

Web Base Analysis Usability And Utility Academic Information System With Rule Base Methods

¹Rifka Dwi Amalia, ²Suryono, ³Catur Edi Widodo

¹Master of Information Systems, Diponegoro University

^{2,3}Department of Physics, Faculty of Science and Mathematics, Diponegoro University

Abstract: Academic information system is a web-based academic information system that is useful to assist the academic activities of academic civitas colleges. Assessing the success of academic information system in terms of usability and utility to find out how far the use of academic information systems by users and meet user expectations is very important. The system can support the success of academic activities. Research analysis of academic information system on *website* sitasya.himsya.ac.id used questionnaires with questions based on the parameters of usability and utility aspects of the system. The assessment used likert scale with web base application. Data collection was conducted by 45 respondents from users of academic information system. From research using rule base method shows academic information system can be assessed online barbasis web by filling question based on parameter of usability and utility aspect whose value represented with scale 1 to 5.

Keywords: academic; information system; usability; Utility; rule-base.

I. INTRODUCTION

The use of information and communication technology increased along with the increased speed of production technology. As well as an increase in the type of device or technology, the number of people using the technology on the rise in society. Meanwhile, the Government supports the use of e-government applications to save on time and on budget. By the same token, some institutions, such as universities, paying attention to the design of a web site that can be used to notify their users. Not only serve the students, academics and employees of the University web site, also provide services to other institutions, and graduates. Therefore, many users visit this web site. Therefore, any University web sites must be used to meet the needs of its users (Sengel, 2013).

Academic information system is one of the web-based tool that is urgently needed in support of the academic activities in the campus. When the process is the implementation of a system has been completed, then the next stage is to conduct evaluation process, so that it can be known the success rate of the system implementation process. By conducting a process evaluation of the academic campus information system, will be able to bring up the recommendations that can be used as a means to improve the quality of these systems in the future (D., 2017).

Measurements against the success of the implementation of a system can be conducted to find out the user's ability to use the system so that the destination can be achieved from the use of such systems that would later describe the empirically satisfaction (satisfaction) user of the system. The main factors that can be used as a guideline in the measurement of the success rate of an implementation of a system or software is usability. Measuring usability can also be said to measure efficiency, effectiveness and user satisfaction, it can be done in two ways, namely relying on assumptions the program maker/self and using usability Metric (Tullis and Albert, 2008).

Two aspects which greatly affect the consideration of users and prospective users in using a system is usability and utility. The second aspect of this although it looks similar, but refers to two different things. Usability refers to the ability of the system to meet the functionality and ease of operational system, while utility refers to the user's motivation in using the system and how much users rely on the system to support its needs. A system with a good usability, not necessarily guarantee optimal utilization by users. So, the utility review on what factors will affect the perception of the user in using the system (Martoyo and Falahah, 2015).

Rule-based reasoning is one of the most popular reasoning paradigm used in artificial intelligence. Reason for rule-based system architecture has two major components: Knowledge Base (usually consists of a set of "IF ... THEN ..." rules represent knowledge domain) and inference (usually contain multiple independent domains, inference mechanisms such as forward-backward chaining) (Buchanan and Shortliffe, 1984).

Based on the above explanation, then this study designed to analyze information systems academic review of the aspects of usability and utility by applying the method of rule-base. The results of this research is to evaluate the measures the extent to which academic information system utilization by users and the extent to which can meet the user's ekpektasi.

II. LITERATURE REVIEW

Measuring usability in libraries website evaluation used by using web base system with the method of survey users and involving large samples. Previous user survey method has not been much utilized in the evaluation of the usability of the website of the library. The measurement is done in general follow the standard method validates the measurement items that come from the study of psychometrics. Methodology with a survey like this could be developed as a measurement tool for other services. Measurements are conducted to evaluate three usability attributes of the Library website, namely effectiveness, efficiency and learnability. With the measurement methods it helps librarians and administrators evaluate usability on the website of the library of the sample involve community library (Soohyung et al., 2011).

USE a Questionnaire as a parameter in measuring usability can be used in assessing the use of the Online system of KRS- can describe such a system is in compliance with the needs of users so it can deliver satisfaction against users . There was significant influence between the free parameters, i.e. parameters usefulness, ease of use, parameters and parameters of the ease of learning against parameter bound parameter, i.e., satisfaction, conducted simultaneously (together). It can be concluded that partially, the parameters of the usefulness and ease of use of influential parameters significantly against the parameters of satisfaction. While the ease of learning parameters have no effect parameter significantly to satisfaction (Kusuma,2016 et al.).

