based on the validator's assessment. There are four stages of developing this 4D model including the define, design, develop, and disseminate stages.

In the development stage is the stage to find out need for the media used to support the learning process. There are 3 things done at this stage, namely needs analysis, material analysis and student analysis. From this analysis, the learning process on hand and foot care material requires media that can support students in learning as a tool to assist lecturers in delivering material and students are able to study independently by using flipbook maker-based e-module media. Design stage including designing flipbook maker-based e-module media applications, learning materials, videos, quizzes, pictures, and bibliography, validation sheets for media experts and material experts. Development stage when the development stage aims to produce valid, practical, and effective flipbook maker-based e-module learning media. The product of flipbook maker based e-module learning media is show in Figure 1, Figure 2, and Figure 3.



Figure 1. Cover Display on Flipbook Maker Based E-Module Learning Media



Figure 2. Initial Appearance of Flipbook Maker Based E-Module Learning Media

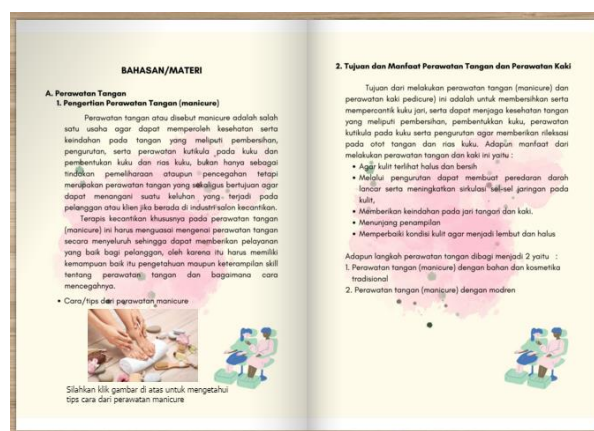


Figure 3. Presentation of Flipbook Maker Based E-Module Learning Media

Flipbook maker based e-module assess by media expert, material expert, lecturer test results, student test results, The detail result is show in [Table 5](#).

Table 5. Results of the Flipbook Maker Based E-Module Assessment

No	The experts	Score	Category
1.	Media expert	0.939	Valid
2.	Material expert	0.859	Valid
3.	Lecturer test results	91.33%	Very practical
4.	Student test results	88.92%	Very practical

The results of the assessment obtained from material experts get a feasibility value of 0.939 with a valid category. Material experts get a feasibility value of 0.859 valid category. Assessment of the response from 3 lecturers obtained a percentage of 91.33% in the very practical category. The results of the practical assessment by 20 students scored 88.92% in the very practical category. The results of the effectiveness test through the test questions were proven by the results of student lecture practice which increased after using flipbook maker-based e-module learning media.

Discussion

Based on the description above, the development of an e-module based on flipbook maker in the Hand Foot and Nail Care Course is a series of activities that have been carried out to obtain learning media with development theory. The purpose of developing e-module learning media based on flipbook maker is to produce valid, practical, and effective learning media. Based on the elaboration of the description of the research results put forward regarding the research and development of flipbook maker-based e-modules in the Makeup and Beauty Education Study Program, Faculty of Tourism and Hospitality, Padang State University, it can be stated that research discussions are in accordance with the four-D research procedure which consists of findings (Define), design (Design), development (Develop), and dissemination (Disseminate). Define is the initial stage carried out in the development procedure. According to previous study explains that there are several stages in carrying out the definition, namely; a) needs analysis, b) material analysis, and c) student analysis. The author carries out these stages intending to obtain and determine development requirements ([Lesmono et al., 2021](#)).

The results showed that the hand, foot and nail care courses based on interview results explained that all lecturers used power points in learning, students' knowledge of learning media in the form of e-modules was still low ([Gupta et al., 2022](#); [Logan et al., 2020](#); [Sriyanti et al., 2021](#)). Currently there is no flipbook maker-based e-module that is used specifically in learning hand and foot care materials. With needs analysis, it is necessary to develop e-module learning media based on flipbook maker ([Chen & Kurniawan, 2022](#); [Sitorus et al., 2019](#); [Widya et al., 2021](#)). The study of material that will be the target of this research is hand care and foot care. At this stage the author analyzes the SLP for the course, then describes what will be achieved in this course. The description that must be mastered by students is being able to understand the technique of sequencing hands and feet, and being able to practice hand and foot care.

After conducting a needs analysis, material analysis, and student analysis, it is continued by continuing the development of the initial product from the flipbook maker-based e-module learning media that has been made ([Arthur et al., 2020](#); [Ilham & Huda, 2021](#); [Winatha et al., 2018](#)). This research produced a product in the form of flipbook maker-based e-module learning media in the Hand, Foot and Nail Care Course. As for the design stage, the media that will be developed by the researcher contains general instructions for using e-modules, videos, quizzes, pictures, learning materials, and bibliography that can make students more interested and can increase cognitive and psychomotor values in learning ([Fahmi et al., 2019](#); [Maharcika et al., 2021](#); [Wijaya, 2021](#)). The development stage aims to produce e-module learning media based on flipbook makers that are valid, practical and effective.

