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FEATURE ALIGNMENT OF THE INTERNAL QUALITY AUDIT SYSTEM BASED ON PPEPP

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Abstract: The Ministry of Education, Culture, Research, and Technology, has developed guidelines for the Internal Quality Assurance System or known as SPMI, that is being implemented through the Internal Quality Audit (IQA) with the PPEPP cycle, namely Determination (P), Implemen-tation (P), Evaluation (E), Control (P), and Improvement (P). Some universities have implemented IQA with system. The problem is that the system does not line well with the PPEPP cycle, which results in unsatisfactory audit results. The purpose of this study is to evaluate how well the university-owned AQI system features in line the PPEPP cycle and to highlight development opportunities. The method used Feature Oriented Domain analysis (FODA) and Acceptance Testing. This study delivered an analysis of IQA system features that consistent with PPEPP. The FODA results were validated by expert and tested with User Acceptance Test (UAT) with 89.98% user response that the system is acceptable. The research contributes to universities' understanding of the features necessary in the AQI system, which has an impact on the perfection of the university AQI system design in accordance with the PPEPP cycle.

Keywords: FODA; IQA system; PPEPP cycle; SPMI

Abstrak: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi telah menyusun pedoman Sistem Penjaminan Mutu Internal atau yang dikenal dengan SPMI, yang diimplementasikan melalui Audit Mutu Internal (AMI) dengan siklus PPEPP, yaitu Penetapan (P), Pelaksanaan (P), Evaluasi (E), Pengendalian (P), dan Peningkatan (P). Beberapa perguruan tinggi telah mengimplementasikan AMI dengan sistem. Permasalahannya, sistem tersebut tidak sejalan dengan siklus PPEPP, sehingga hasil audit kurang memuaskan. Tujuan dari penelitian ini adalah untuk mengevaluasi seberapa baik fitur sistem AMI milik perguruan tinggi sejalan dengan siklus PPEPP dan menyoroti peluang pengembangan. Metode yang digunakan adalah analisis Feature Oriented Domain (FODA) dan Acceptance Testing. Penelitian ini menghasilkan analisis fitur sistem AMI yang konsisten dengan PPEPP. Hasil FODA divalidasi oleh ahli dan diuji dengan User Acceptance Test (UAT) dengan 89,98% respon pengguna bahwa sistem dapat diterima. Penelitian ini memberikan kontribusi terhadap pemahaman universitas terhadap fitur-fitur yang diperlukan dalam sistem AMI, yang berdampak pada kesempurnaan desain sistem AMI universitas sesuai dengan siklus PPEPP.

Kata kunci: FODA; siklus PPEPP; sistem AMI; SPMI

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INTRODUCTION

The implementing a quality assurance system in higher education is not straightforward, including in Indonesia. Standard-based evaluation in education is not a new concept [1]. Higher education institutions must deliver high-quality teaching and use suitable evaluation procedures [2]. SPMI, is a collection of elements and activities that are interconnected and organized regularly to ensure and enhance the quality of higher education in higher education on its own [3]. SPMI activities are conducted in accordance with the PPEPP cycle with the aim of assessing a university's standards. The standards evaluated are SN-DIKTI and those relevant to the higher education institution. Therefore, an internal quality audit (IQA) system is very necessary for universities to facilitate the evaluation process.

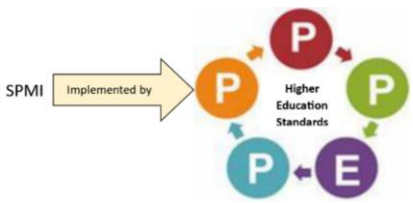

Image 1. SPMI, PPEPP and SPMI's Function in Higher Education Standards

According to researches, various factors impact the execution of the IQA process. Lack of universities support can lead to failure to satisfy established standards, such as the availability of adequate human resources [4]. Some cases showed that audit mechanism failure occurs when audit results are not used as a reference for enhancing academic quality [5], [6]. Institutional policies influence the implementation of higher education quality assurance [7].

IQA system based on PPEPP is a periodic and necessary academic activity in Indonesian universities. Although most institutions do not yet have an IQA information system, a small number do, and they use it. However, performing an audit using information technology has its own set of challenges [8]. The issue is that the system features may not be in line with the provisions of the PPEPP framework. The incapacity of universities to complete the whole PPEPP cycle presents a barrier to adopting the system [9]. The division of tasks while filling out the instrument causes each allocated part to fill in the standards based on their work and responsibilities, without regard for the completion of the cycle. This condition opens up opportunities for a study on feature alignment. Therefore, the purpose of this study is to evaluate the alignment of existing university audit system features with the needs of the PPEPP cycle using feature analysis.

The method of analysis employed is FODA. FODA is a feature-oriented approach that focuses on finding the features users anticipate. FODA requires three activities: context analysis, domain modelling, and architectural modelling [10]. In several studies, FODA was utilized to examine how Learning Management System (LMS) features aligned with SN-DIKTI compliance and the Bauran system with the Outcome Based Education (OBE) framework [11], [12]. Feature analysis can also be developed by subdomain [13] and utilize feature layers for evaluating systems that rely heavily on variability [14]. The FODA is one approach for determining a system's feasibility based on its features.

The feature alignment by FODA requires expert validation. Apart from that, this research also considers the need for feature testing by users using UAT to determine user appropriateness, avoid software malfunctions, and save unneces-

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sary losses [15]. Several scenarios based on situations that develop IQA were created in order to evaluate the IQA system utilized in this investigation. All users of the IQA system participate in UAT.

