Development of canva-based learning media in science subjects at SMP Negeri 7 bitung

Muhammad Yusuf[1*], Masje Wurarah[2] and Anatje Lihiang[2]

[1] Postgraduate Student of Master's Program in Science Education, Manado State University, Indonesia

[2] Science Education Study Program, Postgraduate Program, Manado State University, Indonesia

Correspondence Author: Muhammad Yusuf

Received 2 Aug 2023; Accepted 9 Sep 2023; Published 18 Sep 2023

Abstract

This research addresses the critical need for effective technology integration in the Indonesian education system, focusing on the development and validation of Canva-based learning media for science education. The study utilizes the ADDIE model, emphasizing a systematic approach to analysis, design, development, implementation, and evaluation. Education is a fundamental driver of national development, and Information and Communication Technology (ICT) plays a pivotal role in facilitating effective learning. This study addresses challenges in integrating technology-based learning media into the Indonesian classroom context, focusing on the development of adaptable and curriculum-integrated Canva-based learning materials for science education.. Canva, a versatile graphic design platform, is chosen as the medium, catering to the widespread use of smartphones and laptops among students. The study aims to create engaging, accessible, and flexible learning materials aligned with the existing curriculum. Through interviews, it was revealed that conventional teaching methods persist due to challenges in adopting technology post-Covid-19. To address this, the study aligns with the Merdeka Belajar (Independent Learning) initiative, intending to develop Canva-based science learning media accessible both online and offline. The ADDIE model guides the development process, emphasizing systematic and collaborative design. The media undergoes thorough validation by content and media experts, ensuring alignment with learning objectives and visual appeal. Results indicate high suitability for educational use, correlating with established criteria. The study contributes to the evolving landscape of technology integration in Indonesian schools, especially within the Merdeka Belajar framework. The developed Canva-based learning media serves as a practical solution to challenges faced in post-pandemic education, providing an engaging and adaptable tool for science learning.

Keywords: canva, learning media, science, development

1. Introduction

Education is a crucial part of a nation's development. This is because education can provide knowledge and skills to individuals, enabling them to improve their quality of life and contribute to societal progress. In the context of education, Information and Communication Technology (ICT) plays a vital role in supporting effective and efficient learning processes. One form of applying ICT in education is through the use of technology-based learning media (Kessi, 2019; Susanti, 2014).

Currently, the use of technology-based learning media is increasingly being enhanced in Indonesia. However, challenges persist in its implementation in the classroom, particularly in terms of integration with the existing curriculum and the limited availability of resources. Moreover, a significant portion of technology-based learning media in Indonesia remains static, thus unable to accommodate the diverse learning needs and preferences of students. Therefore, research on the development of technology-based learning media capable of overcoming these challenges is necessary. This study aims to develop a technology-based learning media that can be used to support classroom learning. Additionally, this learning media will be designed to integrate with the existing curriculum and be adaptable to students' learning preferences. (Laurillard, *et al*.,2009; Paat, *et al*., 2019) [6, 12].

The variety of instructional media is extensive, ranging from visual and audio to audio-visual media, among others. Ideally, instructional media should be manipulable and easily perceivable through sight, hearing, and reading. The appropriate use of instructional media can optimize students' enthusiasm for learning and present information that is more engaging, reliable, and facilitates information interpretation. Therefore, the selection of media that can meet the needs to achieve desired goals is crucial. One frequently utilized instructional media is Canva-based learning media, accessible through smartphones, laptops, and other devices (Kustandi, 2020; Siregar, *et al*., 2019) [14].

The rapid development of Information and Communication Technology (ICT) has led to innovations in various fields, particularly in education, marked by the emergence of the concept of electronic learning (E-Learning). The use of electronic devices in E-Learning, facilitated by media that allows learning to occur simultaneously or at different times, offers flexibility in both location and method. Electronic-based learning media supports the implementation of E-Learning, providing a solution for students to learn anytime and anywhere without constraints of time and place, easily and affordably. Additionally, it facilitates the implementation of blended learning/hybrid learning that integrates online and offline learning with technological assistance (Pertiwi, 2023;

Hapsari, 2021; Mokalu, 2022) [10, 8].

