Multidisciplinary Output Research For Actual and International Issue (MORFAI Journal) ISSN (e): 2808-6635
Volumes 6 No. 4 (2026)

DEVELOPMENT OF THE DERMATOPIA FLIPBOOK AS A LEARNING MEDIA FOR FACIAL CARE EDUCATION AMONG VOCATIONAL HIGH SCHOOL BEAUTY PROGRAM STUDENTS IN THE SPECIAL REGION OF YOGYAKARTA

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Received	: 12 May 2026	Accepted	: 14 June 2026
Revised	: 21 May 2026	Published	: 18 June 2026

Abstract

This study aims to develop a digital flipbook named Dermatopia as a learning medium for facial care among 11th-grade students in the Beauty and Skin Care Department at Vocational High Schools in the Special Region of Yogyakarta. The background of this research is the limitations of conventional learning media that are static, bulky, and less interactive, making it difficult for students to master the sequence of facial massage techniques independently in accordance with the Indonesian National Work Competency Standards (SKKNI) in the Beauty sector. This research employed a Research and Development (R&D) approach using the 4D model (Define, Design, Develop, Disseminate). The subjects were 75 eleventh-grade students from four vocational high schools in Yogyakarta. The instruments included material and media expert validation sheets, comprehension tests (pre-test and post-test), practice observation sheets, and student response questionnaires. Data were analyzed using descriptive qualitative and quantitative methods. The results showed that the Dermatopia flipbook has interactive characteristics that integrate anatomy of the skin, skin types, tools and cosmetic materials, and video tutorials on five basic and electric facial massage movements. Material expert validation obtained a score of 4.58 (98.75%) and media expert 4.51 (94.64%), indicating that the product is highly feasible. The effectiveness of the product was proven by an increase in the average student comprehension score from 67.80 to 86.40, a student response score of 4.60 (92%), and a practical accessibility rate of 92%. The flipbook can be accessed at https://buku-dermatopia.netlify.app/. It can be concluded that the Dermatopia flipbook is highly feasible and effective as a learning medium for facial care to support independent learning for Beauty Vocational High School students.

Keywords: *Flipbook, Facial Massage, Educational Media*

INTRODUCTION

The quality of vocational education has become a national priority; however, challenges related to technology access remain one of the main obstacles in many schools in Indonesia (Abidah et al., 2022). Teachers require advanced digital learning media to support students' competency achievement (Fattah et al., 2023). In today's digital era, particularly in education, learning activities are highly dependent on various forms of media, including digital-based learning resources and mobile communication devices. Students increasingly rely on digital tools to complete assignments, access learning materials, and communicate effectively. The development of interactive multimedia-based learning materials for subjects is one way of utilizing technology in the classroom to enhance students' learning interest (Sari et al., 2022). Data from Statistics Indonesia (BPS) in February 2024 showed that graduates from vocational high schools (SMK) recorded the highest Open Unemployment Rate (OUR) at 8.62%, reflecting a mismatch between the curriculum and industry needs (BPS, 2024). In the Skin Beauty Department, students often experience difficulties in adopting modern technologies due to limitations in learning media. Education in the Skin Beauty Department requires relatively high costs because of the dominance of intensive practical activities. Vocational high school students are required to provide high-quality cosmetics, facial treatment equipment such as facial steamers, vacuum devices, and galvanic tools, as well as practice models, resulting in personal expenditures for practical activities reaching approximately IDR 1–5 million per year (general estimates based on observations in Indonesian vocational schools, 2025). In professional training institutions, advanced course packages often range from IDR 5–30 million depending on providers such as Sekolah Beauty or Puspita Martha

(Sekolah Beauty, 2024). Meanwhile, at public universities such as Universitas Negeri Yogyakarta (UNY), the tuition fee (UKT) per semester for the Applied Bachelor's Program in Makeup and Beauty ranges from IDR 500,000 (Category I) to IDR 7,250,000 (Category VIII), with independent admission fees (IPI) reaching up to IDR 60,000,000 (PMB UNY, 2025). These conditions place a financial burden on students from lower- and middle-income families in mastering facial massage techniques comprehensively, thereby widening the competency gap between graduates and increasingly demanding industry standards. Amid these challenges, most vocational students belong to Generation Z (born between 1997 and 2012, representing approximately 27.94% of Indonesia's population according to BPS, 2025), a generation characterized by technological literacy, creativity, digital adaptability, and active gadget usage following the COVID-19 pandemic (Liputan6.com, 2025; ResearchGate, 2024).

