Development of Web Based Web Based Digital Library as Learning Media in Cosmetology Education Program

Nurhayati Tanjung[1], Irmiah Nurul Rangkuti[2], Astrid Sitompul[3], Wisri Ardhita Manda Putri[4], Habibah Hanim Lubis[5], Siti Wahidah[6], Asrah Rezky Fauzani[7]

[1,2,3,4,5,6,7] **Universitas Negeri Medan, Medan, Indonesi**
irmiahnurul@unimed.ac.id
corresponding author: irmiahnurul@unimed.ac.id

ABSTRACT

The problem raised in this study is the limited access of students to relevant, flexible, and appropriate learning resources according to the characteristics of the visual and practice-based Cosmetology field, which is one of the causes of students' lack of understanding of learning. This study aims to: (1) develop a web-based digital library as a learning medium in the Cosmetology Education Study Program. This study is a type of development research using ADDIE which includes five stages: Analysis, Design, Development, Implementation, and Evaluation. Data collection techniques include observation, interviews, and questionnaires. Product validity was assessed by two material experts and two media experts. Product trials were conducted in three stages, namely small group trials with 6 students, medium group trials with 12 students, and large group trials with 32 students. The results of the study showed that the product obtained an average feasibility score of 86.8% from material experts (very good category) and 94.8% from media experts (very good category). The small group trial obtained an average score of 80.9% (good), the medium group 86.8% (very good), and the large group 95.6% (very good). Based on expert evaluation and user trials, it can be concluded that this web-based digital library is appropriate and effective as a learning medium in the Makeup Education Program. The implications of this study indicate that a web-based digital library can be an alternative learning solution that not only improves students' learning independence, but also encourages the integration of technology in vocational learning.

Keywords: digital library, makeup, web

INTRODUCTION

The rapid development of information and communication technology (ICT) has brought about major changes in the way human access, manage, and distribute information. Advances in technology and information as a means of education, where learning can be done and delivered online. The digital revolution has penetrated almost all areas of life, including the world of education. In the context of modern learning, the use of digital technology is no longer an option, but rather a necessity to create an adaptive, flexible, and sustainable learning system. Innovation in education plays an important role in updating teaching and learning approaches, while also enabling adjustments to the ever-growing advances in technology and information (Dainamang et al., 2024; Nwafor et al., 2022). This requires educational institutions to continue to innovate in providing learning facilities and media that are in accordance with the characteristics of today's digital generation.

The library is one of the elements in educational institutions that is expected to be able to provide various information related to science, both for the needs of educational institutions and the general public (Tabrani & Sopandi, 2022). Along with the development of the times, libraries have begun to implement automated systems by integrating computer technology into their various services (Chandio, 2021; Dar et al., 2017; Ihsan et al., 2024). According to Wardani et al. (2023), the library aims to be a source of information by providing access to information to visitors, both proactively and based on user requests. One form of technology utilization in education is the development of a web-based digital library. According to Susanti

(2017), a library is a work unit that collects various collections of library materials, both in print and non-print forms, which are organized regularly so that they can be used by users as a source of information. The library also plays a role in providing literature information services to the public as part of its function (Mair, 2022). Digital libraries allow access to information without limitations of space and time, bridging the limitations of conventional libraries which have so far been an obstacle in supporting the teaching and learning process. With a web-based system, users can access various types of learning resources, such as e-books, scientific journals, learning videos, interactive modules, and other digital resources easily, quickly, and efficiently. Digital libraries can also be developed with features that support independent, collaborative, and curriculum-integrated learning.

In the scope of the Cosmetology Education Program, learning challenges are not only limited to mastering theory, but also to practical skills that require visual, demonstrative, and applicable understanding. The materials taught in this field are dynamic, following the ever-evolving beauty industry trends. Therefore, learning media are needed that are able to provide relevant, up-to-date, and accessible content at any time. Unfortunately, many educational institutions still rely on conventional libraries and printed learning media that are less responsive to changes in the times and student needs.