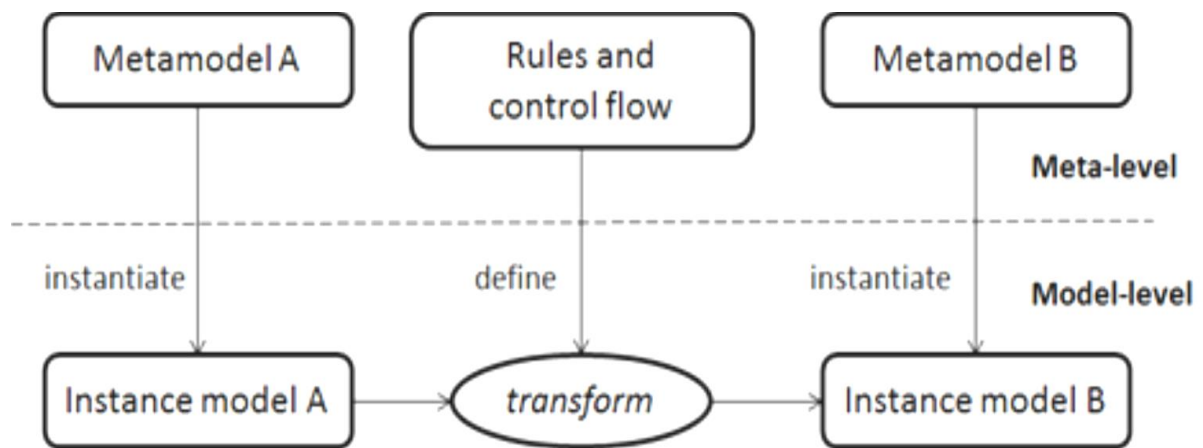
Evaluation information system based on the effectiveness of the user can be done with the approach of the utility system. This approach emphasizes the study on the utilization of the system by its users (user) as one of the benchmarks of success of implementation of the system, by reviewing the utilization of six side i.e. possession, form, place, time, actualization, and the goal. Evaluation of the implementation of an information system based on the concept of effectiveness system can help the management in developing and improving the quality of information systems (Falahan and Rijayana, 2011).

Design case study of usability testing methods used in the web page of the University of Sakarya Turkey. In this method the data collected qualitative and quantitative data which is in the collection of data required interaction with the respondent. A program installed for Morae can interact with a functioning record respondents ' answers to the respondent which would later be recorded by using MS Office. At the end of testing the respondents presented the System Usability Scale (SUS) are applied to define user satisfaction in using the web site. Stated that the user accepted are satisfied with the system if the score more than 70 SUS. With this method, research conducted can't based online which do not need the presence of interactions with the respondent (Sengel, 2013).

Rule-based system is a special type of expert system, comprising a set of rules, which usually take the form of an if-then rules. In General, it can be designed through the use of expert knowledge/expert or through data on the basis of viewpoint. Rule-based system can be designed in two ways: expert-based and data-driven. Rule-based system can be used for the purpose of knowledge discovery, which means managing information or knowledge which is found from the data. Therefore, the rules and rule-based system considered information granules (Han et al., 2016).

Rule-based system can effectively automating the standard troubleshooting. Such a system provides a method of capturing and refining the skills of man, and confirms its relevance to the industry. Rule-based system represents knowledge in terms of the set of rules that tells what to do, that is what can be inferred from the different situations. Application of method of dynamic graph based validation results (online) in the area of rule-based system is a great solution for validating a single rule, chain rule, and overall transformation. This validation is driven by the pre and post conditions-condition that are assigned to this rule. Graph rewriting is one of the most frequent application of techniques applied to its realization (Lengyel, 2015).

