ISSN 2548-6462 (online), ISSN 2088-8740 (print)

DOI: 10.30644/rik.v12i2.747

Designing a website-based information system with the prototyping method for stratification of *Usaha Kesehatan Sekolah* in Boyolali District

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Accepted: 29 September 2023; revision: 13 December 2023; published: 30 December 2023

Abstract

Background: The Indonesian government promotes health at the school level by developing the School Health Program or Usaha Kesehatan Sekolah (UKS). However, the evaluation and monitoring of these programs are still weak. The assessment of the UKS indicators then becomes the basis for the UKS classification, which is referred to as stratification. Therefore, this study aimed to design a UKS stratification system by utilizing school self-assessments.
Method: This study used research and development with the development of the SDLC-prototype model. This research was conducted at three elementary schools, two junior high schools, and two community health centers in Boyolali District. The model was developed in three stages: defining system requirements, designing the systems, and developing prototypes.
Results: The study found that the informants felt it necessary to have the system and were increasingly assisted in developing the UKS with the system. The system was created using the MySQL database. The UKS stratification system is named Sistauks.net, which can be operated from a mobile phone or laptop. Sistauks.net consists of school data entries, the UKS administration and infrastructure, health education, health service indicators, and indicators for fostering a healthy school environment.
Conclusion: Sistauks.net can automatically identify the right UKS stratification for elementary or junior high schools by completing an assessment in the system. In addition, health center staff that hold the UKS program can also see the results of the submissions from their partner schools. Using the system will make analysis results faster and more accurate.

Keywords: prototype, stratification system, school health, SDLC

INTRODUCTION

Indonesia has the world's fourth-largest population of children. Around half of Indonesia's 80 million children are spread across four provinces: West Java, East Java, Central Java, North Sumatra, and Banten. According to UNICEF calculations based on the 2015 National Socioeconomic Survey data, health is the second-biggest problem in child poverty after electricity and water. It has been found that in rural areas, poverty is higher (13%) than in urban areas (7%) (UNICEF, 2020). Studies have found that elementary school students at the age of 5-12 years have the following nutritional status: very short (6.7%), short (16.9%), very thin (2.4%), thin (6.8%), and obese (9.2%). Meanwhile, junior high school students aged 13-15 years have the following nutritional status: very short (7.2%), short (18.5%), very thin (1.9%), thin (6.8%), and obese (4.8%) (1).

Malnutrition can disrupt organ function (2), whereas childhood obesity can lead to noncommunicable diseases in adults (3). Schools are in the best position to provide children with education and health care. The Indonesian government's health promotion strategy is known as School Health Program or *Usaha Kesehatan Sekolah* (UKS), but the evaluation and monitoring of these UKS are still lacking (4).

The three main UKS programs are health education, health services, fostering a healthy school environment, plus UKS management (5). Some studies have found that school health programs can improve the student's health status (6), act as a delivery of reproductive health information (7), and control obesity (8). Healthy school models can improve student health, well-being, and academic achievement (9). If the school health program can function optimally, it is hoped that the student's health will also be achieved optimally.

The school health program can be evaluated and monitored by assessing the achievement of the UKS' main program. The assessment of these indicators then becomes the basis for the UKS classification, which is referred to as stratification. The school health programs are classified into four: Minimum, Standard, Optimal, and Plenary. Based on the results of a preliminary survey conducted during March-April at 18 schools in Boyolali District, it was found that the schools did not know about the UKS stratification, and the information provided by the Boyolali District Health Office did not include this stratification. Boyolali district was chosen as the research location because it was a district in Karisidenan Surakarta with the largest number of elementary and junior high schools (10).

The UKS stratification form is fully detailed in the Ministry of Education's school health program handbook. The form asks questions about the UKS fundamental program and must be filled in manually. Therefore, the data is difficult to collect and requires a relatively long time. As technology develops, it is necessary to innovate to accelerate data collection for the school health program' main program indicators. This research tried to solve the problem by designing a website-based school health program stratification system using the System Development Life Cycle (SDLC) method. This method has very detailed steps in system development to reduce the occurrence of software crisis (11). Therefore, this study aimed to design a school health program stratification system by utilizing school self-assessments.