Based on interviews conducted with 2 teachers and 9 students in April 2023, it was found that a significant portion of the learning process in schools is still conducted conventionally. This is attributed to the transitional phase of the post-Covid-19 pandemic learning process, where students are accustomed to learning from home through television or online platforms. Despite the quality of content and learning context, there are several challenges that hinder the optimal learning process. Some teachers use WhatsApp (WA) as a teaching tool, but learning materials sent through WA are easily deleted and often interrupted by incoming messages. Video conference-based learning using applications such as Zoom, Google Meet, and Lark also requires a significant internet quota and stable network, but internet disruptions are common at SMP Negeri 7 Bitung, resulting in unclear video and audio during conferences. Furthermore, students find these media less familiar and less engaging. In this context, the independent curriculum mandates students to use devices in learning, but the aforementioned challenges make the implementation of this curriculum difficult.

In relation to Merdeka Belajar (Independent Learning), SMP Negeri 7 Bitung is also one of the pioneering schools in the Ministry of Education and Culture's program. Implementing innovative learning approaches, collaboration with external parties, and providing students with the freedom to choose their learning paths, the school has successfully created a learning environment that supports the development of students' potentials. The achievements of students at SMP Negeri 7 Bitung serve as evidence of the success of the implementation of the Merdeka Belajar program in this school. Drawing from the successful experiences of SMP Negeri 7 Bitung, the researcher also aims to conduct developmental research that supports this program, serving as inspiration for other schools in realizing the vision of Independent Learning and improving the quality of education in Indonesia. Therefore, the researcher intends to develop Canva-based science learning media. As this type of learning media is easily accessible through devices owned by most students, who are familiar with and accustomed to using them, it can be used by both students and teachers with or without internet quotas. It is expected to be a useful, engaging, effective, and efficient learning media in the learning process, especially post-Covid-19, where the use of technology in various aspects of life has accelerated rapidly and massively. (Mokalu, Repi, & Ngangi, 2021; Rahayu, Zutiasari, & Munadhiroh, 2021) [9, 16].

2. Materials and methods

Learning media is a tool designed to convey educational messages. Learning itself is a communication process involving students, teachers, and instructional materials. Communication would not occur without the aid of message conveyors or media. Therefore, media serves as a tool with the function of delivering messages (Efendi, 2018) [4].

Learning media is described as graphic, photographic, or electronic tools that can be used to capture, process, and rearrange visual or verbal information. In essence, learning media encompasses everything that can convey messages, stimulate the minds, feelings, attention, and interest of students, thereby fostering the learning process within students (Daulae, 2019) [3].

Canva is an online graphic design platform that enables users to easily create and edit various types of visual materials. With Canva, users can design posters, presentations, infographics, brochures, invitations, and much more using a variety of pre-designed templates or by creating designs from scratch. Canva offers a range of features such as font selection, layout customization, the use of images and icons, and the ability to upload personal images. Additionally, Canva facilitates collaboration among users, allowing teams or groups to work together in creating designs. This platform is popularly utilized by individuals, businesses, educators, and organizations to produce visually appealing and professional materials without requiring extensive design skills (Wulandari & Mudinillah, 2022).

Canva is an online application used for designing learning media. The application has both free and paid versions and is accessible online. With Canva, users can easily create various types of learning media such as infographics, graphics, posters, presentations, brochures, logos, resumes, flyers, A4 documents, Instagram posts, cards, newspapers, comic strips, magazine covers, invitations, photo collages, business cards, desktop wallpapers, reports, certificates, book covers, social media animations, announcements, menus, videos, graphic organizers, stories, letters, letterheads, proposals, labels, worksheets, class schedules, calendars, ID cards, CD covers, US letter documents, mobile-first presentations, planners, programs, e-book covers, and storyboards. (Gehred, 2020) [5].