The validation stage was carried out, namely media validation by media experts, media validation was carried out by three media validators which included aspects of didactic requirements, aspects of construction requirements and aspects of technical requirements so that the results of media validity by media validators with a value of 0.939 were categorized as valid. The next validation stage is material validation. Material validation is carried out by material experts, namely subject lecturers who understand learning material. Material validation was carried out by three material experts. Material validation includes material aspects and aspects of language use so that the results of material validity by media expert validators have a value of 0.859 in the valid category. Judging from the results of the validity of the flipbook maker-based e-module learning media, it is feasible to be tested in class.

The results of this study are in line with previous research conducted by previous study that stated the validation test, the average percentage of the Basic Make-up video assessment score stage I, namely (1) Didactic requirements obtained 88.54% with a very valid category, (2) Construction requirements obtained 84.37% with a very valid category, (3) 95% technical requirements with a valid category. After the first stage of validation, a revision was made to the video learning media (M. Astuti, 2014). Another study conducted obtained that the overall validation of e-module learning media experts based on flipbook maker was very good with a percentage score of 93% (Yulando et al., 2019).

The implication of this study is providing an innovation of flipbook maker-based e-module in hand, foot and nail care courses, especially learning materials for hand and foot care so that students feel happy and can understand the material during learning. It is hoped that this study will improve learning outcomes as well as students' cognitive and psychomotor values in hand, foot and nail care courses. But the weakness in this study lies in the research scope which is still very limited. Therefore, it is hoped that future research will be able to further deepen and broaden the scope of research related to the innovation of flipbook maker-based e-module.

4. CONCLUSION

The flipbook maker-based e-module learning media is suitable for use to increase the cognitive and psychomotor values of UNP Cosmetology and Beauty students which are developed to get a very high category so that the flipbook maker-based e-module learning media is very suitable for use in the learning process and is a learning innovation that can it is recommended for lecturers to use media in learning Hand Care and Foot Care.

5. REFERENCES

- Alfitriani, A., & Hutabri, E. (2017). Kepraktisan dan Keefektifan Modul. In *Jurnal Kependidikan* (Vol. 1, Issue 1, pp. 12–23). https://www.researchgate.net/profile/Adlia-Alfiriani/publication/327184910_Module/links/5b7eba7d92851c1e122a378e/Module.pdf.
- Arthur, R., Dwi, R. N., & Lenggogeni, L. (2020). E-Module of Cost Estimating Course in Building Construction Vocational Undergraduate Program Faculty of Engineering Universitas Negeri Jakarta. *Jurnal Ilmu Pendidikan*, 25(2), 88. <https://doi.org/10.17977/um048v25i2p88-96>.
- Astuti, I. P., Ariyadi, D., & Sumaryanti, L. (2020). Prototipe Media Pembelajaran Berbasis Android Untuk Membaca Permulaan. *Simetris: Jurnal Teknik Mesin, Elektro Dan Ilmu Komputer*, 11(1), 151–156. <https://doi.org/10.24176/simet.v11i1.3791>.
- Astuti, M. (2014). Pengembangan Media Pembelajaran Menggunakan Video Mata Kuliah Dasar Tata Rias Program Studi Pendidikan Tata Rias Dan Kecantikan FT UNP. *Pakar Pendidikan*, 12(2), 118–127. <https://doi.org/10.24036/pakar.v12i2.141>.
- Chen, D., & Kurniawan, D. A. (2022). Preliminary studies: Analysis Of Student Needs For The Use Of Multiple Integral E-Module Of Mathematics Physics I Course. *Buana Pendidikan: Jurnal Fakultas Keguruan Dan Ilmu Pendidikan*, 18(1), 73–80. <https://doi.org/10.36456/bp.vol18.no1.a5145>.
- Dewi, I. P., & Adri, M. (2020). The Effect of Mobile-Learning Models on Students' Learning Outcomes of Research Methodology Courses at the Cosmetology and Beauty Department. In *2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE)*, 1–5. <https://doi.org/10.1109/ICVEE50212.2020.9243201>.
- Fahmi, S., Priwantoro, S. W., Cahdriyana, R. A., Hendroanto, A., Rohmah, S. N., & Nisa, L. C. (2019). Interactive Learning Media Using Kvisoft Flipbook Maker for Mathematics Learning. *Journal of Physics: Conference Series*, 1188(1). <https://doi.org/10.1088/1742-6596/1188/1/012075>.
- Garba, S. A., Byabazaire, Y., & Busthami, A. H. (2015). Toward the use of 21st 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(4), 72–79. <https://doi.org/10.3991/ijet.v10i4.4717>.
- Gupta, T. M., Rana, J., Sharma, S., Agarwal, N., & Kumar, S. (2022). E-learning modules have been an effective tool during COIVD-19 pandemic to manage employee psychosocial issues at IndianOil. *Safety and Health at Work*, 13, S106. <https://doi.org/10.1016/j.shaw.2021.12.1085>.
- Gustinasari, M., Lufri, & Ardi. (2017). Pengembangan Modul Pembelajaran Berbasis Konsep Disertai Contoh pada Materi Sel untuk Siswa SMA. *Bioeducation Journal*, 1(1), 2354–8363. <http://ejournal.unp.ac.id/index.php/bioeducation/article/view/7154>.

