



Information System Design Of Kartu Batang Sehat (Kbs) To Provide Public Health Service In Batang District

Mei Erawati¹, Aris Puji Widodo², Farid Agushybana³

¹ Public Health Office, Batang Regency, Indonesia

² Faculty of Science and Mathematics, Diponegoro University, Indonesia

³ Masters of Public Health, Faculty of Public Health, Diponegoro University, Indonesia

Email : meierawati@gmail.com

Article details:

Received: 3th September, 2019

Revision: 6nd September, 2019

Accepted: 10nd September, 2019

Published: 17nd September, 2019



Kartu Batang Sehat (KBS) is regional government programs to provide public health services of health insurance for the poor in the Batang district. However in practice, there are still obstacles such as long process of KBS proposal service, data verification and validation still use manual system, officers had difficulty in checking the KBS applicant data and double membership are still found that resulted in

duplicate medical expenses insurance. This study attempts to design web based information system by using the waterfall method and to measure the quality of information before and after the development of information systems, based on accessibility, conformity, completeness, availability and punctuality. The results of the study will provide information system consisting of a KBS login page feature, the check page of National Health Insurance JKN data, the check page of Integrated Database (BDT) data, KBS request page, confirmation page of KBS request and summary report. The output of KBS information systems are list of new KBS membership, JKN/KBS membership numbered report, KBS report daily services and official statements of KBS. Based on the information quality test, there is 1.31 point difference of average weighted gap before and after of system development. So we can conclude that this system can cope the problem with proven an increase in the information quality.

Keywords: Information system; KBS; Waterfall method; Health insurance; Information quality

To cite this article:

Mei Erawati, Aris Puji Widodo, Farid Agushybana. 2019. "Information System Design Of Kartu Batang Sehat (Kbs) To Provide Public Health Service In Batang District." *The International Journal of Health, Education and Social (IJHES)*: 10–24.



Introduction

Health insurance is one of the five national government guarantee programs to serve public health, which is implemented through a mandatory insurance mechanism and aims to protect all Indonesian citizens in the insurance system (RI, 2004). The legal entity that organizes the health insurance program in Indonesia is the Health Social Security Officerizing Agency (BPJS) (Menkes, 2013). With this health insurance, all Indonesian citizens have a great opportunity to protect their health better without exception of poor people. Because the health of all poor people or Recipients of Contribution Assistance (PBI) will be borne by the government. Although the government is already covering the health of the poor population in Indonesia, in reality there are still many residents who are entitled but have not been included as recipients of contribution assistance (Dwicaksono, et.al, 2012), (Wiseman et al. 2018). The population that is not covered is the responsibility of the regional government (President of the Republic of Indonesia, 2013). Law number 32 of 2004 concerning regional autonomy has also provided an opportunity for regional governments to provide health insurance for the people in their regions (President of the Republic of Indonesia, 2004).

Based on the mandate of Law 32/2004 and the presidential regulation, the Batang District government organizes health insurance for the poor through the *Kartu Batang Sehat (KBS)*. The policy regarding the KBS is regulated in the Regents of Batang District Number 46 of 2017. KBS participants will later be recommended for submission of integration to BPJS in order to obtain the Indonesia Health Insurance Card for National Health Insurance for Recipients of Contribution Assistance in accordance with the mandate of the presidential and domestic ministerial regulations which require local governments to integrate regional health insurance with the Social Security Organizer (BPJS) in the health sector (President of the Republic of Indonesia, 2018), (Minister of Home Affairs, 2018).

Data on participation in public health insurance programs often become a recurring problem in membership officerization process, such as incomplete data identity, incompatible diagnoses and even multiple participation cases as happened in the Palembang City Health Office (Ayu, Diesty, and Ainy, 2009).

Problems that occur after the implementation of KBS include difficulty of officer in checking the data of KBS applicants because the process of filing KBS has not been dealt with systematically. Managing the system manually, which is still using tools such as Microsoft Word and Microsoft Excel, makes the KBS submission process inefficient, JKN data and Integrated Database (BDT) data are not integrated, so officers cannot check applicant data outside BDT which results in dual membership so health insurance cost will be double. The purpose of this research is to design a web-based KBS information system so that it can be accessed through the internet network to support the implementation of KBS services in Batang Regency and to measure the quality of information based on five aspects namely; completeness, ease, suitability, availability and timeliness.



Methods

The location of this research is in Batang Regency with the object of the KBS information system research. The research sampling technique used purposive sampling. The observed subjects were people related to the KBS information system, namely the Head of the Health Resource Section, the KBS service provider in the Health Service and the KBS service provider in the village. The number of samples in this study were 30 respondents.

