Jurnal Mantik, 7 (1) (2023), ISSN 2685-4236 (Online)

Published by:Institute of Computer Science (IOCS)

Jurnal Mantik

Journal homepage: www.iocscience.org/ejournal/index.php/mantik

Revitalizing health service with e-pharmacy: Technology integration in pharmacy service

Dwi Asa Verano[1*], Muhamad Risal Tawil[2], Kraugusteeliana[3], Tanti Widia Nurdiani[4], Diki Prayugo Wibowo[5]

[1*]Teknik Informatika, Universitas Indo Global Mandiri, Indonesia
[2]Politeknik Baubau, Indonesia
[3]Sistem Informasi, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia
[4]Universitas Islam Raden Rahmat Malang, Indonesia
[5]Program Studi Farmasi, Sekolah Tinggi Farmasi Indonesia, Indonesia

A R T I C L E I N F O

Article history:

Received Apr 30, 2023
Revised May 5, 2023
Accepted May 15, 2023

Keywords:

Application of information technology in health services
E-Pharmacy
Information System
Technology integration

ABSTRACT

To improve the quality and accessibility of services, health services must maintain pace with technological advancements. One of the technologies that can be implemented in pharmacy services is an e-pharmacy-integrated medication sales information system. This can accelerate drug data processing, inventory management, and drug sales transactions, as well as make it easier for users to obtain accurate and up-to-date drug information. The integration of technology in pharmacy services with drug sales information systems can enhance the effectiveness and efficiency of pharmaceutical services, as well as the management of drug stock in pharmacies. Through research, it is hoped to identify and analyze functional needs associated with designing and constructing e-pharmacy technology with information systems so that it can provide benefits for optimizing the use of information technology in providing users with easy access to information and enhancing the efficiency and effectiveness of technology-based services. As a consequence of the research, it is anticipated that the integration of technology in pharmacy services with a drug sales information system will yield greater community and health service benefits.

Corresponding Author:

Dwi Asa Verano,
Teknik Informatika,
Universitas Indo Global Mandiri,
Jend. Sudirman No.Km.4 No. 62 Road, Palembang City, South Sumatra 30129, Indonesia
Email: dwiasa@uigm.ac.id

1. INTRODUCTION

Continual and expanding technological advancements in pharmaceutical services utilizing information systems. This is evidenced by the emergence of numerous new technological innovations, such as e-pharmacy applications, the use of blockchain technology for drug inventory management, and the development of drug sales information systems that are integrated with electronic medical records (Ernawati et al., 2022; Ernawati & Azahra, 2021). In addition, technological advancements allow pharmaceutical institutions to collaborate with other health institutions, such as hospitals and clinics. This improves the integration of information systems, making it

simpler to manage patient data and health services as a whole. With the accelerated advancement of technology(Terttiaavini et al., 2020), it is anticipated that the integration of technology [3] in pharmacy services with drug sales information systems and health services [5] will provide greater benefits to society and health services(Fauzi et al., 2023; Febriani et al., 2023).

Health services are one sector that is very vital in human life. Health is a basic need that must be met by everyone to carry out their daily activities productively. However, it cannot be denied that health services in Indonesia are still experiencing many obstacles, especially in terms of access and service quality(Kraugusteeliana, Surjati, et al., 2022). One of these obstacles is related to pharmaceutical services. So it is necessary to revitalize technology-based services(Nurdiani et al., 2022; Risal et al., 2022; Tawil, 2022), Revitalization of health services with e-pharmacy can be closely related to drug sales information systems. This is because the drug sales information system can also be used to improve the quality of pharmaceutical services and improve the accessibility of medicines for the community(Ernawati et al., 2019; Hasanah et al., 2020; Supinganto et al., 2021).