- Ilham, A., & Huda, Y. (2021). Pengembangan E-Modul Interaktif Menggunakan Media Google Classroom Pada Mata Pelajaran Penerapan Sistem Radio dan Televisi. *Voteteknika (Vocational Teknik Elektronika Dan Informatika)*, 9(2), 147. <https://doi.org/10.24036/voteteknika.v9i2.112530>.
- Ivanovic, M., Milicevic, A. K., Aleksic, V., Bratic, B., & Mandic, M. (2018). Experiences and perspectives of Technology-enhanced learning and teaching in higher education - Serbian case. *Procedia Computer Science*, 126, 1351–1359. <https://doi.org/10.1016/j.procs.2018.08.086>.
- Jamun, Y. M. (2019). Dampak Teknologi Terhadap Pendidikan. *Jurnal Pendidikan Dan Kebudayaan Missio*, 10(1), 48–52. <http://jurnal.unikastpaulus.ac.id/index.php/jpkm/article/view/54>.
- Lesmono, A. D., Wahyuni, S., & Alfiana, R. D. N. (2021). Pengembangan Bahan Ajar Fisika Berupa Komik pada Materi Aahaya di SMP. *Jurnal Pembelajaran Fisika*, 1(1), 100–105. <https://jurnal.unej.ac.id/index.php/JPF/article/download/23143/9291>.
- Li, L. Y., Fan, C. Y., Huang, D. W., & Chen, G. D. (2013). The effects of the E-book system with the reading guidance and the annotation map on the reading performance of college students. *Educational Technology and Society*, 17(1), 320–331. <https://www.jstor.org/stable/jeductechsoci.17.1.320>.
- Logan, R. M., Johnson, C. E., & Worsham, J. W. (2020). Development of an E-learning Module to Facilitate Student Learning and Outcomes. *Teaching and Learning in Nursing*, 00, 139–142. <https://doi.org/10.1016/j.teln.2020.10.007>.
- Maharcika, A. A. M., Suarni, N. K., & Gunamantha, I. M. (2021). Pengembangan Modul Elektronik (E-Modul) Berbasis Flipbook Maker Untuk Subtema Pekerjaan Di Sekitarku Kelas Iv Sd/Mi. *PENDASI: Jurnal Pendidikan Dasar Indonesia*, 5(2), 165–174. https://doi.org/10.23887/jurnal_pendas.v5i2.240.
- Maisyaturrahma, T. (2014). Penerapan Model Pembelajaran Berdasarkan Masalah Menggunakan Modul Ajar Pada Sub Kompetensi Perawatan Tangan, Kaki dan Merias Kuku di SMKN 1 BUDURAN. *Jurnal Tata Rias*, 3(03). <https://jurnalmahasiswa.unesa.ac.id/index.php/19/article/view/8869>.
- Mardhiati, R. (2019). Guru Paud: Pendidikan Perilaku Hidup Bersih dan Sehat (PHBS) Anak Usia Dini. *Ikra-Ith Abdimas*, 2(3), 133–141. <http://journals.upi-yai.ac.id/index.php/IKRAITH-ABDIMAS/article/download/603/449>.
- Mawarni, Z., & Retnani, E. D. (2016). Penerapan Akuntansi Pertanggungjawaban Sebagai Alat Penilaian Kinerja Pusat Biaya. *Jurnal Ilmu Dan Riset Akuntansi (JIRA)*, 5(2). <http://jurnalmahasiswa.stiesia.ac.id/index.php/jira/article/download/1602/1618>.
- Mishra, A., Rani, S., & Bhardwaj, U. D. (2017). Effectiveness of E-learning Module on First Aid: A Study on Student Nurses. In *International Journal of Nursing Education* (Vol. 9, Issue 3). <https://doi.org/10.5958/0974-9357.2017.00060.5>.
- Ngafifi, M. (2020). Kemajuan teknologi dan pola hidup manusia dalam perspektif sosial budaya. *Jurnal Pembangunan Pendidikan: Fondasi Dan Aplikasi*, 2(1). <https://doi.org/10.21831/jppfa.v2i1.2616>.
- Putri, M., Rahmiati, R., Dewi, M., & Irfan, D. (2022). Praktikalitas penggunaan e-modul dalam pembelajaran nail art. *JRTI (Jurnal Riset Tindakan Indonesia)*, 7(1), 60–62. <https://doi.org/10.29210/30031508000>.
- Riananda, N. & L. (2016). Developing ICT-Based Learning Model to Improve Learning Outcomes IPA of SD Fish Market in Sidoarjo. *Proceedings of International Research Clinic & Scientific Publications of Educational Technology*, 1(20), 23. <https://journal.unesa.ac.id/index.php/jtp/article/view/1137>.
- Sitorus, D. S., Siswandari, & Kristiani. (2019). The effectiveness of accounting E-module integrated with character value to improve students' learning outcomes and honesty. *Cakrawala Pendidikan*, 38(1), 120–129. <https://doi.org/10.21831/cp.v38i1.20878>.
- Sriyanti, I., Almafie, M. R., Marlina, L., & Jauhari, J. (2021). 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>.
- Suarsana, I. M., & Mahayukti, G. A. (2013). Pengembangan E-Modul Berorientasi Pemecahan Masalah Untuk Meningkatkan Keterampilan Berpikir Kritis Mahasiswa. *Jurnal Nasional Pendidikan Teknik Informatika (JANAPATI)*, 2(3), 193. <https://doi.org/10.23887/janapati.v2i3.9800>.
- Sugiyono, D. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Sulistiani, S., Kartimi, K., & Sahrir, D. C. (2022). E-modules with Android Appy Pie Based on Socio-Scientific Issues to Improve Students' Critical Thinking Skills. *Journal of Education Technology*, 6(2). <https://doi.org/10.23887/jet.v6i2.44817>.
- Suryaningtyas, A., Kimianti, F., & Prasetyo, Z. K. (2020). *Developing Science Electronic Module Based on Problem-Based Learning and Guided Discovery Learning to Increase Critical Thinking and Problem-Solving Skills*. 401(Iceri 2019), 65–70. <https://doi.org/10.2991/assehr.k.200204.013>.