In this research, the system development method uses the waterfall method with 4 stages: analysis and definition of requirements, the system design stage, the implementation and unit testing stage, and the system integration and testing (Sommerville 2003).

1. Analysis and Definition of Requirements

Analysis and definition of requirements is a stage in the development of software to explore all forms of information from beginning to end in the hope of knowing the problems and obstacles encountered. All software requirements are obtained at this stage, including the use of software. Information is obtained through interviews, surveys or discussions and even literature studies (Jaya and Sundari, 2017). The information is analyzed to obtain documentation of user needs to be used at a later stage. This stage will produce user requirements documents or can be said as data related to the user's wishes in making the system. This document will be the system analysis reference for system development.

2. System Design

System design is done before coding. This stage aims to give an idea of what should be done and how it looks. This stage helps in specifying hardware and system requirements and defining the overall system architecture. This stage focuses on: data structure, software architecture, interface representation, and procedural details (algorithms). This stage will produce a document called software requirements. The document will be used by programmers in building systems.

3. Unit Implementation and Testing

In this stage programming is done. Software design is realized as a series of programs or program units. Coding is a translation of design in a language that can be recognized by computers. Performed by the programmer who will translate the transaction requested by the user. This stage is the actual stages in working on a system. After the coding is complete it will be tested on the system that was made earlier. The purpose of testing is to find errors in the system and then it can be fixed.

4. System Integration and Testing

System Integration and Testing in which individual program units or programs are integrated and tested as complete systems to ensure that system requirements are met. At this stage, a combination of modules that have been made and carried out this test is carried out to find out whether the software made is in accordance with the design and there are still errors or not. This stage can be said to be final in making a system. After analyzing, designing and coding the finished system will be used by the user.

The KBS information system testing is carried out by measuring the quality of information from 5 aspects namely aspects of ease, suitability, completeness, availability, and timeliness. Testing the quality of information using a questionnaire before and after the development of the system. The questionnaire uses a Likert scale with a choice of Score 4 Strongly Agree (SS), Score 3 Agree (S), Score 2 Disagree (TS), Score 1 Strongly Disagree (STS). Data quality information is analyzed by calculating and comparing weighted averages before and after system development.



Results (or Results and Discussion)

The results of this study are explained through the stages of analysis and definition of requirements, as well as system design. The analysis phase and requirements definition include the identification of the KBS service flow and the feasibility study identification, as well as the system design including activity diagrams, use case diagrams and interface design.

1. Analysis and Definition of requirements

At this stage a problem analysis and needs analysis is done by identifying the KBS service flow and identifying the feasibility study at the research location.

a. KBS Service Flow Identification

The KBS service flow identification is obtained from interviews with research subjects. It presented in the flowchart in Figure 1. This flow illustrates the KBS service system that is currently running in Batang District. Starting from the village where every applicant or citizen who will submit KBS comes to the village to request KBS. The KBS applicant verification activities take the form of checking JKN data, and checking BDT data. If the applicant has been registered in JKN data, then the KBS submission is rejected. If the applicant is included in the BDT data, the process can proceed to the Health Office, but if the KBS applicant is not listed in the BDT data, the village official must survey the applicant's house to be photographed as a condition for completing the KBS submission outside the BDT data. Subsequent requirements file is taken to the health office for the applicant's data validation process. If it is valid, the Health Office will produce a KBS certificate. The final stage of this KBS service is the submission of a KBS statement to the applicant and the submission of an integration recommendation to the BPJS to obtain a JKN PBI KIS card. The KBS certificate is only valid for one month from the date of manufacture, then KBS participants who have been integrated into the health BPJS will get a JKN PBI KIS card. The card is obtained a maximum of two months after submitting an integration recommendation to the Health BPJS and will be distributed in stages by the Health BPJS. Figure 1 is an ongoing flow of KBS service