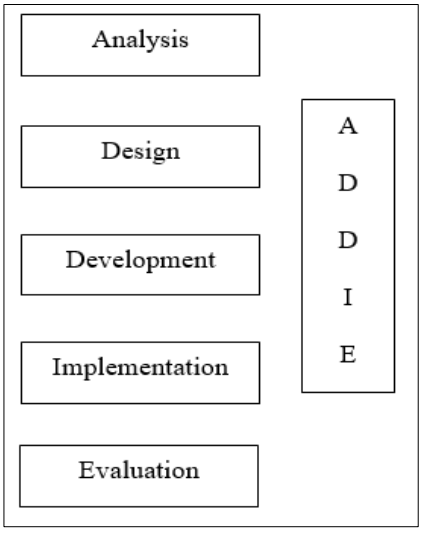

Fig 1: Product Development Procedure

This research utilizes the Research and Development (R&D) methodology with the ADDIE model, an acronym for Analysis, Design, Development, Implementation, and Evaluation. Developed by Reiser and Mollenda in the 1990s, ADDIE serves as a guide in constructing effective, dynamic, and performance-supporting training programs and infrastructure. The ADDIE theory provides a structured and systematic

approach to instructional design, facilitating the creation of effective and efficient learning designs (Linh & Suppasetseree, 2016) [7].

The ADDIE model was chosen due to its widespread use in illustrating a systematic approach to instructional development. It is a versatile and suitable model for development research, closely associated with instructional system development. When applied to development, this process is considered sequential but also interactive, where evaluation results at each stage can inform the refinement of the learning development process. The outcome of each stage serves as the starting point for the subsequent stage (Spatioti, Kazanidis, & Pange, 2022) [15].

The ADDIE framework is an evolving and continuous cyclical process encompassing the entire instructional planning and implementation process. The five stages consist of a framework, each with its distinct objectives and functions in instructional design development. The selection of the ADDIE model is based on several considerations:

Generic design

ADDIE is a generic instructional design model that provides an organized process for developing instructional materials applicable to both face-to-face and online learning. It is a straightforward framework suitable for various settings due to its general structure. (Croxton & Chow, 2015) [2].

Systematic and interactive approach

ADDIE uses a systematic and interactive approach, allowing for step-by-step, organized development of instructional materials. Versatility for Different Learning Domains: ADDIE can be applied to the development of learning materials for verbal, intellectual, psychomotor, and attitudinal domains, making it suitable for developing blog-based content for ICT subjects.

Collaborative development

ADDIE provides an opportunity for instructional designers to collaborate with content experts, media specialists, and instructional designers, ensuring the production of high-quality products.

The ADDIE theory comprises five stages:

- **Analysis:** This initial stage involves analyzing learning needs and identifying learning objectives.
- **Design:** In this stage, instructional designs are created that align with the identified learning needs and objectives.
- **Development:** This stage involves developing instructional materials based on the design created in the previous stage.
- **Implementation:** The implementation stage is the execution of the developed instructional materials.
- **Evaluation:** The final stage involves evaluating and assessing the success and shortcomings of the implemented instructional process.

The ADDIE model provides a systematic, adaptable, and interactive approach to instructional design, ensuring the development of effective learning materials (Budoya, Kissaka & Mtebe, 2019; Peterson, 2003) [1, 13].

Human reproductive system materials

Human reproduction is the effort of living beings to pass on the characteristics of their parents to the next generation and to maintain the continuity of their species. Humans reproduce or engage in sexual reproduction. Sexual reproduction involves two individuals, each contributing a specialized reproductive cell called a gamete, and it is viviparous or giving birth. This process requires reproductive organs, both male and female. Males have a set of reproductive organs that function to produce male gametes, namely spermatozoa (sperm). The formation of sperm is closely tied to the role of sexual hormones. The male reproductive organs originate from embryonic tissues and are differentiated into two types: internal and external reproductive organs.

The female reproductive organs include a pair of ovaries, each oval-shaped with a length of 3-4 cm. The ovaries alternately play a role in producing eggs (ova). Typically, each egg is produced every 28 days. The reproductive tract consists of the uterus, fallopian tubes (oviducts), and vagina. The paired fallopian tubes, located to the right and left of the ovaries, are approximately 10 cm in length. The base of the fallopian tube has a funnel-shaped structure called the infundibulum, which is equipped with fringe-like projections known as fimbriae. The fimbriae function to capture eggs released by the ovaries. Eggs captured by the infundibulum then travel into the fallopian tube, which serves to transport the egg from the ovary to the uterus.