In a drug sales information system, there are several aspects that must be considered, such as drug data processing, inventory management, and drug sales transactions. In this case, the use of information technology can greatly help to speed up data processing(Arsana & Lestari, 2021)and drug sales transactions(Wiratama et al., 2022). By integrating e-pharmacy into a drug sales information system, users can obtain information about medicines more easily and accurately. In addition, e-pharmacy can also assist in monitoring drug supplies and improving the management of drug stocks in pharmacies.

The urgency of research is related to the integration of technology in pharmaceutical services, for example with drug sales information systems, so that there are several benefits from this technology integration which have been conveyed in several studies by(Kraugusteeliana, Subagiyo, et al., 2022; Sudipa, Rahman, et al., 2023)in improving the efficiency and effectiveness of pharmaceutical services. Drug sales information systems that are integrated with e-pharmacy can speed up drug data processing, inventory management(Ismail & Rosadi, 2022), and drug sales transactions. This can reduce patient waiting time and speed up the drug collection process at the pharmacy. Other studies describe technology-based pharmaceutical service quality efforts(Susanna, 2019)with a drug sales information system that is integrated with e-pharmacy, users can obtain information about medicines more easily and accurately. In addition, e-pharmacy can also assist in monitoring drug supplies and improving the management of drug stocks in pharmacies. Other research(Nurdiani & Alie, 2022; Wibowo et al., 2023)explained that in practice, the use of a drug sales information system that is integrated with e-pharmacy can improve drug management in pharmacies. For example, the information system can provide notifications when drugs are running low, so that pharmacies can procure drugs more efficiently(D. A. Verano et al., 2020; VERANO & Ermatita, 2019). This can reduce the risk of running out of stock of medicines needed by patients. As well as research by(Albert et al., 2021; Gebo et al., 2022)which explains that a drug sales information system that is integrated with e-pharmacy can provide detailed data about drug use by patients, so that it can assist in monitoring the effectiveness of treatment and reporting health data.

Based on the urgency above, the research objectives are to identify and analyze the functional needs associated with designing and constructing e-pharmacy technology with information systems so that it can be expected to provide benefits in optimizing the use of information technology in providing users with easy access to information and enhancing the efficiency and effectiveness of technology-based services.

2. RESEARCH METHOD

2.1 Research Flow

The research phases are intended to aid researchers in formulating problems through data collection so that answers can be found for user requirements for e-pharmacy features, particularly drug sales information systems. The research process is depicted in Figure 1.

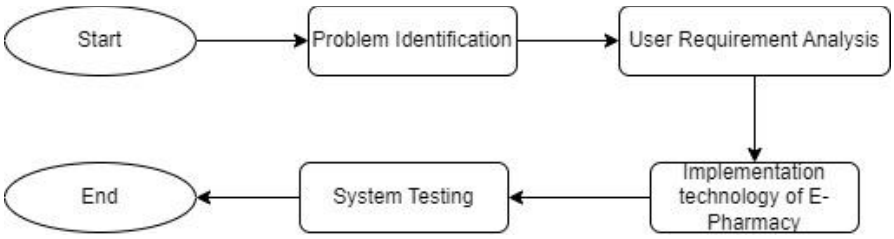

Figure 1. Research Flow

On the basis of Figure 1, it is possible to explain the phases of problem identification based on the literature review of previous research, which explains the urgency in the pharmaceutical industry's application of information technology. Afin de faciliter l'analyse des besoins des utilisateurs et de l'analyse des exigences des systèmes, Karya Agung Farma utilizes the research object so that data pertaining to the business process of the drug sales procedure to patients can be integrated via an information system. In addition, the process of applying e-pharmacy technology, specifically the drug sales information system with system features derived from a requirements analysis. The final step is to evaluate the system using blackbox testing (D. Verano, 2017) to determine whether the system's features align with the requirements analysis.