The Makeup Education Study Program is a study program that teaches makeup science from theory to practice, in its learning it uses many terms adopted from foreign languages. Based on the results of a questionnaire distributed to students of the Makeup Education Study Program, Medan State University, Stambuk Class of 2023, it was seen that 87% of students had difficulty in distinguishing terms that were often used in learning, especially words adopted from foreign languages. As many as 75% of students agreed that this often caused differences in perception in learning communication. And based on the results of the questionnaire distribution, students strongly agreed that there was a makeup learning dictionary that could unify students' perceptions regarding vocabulary that was often used in learning. Based on the results of the needs analysis distributed to students, students were interested in new learning resources that could help learning, namely a dictionary in digital form that could be accessed via mobile phones because students were active mobile phone users. Based on the questionnaire distributed to students of the Makeup Study Program, it was seen that 89% of students spent 6-9 hours a day. Activities carried out include playing games, listening to songs, playing social media. Based on this, the author is interested in developing a web-based digital library to support learning in the make-up education study program, in order to align student perceptions of the terms used in learning. The dictionary to be developed utilizes the Artificial Intelligence (AI) feature based on Augmented Reality (AU) which can directly visualize each vocabulary contained in the web-based digital library that will be developed and can be accessed via students' mobile phones to utilize the most frequently used technological updates by students.

Web Based digital library is an application that produces various information that can be useful to support the process of translating a word or sentence effectively and efficiently. A web based digital library is a dictionary where the data is in digital form and can be accessed through various different media (Nesi, 2009: 458). Compared with printed dictionaries, digital dictionaries provide a wider range of lexical information. Laufer and Hill (2000: 58) suggest that the high speed and easy access of digital dictionaries encourages students who are learning a language to frequently use digital dictionaries in the vocabulary learning process. Students learning a language will continue to use digital dictionaries. Because they realize that when using a web based digital library increases the possibility of learning words that they don't already know and understand.

Electronic dictionaries can be divided into two different types, including: 1) Online electronic dictionaries. These dictionaries are available on websites which are also known as internet dictionaries (Al-Rabi'I in Omar and Dahan (2001), This dictionary can be used directly via the internet. Some of these dictionary websites can be accessed for free and some websites are paid. The advantage of using this dictionary is that it can be used in various places as long as there is an internet connection. However, sometimes it takes a lot of time if the internet connection is busy or interrupted. The advantage of using this

dictionary is that it can be used in various places as long as there is an internet connection. However, sometimes it takes a lot of time if the internet connection is busy or interrupted. 2) Offline electronic dictionary This dictionary is available in compact disc (CD) form. This type of dictionary can be used with a computer or smartphone. The advantage of using this type of dictionary is that users are free from internet connection problems and the disadvantage is that it requires expensive equipment to access or use it. 1) The Importance of Dictionaries Hodi Ali (2012: 3) states, dictionaries are important tools in education that play an important role in various language learning processes including reading comprehension and learning as well as understanding vocabulary. Nation (2008: 98) suggests that a dictionary will really help students in three main ways, by using a dictionary students understand the words students find when reading and listening, find the words students need to speak and write, and to remember the vocabulary. Therefore, a dictionary is a tool that can help students understand reading skills. Reading will be very interesting if students can understand what they read, and this happens when dictionaries play an important role as a means to facilitate students in reading. Students will be more successful in using dictionaries for a wider range of tasks including reading than speaking, because speaking requires more information concepts, which include understanding idioms, grammar, collocations, synonyms and lexical phrases. 2)Advantages and Disadvantages of Electronic Dictionaries In this era of technological advances.

The development of electronic dictionaries is also increasingly rapid and numerous. another studies also suggest such several advantages of using electronic dictionaries in language, including: improving student's learning with independent way, easy access to oral and written translations from many languages, speed of use, increasing recognition of word forms, increasing recognition of word meanings, consolidation of meaning, words, improving reading comprehension, increasing vocabulary acquisition, increasing positive attitudes towards vocabulary learning, designing effective vocabulary learning, achieving great in vocabulary tests, also learning vocabulary in authentic texts. It often happens when students use electronic dictionaries in the classroom, electronic dictionaries can also be very annoying to students when students use electronic dictionaries in class. Based on the description above, this electronic vocabulary and pronunciation dictionary was developed to include vocabulary and its meaning as well as adding audio pronunciations of the vocabulary. This electronic dictionary was developed and is available in online form which can be accessed via the website and is also available offline in file form which can be accessed using a laptop/computer and smartphone.