Dynamic validation and validation attributes include the value of the structure, which can be expressed in first-order logic extended with the ability to traverse. Examples of languages that are currently applied to determine the value of the attribute and the condition of the interval is the Object Constraint Language (OCL), C, Java, and Python. Conditions and terms is a condition of transition and pre-condition of regulatory transformation. Pre-condition was a prerequisites that are assigned to a Boolean rules that must be true. If the prerequisite of a rule is not true, then the rule failed. If the rules post-condition not true after execution rule, then the rule failed. About the condition of pre and post-condition, execute rules shown in Figure 1



Pict1. Transformation proces

- a. Find the structure of the left-hand side (LHS).
- b. Validating constraints defined in the LHS on the model of the corresponding input.
- c. If it meets all of the prerequisites, then run the rule, otherwise the rules failed.
- d. validates the limitations defined in the right-hand side (RHS) on the model of modified/generated. If the results of the post meets the requirements of rule, then the rule is successful, if not the rules failed.

The consequences that an expression on the LHS is the prerequisite rules, and an expression in the RHS is post-condition against the regulation. The rule can be executed if and only if all the conditions listed in the LHS is correct. If a regulation completed successfully, then all the terms listed in the RHS should be correct (Lengyel, 2015).

Rule-based systems designed to solve problems in the selected domain. Each domain has its own reasoning and knowledge, which can be copied and replaced through automatic rule-based system. Many domains that contain the knowledge that can be captured completely only through information systems, because humans may not be able to access or fully immediately took the information needed. There are many advantages of a rule-based expert system which are: lower costs due to reduced need for human experts, is permanent, it can be used for different knowledge systems, enhance functionality and improve reliability because it minimizes the error prone to human beings. The advantages of rule-based expert system of diverse and could greatly facilitate human life for the better. This rule-based system can be used and developed in the domain of university education. The first system used as a course advisory system recommended courses to undergraduate and the second suggested system of scholarships to students based on their eligibility. Both systems are then implemented and tested in using Oracle software Policy Autimation (OPA). OPA automatically form a problem solving or decision making based on the existing rule base (Engin Wednesday et. al., 2014).

III. METHODOLOGY

3.1 Materials and research tools:

Data input into the system in the form of parameters used for the measurement of usability: usefulness, satisfaction, ease of learning, and ease of use, and the parameters used for the measurement of utility: utility possession, goal utility, place utility, form utility, time actualization utility, and utility. As for the dissemination of the questionnaire will be filled by students, professors, and employees who use information systems academic as the respondent.

As for the tool used is a computer unit with the PHP programming language

3.2 Research Procedure:

Implementation of the research done by several stages, namely the preparation, design and analysis of the research. Stages of research shown in Figure 2.