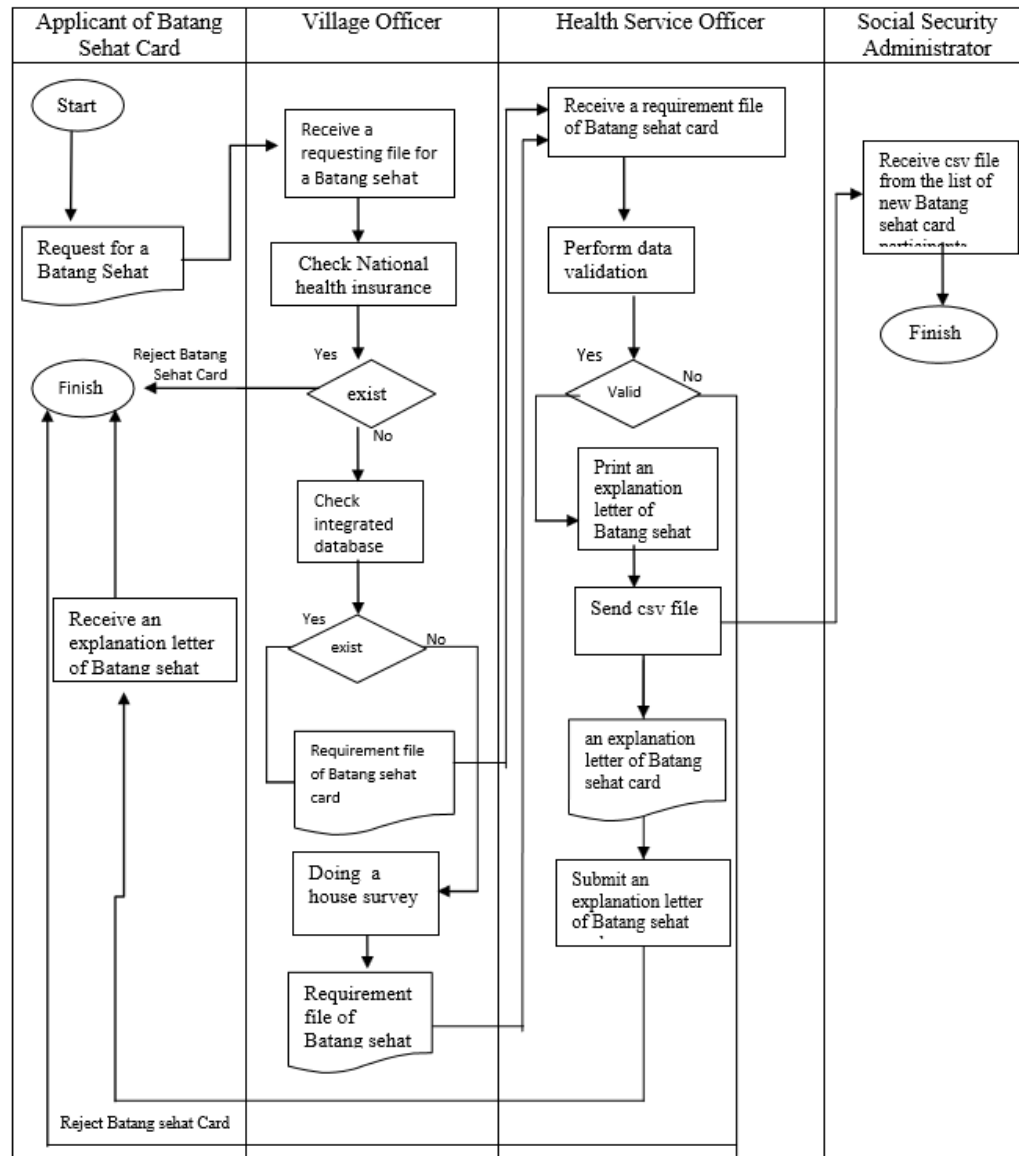


Figure 1. KBS service flow

b. Identification of Feasibility Studies

The Batang District Health Office in the KBS service process involved 248 villages spread throughout the Batang District area. Each village has an average of 4 laptops and 2 computers and is equipped with an internet network to help with daily work. The availability of operational staff has good skills in operating computers that have been supported by at least formal education with a high school education



background. From the identification of the feasibility study, it can be concluded that the availability of resources both from the availability of technology and operational staff is sufficient to support the implementation of a web-based KBS information system

2. System Design

At this stage the hardware and system requirements specification is compiled and defines the overall system architecture. At the system design stage will be presented in the form of activity diagrams, use case diagrams and interface design.

a. Activity Diagram

Activity Diagrams are visual forms of workflows that contain activities and actions that can also contain choices, repetitions or concurrences. Activity Diagram illustrates the activities of an information system (Nugroho, 2010) Activity Diagrams on the KBS information system are shown in Figure 2 and Figure 3 below:

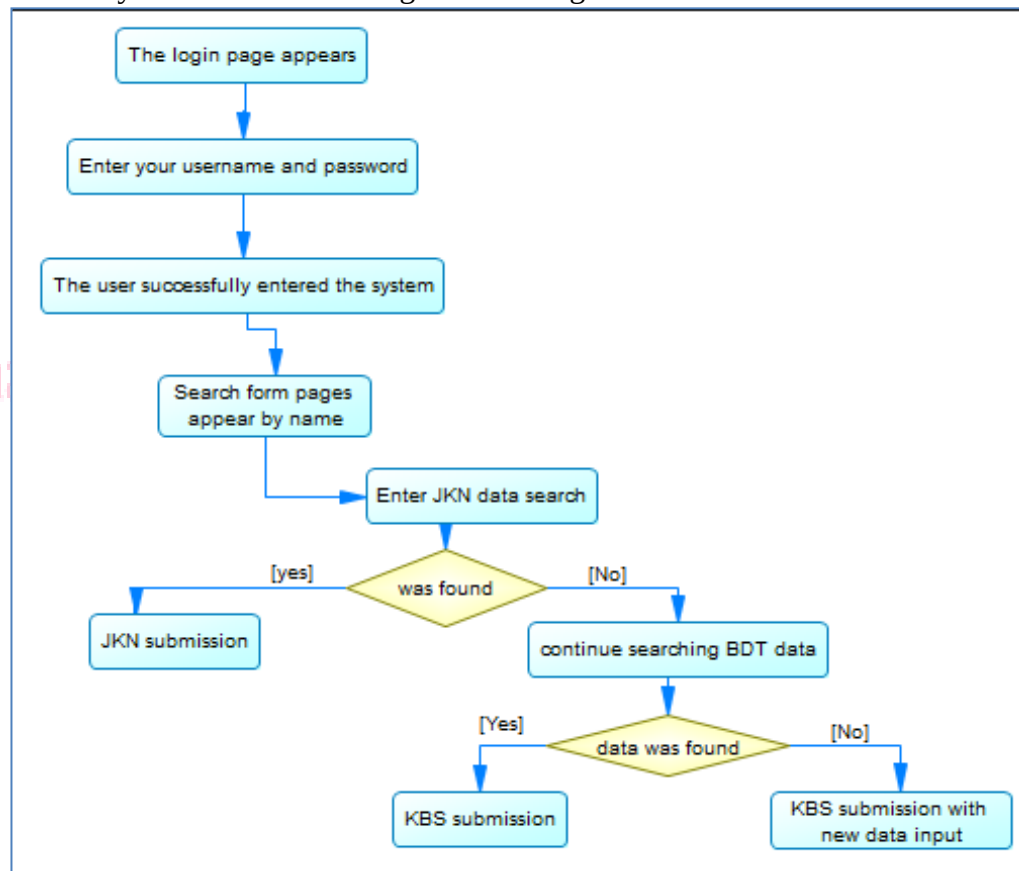


Figure 2. Activity Diagram of KBS Information System in the Village Officer

Figure 2 is an activity diagram for village officials where the village officer logs in with his username and password according to his village to enter the system, then the



village officer searches for names to check whether or not he can submit a KBS. The village officer checks the JKN data, this stage is very important to determine whether there is a dual membership or not because if the applicant's name is found in the JKN data means the applicant has been registered as a JKN participant then the KBS submission is rejected. If not found in the JKN data then the village officer checks the BDT data, if found can submit a KBS, but if it is not found the village officer can submit KBS with new data input outside the BDT by attaching a photo ID card, photo Family Card, photo of the applicant's house, Photo Applicant and Photo Certificate of Absolute Responsibility.