2.2 Waterfall Method

One of the software development methodologies used in software or application development initiatives is the waterfall technique. In the field of software engineering, the waterfall technique is one of the most used software development methodologies (Mubaroq et al., 2017; Ramadhan et al., 2015; Sudipa, Udayana, et al., 2023). With this approach, the five main phases of software development—requirements analysis, design, implementation, testing, and maintenance into separate sequential steps. Before beginning the following step, each one must be finished in its entirety. The stages of this process are sequential and systematic, starting with requirements analysis and ending with maintenance(Andrei et al., 2019).

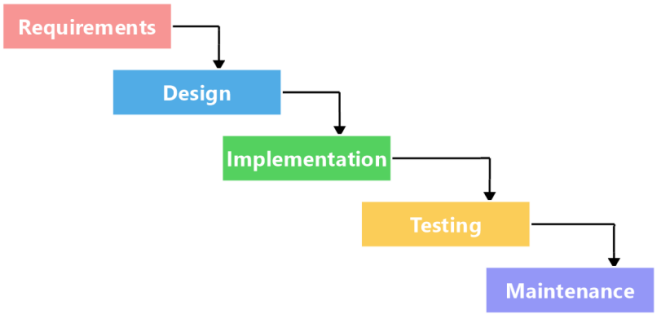

Figure 2. Waterfall Method Phase

According to Figure 1, the first phase, needs analysis, is when the development team analyzes the client's or end user's needs and requirements. This phase is crucial, as it determines the project's success and prevents subsequent development errors. Upon

completion of the requirement analysis phase, the design phase commences. At this juncture, the development team will create a comprehensive plan for the creation of the software, including system architecture and technical specifications. The development team will implement the design and technical specifications created in the previous phase during the implementation phase. At this point, the program code will be written and tested to ensure that it conforms to the requirements. After the implementation phase, the development team will enter the testing phase, whose objective is to ensure that the software functions as anticipated and meets the needs analysis-determined requirements. The final phase of the waterfall method is maintenance, during which the development team fixes errors and adds new features as necessary. This phase will continue for the duration of the software's existence.

3. RESULTS AND DISCUSSIONS

3.1 Needs Analysis

Based on the needs analysis, the needs analysis stage obtains the system features needed by the user to support ease in managing drug sales transactions, so that based on the analysis of user needs in the form of an event list from the sales information system. System event lists are used systematically to facilitate the sequencing of each process on the system that can be performed by the user(Mall, 2018). There are several system features namely:

Table 1. Event List of System Features

No	Event List Name	Description of System Features
1	Login	Used as user login for the user
2	Manage user data	Add User Data, Edit User Data
3	Manage Medicine Master	The process of adding drug data, editing drug data, deleting drug data
4	Managing Drug Types	Add Drug Type Data, Edit Drug Type Data, Delete Drug Type Data
5	Managing Stock and Expired Drugs	Add Stock and Expired Data, Edit Stock and Expired Data, Delete Stock and Expired Data
6	Manage Services	Add Service Data, Edit Service Data, Delete Service Data
7	Manage Orders	Add Order Data, Edit Order Data, Delete Order Data, Send Order Data
8	Manage Sales Transactions	Add Sales Transaction Data, Save Sales Transaction Data
9	Print Sales Report	Daily Sales Report, Monthly Sales Report, Annual Sales Report

3.2 Systesm planning

The system design uses a structured approach, namely Data Flow Diagrams (DFD) which begins with designing context diagrams. Context Diagram describes the entire system and related entities in the Web-Based drug sales information system. The following context diagram can be seen in Figure 2 below.