Vocational high school graduates continue to face major challenges, particularly regarding employment absorption. According to Statistics Indonesia (BPS) data as of February 2024, the Open Unemployment Rate among SMK graduates reached 8.62%, the highest among all educational levels (BPS, 2024). This figure indicates a mismatch between competencies taught in schools and the increasingly digital-oriented demands of industry. Students in the Skin Beauty Department, in particular, often encounter difficulties in adopting modern technologies due to limited access and training. Meanwhile, digital platforms, applications, and social media have become essential tools for fostering creativity, developing marketing strategies, and understanding the latest trends in the beauty industry (Mausa, 2020). In Indonesia, the Skin Beauty Department in vocational schools requires sophisticated digital learning support tools because online beauty services and modern technologies have created new business opportunities. Consequently, graduates must be prepared for a digitally oriented workforce (Ministry of Primary and Secondary Education, 2025).

Digital learning platforms, applications, and social media are crucial for fostering creativity, designing marketing strategies, and understanding the latest methods and trends. One of the vocational programs available in Indonesia is the Skin Beauty Department, which requires advanced learning support tools because modern beauty equipment increasingly utilizes sophisticated technologies. Online beauty services also represent another area where digitalization has created new business opportunities. Therefore, technology integration into beauty education and procedures is essential to prepare graduates for an increasingly digital and contemporary workforce (Mausa, 2020). One of the subjects taught in the Skin Beauty Department at vocational schools in Yogyakarta is facial treatment. To date, instructors have primarily used PowerPoint presentations, textbooks, and YouTube videos to deliver instructional materials. Based on observations conducted in Grade XI at SMKS YPKK 3 Sleman on January 15, 2025, students most frequently accessed YouTube videos (42.9%), followed by textbooks (35.7%), PowerPoint materials (14.3%), and other reference books (7.1%). From the students' perspective, dependence on these media causes difficulties in understanding practical sequences because students tend to seek quick content without in-depth structure, which consequently reduces learning motivation (Sari et al., 2022).

Teachers are expected to provide interactive multimedia learning materials that can enhance students' interest in learning and improve instructional quality in line with technological advancements (Kahfi et al., 2021). As the most frequently accessed medium (42.9%), YouTube videos tend to lack clear structures and do not present facial massage procedures in a systematic sequence, which is crucial for skill-based practice. Textbooks (35.7%) are also considered insufficiently interactive for visualizing movements. Therefore, flipbooks were selected because of their ability to provide systematic visualizations of massage procedures while maintaining the experience of turning pages. Flipbooks present materials in an organized manner, making them easier to understand. Furthermore, this medium supports flexible learning, allowing students to access and review materials anytime. The development of this facial massage flipbook is not merely the introduction of a new learning medium; rather, it represents a digital innovation that systematically organizes the five standard international facial massage movements, which previously had not been structured into a dedicated student learning book. Therefore, this medium is expected to serve as an effective tool for improving students' understanding and practical skills.

LITERATURE REVIEW

A flipbook is a digital publication consisting of text and images that is produced, published, and read using computers or other digital devices (Puspaningrum et al., 2021), while the term e-book refers to the electronic version of a book. The development of flipbooks plays an important role in learning activities. This significance encompasses their functions, objectives, and practical uses. The preparation of flipbooks is an adaptation of modules and e-books. As a type of instructional resource, flipbooks serve as reference materials for learning, function as self-learning materials, partially substitute the role of educators, and help readers understand lessons more easily through digital systems. Planning an educational product or activity requires careful consideration to ensure that it can be

implemented effectively and appropriately. Feasibility aspects include assessments of technical, financial, operational, and market factors to ensure that the activity can be carried out successfully and has promising prospects. Meanwhile, legal aspects focus on compliance with applicable laws and regulations, including licensing, intellectual property rights, and standards and ethics established by the government or related institutions (Kasmir & Jafar, 2017). According to Hafiduddin (2024), the content (text and/or images) contained in books must comply with prevailing norms and Pancasila values and should not contain elements that could harm, endanger, or negatively affect readers. Assessments used to measure the achievement of learning objectives should be conducted objectively, systematically, and comprehensively to determine the extent to which students have attained the expected competencies (Putri et al., 2023). Information presented in books should reflect real-life situations so that the material becomes more relevant, easier to understand, and applicable to students' everyday lives (Wulandari et al., 2021). Learning materials and practical activities must also comply with Occupational Health, Safety, and Environmental Standards (K3LH) to ensure that the learning process is safe, comfortable, and in accordance with existing regulations (Dwi Isnaini, 2021).