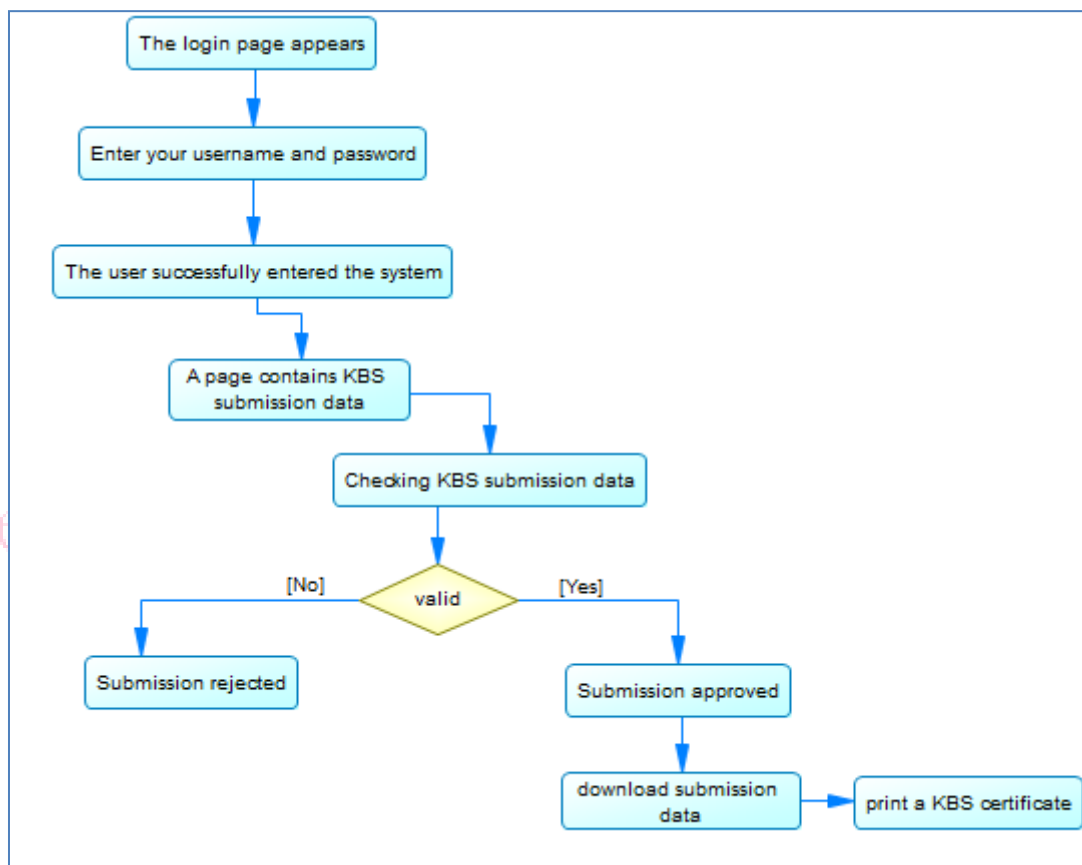


Figure 3. KBS Information System Activity Diagram on the Health Office Officer

The next process is shown in Figure 3, which is an activity diagram for the officer of the health department after successfully logging into the health department system, they check the KBS submission from the village, then process the KBS submission. In the final stage the health office officer can download the csv file export results from the submission of the KBS which is used as the basis for the issuance of a KBS certificate and the submission of an integration recommendation to the Health BPJS.



b. Use Case Diagram

Use Case Diagram is diagram which shown illustration of activity between actor and system. Use cases describe the system, the system environment, and the relationship between the system and its environment.