LITERATURE REVIEW
Web Based Digital Library

A digital library is an information system that provides various sources of information in digital form and can be accessed online via the internet network. According to Purwono (2018), a web-based digital library is an evolutionary form of a conventional library that utilizes information technology to provide faster, broader, and more flexible access to information. Digital libraries allow users to access e-books, journals, videos, interactive modules, and other documents anytime and anywhere. The use of web-based technology strengthens the accessibility and efficiency aspects, because users are no longer limited by the physical space and operating hours of the library. According to Handayani & Prasetyo (2020), a web-based digital library system designed with a user-friendly interface and interactive features will improve the user experience in accessing and utilizing learning resources optimally.

Digital Based Learning Media

Learning media is anything that can be used to convey messages or learning information. In the context of digital-based education, learning media not only functions as a teaching aid, but also as a platform that supports independent and interactive learning. According to Arsyad (2019), digital media such as e-learning, video tutorials, and digital libraries have a strategic role in creating a flexible learning environment and supporting the diversity of student learning styles.

In a study by Sari et al. (2021), it was stated that the use of information technology-based learning media can increase student engagement and learning outcomes. The integration of digital media with the learning system allows for personalization and enrichment of materials that are relevant to the needs of students.

Cosmetology Education Programs

The cosmetology education program is a program of expertise that focuses on the theory and practice of beauty care, covering aspects of skin, hair, nails, makeup, and cosmetic technology. Learning in this program requires access to visual and technical materials that are up-to-date and applicable. According to Susilawati (2021), the limited learning resources in printed form are often unable to meet the need for materials that change rapidly following beauty industry trends. Literature from Dewi & Kartika (2022) shows that cosmetology learning will be more effective if supported by interactive media such as demonstration videos, the latest cosmetic product catalogs, and scientific journals in the field of dermatology and beauty. Therefore, the availability of a web-based digital library is important to provide access to diverse and up-to-date references.

Web Based System Development in Education

The development of web-based learning systems is one of the digital transformation strategies in the world of education. System development models such as ADDIE (Analysis, Design, Development, Implementation, and Evaluation) are often used in designing and evaluating digital learning media. According to Sadiman et al. (2020), the web-based system development approach must consider aspects of user needs, ease of navigation, relevant content, and ongoing technical support. Several studies, such as those conducted by Rachmawati & Nugroho (2020), show that the development of web-based digital systems in campus environments can increase learning efficiency, expand the reach of information, and support academic activities as a whole.

METHOD

This research is an R&D research using the ADDIE model. This model was chosen because it is systematic and flexible in developing technology-based learning media. The ADDIE model consists of 5 stages, namely analysis, design, development, implementation and evaluation (Januszewski & Molenda, 2008). This research was conducted at the Makeup Education study program, Medan State University in the even semester of the 2022/2023 academic year. The object of the research is a web-based digital library. The approach used is mixed methods, namely qualitative at the initial analysis and evaluation stage, and quantitative at the validation and product effectiveness testing stage.

The development stages using the ADDIE model are: 1) Analysis of student and teacher needs as well as curriculum and learning needs; 2) Design, compiling materials, formulating media storyboards, and compiling instrument grids used to obtain data; 3) Development, namely developing media and validating material experts and media experts; 4) Implementation, namely conducting trials on make-up students to obtain responses from the use of media; and 5) Evaluation is carried out at each stage of development (formative and summative tests). In this study, the instruments used were student and teacher needs questionnaires, expert validation questionnaires, and student trial questionnaires. Measurements were carried out using a Likert scale with a scale of 1-5, each answer being given a score between 1 and 5 (Sugiyono, 2020).