Several important aspects should be considered in developing instructional flipbooks. These include the completeness of the learning materials, systematic and logical organization of the content, depth of the subject matter, accuracy of concepts and definitions, correctness of vocabulary according to theoretical principles, and the relevance of the material to real-world situations (Sudjana, 2009). The language used should be proper, accurate, and easily understood by vocational high school students to ensure effective communication and avoid misunderstandings (Dwi Isnaini, 2021). A book should contain a complete title page and a well-organized table of contents so that readers can easily understand its structure and content (Anharuddin & Prastowo, 2023). In addition, books should provide complete and systematically arranged lists of figures and tables to facilitate readers in understanding the material and locating information efficiently (Afrahamiryano & Ariani, 2017).

The content of instructional flipbooks should also be aligned with contemporary developments. Consistency in presentation through clear narration, logical sequencing of concepts and procedures, appropriate sound effects, and the accuracy of terminology are important considerations (P. D. W. Sanjaya, 2022). Other aspects include learning flexibility, clarity of instructions, the use of up-to-date references, the ability of the material to stimulate learners' curiosity, and the proper composition of text, images, videos, and animations within the flipbook (Tyas et al., 2024). Generation Z is a digital-native generation that has grown up alongside technology, smartphones, and social media from an early age. They possess learning characteristics that differ from those of previous generations; therefore, learning media should be designed according to their preferences and learning styles (Pujiono, 2021). Generation Z tends to prefer visual and interactive content because they understand material more easily through images, infographics, short videos, and animations rather than long and monotonous texts. Furthermore, they expect learning media to be mobile-friendly and accessible anytime through smartphones, including offline access to support independent learning without relying on stable internet connections. Students generally prefer concise, practical, and microlearning-based materials; therefore, bite-sized content that directly addresses the main points is more appealing than lengthy and less efficient materials. Interactive media that provide immediate feedback, such as quizzes, reflections, and simulations, are also highly suitable because Generation Z is accustomed to game features and social media interactions.

Student learning outcomes can be optimized when the learning media used are effective, aligned with students' characteristics, and supportive of learning objectives. However, facial treatment instruction in the Skin Beauty Department of vocational high schools is still dominated by conventional methods, such as lectures and textbooks, which tend to be static, lengthy, and disconnected from visual elements and hands-on practice (Kahfi et al., 2021). Consequently, students often experience difficulties in mastering facial massage techniques systematically, understanding skin anatomy, and correctly operating electrical beauty devices. Challenges related to technology access in vocational schools further exacerbate these problems. To ensure the quality and effectiveness of the flipbook, its development employs the Four-D (4D) Research and Development model proposed by Thiagarajan et al. (1974), consisting of the Define, Design, Develop, and Disseminate stages. The development of the "Dermatopia" flipbook represents a strategic solution for bridging the gap between the complexity of practical learning materials and the limitations of conventional teaching resources. By integrating digital technology with systematically organized facial treatment materials, this medium is expected to facilitate students' cognitive and psychomotor processes, thereby significantly improving the effectiveness of learning and the learning outcomes of Beauty and Skin Care students in vocational high schools in Yogyakarta.

METHOD

Research and Development Model

This study employed a Research and Development (R&D) approach for the development of the flipbook product. According to Abadi et al. (2018), the R&D process consists of four stages: *Define, Design, Develop, and Disseminate*. Data collection was conducted to support the development of the facial treatment flipbook as a learning medium. The R&D approach aims to create new products through a systematic development process. The resulting learning media were subsequently validated by subject matter experts and media experts.

Development Procedure

This study adopted the Four-D (4D) development model, consisting of the *Define, Design, Develop, and Disseminate* stages. The model was originally developed by Sivasailam Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel in 1974 and was later applied in the study by Arkadiantika et al. (2020). The 4D model can be used to develop various types of instructional media. This model was selected because its implementation stages are systematic and detailed, as described below.

1. Define Stage

The problem analysis stage was conducted to identify the learning challenges faced by beauty students in vocational high schools and within the beauty industry. Existing conditions of facial treatment learning were investigated through interviews with facial treatment practitioners to understand work procedures, services provided, equipment commonly used, and the implementation of facial treatment technologies in vocational high schools.