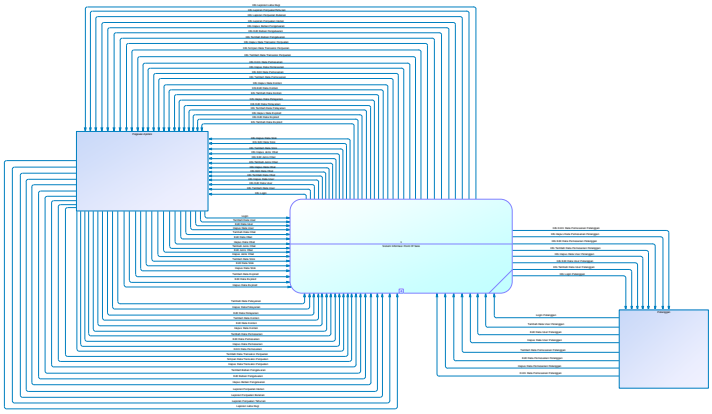

Figure 2. Context Diagram

Based on Figure 2, it can be explained that in the Context Diagram the two entities are related, namely the pharmacy employee entity and the customer. Pharmacy employees are responsible for inputting customer shopping items, processing transactions and managing drug sales reports. Then customers can only see a list of drugs, a list of services, select and order the drug items they want to buy.

3.3 System Implementation

a. Customer User Dashboard Interface Page

In this image is the user interface of the Customer User Dashboard Page. The contents of this page display information on drug content and service content that are best selling at pharmacies. The user interface image of the Customer User Dashboard page can be seen in Figure 3 below.

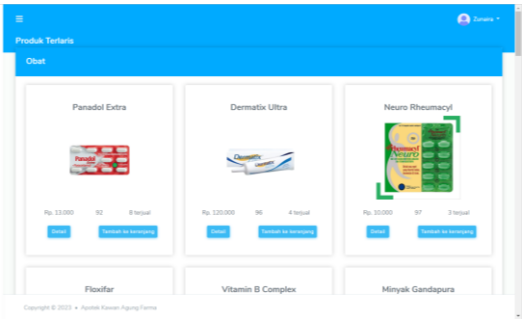

Figure 3. Customer User Dashboard Interface Page

b. Medication Type Interface Page

In this image is the user interface of the Drug Types Page. This page displays the types of drugs that have been inputted by the admin. The user interface image of the Drug Types Page can be seen in Figure 4 below.

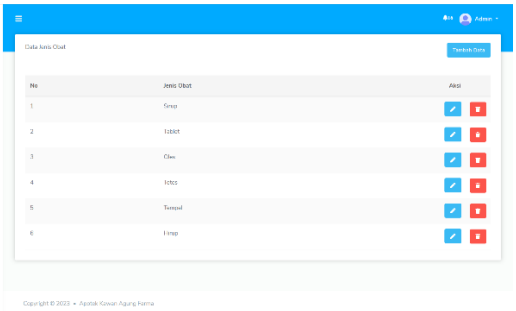

Figure 4. Drug Types Page

c. Medication Purchase Interface Page

In this picture is the user interface of the Drug Purchase Page which is found on the drug master menu. The contents of this page displays a list of drug purchases purchased from suppliers. Pharmacy employees will input data on drug purchases and prices from suppliers in the Drug Sales Point Of Sale system. The user interface image of the Drug Purchase Page can be seen in Figure 4.10 below.

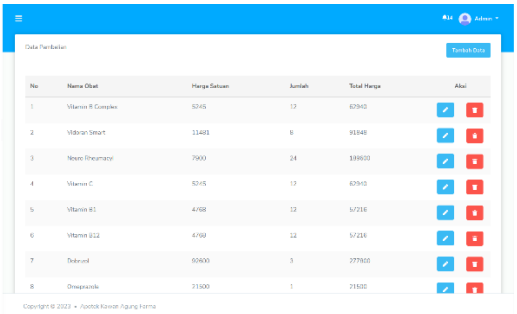

Figure 5. Drug Purchase Page

d. Drug Sales Interface Page

In this image is the user interface of the Drug Sales Page which is found on the drug master menu. The contents of this page displays data on the list of drug sales that will be sold to customers. Pharmacy employees will input drug data and prices into the Drug Sales Point Of Sale system. The drug sales page user interface image can be seen in Figure 6 below.

