



## **Development of Website-Based Stunting Prevention Educational Media Services (Case Study: UPT Puskesmas Tirto Pekalongan)**

**Dinita Kusumasari\*, Egia Rosi Subhiyakto**

Faculty of Computer Science, Universitas Dian Nuswantoro Semarang, Jl. Imam Bonjol No 207 Semarang 50131, Central Java, Indonesia

\*[111202013038@mhs.dinus.ac.id](mailto:111202013038@mhs.dinus.ac.id)

**Abstract.** UPT Puskesmas Tirto is a public health center located in the West Pekalongan sub-district that provides maternal and child health poly services. This poly provides educational services related to the problem of stunting in children through Posyandu activities. However, providing educational services is less effective and efficient because some parents do not have much time to attend counseling so information is not conveyed properly. This research aims to optimize the provision of educational services to parents, prospective mothers, and young women through the use of information technology by developing a website-based stunting prevention educational media service using the ReactJs framework. The development process of this research is carried out by prototyping method. Based on the results of testing using the Blackbox method, it shows that the main features such as nutrition check services, consultation services with Puskesmas nutritionists, and literacy services in the form of articles in the application can run well according to their functions in providing stunting prevention information with 100% results.

**Keywords:** Website App, Educational Media, Stunting Prevention, Prototyping, React Js

*(Received 2024-02-29, Accepted 2024-03-05, Available Online by 2024-03-09)*

### **1. Introduction**

Child stunting is one of the health problems that has not been resolved in several countries including Indonesia. In the Central Java region, especially in Pekalongan City, stunting is a serious health problem in children and has not been resolved optimally. This was mentioned in the statement of the Head of Population Control and Family Planning of the Social and Family Planning Agency, who stated that the prevalence rate of child stunting in the Pekalongan City area still reached 23.1% in 2023 [1] considering that the national stunting prevalence standard targeted by 2024 must be below 14% [2] and set by WHO must be below 20% [3].

Based on the results of direct interview observations with one of the maternal and child health clinic officers of the UPT Puskesmas Tirto Pekalongan City, many factors can influence the incidence of stunting in children, this can usually be influenced by several internal factors, including children who

are born from anemic or malnourished mothers, low-calorie intake and nutrition in mothers and children. Then external factors, it is caused by poor parenting patterns, lack of knowledge about basic vaccinations in children, and low levels of knowledge and awareness of parents regarding stunting. Maternal and child health clinic service officers have taken several actions to suppress the internal and external factors that cause stunting in children. One of them is by providing free educational services to parents through counseling related to stunting in children. This educational service is routinely held every month complete with counseling with midwives, nutrition officers, and local Posyandu cadres. However, in reality, there are accessibility constraints faced by parents in attending conventional counseling activities such as busyness and time constraints so that they do not get information about stunting prevention provided during counseling activities. In addition, educational counseling that targets adolescent girls at school is less effective due to limited time and space. This is certainly a serious concern because knowledge about anemia and malnutrition is a basic thing that must be considered in adolescent girls so that later they do not give birth to children with stunting conditions [4]. The findings of these problems can be the basis for the need to optimize stunting prevention education services.

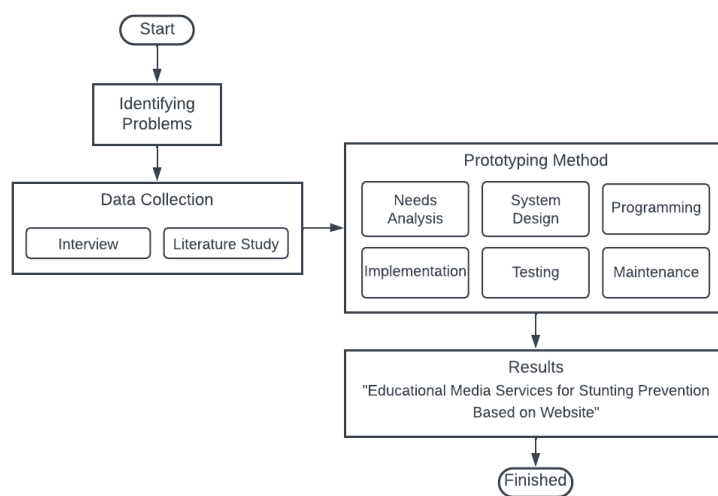
To optimize stunting prevention education services, an update is needed by utilizing technology [5] in the form of educational media services [6] so that information about the chain of stunting problems is conveyed to parents and adolescent girls who will become prospective mothers [7] [8]. The selection of the *website* as a medium for digitizing the delivery of information and education provides a solution because users have the freedom to access it anytime and anywhere through the *browser* on Android and *iOS* devices [9]. Digitalization in this study is defined as the process of transforming health education services from conventional forms to be more interactive and integrated with health workers, to provide convenience and more reliable information for users [10].