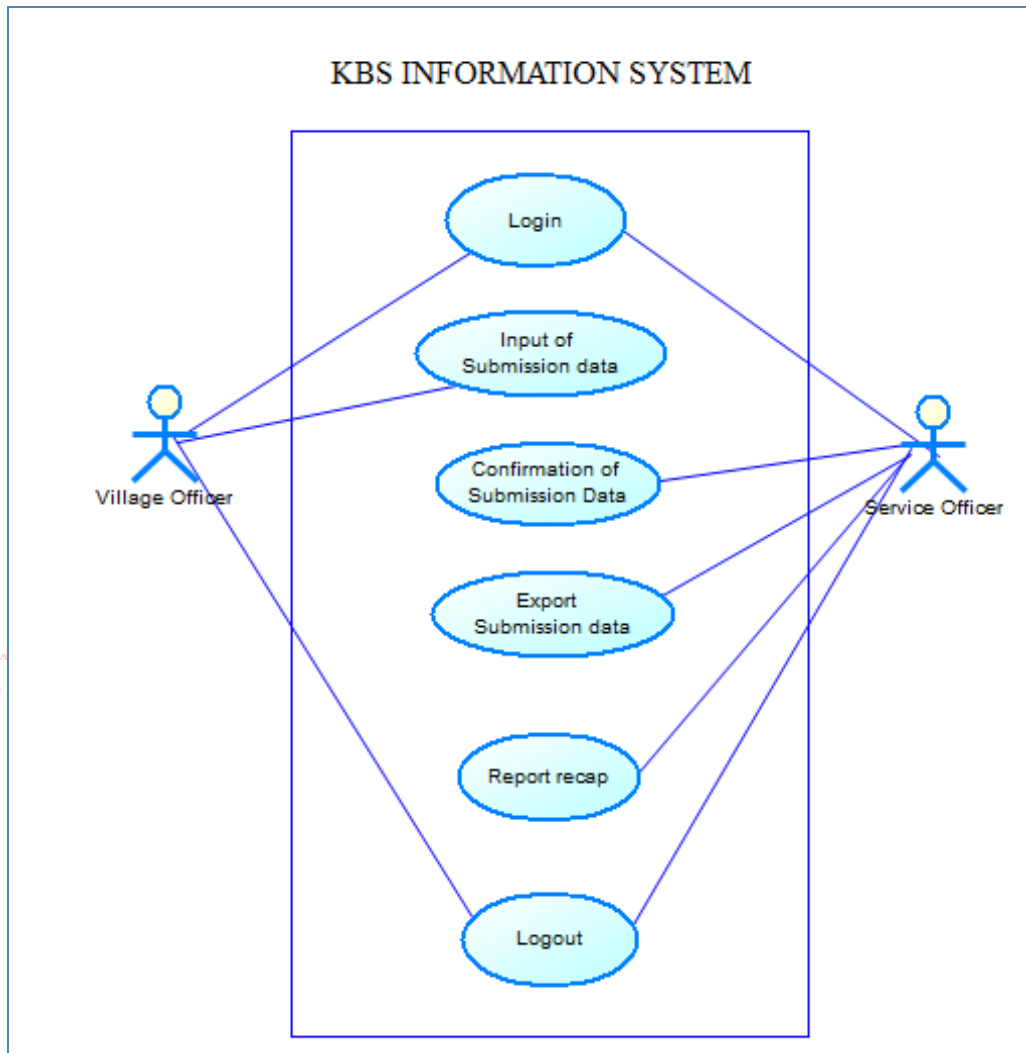


Figure 4. Use case Diagram KBS's system information

Figure 4 shows that the functions must exist in the KBS information system consist of two actors, the village officer and the service officer. The village officer actor has the KBS submission data input function, while the official officer actor has the submission data confirmation function, the export submission data and report recap.



c. User Interface Design

Interface design has the following features :

1. Application login page

The final design stage is interface design. This design begins with the appearance of the application login page. This login page serves to limit the access rights of information system users.

2. JKN Data Checking Page

The JKN data checking page displays JKN data with a search for the name entered. Form name can be edited, press ENTER to search. If the name found, the KBS submission is rejected. This menu prevent double participation, where participants who have been registered in the JKN data have health insurance and therefore cannot be proposed for KBS submission. If not found then proceed with checking BDT data.

3. BDT Checking Page

BDT data checking is carried out if the applicant's name is not found when checking JKN data. BDT data can be displayed by searching the name entered. The form name can be edited, press ENTER to search. If found, it can submit a request for KBS to be made to the department. If not found, then can submit a request for submission of new KBS.

4. New KBS Submission Page

Another result of the interface design is the new KBS submission page. This page is used to input new data if the applicant's name is not found in the JKN data or BDT data, by completing the required forms and files, after the form is filled, click "send submission", then automatically the new submission data will be sent to the officer of the health office through the information system KBS. This stage is expected to be able to shorten and simplify the KBS service process so that village officials no longer need to come to the health office to assist KBS applicants and KBS applicants do not need to queue in length at the Health Office, because applicants come only to collect KBS certificates.

5. Submission Confirmation page

Next is the submission confirmation page, which can only be accessed by the health office officer. This page serves to validate KBS submission data if it is valid, click "Ok". Data is automatically stored in the system and the officer can download the file in CSV format. Files in CSV format store information separated by commas, not save information in the form of columns. This will make it easier to move it from one program to another. This CSV file will be the basis for submitting integration recommendations to the Health BPJS..

6. Print Report Page

This page serves to display the JKN membership report and KBS membership report. Print page of JKN and KBS defense report.

From the features previously described, here are some examples of user interface images from the KBS information system.



Figure 5. New KBS Submission Page

Laporan Kepesertaan Jaminan Kesehatan Menurut Jenis Kelamin Kabupaten Batang

[CETAK](#)

No	Jenis Jaminan Kesehatan	Peserta Jaminan Kesehatan					
		Jumlah			%		
		L	P	L+P	L	P	L+P
1	JKN	1	3	2	0.0003	0.0008	0.0003
2	KBS	7	4	11	0.0019	0.0011	0.0015
	Jumlah	8	7	13	0.0021	0.0018	0.0017

© 2019

Figure 6. Print Report Page



3. Implementation

The process of developing an information system uses the javascript programming language with the mongodb database engine. This KBS information system is web based.

4. Information Quality Testing

Information quality testing is done by comparing the weighted average before and after the development of the KBS information system. Measurement of information quality includes five aspects, namely availability, convenience, suitability, completeness and timeliness. Here are the results of the calculation of the weighted average before and after the development of the information system;

Table 1. Weighted Average Information Quality

Information Quality Aspects	Weighted Average Before Development	Weighted Average After Development	Average Difference
Availability	1,98	3,10	1,12
Convenience	2,08	3,13	1,05
Suitability	2,27	3,57	1,30
Completeness	1,98	3,37	1,39
timelines	1,87	3,60	1,73
Overall average	2,04	3,35	1,31

Based on Table 1 it is known that the weighted average quality of information on the aspect of availability before development is 1.98 and after development is 3.10. The weighted average value before and after the development of the system experienced a weighted average increase of 1.12.