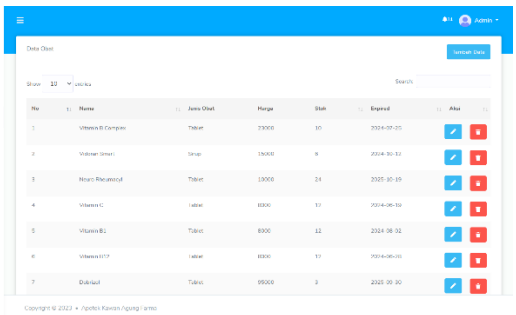

Figure 6. Drug Sales Page

e. Service Interface Page

In this image is the user interface of the Service Page. The contents of this page are a list of services available at the pharmacy. On this page there is also a button to input a new service. The Service Page user interface image can be seen in Figure 7 below.

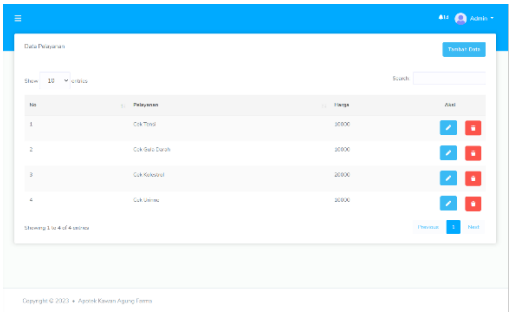

Figure 7. Service page

f. Service Content Interface Page

In this image is the user interface of the Service Content Page. In this image employees can see the service content that has been inputted. The user interface image of the Service Content Page can be seen in Figure 8 below.

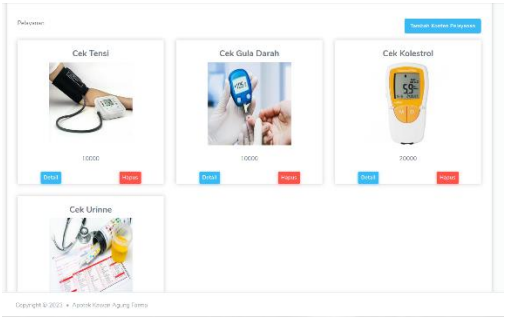

Figure 8. Service Content Page

g. Sales Transaction Page

In this image is the user interface of the Transaction List Page. The contents of this page displays a list of transactions that have occurred. The user interface image of the Transaction List page can be seen in Figure 9 below.

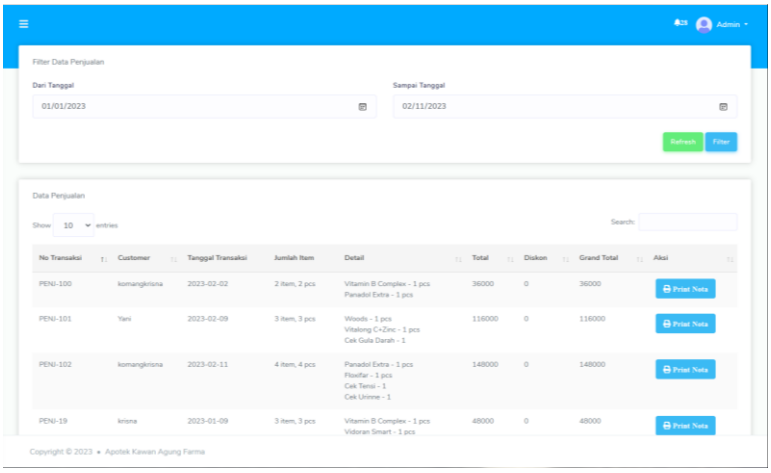

Figure 9. Transaction List page

h. Order Transaction Page

In this image is the user interface of the Incoming Order Page. The contents of this page display a drug or service order form and proof of payment from the customer online. Pharmacy employees will receive orders from that page which is indicated by the appearance of a notification. The user interface image of the Incoming Order Page can be seen in Figure 10 below.