Some relevant previous research related to the development of health education service applications includes research [11] that provides KIA (Maternal and Child Health) book education services based on Android applications, with this application making it easier for health cadres to provide health assistance to pregnant women by providing information related to stunting, nutrition-related information, body mass index check calculators, and immunizations. However, some things are lacking in this study, namely the absence of an online counseling system that facilitates the educational assistance process. Furthermore, research [12] developed a service that makes it easier for health workers to monitor the growth data of children affected by stunting. This research only focuses on collecting data on children who are stunted so it does not provide educational features such as article features on stunting prevention. Other research [13] built an android-based health application to facilitate monitoring and prevention of stunting through data inputted by parents. The application developed in this study has been successfully tested on Android version 7 nougat but it is still unknown whether it can be compatible with the latest version of Android. In addition, this research is also not equipped with access to information about stunting and a consultation system so it does not provide educational and interactive content. The development of health education service applications in previous studies has made an important contribution to maternal and child health. However, there are still shortcomings that need to be considered, such as the development of features that specifically focus less on providing educational services on stunting prevention and the absence of interactive features such as online consultations with health workers. In addition, the Android application developed has limitations in accessibility and compatibility with certain specifications.

Seeing the existing problems and shortcomings of previous research, this research was conducted to complement these shortcomings. This research aims to develop a *website-based* stunting prevention educational media service application. This *website* application provides broad accessibility through a digital platform by providing free educational services in the form of access to articles about stunting, body mass index checks on children, and consultation services via *WhatsApp* with Puskesmas nutrition officers so that parents and prospective mothers can access information related to stunting prevention education anytime and anywhere according to their needs, which may not be met by conventional counseling methods. Thus, this web-based approach is expected to provide a more effective solution in overcoming the limitations of stunting prevention education.

## 2. Research Methods

Application development in this study was developed using the prototyping method. The prototyping method is a process used in software development by involving users directly in the process [14] [15] [16]. User involvement in the software development process aims so that researchers do not misunderstand the system requirements needed by their users [17]. Another goal is that users can monitor each process so that they can understand how the system works that has been created. This is an advantage of the prototyping method compared to other methods such as Rapid Application Development (RAD) or Waterfall [18] [19]. In addition, the use of prototyping methods is very relevant to ongoing projects that require modification because it is responsive to changing user needs [20].



**Figure 1.** Research stages

Figure 1 illustrates the process of research stages that will be carried out in this study. The stages began with identifying problems related to stunting prevention education services at the mother and child clinic that were not optimal. Research data was obtained through direct interviews with 2 nutrition clinic officers from UPT Puskesmas Tirto, and supported by literature studies such as journals, articles, and relevant sources to understand the need to optimize stunting prevention education services. The questions asked to support the research included factors that cause stunting in children, types of educational services that have been provided to parents, prospective mothers, and adolescent girls, and information related to stunting. The next step is to analyze the interview data in the form of audio recordings and convert them into a table of functional requirements for the features to be developed. In the design stage, a system design will be made which includes use case design and system user interface design. The results of this design are then implemented into code using the JavaScript programming language using the ReactJs framework. After successful implementation, the system will be tested using Blackbox, and maintenance is carried out to ensure the application can run as expected.