METHOD

1. The research flow

This research consisted of three stages: first, identifying system requirements; second, designing context diagrams, flow charts, system design, and the school health stratification system interface; and third, compiling databases and draft models/prototypes of the system.

2. The research site

This research was conducted in May-December 2022. The research took place in the Boyolali Regency area with three Elementary Schools and two Junior High Schools designated by the Boyolali District Education Office.

3. The research design

This study involved research and development (12), using qualitative methods to collect information on the needs of system users (19) and the System Development Life Cycle method and prototypes to create the system.

4. Population and sample

The population of this research included Public Elementary Schools (PES) and Junior High Schools (PJHS) in Boyolali Regency. The purposive sampling technique was used to select the sample. The research sample was determined by the following inclusion criteria: 1) School principals or supervisory teachers or field supervisors from the UKS assigned to elementary schools in Boyolali Regency; 2) School principals or supervisory teachers or field supervisors from the UKS assigned to junior high schools in the Boyolali Regency area; 3) The people mentioned above must have experience in the UKS activities. Meanwhile, the exclusion criteria for this research sample were informants from elementary or junior high schools who were unable to provide information until the time when data collection was completed.

The informants of this study were school principals/main coach of UKS/field teacher of UKS at three elementary schools (Banjarsari, Kopen, and Tawengan) and two

junior high schools (Teras and Boyolali). The informants from the triangulation source were those in charge of the school health program at the Teras and the Boyolali Public Health Center (PHC).

5. Data collection technique

This research used primary and secondary data. The primary data were obtained from interviews with school principals, main coach of UKS, and field teacher of UKS. Meanwhile, the secondary data was collected from the school health program stratification forms and program documentation. Triangulation was employed to validate the research data by interviewing those in charge of the UKS programs from the public health centers.

6. Data analysis

The data was analyzed by interpreting the data of the needs of the system and observing whether the system was running according to the procedures that had been designed.

FINDINGS

1. Identifying the needs of the system

This research involved the schools as the main users of *Sistauks.net* and also those in charge of the school health program from the public health centers. The informants' characteristics are described in Table 1. Some informants were involved in the school health programs for over five years. However, most were not involved in school health training and did not know school health stratification. The interviews revealed that many informants did not know the things to be met to achieve a certain school health status.

> *"….We have standard stratification, but we don't know what's the assessment, what's lacking, and what needs to be improved.*" (I1, 52nd)

Several informants also did not know about the school health's main programs that must be implemented at schools.

> *"So far, the school health only treats the sick students by, for example, giving warm tea to those catching a cold during the ceremony. For the junior doctor program, it cannot be maximized because students cannot handle their peers, so teachers must intervene. There are two junior doctors who will be trained in first aid in the future. The school health itself is not optimal because usually, those who are sick are taken to the teacher's room. In the future, it will be changed."* (I9, 26th)

In addition, the informants also said that some of the school health stratification assessments had not been carried out yet. Some were running it but had never used the system. Also, the observations from the school health stratification recapitulation data showed different things from those on the site.

> *"…we are about to do it with Google form. Previously, analysis was conducted in the form of files and documents."* (I12, 47th)
>
> *"Last year, Google form was used, and the data were recapitulated. In the past, before the pandemic, it was analyzed first, and a diagram was made per school."* (I12, 47th)
>
> *"…yes, we have. Optimally, we have criteria, such as in the school canteen. For example, students must not smoke according to clean and healthy living behavior. Yes, we have the criteria and guidelines… if the analysis can be done quickly, it will be better"* (I11, 54th)

The informant hoped that the system would help develop the school health in the future.