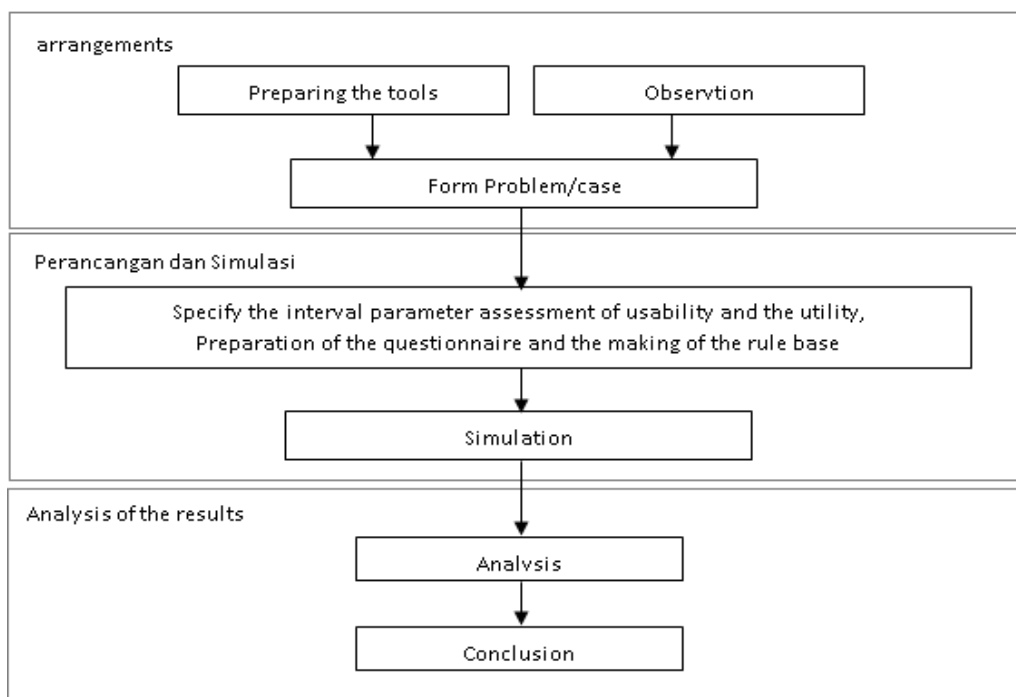


Figure 2. Research steps

3.2.1 The Stages of Preparation:

The first stage is study of literature, preparing tools and materials, followed by observation. This library includes the study of the activities of the collection journal is more supportive to the research methodology that is the method of rule base, the parameters of the usability and utility

The design of system analysis of academic information systems built with web based. Input data from the user's questionnaire as respondents who accessed online using the services of academic information systems, then the answers to questionnaires from respondents can be processed using the method of rule base to produce the quality/quantity of value each parameter, with the parameters used in the aspects of usability and utility for analyzing a system of academic information services used

In the analysis of the academic information system interface consists of two parts namely the administrator page that is accessed by an admin for processing systems, and pages accessed by questionnaire respondents. Administrator page is used for the processing of such data add a question by using the parameters of the aspects of the usability and utility of the academic information system and place the rule base as a method. While the input data of the respondents be answers and demographic/respondent data.

On a visit to the respondent on the academic information systems then available services survey to fill out a questionnaire that already provided, press the survey then showed up the instructions for filling out the questions press continued after already understand instructions, then comes the questions in accordance with the categories/parameters each and concludes with the demographic that is filling up the data of the respondents. Where the respondent must answer the question with a scale of 1 to 5 with different parameters. In the research model answers in the questionnaire using a scale of 1 to 5 refers to the basic stages of each indicator as follows: 1 = strongly disagree 2 = disagree, 3 = neutral, 4 = Disagree, 5 = strongly agree.

After the questionnaires answered by the respondents that answer then directly stored in a database in accordance with the categories/parameters each with a scale that is already defined, for though the data into the method of rule base. The output of the system that created the first pie chart form, to display the results of calculations of each aspect of usability and utility are rated with the highest percentage obtained from answers to questionnaire respondents, as well as the rule base already determined its value and conclusions are strongly disagree, disagree, neutral, disagree, and strongly disagree. And the second bar graph to display the value of the parameter that has been rated by respondents, how many of the respondents choose the score in each question-per-parameter. System framework built on Figure 3.

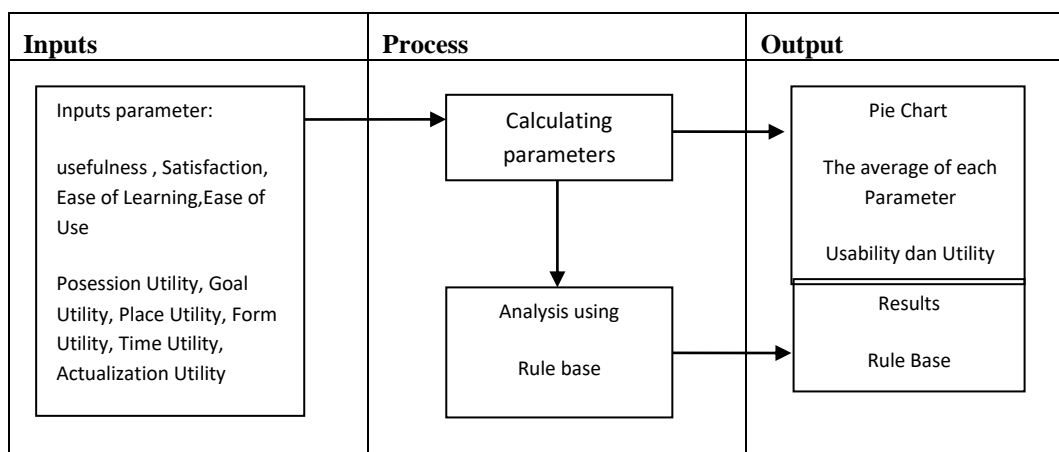


Figure 3. The Framework Of The Information System Analysis Of Academic Information Systems

The system will store the results of the questionnaire questions derived from the respondent. Any questions are answered by the respondent and the respondent's data will be stored in the table, which the respondents there is a table of answers that can be processed and shown in table charts. From the table answers will also be calculated the value of each of the parameters that are obtained in accordance with the choice of the respondent's answer, which is then processed in the table rule base, so that the system can produce results in the form of information \rightarrow rule base and can be shown the value the average of each of the parameters on the graph pie.