Table 1. **Likert Scale Score**

Answer	score
Strongly agree	5
Agree	4
Disagree	3
Don't agree	2
Strongly Disagree	1

Source: (Riduwan, 2016)

The results of the assessment of media experts and material experts are in the form of quantitative data which are then analyzed again using descriptive data. Analysis of the calculation results is carried out using a percentage using the formula:

$$Percentage\ (\%) = \frac{Total\ scores\ obtained}{The\ ideal\ score\ sum\ of\ the\ entire\ system} \times 100\%$$

The calculation results based on aspects are concluded with predetermined criteria, namely:

Table 2. Scoring category

| No	Intervals	Category
1	81% - 100%	Strongly agree
2	61% - 80%	Agree
3	41% - 60%	Disagree
4	21% - 40%	Don't agree
5	0% - 20%	Strongly Disagree

Source: (Riduwan, 2016)

RESULTS AND DISCUSSION

Makeup Education requires the provision of practical and easily accessible learning resources to support students' technical and aesthetic skills. However, in practice, the availability and access to learning references in the field of Makeup are still relatively limited, both in terms of quantity, media variety, and access range. Teaching materials are still mostly delivered conventionally through printed books or oral explanations, so they are not yet fully able to support the dynamic and digital-based independent learning needs of students. Web-based digital libraries not only store information in various formats (text, images, videos, etc.), but also allow fast access, efficient search of materials, and collaboration between users. In the context of learning Makeup, digital libraries can contain various sources such as makeup dictionaries, makeup tutorials, hair styling techniques, beauty e-books, and even applicable demonstration videos.

The development of web-based digital library media was developed using the ADDIE development model with 5 stages, namely analysis, design, development, implementation, and evaluation. The analysis stage was carried out by analyzing the needs of students, teachers, and learning needs. Based on observations made, it is known that there is a lack of learning media for make-up, especially those containing important terms in make-up, so that students often do not understand make-up terms. In addition, students tend to search for assignments and learning information on the internet. Needs analysis was carried out by 32 students and 2 teachers. Based on the results of the needs analysis, it is known that 93% of students and 86% of teachers really need media that can help in learning make-up.

The design stage in this study is an important phase that bridges the results of the needs analysis with the technical development process. At this stage, systematic planning is carried out to produce a web-based digital library design that is in accordance with the learning objectives, user needs, and characteristics of the Makeup Education Program. At this stage, the formulation of learning objectives and initial design is carried out, namely the design of learning content that is in accordance with the curriculum and the needs of the makeup study program. In addition, the design of an aesthetic and user-friendly interface (user interface) and user experience (user experience) is also carried out. At this stage, the preparation of instruments for the validation and product testing stages is also carried out. The instruments are in the form of expert validation questionnaires (materials and media), user assessment questionnaires (usefulness and attractiveness). The results of this design stage are the main basis for the development stage, with the hope that the final product can truly answer the learning needs in the field of Makeup effectively and attractively.
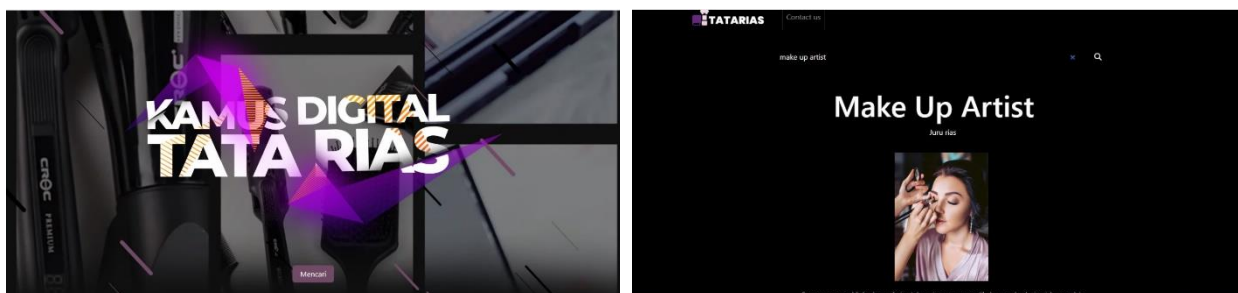
Figure 1. **Digital Library Media Design**