Discussion

The increase in the weighted average can be interpreted that there is an increase in the quality of information on the availability aspect of the system being developed. This is in line with research conducted by Hamdan Syah A. (2016) that there is an increase in the quality of information in the aspect of availability of information systems for monitoring medical devices with a weighted average increase of 2.26 (Alam, Sudiro, and Purnami, 2016). The weighted average yield of information quality on the aspect of convenience before development was 2.08 and after development was 3.13. The weighted average value before and after the development of the system experienced a weighted average increase of 1.05. The increase in the weighted average can be interpreted that there is an increase in the quality of information on the aspect of convenience in the system being developed. This is in line with research conducted by Dedi Apriyandi (2017) which states that the ease of access to data and information generated after the



development of an information system for meningitis vaccination system is better than before the development of the system with a weighted average increase of 1.82 (Apriyandi, Adi, and Widodo, 2017).

Information quality on conformity aspects produced weighted average value before the development of the system was 2.27 and after the development of the system was 3.57. The weighted average value before and after the development of the system experienced a weighted average increase of 1.30. The increase in the weighted average can be interpreted that there is an increase in the quality of information on aspects of suitability in the system being developed. This is in line with research conducted by Hamdan Syah Alam in 2016 which states that there is an increase in the quality of information on the aspects of suitability in the information system of monitoring medical devices with a weighted average increase of 2.22 (Alam, Sudiro, and Purnami, 2016). In the aspect of completeness the weighted average result before system development was 1.98 and after system development was 3.37. The weighted average value before and after the development of the system experienced a weighted average increase of 1.39. The increase in the weighted average can be interpreted that there is an increase in the quality of information on the completeness aspect of the system being developed. This is in line with research conducted by Gandha Sunaryo Putra in 2016 that there is a positive and significant influence on the completeness of information before and after the development of a healthy home appraisal information system with a weighted average increase of 2.84 and a probability value of 0.016 (Putra, Nurjazuli, and Mawarni, 2016).

Information quality on the aspect of timeliness produced a weighted average value before the development of the system of 1.87 and after the development of the system of 3.60. The weighted average value before and after the development of the system experienced a weighted average increase of 1.73. The increase in the weighted average can be interpreted that there is an increase in the quality of information on the aspect of timeliness in the system being developed. This is in line with research conducted by Gandha Sunaryo Putra (2016) stating that there is a positive and significant effect on the timeliness before and after the development of a healthy house valuation information system with a weighted average increase of 2.71 and a probability value of 0.016 (Putra, Nurjazuli, and Mawarni, 2016).

The weighted average of the five aspects of information quality before development and after development has increased with a weighted average difference of 1.31. This can be interpreted that the quality of information has increased before and after the development of information of 1.31. With this increase, users will increase the use of the new system so that the system developed is useful. This is supported by research conducted by Ida Bagus G. M. M. B. in 2018, stating that information quality has a positive and significant effect on the satisfaction of accounting system users (Mangun Buana and Putu Wirawati, 2018). In a study conducted by Margaretha K., Hanung Adi N., and Wing W. W. in 2016 stated that improving the quality of information increases user confidence in the use of a tourism website system (Prihantiwi, Nugroho, and Winarno, 2016).



Conclusion and Recommendation

This study can be concluded that the KBS Information System can help officer officers in the village, so that the process of making KBS more effective and efficient, facilitates officers in checking the data of KBS applicants, reduces the occurrence of dual participation so as to prevent duplication of health financing, and helps officer officers in the Office Health in KBS services and making KBS membership reports

The testing result of the information quality on aspects of availability, convenience, suitability, completeness and timeliness after the development of the system shows that the new system is able to overcome problems related to information quality.



International Journal of Health, Education and Social (IJHES)