From this research can be described by using the context diagram in the process of creating a system that will be examined, as well as having a process connected with multiple entities with existing data streams, such as the research context diagram addressed in Figure 4.

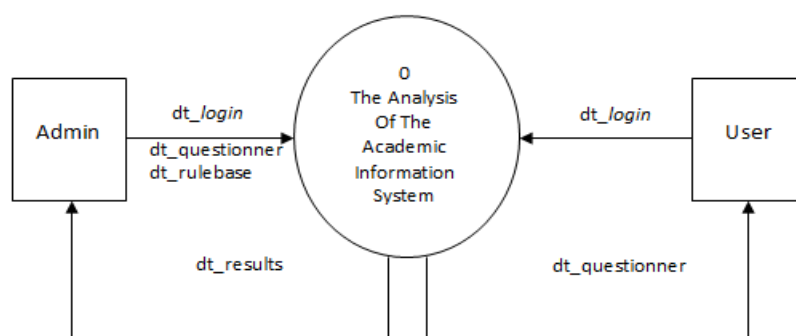


Figure 4. Context Diagram

Flowchart data for the next step, in this research can describe multiple processes connected with some of the entities and data stream as sequence in the research that is done, the zero level data flow diagram as shown in Figure 5.

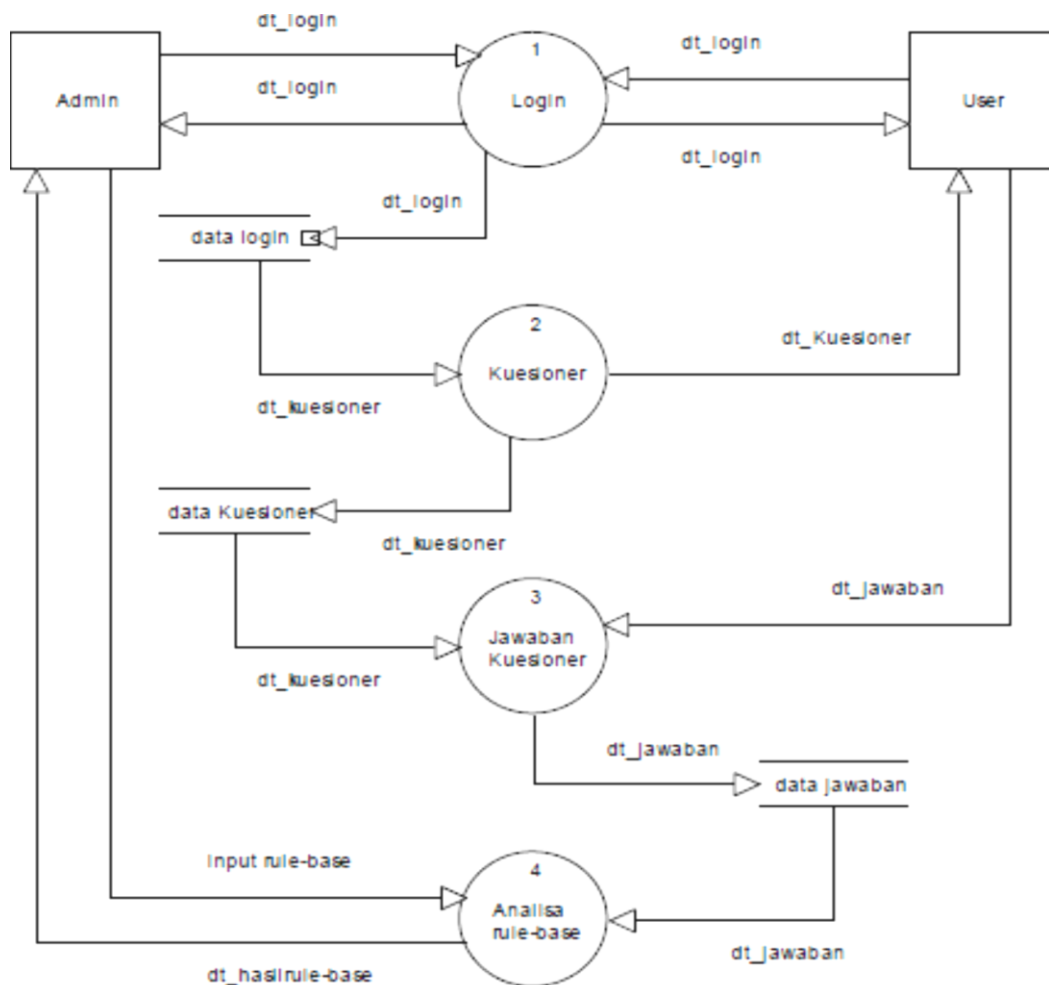


Figure 5. Diagram Flow Data (DFD) zero levels

IV. DATA ANALYSIS AND DISCUSSION

From the results of the analysis of the academic information system from every aspect of the usability and utility of the system and any parameters that have been filled by the respondents, had some average value which is then done by the method of rule base may be displayed on the chart Pie with calculations per parameter and the rule base of the aspects that have been inputed at the time respondents fill out questionnaires.

Pie chart results for rule system usability aspects of base shown in Figure 6, the average value of an answer to any parameter shown in table 1, while on the look of the rule base that is active is shown in table 2 with the user's perception of the outcome that is VERY DESERVES.