> "*We hope that this system will help evaluate the necessary things to improve the stratification*." (I2, 35th)

Based on the interviews, it can be concluded that informants needed to know the indicators that must be met to get certain stratification status, details of activities that must be carried out at the school healths, and faster and more accurate data analysis.

ISSN 2548-6462 (online), ISSN 2088-8740 (print)

Table 1. The informants' characteristics regarding the needs of the system

Initial	Age	Institution	Position	Digitally capable	Length of time at the school health	School health training	Knowing About stratification
I1	52	PJHS "X"	Main coach of UKS	Capable	5 years	Yes	Know
I2	35	PJHS "X"	Vice Principal	Adept	4 years	No	Know
I3	35	PJHS "Y"	Field teacher of UKS	Capable	<1 year	No	Don't know
I4	50	PJHS "Y"	Main coach of UKS	Capable	5 years	No	Don't know
I5	42	PES X"	Field teacher of UKS	Adept	5 years	No	Don't know
I6	32	PES "Y"	Main coach of UKS	Adept	1 year	No	Don't know
I7	24	PES "Y"	Field teacher of UKS	Adept	5 years	No	Don't know
I8	55	PES "Y"	Principal	Capable	>5 years	No	Don't know
I9	26	PES "Z"	Main coach of UKS	Adept	<1 year	Yes	Don't know
I10	23	PES "Z"	Main coach of UKS	Adept	<1 year	No	Don't know
I11	54	PHC X	PIC of school health programs	Capable	>10 years	Yes	Know
I12	47	PHC Y	PIC of school health programs	Capable	4 years	Yes	Know

2. Context diagram

The following is the plan for using the *Sistauks.net* system by school health officers at schools, public health centers, and the health office.

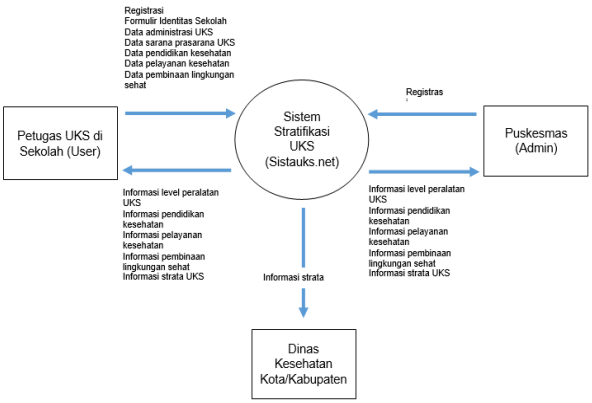


Diagram 1. Plan for the Use and Benefits of the School Health Stratification System (*Sistauks.net*)

3. Flowchart

The process of the *Sistauks.net* system consists of data input by the school related to health education indicators, health services, and fostering a healthy school environment. After that, the data reading process will be carried out by the system. The final stage is the interpretation of the results, which can categorize the school health based on the stratification guidelines in the Guidance and Development Guidebook.

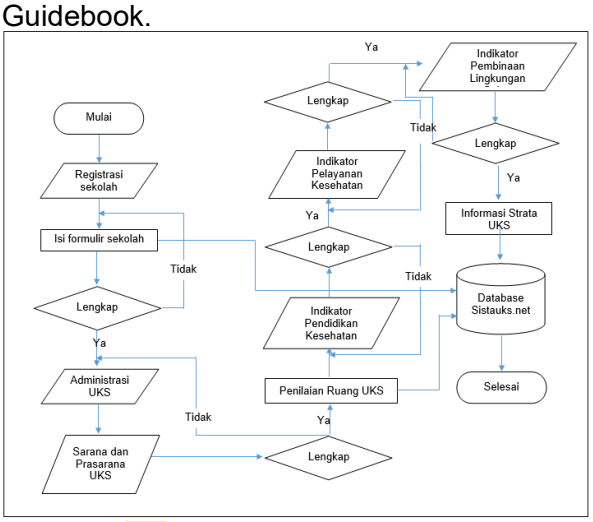


Diagram 2. Operational Flow of the School Health Stratification System (*Sistauks.net*)

4. The interface of Sistauks.net

The interface is presented for viewing on desktop and mobile. The system display on the desktop is shown in Figures 1-4, and on the mobile view, in Figures 5-8. Details of the contents of the system include the register menu, login menu, school identity input, school health administration and infrastructure input, health education input, health service input, healthy school environment development input, and school health stratification results.