The uterus, or womb, is the meeting point of the right and left fallopian tubes and is shaped like a pear. Its lower part narrows and is referred to as the cervix or neck of the uterus. The human uterus functions as the site for zygote development in case of fertilization. The vagina serves as the final channel of the internal female reproductive tract. The mucous membrane produces mucus during sexual stimulation, a secretion facilitated by the Bartholin's glands. External reproductive organs include the vulva, a cleft on the outer part divided into two parts:

- Labia majora (outer lips), which form a pair and extend backward to reach the mons pubis. The mons pubis (mons veneris) is the upper and outer region of the vulva containing abundant fatty tissue and developing hair during puberty.
- Labia minora (inner lips), folds inside the labia majora, also in pairs, serving to protect the vagina. The clitoris is a small protrusion formed by the combination of the labia majora and minora at its upper part. Structurally, the clitoris is not identical to the male penis, but it contains corpora cavernosa, numerous blood vessels, and sensory nerve endings.

The human reproductive system is a complex set of organs and structures responsible for the creation of new life. It is divided into male and female reproductive systems, each with its own distinct organs and functions.

Male reproductive system

a) **Testes (Testicles):** Paired organs located in the scrotum, responsible for producing sperm cells and testosterone.
b) **Scrotum:** External sac that houses and protects the testes, maintaining a temperature suitable for sperm production.
c) **Epididymis:** Coiled tube located on the surface of each testicle where sperm mature and are stored.
d) **Vas deferens:** Duct that carries mature sperm from the epididymis to the urethra during ejaculation.
e) **Seminal vesicles:** Glands that produce seminal fluid, contributing nutrients and energy for sperm.
f) **Prostate gland:** Gland that secretes a milky fluid that enhances sperm motility and viability.
g) **Bulbourethral glands:** Glands that produce a clear fluid to cleanse and lubricate the urethra during sexual arousal.
h) **Urethra:** Tube connecting the urinary bladder to the external genitals, serving as a passage for both urine and semen.

Female reproductive system

a) **Ovaries:** Paired organs producing eggs (ova) and female sex hormones (estrogen and progesterone).
b) **Fallopian tubes (Oviducts):** Pair of tubes that transport eggs from the ovaries to the uterus; the site of fertilization.
c) **Uterus (Womb):** Muscular organ where a fertilized egg implants and develops into a fetus during pregnancy.
d) **Cervix:** Lower part of the uterus that connects to the vagina; it allows sperm to enter the uterus and serves as the passage for menstrual flow.
e) **Vagina:** Elastic tube connecting the uterus to the external genitals; it serves as the birth canal during childbirth and receives the penis during sexual intercourse.
f) **Labia majora and labia minora:** Outer and inner folds of skin surrounding the vaginal opening.
g) **Clitoris:** Sensitive organ at the top of the labia minora, analogous to the male penis, responsible for sexual arousal.
h) **Bartholin's glands:** Glands located near the vaginal opening that secrete lubricating fluid during sexual arousal.
i) Understanding the structures and functions of the male and female reproductive systems is essential for comprehending human reproduction, fertility, and sexual health.

3. Results & discussion

a) Research location and time

This research was conducted at the SMP Negeri 7 Bitung school complex during the odd semester of the 2023/2024 academic year.

b) Research type

The applied research falls under the category of Research and Development (R&D), specifically utilizing the ADDIE model. The focus of this research is on science education, particularly the topic of the reproductive system.

c) Research procedure

The research procedure follows the ADDIE model:

i. Analysis (Analisis)

In this phase, the researcher observed issues in student learning and learning materials, analyzed the school environment, and considered student characteristics. Issues observed included limited use of learning media, occasional reliance on conventional methods such as chalkboards, and the impact of the COVID-19 pandemic on disrupting traditional learning. The teacher's decision to adopt Canva-based learning media faced challenges as some students were not receptive. To address this, the researcher aimed to create engaging Canva-based learning materials compatible with the current use of smartphones.