The third stage is the development stage. The development stage is the process of realizing the design that has been prepared at the design stage into a real product, namely a web-based digital library. At this stage, the developer begins to build a system based on the technical and pedagogical specifications that have been designed previously. The product begins to be developed using a combination of web technologies such as HTML, CSS, JavaScript, and PHP, as well as a MySQL database as a storage medium for user data and learning content. After the product is finished being developed, product validation is carried out. Media products are validated by material experts to assess the content and suitability of the curriculum, while media validation is carried out to assess the appearance and readability as well as information technology (to assess the technical aspects and security of the system). Each expert provides an assessment using a validation questionnaire instrument, as well as suggestions and input for product improvement. Validation data are analyzed quantitatively using descriptive statistical techniques in the form of percentages and average scores to determine the level of product feasibility. Validation of material experts was carried out by two experts in the field of make-up. Validation of material experts was used to assess the appropriateness of the content of the material and the suitability of learning objectives. The following are the results of the assessment of material experts:

Table 3. **The validation results by 2 person material experts**

No.	Material Experts		Total
1.	Material Expert 1	86,8%	86,8%
2.	Material Expert 2	86,8%	

From the results of the assessment of material experts, the average assessment of two material experts was 86.8% with a very good category. This shows that web-based digital libraries can be used in makeup learning because they are in accordance with the material and curriculum in Makeup Education. Media expert validation was conducted by two experts in the field of learning media. Media validation was conducted to assess the technical and security aspects of the system on the media. The following are the results of the media expert assessment:

Table 4. **Validation results by 2 person**

No.	Media Experts	Score	Total
1.	Media Expert 1	92,8	94,8%
2.	Media Expert 2	96,8	

The results of the assessment by two media experts obtained an average assessment of 94.8% with a very good category. This shows that web-based digital library media can be used in makeup learning. After validation by material and media experts, improvements were made based on suggestions from the validator, then after revisions, product implementation was carried out. At this stage, the product will be tested on 32

students. The trial was carried out in three stages, namely a small-scale trial of 6 students, a medium-scale trial of 12 students and a large-scale trial of 32 students. The results of the three trials can be seen in the following table.

Table 5. Product Trial Results On Small, Medium And Large Scales

No.	Group Trial	Score	Total
1.	Small Group Trial	80,9%	Good category
2.	Medium Group Trial	86,6%	Good category
3.	Large Group Trial	95,6%	Very Good Category

The results of the small group trial stated that the web-based digital library media for skin beauty in terms of the feasibility of the content and the feasibility of the media display was assessed at 80.9% with a good category. The results of the medium group trial obtained an assessment of 86.8% with a very good category. The results of the large group trial stated that the web-based digital library media in terms of the feasibility of the content and the feasibility of the media display was assessed at 95.6% with a Very Good category. This proves that the media is very suitable for use in learning make-up. Media is said to be very suitable if it provides good aspects of benefits and media functions (Mawaddah et al., 2019).

The evaluation stage is carried out at each stage of the media development process. The evaluation stage aims to assess the suitability of the media developed with user needs. Formative evaluation is carried out continuously at each stage of the development process to identify deficiencies and make improvements. Meanwhile, summative evaluation is carried out at the end of the development process to assess the overall quality of the product. At this summative stage, a validity test is also carried out to ensure that the media produced is declared very suitable for use as a learning tool.

This study aims to develop a web-based digital library as a learning media that supports the learning process of students in the Makeup Education Program. Based on the development stages that follow the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), it can be concluded that the product developed has met the characteristics of effective, interesting learning media, and in accordance with user needs. This media is not only an additional learning resource that is relevant to the needs of the Makeup Program, but also encourages student learning independence through open and interactive access to materials. Digital libraries are able to adapt to the habits of today's students who are very familiar with the use of gadgets and find it difficult to get away from them, making it the right choice as a relevant and easily accessible learning resource (Bestari & Hakiki, 2018).