## 3. Results and Discussion

### 3.1. Planning and Analysis Stage

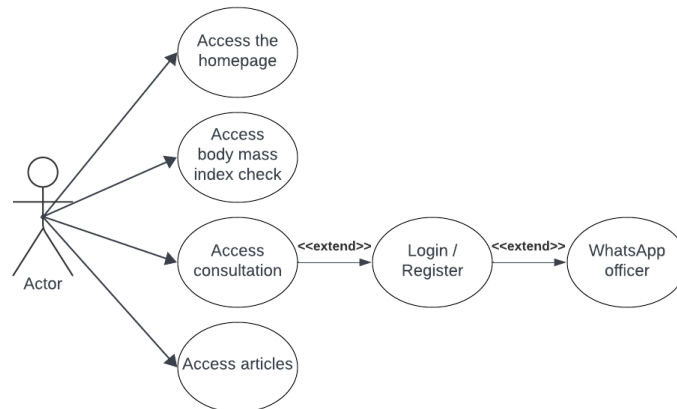
The results of the analysis of system requirements obtained through direct interview data with relevant health center officers and literature studies, show some of the functional requirements required by the system to meet user needs. The functional requirements of the system to be developed can be seen in Table 1. Furthermore, these functional requirements will be the main guide in developing the application website to ensure that the features produced can provide solutions that meet user needs.

**Table 1.** Functional requirements

ReqID	Description	Use Case
FPR01	Display the home page	UC1
FPR02	Display the result of the body mass index check	UC2
FPR03	Displaying consultation with officers	UC3
FPR04	Display a selection of stunting education articles	UC4

### 3.2. System Design Stage

At this stage, the developed website will go through the process of designing a user-friendly interface. This process includes creating user requirements diagrams, and lo-fi, and hi-fi designs according to the system functionality requirements that have been determined from the planning and analysis stages. Where the design process includes determining content such as nutritional information, healthy eating patterns, body mass index checks, and consultation services. The use case diagram in Figure 2 aims to clarify the description of the interaction model between the user and the system, with features such as accessing the home page, checking body mass index, accessing the consultation page after login or registration, and accessing articles related to stunting.



**Figure 2.** Use case diagram

### 3.3. Implementation Stage

The following are the results of the website implementation that has been developed. In Figure 3 there is access to the home page which contains an introduction to the SIPENTING website, data on the prevalence of stunting in children according to SSGI, and an overview of stunting articles. In addition, the home page is also equipped with navigation buttons to access the consultation, nutrition check, and article pages.

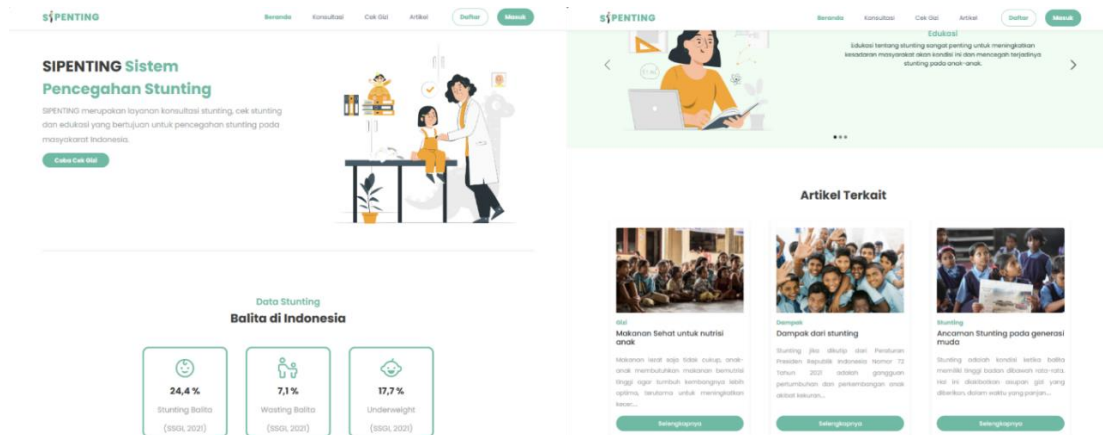


Figure 3. Home page view

Furthermore, Figure 4 displays the results of the implementation of the nutrition check page. On this page, the user can check the nutrition of the child by entering the child's height and weight. The results of the nutrition check are obtained by measuring the body mass index comparison of height and weight of the child.