References

- Alam, Hamdan Syah, Sudiro, and Cahya TRi Purnami. 2016. "Pengembangan Sistem Informasi Pemantauan Alat Kesehatan Untuk Mendukung Penjaminan Mutu Pelayanan Kesehatan Di Balai Kesehatan Indera Masyarakat (BKIM) Provinsi Jawa Tengah." *Jurnal Manajemen Kesehatan Indonesia* 4 (3): 187–95.
- Apriyandi, Dedi, Kusworo Adi, and Aris Puji Widodo. 2017. "Rancang Bangun Sistem Informasi Officeristrasi Vaksinasi Meningitis Berbasis Web Di Kantor Kesehatan Pelabuhan Kelas III Banda Aceh." *Jurnal Manajemen Kesehatan Indonesia* 5 (2): 131–37.
- Ayu, Uca, Frama Diesty, and Asmaripa Ainy. 2009. "Antara Pengajuan Dengan Penyetujuan Klaim Jaminan Sosial Kesehatan Puskesmas Sekota Palembang Pada Maret 2009."
- Bupati Batang. 2017. Peraturan Bupati Batang Nomor 46 Tahun 2017 Tentang Kartu Batang Sehat. Batang.
- Dwicaksono, Adenantera, Ari Nurman, and Panji Yudha Prasetya. 2012. JAMKESMAS Dan Program Jaminan Kesehatan Daerah.
- Jaya, Imam Mahfuji, and Jenie Sundari. 2017. "Pengaruh Kualitas Sistem Informasi Terhadap Kepuasan Pengguna Pada SMA Al-Huda Cengkareng." *Techno. COM* 16 (3): 256–67.
- JSP, Tyoso. 2016. *Sistem Informasi Manajemen. Ke-1*. Yogyakarta: Deepublish.
- Kemenkes. 2004. "Undang-Undang Nomor 40 Tahun 2004." Pemerintah RI, no. 40: 1–29. <https://doi.org/10.1017/CBO9781107415324.004>.
- Mangun Buana, Ida Bagus Gede Mawang, and Ni Gusti Putu Wirawati. 2018. "Pengaruh Kualitas Sistem Informasi, Kualitas Informasi Dan Perceived Usefulness Pada Kepuasan Pengguna Sistem Informasi Akuntansi." *E-Jurnal Akuntansi Universitas Udayana* 22 (1): 683–713.
- Mendagri. 2018. Peraturan Menteri Dalam Negeri Republik Indonesia Nomor 134 Tahun 2017 Tentang Perubahan Atas Peraturan Menteri Dalam Negeri Nomor 33 Tahun 2017 Tentang Pedoman Penyusunan Anggaran Pendapatan Dan Belanja Daerah Tahun Anggaran 2018.



- Menkes. 2013. Peraturan Menteri Kesehatan Republik Indonesia Nomor 71 Tahun 2013 Tentang Pelayanan Kesehatan Pada Jaminan Kesehatan Nasional.
- Nugroho, Adi. 2010. Rekayasa Perangkat Lunak Berorientasi Objek Dengan Metode USDP. Edited by Oktaviani HS. 1st ed. Yogyakarta.
- Presiden Republik Indonesia. 2004. Undang-Undang Republik Indonesia Nomor 32 Tahun 2004 Tentang Pemerintahan Daerah.
- Presiden RI. 2013. Peraturan Presiden Republik Indonesia Nomor 12 Tahun 2013 Tentang Jaminan Kesehatan. Vol. 53. <https://doi.org/10.1017/CBO9781107415324.004>.
- . 2018. “Perpres Nomor 82 Tahun 2018 Tentang Jaminan Kesehatan.”
- Prihantiwi, Margaretha Kusuma, Hanung Adi Nugroho, and Wing Wahyu Winarno. 2016. “Pengukuran Kualitas Media Dan Informasi Website Dalam Diseminasi Pariwisata Untuk Mendukung Viral Marketing (Studi : Official Bantul Tourism Web).” *Jurnal Teknologi Informasi Dan Komunikasi* 5 (2): 135–48.
- Putra, Gandha Sunaryo, Nurjazuli, and Atik Mawarni. 2016. “Pengembang Sistem Informasi Penilaian Rumah Sehat Untuk Evaluasi Bidang Penyehatan Lingkungan Dan Promosi Kesehatan Di Dinas Kesehatan Kota Pontianak.” *Jurnal Manajemen Kesehatan Indonesia* 4 (1): 65–73.
- Sommerville, Ian. 2003. *Software Engineering (Rekayasa Perangkat Lunak)*. Edited by H.M.Wibi Hardani. Edisi 6. Jakarta.
- W. Kumorotomo. 2001. *Sistem Informasi Manajemen Dalam Organisasi Publik*. Yogyakarta: Gadjah Mada University Press.
- Wiseman, Virginia, Hasbullah Thabrany, Augustine Asante, Manon Haemmerli, Soewarta Kosen, Lucy Gilson, Anne Mills, Andrew Hayen, Viroj Tangcharoensathien, and Walaiporn Patcharanarumol. 2018. “An Evaluation of Health Systems Equity in Indonesia: Study Protocol.” *International Journal for Equity in Health* 17 (1): 1–9. <https://doi.org/10.1186/s12939-018-0822-0>.