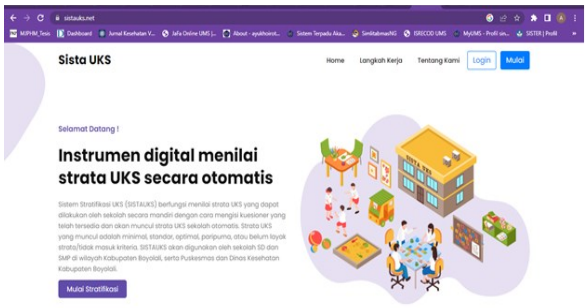


Figure 1. The front page (desktop)

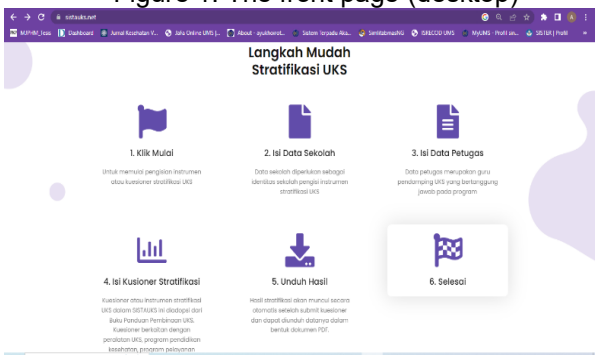


Figure 2. The easy steps for school health stratification page (desktop)

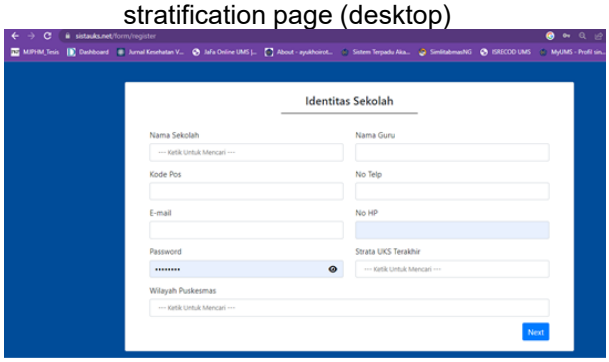
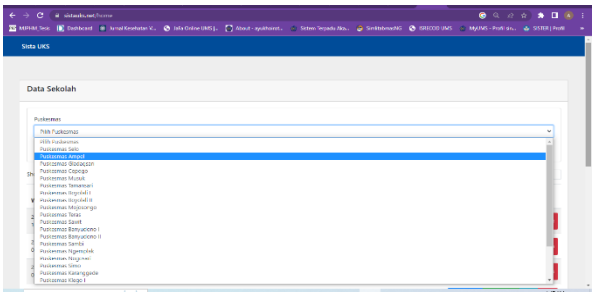


Figure 3. School identity registration page (desktop)



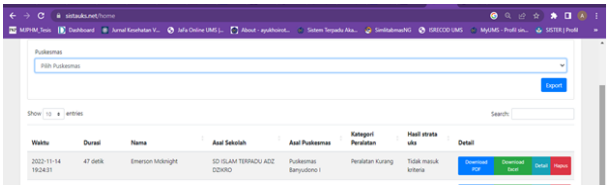


Figure 4. Administration page (desktop)

Figure 5. The front page (mobile)

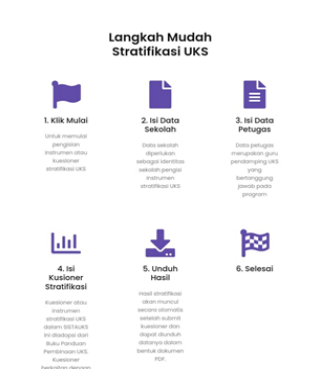


Figure 6. The easy steps for school health stratification page (mobile)