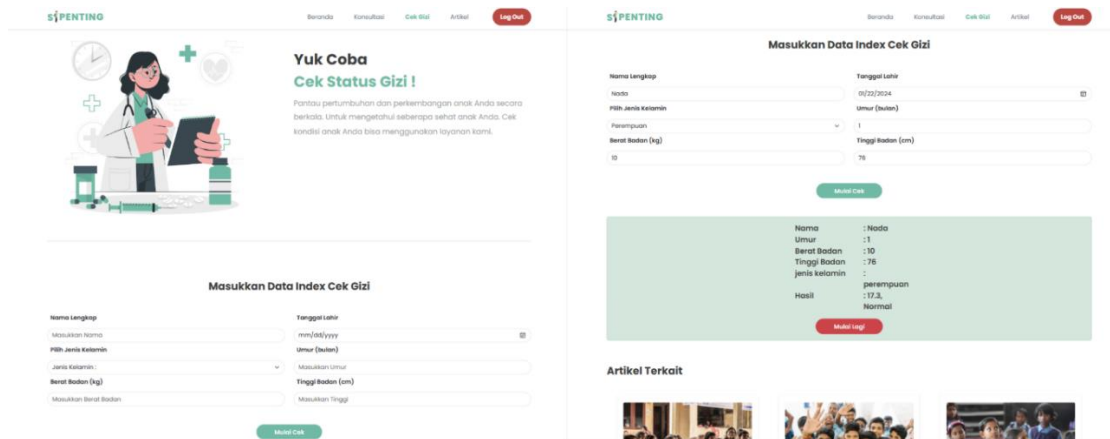


Figure 4. Display of nutrition check page

Figure 5, is a display of the results of the implementation of the consultation page that can be accessed if the user has logged in or registered first as in Figure 6 by entering a username, email, and password. In Figure 6, there is a consultation button which if clicked the user will be directed to the WhatsApp number of the nutritionist of the UPT Tirto Pekalongan City health center who can be contacted if they want to consult about stunting problems in children.