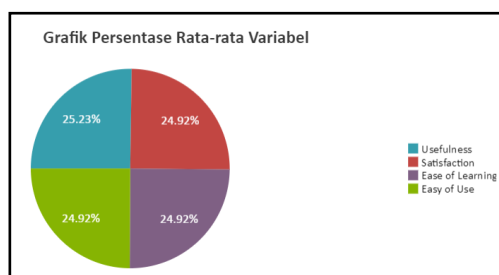


Figure 6. Pie Chart system usability

Table 1. The average value of an answer to every aspect of the system usability parameters

Nama Parameter	Rata-rata
Usefulness	83
Satisfaction	82
Ease of Learning	82
Ease of Use	82

Table 2. The active rule base an aspects of usability of the system

Nama Parameter	Min	Max
Usefulness	81	100
Satisfaction	81	100
Ease of Learning	81	100
Ease of Use	81	100
Conclusions	VERY DESERVES	

The results of the rule system usability aspects shows VERY DESERVES conclusions, meaning that the academic information system that judged already meet the ekpektation user on the ability of the system to meet a good and effective functionality and operational systems easy learning by the user.

Pie chart results for rule base aspects of utility system shown in Figure 7, the average value of an answer to any parameter shown in table 3, while on the look of the rule base that is active is shown in table 4 with the results of the user's perception that is VERY DESERVES.

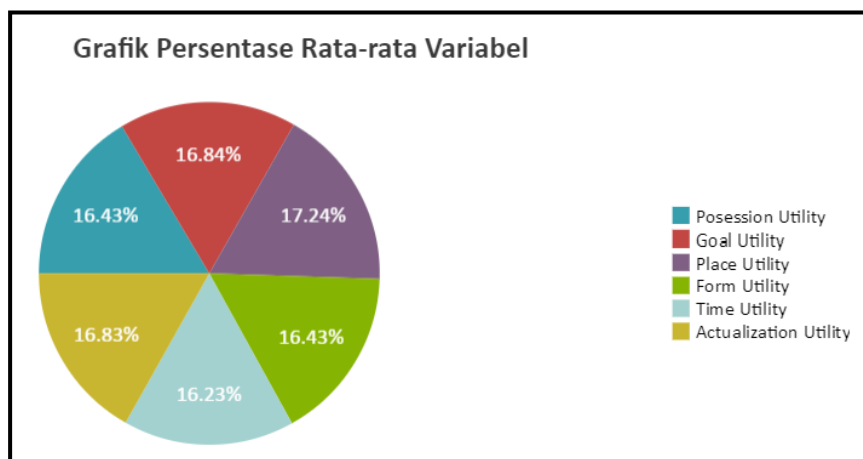


Figure 7. Pie Graphics of an aspect utility sistem

Table 3. The average value of an answer to every aspect of the system usability parameters