- Uno, W. A., Halim, I., & Syahriyanto. (2021). Pengembangan Media Pembelajaran Pop Up Book Berbasis Kearifan Lokal Padapembelajaran Tematik Tema 5 Pengalamanku Sub Bab Pengalamanku Di Tempat Wisata. *Jurnal Pendidikan, Sains Dan Teknologi*, 8(1), 67–81. <https://doi.org/https://doi.org/10.47668/edusaintek.v8i2.371>.
- Wibowo, E., & Pratiwi, D. D. (2018). Pengembangan Bahan Ajar Menggunakan Aplikasi Kvisoft Flipbook Maker Materi Himpunan. *Desimal: Jurnal Matematika*, 1(2), 147. <https://doi.org/10.24042/djm.v1i2.2279>.
- Widya, Maielfi, D., & Alfiyandri. (2021). Need Analysis for Physics E-Module Based on Creative Problem Solving Integrated 21st Century Skills. *Journal of Physics: Conference Series*, 1940(1). <https://doi.org/10.1088/1742-6596/1940/1/012110>.
- Wijaya, S. A. & J. (2021). Developing Kvisoft Flipbook Maker-Based Physics E-Module to Build on Critical Thinking Skills of Senior High School Students. *In 6th International Seminar on Science Education (ISSE 2020)*, 515–521. <https://doi.org/10.2991/assehr.k.210326.074>.
- Winatha, K. R., Naswan, S., & Ketut, A. (2018). Pengembangan E-modul Interaktif Berbasis Proyek Pada Mata Pelajaran Simulasi Digital Kelas X di SMK TI Bali Global Singaraja. *Jurnal Teknologi Pembelajaran Indonesia*, 8(1). <https://doi.org/10.23887/jtpi.v8i1.2238>.
- Yamin, M. R., & Karmila. (2020). Analisis Kebutuhan Pengembangan Media Pembelajaran Berbasis Cartoon dalam Pembelajaran IPA pada Materi Lingkungan Kelas III SD. *Biology Teaching and Learning*, 2(2), 159–170. <https://doi.org/10.35580/btl.v2i2.12307>.
- Yulando, S., Sutopo, S., & Franklin Chi, T. (2019). Electronic Module Design and Development: An Interactive Learning. *American Journal of Educational Research*, 7(10), 694–698. <https://doi.org/10.12691/education-7-10-4>.