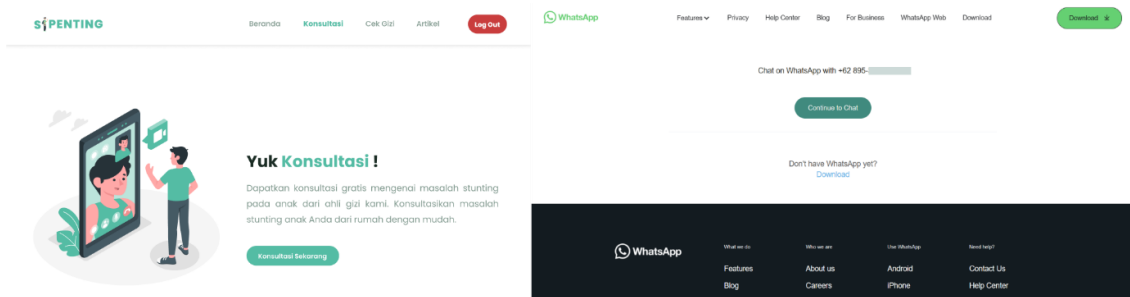


Figure 5. Consultation page view

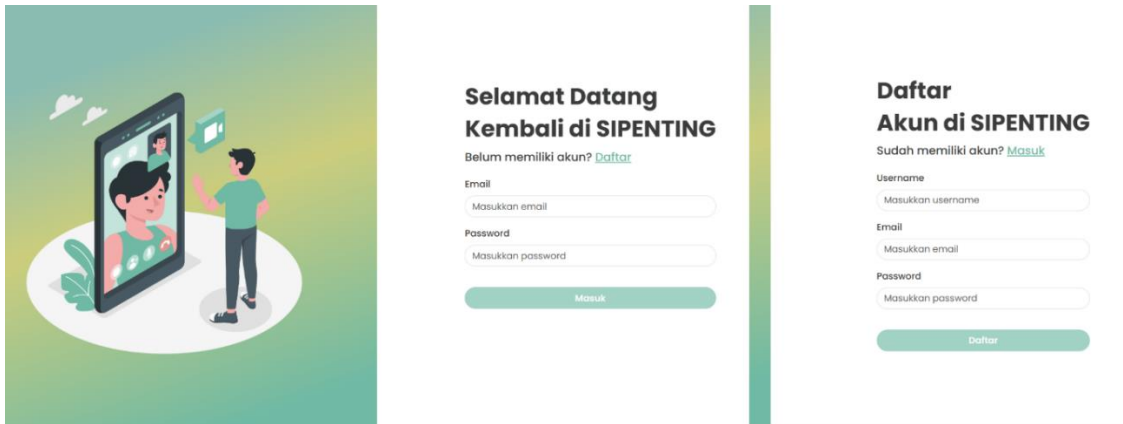


Figure 6. Login and register page view

Figure 7, is a display of the results of the implementation of the article page. On this page, there are several articles provided to improve user literacy and on this page, a button is also provided to filter articles according to the topic the user wants to read. In addition, there is an article detail page to display the content of the article to be read if the user presses the more button.

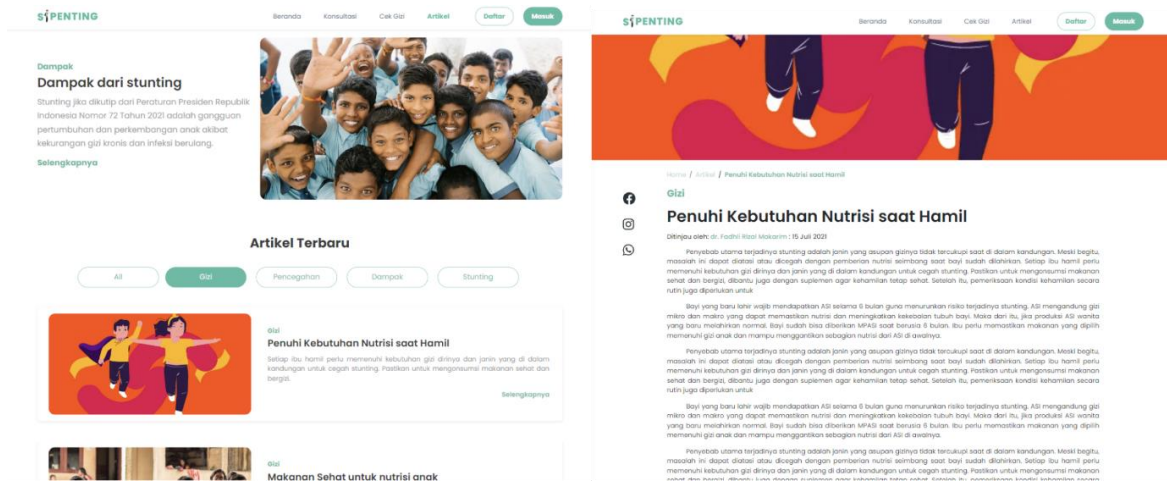


Figure 7. Article page view

### 3.4. Testing Stage

The successfully implemented SIPENTING website requires a test to ensure that the web application runs optimally so that no errors appear on the system. This test is carried out using the Blackbox method by evaluating the input process received and the output given by the system. The test results can be seen in Table 2 below.

Table 2. Blackbox testing results

Features	Test Scenario	Results
Home menu	The user is directed to the home page which contains a brief overview of the website, child stunting prevalence data according to SSGI, and an overview of stunting articles.	Successful
Conduct a nutrition check	Users can check nutrition by entering body mass index data such as the child's name, child's gender, child's age child's weight in kilograms, and height in centimeters.	Successful

<b>Conduct a consultation</b>	Users are directed to the login or register page and asked to complete the data. Furthermore, users can consult by clicking the consultation button, and will be forwarded to the WhatsApp of the Puskesmas officer.	Successful
<b>View article</b>	Users can filter for the topic of the article they want to read and can click the More button to be directed to the article detail page to access the content of the article.	Successful

Based on the results of *Blackbox* testing in Table 2, each feature on the SIPENTING *website* successfully fulfills the test scenario and can run optimally as expected. The implications of the findings in this study indicate that limited access to information obtained by parents on stunting prevention can increase the likelihood of stunting in their children. The use of technology can be a foundation for Puskesmas as a public health service to help parents improve their understanding. Utilizing technology such as websites, can encourage further development in the provision of information on stunting prevention, as well as facilitate online consultations with nutrition officers.