ii. Design (Desain)

The design phase involved creating a storyboard as a guide for layout and content creation, covering learning materials, evaluations, profiles, videos, games, worksheets, curriculum, and more.

iii. Development (Pengembangan)

The development phase commenced with the creation of the Canva-based learning media. The required hardware and software components, such as Google Chrome, MS Word, Canva APK, and others, were prepared. Google Chrome was used for browsing and searching materials, with acquired content stored as Word files. These materials were then packaged into a Canva application with designed layouts, backgrounds, sounds, and brightness to enhance visual appeal. The final step involved integrating the developed media into the Canva application for usability in the learning process.

Below are some display results from the Canva-based learning media:

1. Splash screen display

The splash screen serves as the initial display before entering the main media page. It provides instructions to enter the media by clicking or pressing an icon. The splash screen is designed with an inviting message like "Let's Learn Together," prompting users to proceed to the main menu.

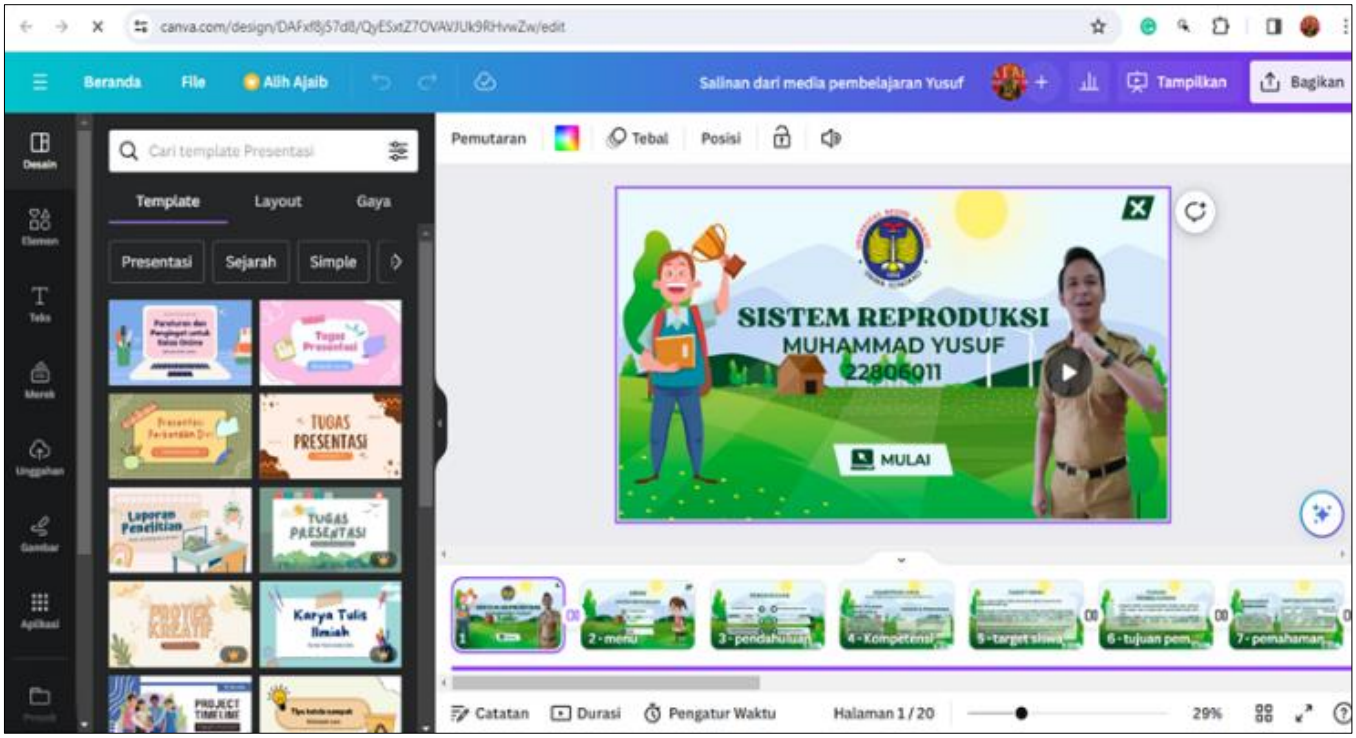

Fig 2: Display of reproductive system learning media

2) Validation

In this phase, the produced media will undergo validation by experts, encompassing media specialists, content experts, and an IPA (Science) teacher as a practitioner in IPA learning. The validation aims to assess the suitability of the created media. Comments and suggestions from experts will serve as the basis for revising and enhancing the media.