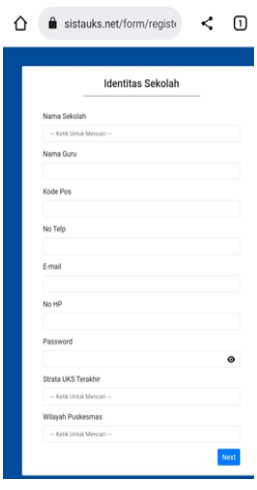


Figure 7. School identity registration page (mobile)

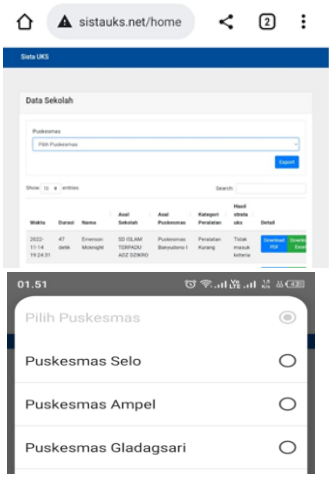


Figure 8. Administration page (mobile)

5. Determining school health stratification

The formula used in this system was based on a guidebook issued by the government (Petunjuk Teknis Pembinaan Penerapan Sekolah/Madrasah Sehat, 2021).

a. Stratification Category

Table 2. The requirements for UKS stratification of high school

	Stratification Categories	Requirements
0	**Does not belong to any category**	**Does not meet any indicators of the minimum stratification criteria**
1	**Minimum Stratification**	**Meets the minimum criteria of health education, health service, and fostering a healthy school environment**
	Health education	Numbers 1-3
	Health service	Numbers 1
	Fostering a Healthy school environment	Numbers 1-11
2	**Standard Stratification**	**Meets the standard criteria of health education, health service, and fostering a healthy school environment**
	Health education	Numbers 1-9
	Health service	Numbers 1-4
	Healthy environment development	Numbers 1-15
3	**Optimal Stratification**	**Meets the optimal criteria of health education, health service, and fostering a healthy school environment**
	Health education	Numbers 1-12
	Health service	Numbers 1-6
	Healthy environment development	Numbers 1-18
4	**Plenary Stratification**	**Meets the plenary criteria of health education, health service, and fostering a healthy school environment**
	Health education	Numbers 1-15
	Health service	Numbers 1-9
	Healthy environment development	Numbers 1-25

b. Stratification category

Table 3. The requirements for UKS stratification of elementary school

	Stratification Categories	Requirements
0	**Does not belong to any criteria**	**Does not meet any indicators of the minimum stratification criteria**
1	**Minimum Stratification**	**Meets the minimum criteria of education, service, and development**
	Health education	Numbers 1-3
	Health service	Numbers 1-3
	Healthy environment development	Numbers 1-11
2	**Standard Stratification**	**Meets the standard criteria of education, service, and development**
	Health education	Numbers 1-9
	Health service	Numbers 1-6
	Healthy environment development	Numbers 1-15
3	**Optimal Stratification**	**Meets the optimum criteria of education, service, and development**
	Health education	Numbers 1-12
	Health service	Numbers 1-7
	Healthy environment development	Numbers 1-18
4	**Plenary Stratification**	**Meets the complete criteria of education, service, and development**
	Health education	Numbers 1-15
	Health service	Numbers 1-10
	Healthy environment development	Numbers 1-25

6. Observing *Sistauks.net*

The informants used the *Sistauks.net* system both on desktop and mobile. The following points are the results of system testing:

a. *Sistauks.net* could be accessed on popular search sites (Google Chrome, Mozilla Firefox, Opera, and Microsoft Edge). The system could not be accessed properly on the default search sites from the device (due to buttons that do not change colors).
b. The informants could register successfully.
c. After registration, the users sometimes experienced problems such as wrong usernames or passwords.
d. Filling in for administration and infrastructure could be easily understood and done. However, the informants encountered some unfamiliar terms.
e. Filling in for indicators of health education, health services, and

fostering a healthy school environment can be done smoothly and successfully. However, not all points had the *choose file* button to upload evidence.

f. The input data were read and interpreted smoothly and in accordance with existing guidelines.
g. The stratification results could be downloaded in Excel and PDF. During the testing, the results were downloaded successfully.