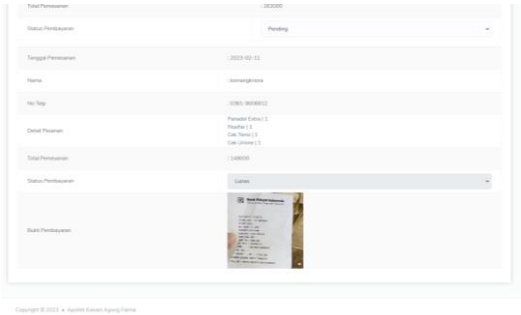

Figure 10. Order Transaction Page

i. Sales Report Page

In this image is the Sales Report Page user interface. The contents of this page display sales revenue per day, month and year, by filtering the desired date, month and year. The Sales Report Page user interface image can be seen in Figure 11 below.

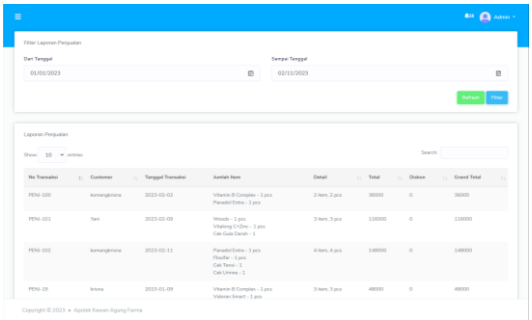

Figure 11. Sales Report Page

3.4 System Testing

The system testing phase uses blackbox testing, which is a testing technique to check the suitability of system functionality whether it is running validly and in accordance with the scenarios that are run on each feature page of the drug sales information system. Blackbox testing can be seen in Table 2 below.

Table 2. System Testing Scenarios

No	Interface Page	System Test Scenario
1	Login	Valid
2	User data	Valid
3	Drug Master Data	Valid
4	Drug Type Data	Valid
5	Drug Stock and Expired Data	Valid
6	Service Data	Valid
7	Order Data	Valid
8	Sales Transaction Data	Valid
9	Sales Report Data	Valid

Based on system testing using blackbox testing is obtainedthe result that all system features have been running successfully and are valid and in accordance with user needs and system requirements.

4. CONCLUSION

The conclusion of the conducted research is that it was successful in identifying and analyzing functional needs and designing and constructing e-pharmacy technology, particularly drug sales information systems, so that it can provide benefits for optimizing the use of information technology in providing users with easy access to information and increasing the effectiveness and efficiency of technology-based services. Based on an analysis of user and system requirements, there are nine primary system features that can facilitate online drug transactions between pharmacies and customers. Using blackbox testing, system testing determined that all system features ran effectively and correctly, in accordance with user needs and system specifications. In order to support the concept of e-pharmacy in the digital era, the contribution of research is to be able to construct an information system with the interaction of medicine sales features to facilitate the pharmacy and ordering to facilitate service to consumers. Suggestions for future research may include a patient registration and queuing system, as well as features for patient users conducting examinations on the doctor on duty at the pharmacy.

REFERENCES

Albert, T., Nugroho, J. A., & Hapsari, R. W. (2021). *Perancangan Ulang UI / UX Website sebuah Perusahaan Farmasi*.

Andrei, B.-A., Casu-Pop, A.-C., Gheorghe, S.-C., & Boiangiu, C.-A. (2019). A study on using waterfall and agile methods in software project management. *Journal of Information Systems & Operations Management*, 125–135.

Arsana, I. N. A., & Lestari, A. S. (2021). Rancang Bangun Sistem Informasi Laporan Keuangan Pada SMP Nasional Berbasis Web. *Jurnal Krisnadana*, *1*(1), 47–56.

Ernawati, K., & Azahra, H. (2021). The Utilization of Mobile-Based Information Technology in the Management of Dengue Fever in the Community Year 2019-2020: Systematic Review. *International Journal of Current Research and Review*, *13*(18), 94–105.