2. Design Stage

The Design stage was conducted to produce the blueprint for the Dermatopia facial treatment flipbook intended for facial massage beauty services. The design was based on selected reference products containing various facial treatment tips and techniques. The third design model was chosen because the images and text arrangement were easier to read. The integration of illustrations and written explanations facilitated students' understanding of the material, while the layout provided a balanced visual presentation, particularly when the inserted images were not excessively large.

3. Develop Stage

During the Develop stage, the design inspired by published facial treatment books was transformed into a flipbook product that is portable and expected to facilitate rapid comprehension by readers due to its concise and accessible presentation. Throughout the development process, the product creators worked under the guidance of the Final Project supervisor and involved students to ensure that the final product complied with established facial treatment standards and specifications, while also meeting students' needs and learning objectives.

4. Disseminate Stage

The Disseminate stage was conducted to determine the public acceptance of the facial treatment flipbook. Product acceptance testing was designed as the final stage of the research to evaluate whether the developed product was accepted by the wider community. Preference testing was carried out to assess users' responses toward the flipbook product.

Data Analysis Technique

In this study, data were collected using several primary instruments to measure the variables under investigation, namely the independent variable (treatment: the use of the Facial Massage Flipbook) and the dependent variables (learning outcomes, improvement of students' cognitive abilities, and practical skills).

a. Types of Instruments

The types of instruments used for data testing are presented in Table, which describes the data testing system employed in this study.

Table: Systematic Data Testing Types

Instrument	Type of Data Collected	Variables Measured
Interview	Qualitative Data	Additional information from a Beauty Teacher regarding students' daily scores (Experimental Group), feedback on the Flipbook, and suggestions from the teacher.
Product Feasibility Instrument	Quantitative Data	Product feasibility (content validity and product construct validity)
Observation/ Distribution of *Pretest and Post Test*	Qualitative and Quantitative Data	Learning implementation, student responses, and practical skills.

a. Research Variables

Research variables are anything, in any form, determined by the researcher to be studied in order to obtain information about a particular phenomenon and subsequently draw conclusions. In this development study, two main variables were analyzed:

1) Independent Variable

The independent variable is the variable that influences or causes changes in the dependent variable. In this study, the independent variable is the development of the Facial Massage Flipbook as a digital learning medium.

2) Dependent Variable

The dependent variable is the variable that is influenced or affected by the existence of the independent variable. In this context, the dependent variable is the improvement of students' cognitive learning outcomes and practical skills in the Facial and Skin Care subject. These outcomes were measured through achievement tests and practical skill observation sheets.

Data Analysis Method

a. Flipbook Media Feasibility Test

The questionnaire results were analyzed and interpreted to determine the feasibility level of the media using the Likert scale method for score calculation.

Table: Flipbook feasibility Assessment Categories

NO	Kategori	Skor
1	Sangat Layak	4
2	Layak	3
3	Tidak Layak	2
4	Sangat Tidak Layak	1

Source: (Adapted from Sugiyono, 2010)

Flipbook Product Feasibility Calculation

$$KP = \frac{x}{x^1} \text{ x } 100\%$$

Source: (Adapted from Sugiyono, 2010)

Descpription:

KP = Product feasibility
x = Total score obtained
x1 = Total ideal score for all items

Furthermore, the percentage results were used to determine the feasibility level of the aspects being evaluated. According to Arikunto (2009), feasibility is classified into four categories, as follows:

Table of Percentage Categories for Assesment Criteria

NO	PRESENTASE NILAI RATA-RATA	KATEGORI KELAYAKAN
1	81% - 100%	Sangat Layak
2	61%-80%	Layak
3	41%-60%	Cukup Layak
4	21% - 40%	Tidak Layak

Source: (Arikunto, 2009) Modifikasi Arikunto

RESULTS AND DISCUSSION

The researcher conducted this study in the Beauty and Cosmetology Departments of vocational high schools in Yogyakarta and developed the flipbook using the 4D model. The study involved Grade XI students from four vocational schools: 36 students from SMK Negeri 1 Wonosari, 14 students from SMK Negeri 4 Yogyakarta, 13 students from SMKS Berbudi Yogyakarta, and 12 students from SMK YPKK 3 Sleman. The stages of the 4D model (Define, Design, Develop, and Disseminate) implemented in this study are described as follows:

1. Initial Development Stages

a. Define

At this stage, the researcher reviewed various related references from reliable sources to establish a strong theoretical foundation for the study. The analysis focused on identifying students' problems and needs. The Define stage is an important initial step for identifying problems and user requirements so that the developed product is truly aligned with field conditions (Kurniawan & Dewi, 2017). In this study, the Define stage focused on analyzing the needs of Grade XI students and teachers in the Beauty and Skin Care Department at four vocational high schools in the Yogyakarta region, namely SMKN 4 Yogyakarta, SMKN 1 Wonosari, SMKS Berbudi Yogyakarta, and SMK YPKK 3 Sleman.

b. Design

The Design stage involved preparing the initial product design based on the findings obtained during the needs analysis stage, with the objective of producing a prototype that met user needs and vocational education standards (Wahyuni & Santosa, 2022). In this study, the design phase focused on developing the storyboard, content scenarios, and technical specifications of the Dermatopia: Skin Care Atlas Flipbook, which was intended to strengthen facial massage practical learning for students in the Beauty and Skin Care Department.

c. Develop

The Develop stage consisted of producing the flipbook based on the designed prototype, followed by expert validation and revisions to ensure that the product achieved a high level of quality before field testing (Rayanto & Suharsono, 2023). In this study, the Develop stage resulted in the creation of the Dermatopia: Skin Care Atlas Flipbook, which was developed using Flip PDF Professional. The product was ready to be distributed and used by Beauty and Skin Care students in vocational schools in Yogyakarta. The flipbook can be accessed through personal computers and smartphones, features realistic 3D page-flipping effects, can be used offline after a single download, and can be easily stored on cloud drives or smartphone storage for independent learning at any time. The contents of the flipbook include tutorials on manual and electrical facial massage techniques, facial anatomy, skin structure, treatment equipment, and safe cosmetic materials.

d. Disseminate

The Disseminate stage was conducted through field implementation in the four vocational schools in the Yogyakarta region, involving a total of 75 Grade XI students. The flipbook was used during four to six practical learning sessions in the Facial Treatment course. Data on effectiveness were collected through theoretical and practical tests (pretests and posttests) as well as student response questionnaires. The results of the paired-samples t-test conducted in three schools and the one-sample t-test conducted at SMKN 1 Wonosari demonstrated highly significant improvements ($p < 0.01$) across all groups. The effect sizes (Cohen's d) ranged from 1.164 to 5.654, indicating large to very large effects. Student response questionnaires yielded an average score of 4.60 (92%), categorizing the flipbook as highly practical and attractive.

CONCLUSION

The Dermatopia Facial Treatment Flipbook has been successfully developed as an interactive digital learning medium with the following key characteristics: **(a)** systematic and sequential presentation of materials based on the competency unit *"Performing Basic Facial Treatment"* (S.96KEC01.039.2) as stipulated in the Indonesian National Work Competency Standards (SKKNI) No. 180 of 2021 and the learning outcomes of the *Merdeka Curriculum*; **(b)** integration of concise text, sequential illustrations, infographics, and facial massage tutorial videos featuring the five basic international massage movements accessed through QR codes; **(c)** support for offline access with 3D page-flipping effects, intuitive navigation, and flexibility for A5-size printing; and **(d)** a design specifically intended for Grade XI students of the Beauty and Skin Care Department to support flexible independent learning.

The feasibility results indicate that the developed flipbook is highly suitable for use as a learning medium for the Facial Treatment subject for Grade XI students in the Beauty and Skin Care Department. This evaluation was based on expert validation using a 4-point Likert scale instrument, in which the media expert awarded an average score of 3.84, while the average score from three subject matter experts was 3.91. Overall, the average validation score reached 3.89 (97.25%), placing the media in the **"***Highly Feasible***"** category. The effectiveness of the Dermatopia Flipbook was proven to be highly effective in improving students' cognitive understanding. This was demonstrated by the increase in the average student learning score from 67.80 to 86.40, with a normalized gain (N-gain) value of 0.78 obtained from practical trials conducted in four schools. The effectiveness was also reflected in students' responses, which achieved an average score of 4.60 (92%) on a 5-point scale, with a satisfaction level of 94% and a self-practice accessibility rate of 92% based on questionnaire and observation results. Students reported that the intuitive navigation, the integration of facial massage tutorial videos through QR codes, and the offline access feature greatly facilitated their understanding of psychomotor skills and enabled them to practice systematically and independently outside the classroom.

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