Web-based digital libraries can help in learning makeup such as makeup dictionaries, makeup tutorials, hair styling techniques, and even demonstration videos that can be applied. Students can easily access materials and collaboration between users. In addition, students are more motivated to read. This can be seen from the number of students who access digital libraries. This statement is in accordance with the results of research (Isnaini, et al. 2024) which states that digital libraries have a significant positive impact on children's literacy. The use of digital libraries can improve the quality of students' high-level thinking (Hikamudin et al., 2019). The results of this study are also supported by the research of Purwanti, R. (2017) which states that there is a significant influence of the high category between digital libraries on increasing the level of student knowledge. This proves that digital libraries can help students in learning both at school and independently.

CONCLUSIONS AND RECOMMENDATION

Based on the results of research and development that have been carried out through the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), it can be concluded that the web-based digital library that was developed has proven to be feasible and effective as a learning medium in the Makeup Education Program.

First, from the results of the needs analysis, it is known that students and lecturers need learning resources that are flexible, easily accessible, and present visual and practice-based content. This encourages the importance of developing digital media that supports the characteristics of Makeup learning. Second, at the design and development stage, the product is designed based on pedagogical principles and learning technology by paying attention to an attractive user interface, easy navigation, and content that is in accordance with the curriculum. The results of validation by experts show that this product has a high level of feasibility, both in terms of content, appearance, and technical aspects. Third, through implementation and limited trials, this digital library is considered to help students learn independently and increase their involvement in the material. The results of validation by 2 material experts obtained a score of 86.8% with a good category. The results of validation by 2 media experts obtained a score of 94.8% with a very good category. Furthermore, in the small group test, a score of 80.9% was obtained with a good category. The medium group trial obtained a score of 86.8% with a very good category and the large group trial obtained a score of 95.6% with a Very Good category. Based on these results, the web-based digital library media is feasible and can be used to support learning activities. Thus, this web-based digital library is not only an alternative source of innovative and interesting learning, but is also able to increase the effectiveness of learning in the Makeup Education Program. Further research is recommended to develop additional interactive features such as online quizzes, video-based practice questions, or Makeup practice simulations to increase user engagement and strengthen the evaluative aspect of learning.

REFERENCES

Arsyad, A. (2019). *Media pembelajaran* (Edisi revisi, cetakan ke-21). Jakarta: Rajawali Pers.

Bestari, M. P., & Hakiki, M. H. (2018). Peningkatan Literasi Sekolah Guru dan Siswa melalui Pengabdian Kepada Masyarakat Perpustakaan STIE Perbanas Surabaya. Pustabiblia: Journal of Library and Information Science, 2(1), 137. https://doi.org/10.18326/pustabiblia.v2i1.137-148

Chandio, A. R. (2021). Evaluating ICT utilization in education administration and

Dainamang, S. A., Praherdhiono, H., & Soepriyanto, Y. (2024). Design of learning python programming for informatics education student using cloud computing technology based on google colaboratory. *Journal of Research in Instructional*, *4*(1), 111–120. https://doi.org/10.30862/jri.v4i1.367

Dar, T. H., Jeelani, S. G. M., Mir, H. A., & Ganaie, S. A. (2017). Use of ICT in IIT and IIM libraries of India. *International Journal of Library & Information Science (IJLIS)*, *6*(1), 1–18.

Hikamudin, M. I., Hartati, T., Agustin, M., Prawiyogi, A. G., & Fauzan, A. (2019). Peningkatan Literasi Perpustakaan Digital Melalui Pembelajaran Keterampilan Berpikir Tingkat Tinggi di Sekolah Dasar. Edulib, 9(1), 12–25. https://doi.org/10.17509/edulib.v9i1.15566

Ihsan, M. S., Husain, P., Fauziah, N., & Alyaminy, I. H. A. Z. (2024). Development of blended learning-based e-learning to improve students' concept understanding in the COVID-19 pandemic era. *Journal of Research in Instructional*, *4*(1), 238–252. https://doi.org/10.30862/jri.v4i1.345

Isnaini, R., Kurniawan, A., Marjito, M., & Pratiwi, V. U. (2024). Perpustakaan Digital Meningkatkan Literasi Dongeng pada Siswa Sekolah Dasar. *Jurnal Pendidikan*, *33*(2), 525-536.