2.1 Content expert validation

The content expert validation involved an expert in biology education from the State University of Manado, validating the digital learning media on the reproductive system using Android-based smartphones. During the content expert validation, the created media received corrections and suggestions, such as refining indicators to align with the learning objectives, incorporating additional content on reproductive health, and adding image sources to the visuals.

After conducting the validation with the content expert and receiving constructive feedback for the advancement of the Canva media, the researcher made efforts to enhance the media, taking into account the provided suggestions by the media expert.

After the media revision, the content expert validated the media by filling out the provided questionnaire. The validation questionnaire utilized the Likert scale with 5 response criteria: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). The validation questionnaire for the content expert consisted of 11 indicators. The validation results are presented in the table below:

Table 1: Validation results table for content expert

No	Indicator	Score
1	Alignment of learning objectives with CPL	5
2	Completeness and comprehensiveness of material	4
3	Alignment of material with learning objectives	4
4	Clarity and systematic delivery of material	4
5	Ease of understanding the material	4
6	Clarity of example questions	4
7	Accuracy of answer keys	5
8	Completeness of questions	4
9	Alignment of evaluation with learning objectives	4
10	Alignment of evaluation with material	4
11	Provision of feedback on evaluation	5
Total score		47
Average score		4.27
Criteria		Very suitable

From the above data, it can be concluded that the assessment results from the content expert yielded an average score of 4.27. This result indicates that the content included in this media is highly suitable for use or implementation in instructional media. This is in line with the reference data in Sukarjo's conversion table, where the value falls within the range of 4.21 - 5.00 on the scale.

2.2 Media expert validation

The media expert who conducted validation on the digital instructional media using Canva-based learning materials on the reproductive system is a Ph.D. lecturer in Science Education at Manado State University. Validation was done by

filling in the boxes provided in the questionnaire. Some additional feedback from the examiner for the improvement of the media includes insufficient contrast and brightness, leading to suboptimal lighting, and video pages lacking actual video content. Additionally, there is a suggestion to incorporate a feedback scoring system for students' assessment results. After corrections and receiving input from the media expert, the researcher improved the media to the best of their ability, taking into consideration the explanations provided by the media experts. For a clear visual representation, refer to the images below. Following the media revision, the next step involves validation by a media expert, who will fill in the provided boxes in the questionnaire, paying attention to the guidelines for completing the questionnaire.

Table 2

No	Indicator	Score
Aspects of device engineering		
1	Effectiveness and efficiency in development	5
2	Effectiveness and efficiency in use	5
3	Easily managed/maintained	5
4	Ease of media operation	5
5	Clarity of usage instructions	4
6	Accuracy of application selection	4
Total score		28
Average score		4.66
Criteria		Very good
Aspects of visual display		
7	Suitability of color selection	4
8	Suitability of font selection	4
9	Suitability of button design	4
10	Suitability of layout pattern design	5
11	Suitability of image display with content	5
12	Balance of image proportions	4
13	Suitability of sound effects selection	4
14	Neatness of design	5
15	Attractiveness of design	5
Total score		40
Average score		4.44
Criteria		Very good

From the data above, it can be concluded that the average rating obtained from media experts is 4.44. This result indicates that the Canva-based learning media is highly suitable for use or implementation in education. This aligns with the reference data in the Suigyono conversion table, where the value falls within the range of 4.21-5.00 on the scale.