Ernawati, K., Nugroho, B. S., Suryana, C., Riyanto, A., & Fatmawati, E. (2022). Advantages of Digital Applications in Public Health Services on Automation Era. *International Journal of Health Sciences*, *6*(1), 174–186.

Ernawati, K., Widianti, D., Yusnita, Y., Batubara, L., Jannah, F., & Mahardhika, Z. P. (2019). Hubungan Paparan Informasi Dengan Pengetahuan Pengendalian Vektor Nyamuk DBD di

Desa Koper, Kecamatan Kresek, Kabupaten Tangerang. *Jurnal Kedokteran YARSI*, *27*(3), 144–151.

Fauzi, A. A., Kom, S., Kom, M., Budi Harto, S. E., MM, P. I. A., Mulyanto, M. E., Dulame, I. M., Pramuditha, P., Sudipa, I. G. I., & Kom, S. (2023). *PEMANFAATAN TEKNOLOGI INFORMASI DI BERBAGAI SEKTOR PADA MASA SOCIETY 5.0*. PT. Sonpedia Publishing Indonesia.

Febriani, R., Dewantara, R., Kraugusteeliana, K., Sinlae, A. A. J., Widiyawati, W., Ahmad, N., Ariyanti, M., Satria, S., Sulistianto, S. W., & Siregar, Z. H. (2023). *KONSEP DASAR ICT DALAM APLIKASI SISTEM KOMPUTER DAN LAYANAN INTERNET*.

Gebo, A., Aditama, P. W., Sarasvananda, I. B. G., & Permana, I. P. H. (2022). SISTEM INFORMASI LAPORAN KEUANGAN PADA SMK NEGERI 1 ENDE BERBASIS WEB. *Jurnal Krisnadana*, *1*(3), 15–25.

Hasanah, S. U., Wibowo, D. P., & Aulifa, D. L. (2020). Lindungi imunitas masyarakat dengan minuman herbal. *CARADDE: Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 212–218.

Ismail, M. C., & Rosadi, M. I. (2022). Penerapan Algoritma FIFO pada Aplikasi Monitoring Stok Material Berbasis Android di PDKB PT. PLN (Persero) UP3 Pasuruan. *Jurnal Krisnadana*, *2*(1), 257–276.

Kraugusteeliana, K., Subagiyo, A., & Setyawan, F. (2022). Pemilihan Jenis Obat Terbaik Untuk Gejala Batuk Remaja dengan Menggunakan Metode AHP dan ARAS. *JURIKOM (Jurnal Riset Komputer)*, *9*(6), 2172–2182.

Kraugusteeliana, K., Surjati, E., Ausat, A. M. A., Pramono, S. A., & Prabu, H. K. (2022). A Literature Review on the Application of Technology During Covid-19 and Its Relationship to Performance. *International Journal of Artificial Intelligence Research*, *6*(1.2).

Mall, R. (2018). *Fundamentals of software engineering*. PHI Learning Pvt. Ltd.

Mubaroq, A., Wiryasaputra, R., & Verano, D. A. (2017). PENERAPAN ANALISA SWOT DALAM SISTEM PENDUKUNG KEPUTUSAN MANAJEMEN DI MUBAROK RESTO. *Jurnal Informatika Global*, *8*(2).

Nurdiani, T. W., & Alie, R. M. M. (2022). Build a Service Excellence Culture of Pleasure to Customers. *Joong-Ki: Jurnal Pengabdian Masyarakat*, *1*(3), 424–429.

Nurdiani, T. W., Cakranegara, P. A., Indarto, S. L., Terisia, V., & Pakawaru, M. I. (2022). ANALYSIS OF INTERNAL CONTROL AND READINESS OF INFORMATION TECHNOLOGY ADAPTATION IN COOPERATIVES USING COBIT 5 FRAMEWORK. *Jurnal Ekonomi*, *11*(03), 1734–1739.