Januszewski, A., & Molenda, M. (2008). *Technology: A Definition with Commentary*. Lawrence Erlbaum Associates

Junaedi, A., & Ramadhan, M. R. (2021). Perancangan perpustakaan digital berbasis website. *Repository Universitas Sriwijaya*. Management during the COVID-19 outbreak in Pakistan: An empirical review. *Journal of Research in Instructional*, *1*(2), 81–94. https://doi.org/10.30862/jri.v1i2.15

Mawaddah, W., Ahied, M., Hadi, W. P., & Wulandari, A. Y. R. (2019). Uji Kelayakan Multimedia Interaktif Berbasis Powerpoint Disertai Permainan Jeopardy Terhadap Motivasi Belajar Siswa. *Natural Science Education Research (NSER)*, *2*(2), 174–185. https://doi.org/10.21107/NSER.V2I2.6254

Nwafor, S. C., Ibe, F. N., & Muoneke, N. M. (2022). Optimizing information and communication technology applications in chemistry learning. *Journal of Research in Instructional*, 2(2), 151–162. https://doi.org/10.30862/jri.v2i2.92

Purwanti, R. (2017). Pengaruh Perpustakaan Digital dan Gerakan Literasi Sekolah sebagai Sumber Belajar terhadap Peningkatan Pengetahuan Kewarganegaraan (Civic Knowledge) Peserta Didik (Studi Korelasional di Sekolah Menengah Atas Negeri 4 Bandung). Universitas Pendidikan Indonesia

Purwono, A. (2018). Pengembangan perpustakaan digital untuk mendukung pembelajaran berbasis TIK. *Jurnal Ilmu Informasi Perpustakaan dan Kearsipan*, 20(2), 105–112.

Rachmawati, R., & Nugroho, H. (2020). Pengembangan sistem informasi berbasis web untuk layanan akademik. *Jurnal Teknologi Informasi dan Ilmu Komputer (JTIIK)*, 7(1), 35–41.

Riduwan. (2016). *Skala Pengukuran Variabel-Variabel enelitian*. alfabeta.

Sadiman, A. S., Rahardjo, R., Haryono, A., & Rahardjito, A. (2020). *Media pendidikan: Pengertian, pengembangan, dan pemanfaatannya*. Yogyakarta: PT Raja Grafindo Persada.

Sari, R. N., Putra, R. P., & Dewi, S. R. (2019). Pelatihan membuat media pembelajaran interaktif berbasis teknologi informasi. *Jurnal Abdimas Teknologi*, 2(2), 22–29.

Sugiyono. (2020). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta

Susanti, M. (2017). Hubungan Intensitas Pemanfaatan Perpustakaan Terhadap Hasil Belajar Maha- siswa: Study Kasus pada UPT Perpustakaan Universitas Muhammadiyah Bengkulu.

Susilawati, E., Kusnandar, & Nurhayati, A. S. (2021). Pemanfaatan konten digital pusat sumber belajar (PSB) pada sekolah rintisan penerima bantuan perangkat PSB. *Jurnal Inovasi Pendidikan dan Teknologi Pembelajaran*, 3(1), 44–52.

Tabrani, M., & Sopandi, R. (2022). Penerapan Metode Waterfall Pada Sistem Informasi Perpustakaan Desa Pebayuran Kabupaten Bekasi. 11(1).

Wardani, I., Fikri, M., & Maulana, M. F. (2023). Dawatuna : Journal of Communication and Islamic Broadcasting Model Kerjasama Antar Perpustakaan Umum Dalam Negeri Dawa- tuna : Journal of Communication and Is- lamic Broadcasting. 3, 364–372. https://doi.org/10.47476/dawatuna.v3i2.2485