DISCUSSION

Based on a preliminary survey conducted on the main coach of UKS, field teacher of UKS, and the people in charge (PIC) of the school health program at the public health centers, the researchers decided to develop the school health stratification system, *Sistauks.net*. The system was born of the research process, the researchers' thoughts and skills, and thoughts from school health coaches and public health center staff to realize a better school health program. A health system is developed to provide high-quality data for organizational decision-making (13). *Sistauks.net* provides a different assessment view between elementary and junior high schools.

This study found that school health monitoring and evaluation were done using paper-based form and Google forms which were then analyzed manually. In this case, the data collection and analysis will take much longer, and the results also tend to be inaccurate because the potential for errors is greater than when collecting and analyzing using an application or system (14). Manual recording is also vulnerable to data loss and erroneous recording, and the data cannot be accessed simultaneously (15). The final structure of *Sistauks.net* supports schools in knowing the school healths' facilities and infrastructure that must be met and the programs that must be planned and implemented. Apart from that, the public health center staff can also receive information about the school health condition they are in charge of.

Research by Modev et al. (2017) states that a computerized system is not only about inputting data using a computer but includes recording data, distributing data, and printing reports involving computers (16). In this era, schools have to adapt to become a digital school for better management (17,18). According to that definition, *Sistauks.net* is considered a computerized system because all processes starting from recording data, distributing data, and printing stratification results, are carried out using a computer. The schools have been equipped with computer facilities, and they can use the system easily. *Sistauks.net* is an innovation in the school health monitoring and evaluation process. Such a website-based information system will make it easier to process, store and search data (20,21).

CONCLUSION

The identification of the need for this system indicates that the informants will be increasingly assisted in developing the school health with this system. The system was created using the MySQL database. This system can be operated from mobile or desktop smoothly. Sistauks.net consists of school data entries, school health administration and infrastructure, health education indicators, health service indicators, and indicators for fostering a healthy school environment.

The informants also gave some inputs to make *Sistauks.net* better. First, some documents, such as report templates and school health books, should be available for download on the start menu. Second, it is necessary to remove the cancel button on the filling result page so that users cannot change the information that has been input. Also, adding a choose file button for each indicator to upload necessary documents is necessary. It is also suggested to provide stratification results in PDF and a certificate signed by the public health centers. Lastly, it is also recommended to provide additional information in the stratification results file,

such as recommendations for achieving the desired stratification.

ACKNOWLEDGEMENT

The authors would like to thank the Innovation Research Institute of the Muhammadiyah University of Surakarta for providing research funding for the design of this school health stratification system.