4. Conclusions

Development stages

- **Analysis stage:** This involves analyzing the needs and characteristics of students, along with an examination of the media used in the learning process.
- **Design stage:** This includes creating a design for the learning media, such as storyboarding, organizing content, questions, and the placement of various menus.
- **Development stage:** This encompasses the actual creation of the media, validation by subject matter experts, validation by media experts, and validation by a science education practitioner.
- **Implementation:** In this stage, implementation is carried out with small groups consisting of 5 students in the 9th-grade class and larger groups with 20 students in the 9th grade at SMP Negeri 7 Bitung.

Implementation of Reproductive System Learning Media based on Canva on a Small Scale: The implementation involved 8 respondents, and the results showed a percentage above 65%, categorized as highly suitable for use in learning media.

References

1. Budoya CM, Kissaka MM, Mtebe JS. Instructional Design Enabled Agile Method Using ADDIE Model and Feature Driven Development Process. International Journal of Education and Development Using Information and Communication Technology. 2019;15(1):n1.
2. Croxton RA, Chow AS. Using ADDIE and systems thinking as the framework for developing a MOOC: A case study. Quarterly Review of Distance Education. 2015;16(4):83.
3. Daulae TH. Langkah-Langkah Pengembangan Media Pembelajaran Menuju Peningkatan Kualitas Pembelajaran. In Forum Paedagogik (Vol. 10, No. 1, pp. 52-63). IAIN Padangsidimpuan, 2019.
4. Efendi NM. Revolusi pembelajaran berbasis digital (Penggunaan animasi digital pada start up sebagai metode pembelajaran siswa belajar aktif). Habitus: Jurnal Pendidikan, Sosiologi, & Antropologi. 2018;2(2):173-182.
5. Gehred, Alison Paige. "Canva." Journal of the Medical Library Association: JMLA. 2020;108(2):338.
6. Laurillard D, Oliver M, Wasson B, Hoppe U. Implementing technology-enhanced learning. Technology-enhanced learning: Principles and products, 2009, 289-306.
7. Linh ND, Suppasetseree S. The Development of an Instructional Design Model on Facebook Based Collaborative Learning to Enhance EFL Students' Writing Skills. IAFOR Journal of Language Learning. 2016;2(1):48-66.
8. Mokalu YB, Wowor EC, Tumewu WA. Developing Instagram Application-Based Media to Optimize Student Learning Outcomes of the Natural Science Education Department Unima. SOSCIED. 2022;5(2):230-237.
9. Mokalu YB, Repi RA, Ngangi J. Developing instagram-based biology animation learning media for junior high school student during covid-19 pandemic in Manado. International Journal of Advanced Education and Research. 2021;6(3):45-48.
10. Pertiwi MG, Lihiang A, Paat M. Development of Animaker-Based Science Learning Multimedia on Global Warming Materials at SMP Brother Don Bosco Tomohon. Web of Semantic: Universal Journal on Innovative Education. 2023;2(6):166-174.

11. Paat M, Sutopo H, Siregar N. Developing augmented reality application on komodo dragon for elementary school children during the new normal of covid-19 pandemic. Journal of Theoretical and Applied Information Technology, 2021, 2761-2769.
12. Paat M, Sutopo H, Siregar N. Developing a Mobile Multimedia-based Learning Resource on Living of Komodo Dragons. In Proceedings of the 2019 3rd International Conference on Computer Science and Artificial Intelligence, 2019, 273-277.
13. Peterson C. Bringing ADDIE to life: Instructional design at its best. Journal of Educational Multimedia and Hypermedia. 2003;12(3):227-241.
14. Siregar N, Sutopo H, Paat M. Mobile Multimedia-based Batakologi Learning Model Development. Journal of Mobile Multimedia, 2019, 271-288.
15. Spatioti AG, Kazanidis I, Pange J. A comparative study of the ADDIE instructional design model in distance education. Information. 2022;13(9):402.
16. Rahayu WP, Zutiasari I, Munadhiroh S. Learning Media of Canva Based on Flipbook in the Subjects of Creative Products and Entrepreneurship to Improve Students' Digital Technopreneurship Competence. In Sixth Padang International Conference on Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2020) (pp. 220-229). Atlantis Press, 2021.