Ramadhan, K., Astuti, L. W., & Verano, D. A. (2015). Game edukasi tebak gambar bendera negara menggunakan metode Linear Congruential Generator (LCG) berbasis Android. *Jurnal Informatika Global*, *6*(2).

Risal, M., Sudirman, S., Malik, A., Amiruddin, A., & Rongre, Y. (2022). Confirmatory Factor Analysis dan Structural Equation Model Konstruk Perceived Organizational Support pada Karyawan Kawasan Industri Makassar. *Syntax Literate; Jurnal Ilmiah Indonesia*, *7*(3), 1175–1195.

Sudipa, I. G. I., Rahman, R., Fauzi, M., Pongpalilu, F., Setiawan, Z., Huda, M., Kusuma, A. S., Putra, D. M. D. U., Burhan, M. I., & Anzani, Y. M. (2023). *PENERAPAN SISTEM INFORMASI DI BERBAGAI BIDANG*. PT. Sonpedia Publishing Indonesia.

Sudipa, I. G. I., Udayana, I. P. A. E. D., Rizal, A. A., Kharisma, P. I., Indriyani, T., Asana, I. M. D. P., Ariana, A. A. G. B., & Rachman, A. (2023). *METODE PENELITIAN BIDANG ILMU INFORMATIKA (Teori & Referensi Berbasis Studi Kasus)*. PT. Sonpedia Publishing Indonesia.

Supinganto, A., Pramana, C., Sirait, L. I., Kumalasari, M. L. F., Hadi, M. I., Ernawati, K., Staryo, N. A., Suprayitno, E., Utami, K., & Hadi, S. P. I. (2021). The use of masks, as an effective method in preventing the transmission of the COVID-19, during pandemic and the new Normal Era: A review. *Kusniyati and Hadi, Selasih Putri Isnawati, The Use of Masks, as an Effective Method in Preventing the Transmission of the COVID-19, During Pandemic and the New Normal Era: A Review (February 7, 2021)*.

Susanna, D. (2019). sismantik: siswa pemantau jentik sekolah dasar dalam upaya penurunan kasus demam berdarah dengue (DBD). *Jurnal Pengabdian Kepada Masyarakat (Indonesian Journal of Community Engagement)*.

Tawil, M. R. (2022). Adaptasi Alat Ukur Organizational Citizenship Behavior Melalui Analisis Structural Equation Model. *Syntax Literate; Jurnal Ilmiah Indonesia*, *7*(2), 2027–2036.

Terttiaavini, T., Zamzam, F., Ramadhan, M., & Saputra, T. S. (2020). Knowledge Mangement System sebagai Dasar Pengembangan Sistem Informasi Kinerja Dosen. *Jurnal Informatika Global*, *11*(2).

Verano, D. (2017). Assosiasi Rules Dan Moving Average Untuk Memprediksi Persediaan Bahan

Baku Produksi. *Annual Research Seminar (ARS)*, *2*(1), 438–444.

Verano, D. A., Husnawati, H., & Ermatita, E. (2020). Implementation of autoregressive integrated moving average model to forecast raw material stock in the digital printing industry. *Journal of Information Technology and Computer Science*, *5*(1), 13–22.

VERANO, D. W. I. A. S. A., & Ermatita, E. (2019). *Penerapan Model Autoregresif Integrated Moving Average Untuk Memprediksi Stok Bahan Baku Produksi Pada Industri Percetakan*. Sriwijaya University.

Wibowo, D. P., Irmawati, S., Tristiyanti, D., Normila, N., & Sutriyawan, A. (2023). Hubungan Pola Asuh Ibu dan Pola Pemberian Makanan terhadap Kejadian Stunting. *JI-KES (Jurnal Ilmu Kesehatan)*, *6*(2), 116–121.

Wiratama, I. K., Aditama, P. W., Santika, P. P., & Sari, N. P. A. N. (2022). Implementasi Sistem Informasi Inventaris pada Kantor Desa Ketewel. *Jurnal Krisnadana*, *1*(2), 1–10.