Nama Parameter	Rata-rata
Posession Utility	81
Goal Utility	83
Place Utility	85
Form Utility	81
Time Utility	80
Actualization Utility	83

Table 4. The active rule base an aspects of usability of the system

Nama Parameter	Min	Max
Possession Utility	81	100
Goal Utility	81	100
Place Utility	81	100
Form Utility	81	100
Time Utility	61	80
Actualization Utility	81	100
Conclusion	VERY DESERVES	

The results of the rule base aspects of utility system shows VERY DESERVES conclusions, meaning that the academic information system that meets a user's ekpektasi votes against the dimensions of the product i.e. information systems or information generated by the system required by the user, the dimension of the process of how the information generated by the system, and the services or service i.e. information systems service quality or infrastructure supporting is good for the user.

V. CONCLUSION

On the research of academic information system analysis based on the aspects of usability and utility with the method of rule base so it can be drawn the conclusion, that the academic information system can be assessed online barbasis web by filling out the questions based on the parameters of the aspects of usability and utility whose value is represented with a scale of 1 to 5.

Some suggestions for the improvement and further development of the academic information system that is:

1. Addition of the communication media to always be improved again in the process of granting academic information.
2. Improvements of some system is very important, to make way for academic activities and will certainly facilitate learning activities that exist on campus.

REFERENCES

- [1] Buchanan, B. G., and Shortliffe, E. H., 1984. Rule based Expert Systems, Addison-Wesley, Reading, MA.
- [2] Engin, G., Aksoyer, B., Avdagic, M., Bozanlı, D., Hanay, U., Maden, M., and Ertek, G., 2014. Rule-based expert systems for supporting university students, In Proceedings of 2nd International Conference on Information Technology and Quantitative Management, ITQM 2014, Procedia Computer Science 31.
- [3] Falahah and Rijayana, I., 2011. "Evaluasi Implementasi Sistem Informasi Dengan Pendekatan Utilty System (Studi Kasus Sistem E-CAMPUS Universitas Widyatama)," Jurnal Ilmiah Kursor, Vol. 6, No. 2.
- [4] Hermanto, A., Supangat, and Fridy, M., 2017. Evaluasi Usabilitas Layanan Sistem Informasi Akademik Berdasarkan Kombinasi ServQual dan Webqual. Journal of Information Systems Engineering and Business Intelligence, Vol. 3, No. 1.
- [5] Kendall, K. E., and Kendall, J. E., 2007. System Analysis and Design, 7th Ed, Prentice Hall.
- [6] Kusuma, W.A., Noviasari V., and Marthasari G. I., 2016. Analisis Usability dan User Experience pada sistem KRS Online UMM menggunakan USE Questionnaire. Jurnal Nasional Teknik Elektro dan Teknologi Informasi (JNTETI) 5 (4).
- [7] Lengyel, L., 2015. Validating Rule-based Algorithms. Acta Polytechnica Hungarica, Vol. 12, No. 4.

International Journal of Novel Research in Computer Science and Software Engineering

Vol. 4, Issue 3, pp: (33-41), Month: September - December 2017, Available at: www.noveltyjournals.com

- [8] Martoyo, W., and Falahah, 2015. "Kajian Evaluasi Usability dan Utility pada situs web, Open Acces Journal of Information Systems (OASIS), vol. 05, no. 5.
- [9] Han, L., Gegov, A., and Cocea, M., 2016. Rule based systems : a granular computing perspective, In: Granular Computing, vol. 1, no. 4.
- [10] Lund, M. A., 2001. Measuring Usability with the USE Questionnaire, STC Usability SIG Newsletter, vol. 8, no. 2.
- [11] Sengel, E., 2013. Usability level of a university web site. Procedia - Social and Behavioral Sciences 106 (2013) 3246 – 3252.
- [12] Soohyung, J., Suyu, L., and Kun, L., 2011. A Usability Evaluation Model for Academic Library Websites: Efficiency, Effectiveness and Learnability. Journal of Library and Information Studies 9:2
- [13] Tullis, T., and Albert, B., 2008. Measuring The User Experience. Morgan Kaufman Publisher. Burlington, MA, USA.
- [14] Whyte, G., and Bytheway, A., 1996. Factors Affecting Information Systems Success," International Journal of Service Industry Management, MCB University Press, vol. 07, no 1.