REFERENCES

1. Balitbangkes RI. Laporan Riset kesehatan dasar 2018. Lembaga Penerbit Balitbangkes. 2018.
2. Saunders J, Smith T. Malnutrition: Causes and consequences. Vol. 10, Clinical Medicine, Journal of the Royal College of Physicians of London. 2010.
3. Balasundaram P, Krishna S. Obesity Effects On Child Health. StatPearls. 2021.
4. World Health Organization. Making every school a health-promoting school [Internet]. 2021. Available from: http://www.wipo.int/amc/en/mediation/rules
5. Kementerian Kesehatan RI DJKM. Petunjuk Teknis Pembinaan Penerapan Sekolah/Madrasah Sehat. 2021.
6. Prasetyo YB, Hudha AM, Mayangsari WT. Pelaksanaan Program Usaha Kesehatan Sekolah Dalam Upaya Meningkatkan Derajat Kesehatan Pada Anak Usia Sekolah Dasar di Lombok Timur. Jurnal Kedokteran YARSI. 2014;22(2).
7. Budiono A, Sulistyowati M. Peran UKS (Usaha Kesehatan Sekolah) dalam Penyampaian Informasi Kesehatan Reproduksi Terhadap Siswa SMP Negeri X di Surabaya. J PROMKES. 2014;2(1):58–65.
8. Fridayanti DV, Prameswari GN. Peran Uks (Usaha Kesehatan Sekolah) Dalam Upaya Penanggulangan Obesitas Pada Anak Usia Sekolah. JHE (Journal Heal Educ. 2016;1(2):8–14.
9. Langford R, Bonell CP, Jones HE, Pouliou T, Murphy SM, Waters E, Komro KA, Gibbs LF, Magnus D CR. The WHO Health Promoting School framework for improving the health and well-being of students and their academic achievement (Review) Langford. Cochrane Database Syst Rev. 2014;(4):1–31.
10. Dirjen Dikdasmen. Data Sekolah Provinsi Jawa Tengah. Dapodikdasmen. 2021.
11. Dwanoko YS. Implementasi Software Development Life Cycle (SDLC) dalam Penerapan Pembangunan Aplikasi Perangkat Lunak. J Teknol Inf. 2016;7(2):83–93.
12. Mutalazimah, Handaga B, Sigit AA. Aplikasi Sistem Informasi Geografis pada Pemantauan Status Gizi Balita di Dinas Kesehatan Kabupaten Sukoharjo. Forum Geogr. 2009;23(3):153–66.
13. Asparizal, Hafrida L, Nanda EC. Aplikasi Laporan Keuangan Unit Simpan Pinjam Gemilang Jaya pada Desa Pamesi. Lentera Dumai. 2020;11(1):16–23.
14. Supriyanto A, Hartono B. Peran Teknologi Informasi Bagi Kader Posyandu. Peran Teknol Inf Bagi Kader Posyandu Dalam Kegiat Pendekatan Kl.a. 2017;360–5.
15. Kusumadewi S, Kurniawan R, Wahyuningsih H. Implementasi Sistem Informasi Posyandu Berbasis Web dan Android di Desa Bimomartani. JPPM (Jurnal Pengabdi dan Pemberdaya Masyarakat). 2019;3(2):351.
16. Modev AC, Asparizal, Andrianto S. Komputerisasi Barang Inventaris pada Kantor Lingkungan Hidup Kota Dumai. J Inform Manaj dan Komput. 2017;9(1):1–9.
17. Fitria CN, Hermawan HD, Sayekti IC, Selfia KD, Azra A, Prasojo I. Pengembangan Digitalisasi Sekolah Berbasis Website pada Era Komputasi Global di SMP Muhammadiyah. Buletin KKN Pendidikan. 2021;3(1).
18. Zuliyana A, Anggoro DA. Sistem Informasi Akademik Sekolah berbasis Web di SMK Widya Taruna Kabupaten Karanganyar. Emitor: Jurnal Teknik

Elektro. 2020;20(2).
19. Alis Setiyadi N, Setyowati M. Needs Assessment for an Information System to Support a TB Control Program in Indonesia. KnE Life Sciences. 2022;2022:863–71.
20. Pramitasari B, Nurgiyatna N. Sistem Informasi Unit Kegiatan Mahasiswa Marching Band Universitas Muhammadiyah Surakarta berbasis Web. Emit J Tek Elektro. 2019;19(2):59–65.
21. Dewi Putri Y. Pengembangan Sistem Informasi Pengembangan Sistem Informasi Berbasis Web untuk Peningkatan Kinerja Unit Bursa Kerja Khusus SMK Negeri 1 Tanjung Raya. Khazanah Inform J Ilmu Komput dan Inform. 2018;Vol 3(No. 2 Desember 2017):73–9.