#### 4. Conclusion

Based on the results and discussion, it can be concluded that the implementation of stunting prevention educational media services through the SIPENTING website at UPT Puskesmas Tirto has succeeded in improving the effectiveness and efficiency of delivering information. Successfully developed features such as nutrition checks, consultations, and articles make it easier for parents, prospective mothers, and young women to access stunting prevention information flexibly accompanied by nutrition officers through the consultation feature. The existence of this website is expected to help researchers in the future to be able to continue to optimize and update existing features. This research contributes to the field of health education through the use of information technology. Thus, this research not only provides new insights into innovative approaches to delivering health information but also provides a foundation for the development of broader and more equitable stunting prevention strategies in the community.

#### References

- [1] Tim Komunikasi Publik Kota Pekalongan, “Rembug Stunting, Pemkot Komitmen Turunkan Angka Stunting,” *Pemerintah Kota Pekalongan*, 2023, [Online]. Available: <https://pekalongankota.go.id/berita/rembug-stunting-pemkot-komitmen-turunkan-angka-stunting.html>
- [2] SSGI, “Hasil Survei Status Gizi Indonesia,” *Kementeri. Kesehatan. Republik Indones.*, pp. 77–77, 2023, [Online]. Available: <https://promkes.kemkes.go.id/materi-hasil-survei-status-gizi-indonesia-ssgi-2022>
- [3] S. N. Tarmizi, “Prevalensi Stunting di Indonesia Turun ke 21,6% dari 24,4%,” *Kementeri. Kesehatan. Republik Indones.*, 2023, [Online]. Available: <https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20230125/3142280/prevalensi-stunting-di-indonesia-turun-ke-216-dari-244>
- [4] T. U. Kusuma, “Peran Edukasi Gizi Dalam Pencegahan Anemia Pada Remaja Di Indonesia: Literature Review,” *J. Surya Muda*, vol. 4, no. 1, pp. 61–78, 2022, doi: 10.38102/jsm.v4i1.162.
- [5] A. A. Fauzi *et al.*, *PEMANFAATAN TEKNOLOGI INFORMASI DI BERBAGAI SEKTOR PADA MASA SOCIETY 5.0.*, no. January. PT. Sonpedia Publishing Indonesia, 2023.
- [6] N. Agustian and U. H. Salsabila, “Peran Teknologi Pendidikan dalam Pembelajaran,” *ISLAMIKA*, vol. 3, no. 1, pp. 123–133, Jan. 2021, doi: 10.36088/islamika.v3i1.1047.
- [7] E. FITRIAMI and A. V. Galaresa, “Edukasi Pencegahan Stunting Berbasis Aplikasi Android Dalam Meningkatkan Pengetahuan Dan Sikap Ibu,” *Citra Delima Sci. J. Citra Int. Inst.*, vol. 5, no. 2, pp. 78–85, Dec. 2021, doi: 10.33862/citradelima.v5i2.258.

- [8] A. E. Emaniar *et al.*, “INCREASING MATERNAL KNOWLEDGE IN PREVENTING STUNTING THROUGH COMMUNITY-BASED NUTRITION EDUCATION,” *Adv. Sustain. Sci. Eng. Technol.*, vol. 5, no. 2, p. 0230205, Jul. 2023, doi: 10.26877/asset.v5i2.16252.
- [9] F. Fattah and H. Azis, “Pemanfaatan Website sebagai Media Penyebaran Informasi pada Desa Tonasa Kecamatan Sanrobone Kabupaten Takalar,” *Ilmu Komput. Untuk Masy.*, vol. 1, no. 1, pp. 15–20, 2020, doi: 10.33096/ilkomas.v1i1.771.
- [10] F. Rachmawati *et al.*, *Digitalisasi dalam Perawatan Kesehatan*, vol. 3, no. Juni. WIDINA BHAKTI PERSADA BANDUNG, 2022.
- [11] A. P. A. Gita, N. T. Surya, and A. Setyaningsih, “Aplikasi stunting berbasis android guna mempercepat deteksi dini kejadian stunting,” *J. Public Heal. Innov.*, vol. 3, no. 02, pp. 142–150, Jun. 2023, doi: 10.34305/jphi.v3i02.714.
- [12] H. A. D. S. Silalahi, M. I. Hutapea, and J. Jamaluddin, “DIGITALISASI AKSES SISTEM LAYANAN TERPADU UNTUK ANAK STUNTING DI DINAS PENGENDALIAN PENDUDUK DAN KELUARGA BERENCANA DI KOTA MEDAN BERBASIS MOBILE,” *TAMIKA J. Tugas Akhir Manaj. Inform. Komputerisasi Akunt.*, vol. 3, no. 1, pp. 17–23, Jun. 2023, doi: 10.46880/tamika.Vol3No1.pp17-23.
- [13] A. Hendryani and E. Susana, “Pengembangan Aplikasi Mobile Health Berbasis Android untuk Monitoring dan Evaluasi Stunting,” *J. Sehat Mandiri*, vol. 15, no. 1, pp. 24–32, Jun. 2020, doi: 10.33761/jsm.v15i1.188.
- [14] A. Fiorenza and H. Tolle, “Pengembangan Aplikasi Mobile sebagai Media Edukasi Kesehatan Gigi menggunakan Teknologi Firebase serta Metode Prototyping (Studi Kasus RSGM Universitas Brawijaya),” vol. 7, no. 1, pp. 258–266, 2023, [Online]. Available: <http://j-ptiik.ub.ac.id>
- [15] M. Fadhlil and Annisa Marion, “Penerapan Metode Prototyping Pada Aplikasi Sentra Pelayanan Kepolisian Terpadu Berbasis Web,” *J. Appl. Comput. Sci. Technol.*, vol. 3, no. 1, pp. 127–133, 2022, doi: 10.52158/jacost.v3i1.267.
- [16] S. D. Putra, T. F. Eldiana, and D. Aryani, “Model Pengembangan Aplikasi Mobile E-Dakwah Di Masa Pandemi Covid-19 Dengan Metode Prototyping,” *J. Inf. Syst. Informatics Comput.*, vol. 4, no. 1, pp. 116–121, 2020.
- [17] N. Andini, R. Taufiq, D. Y. Priyanggodo, and Y. Sugiyani, “PENGUNAAN METODE PROTOTYPE PADA PENGEMBANGAN SISTEM INFORMASI IMUNISASI POSYANDU,” *JIKA (Jurnal Inform.*, vol. 7, no. 4, p. 431, Nov. 2023, doi: 10.31000/jika.v7i4.9329.
- [18] V. Adi Kurniyanti and D. Murdiani, “Perbandingan Model Waterfall Dengan Prototype Pada Pengembangan System Informasi Berbasis Website,” *J. Syntax Fusion*, vol. 2, no. 08, pp. 669–675, Aug. 2022, doi: 10.54543/fusion.v2i08.210.
- [19] T. Pricillia and Zulfachmi, “Perbandingan Metode Pengembangan Perangkat Lunak (Waterfall, Prototype, RAD),” *J. Bangkit Indones.*, vol. 10, no. 1, pp. 6–12, Mar. 2021, doi: 10.52771/bangkitindonesia.v10i1.153.
- [20] Y. Wahyudin and D. N. Rahayu, “Analisis Metode Pengembangan Sistem Informasi Berbasis Website: A Literatur Review,” *J. Interkom J. Publ. Ilm. Bid. Teknol. Inf. dan Komun.*, vol. 15, no. 3, pp. 26–40, Oct. 2020, doi: 10.35969/interkom.v15i3.74.