The results of this research contribute to an enhanced understanding of aligning university audit system features with the PPEPP cycle. The study's findings guide the features that should or shouldn't be included in the system to assist the auditee and auditor in carrying out the auditing process. The study's findings are intended to have significance for knowledge in examining the features required by the system and to assist users.

METHOD

The current research employs a qualitative method, including literature reviews and an examination of the IQA system utilized as samples. Image 2 depicts the steps of the research in issue.

Image 2. Research Method

The research starts with problem identification, which leads to research questions and goals to be achieved, as shown in image 2. The literature review is done to gather all the information in the form of pertinent study materials so that the current research position is known, feature analysis is done with FODA, and the system's suitability is tested by 17 users through UAT: LP3M=1, Auditors=4, Study Programs=5, UPPS=2, Student Affairs=1, LPPM=1, Lab & Net=1, UTIK=1, and the Expert=1.

Table 1. Linkert Scale - UAT Percentage

Scale	Information	% of UAT
1	Unacceptable	0-20
2	Less Acceptable	21-40
3	Neutral	41-60
4	Acceptable	61-80
5	Very Acceptable	81-100

Table 1 is an explanation of the Linkert scale and UAT percentage used. The number of users in each question multiplies this scale. This proportion serves as an indicator for the user acceptance of the IQA system. In addition, the results of the system feature analysis will be compared with the PPEPP fulfillment requirements. The findings of the analysis were evaluated utilizing expert validation procedures. Expert validation is a process that incorporates specialists in the relevant science to acquire evaluations, ideas, or recommendations [16]. This expert validation has aided decision-making by making it simple to absorb the necessary modifications.

RESULT AND DISCUSSION

FODA Analysis

The first step in FODA analysis is Context Analysis Results. The interaction of entities with the IQA system is visualized through a context diagram. Entities are made up of three types of users: auditees, auditors, dan LP3M. Image 3 shows the context analysis findings. There are three entities engage with the system for various reasons. The auditee is an entity that completes the audit instrument by

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the established standards, namely Ins-01 to Ins-04, may change the instrument contents, and sends files as proof. Auditees are grouped into eight categories: Study Program, UPPS, Student Affairs, LPPM, Corporation, Lab & Net, Library, and UTIK. The Auditor is an entity that reviews the instrument completed by the Auditees, fills in certain sections of the instrument, namely Ins-02 to Ins04, and confirms the instrument's contents. Any discovered mistakes are notified to the Auditees in the form of revisions. LP3M is a system controller. LP3M can inspect all filled-out instruments, validate them, generate audit result reports, and print them as needed. Each entity must log in before utilizing the system.

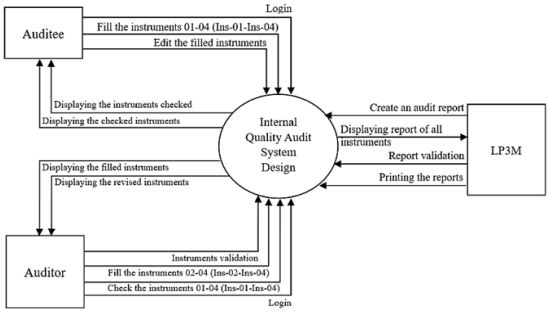

Image 3. IQA System Design

The second step of FODA analysis is Domain Modeling. The Domain Modeling section is shown through ER-Model and Functional Analysis. The purpose of ER-Model is to express domain knowledge clearly in terms of domain entities and the relationships between them. Image 4 depicts the entities in the IQA system and their interactions outside of login. The nine entities illustrated such as users (auditor, auditee, and LP3M), standards, sub-standards, questions, files, instruments, and reports as well as derivatives with critical tasks that can be added as necessary entities.

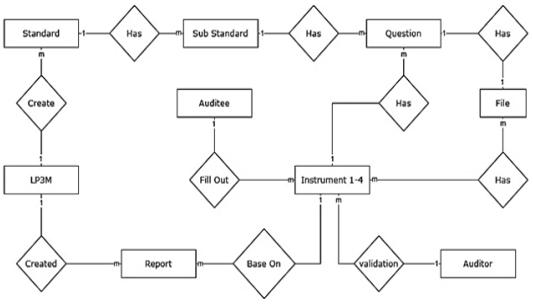

Image 4. ER-Model of IQA System

Next FODA analysis is Functional analysis. Functional analysis is shown through Usecase Diagram. A use case diagram represents the IQA system's functional analysis as shown image 5.

Image 5. Use Case Diagram of IQA System

Several activities included in the main menu demonstrate user engagement with the system. Each menu has submenus and is interrelated. The system contains three actors who interact with the main feature and its sub-features via extend and include relations. LP3M serves as the system and data manager, while the Auditor and Auditee complete the PPEPP-based instrument. The use case illustration is consistent with the context diagram in image 3.

The main features of the IQA system should comply with the system's

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functional requirements. This requires an architectural model that explains the organization of the IQA system software structure that is being developed. The development of the IQA system architecture model is primarily focused on testing system functionalities and develop the system by strengthening the previously created Laravel framework design. Testing based on scenarios, as well as expert validation and UAT results, may be continued to ensure that the system operation is balanced and always in conformity with the most recent SPMI standards.

Alignment of FODA Result to PPEPP Implementation Through Expert Validation and UAT

The FODA results for the IQA system reveal that it has a distinct domain with a variety of features that facilitate its deployment. To guarantee that the FODA results are consistent with the PPEPP cycle, this research contains expert validation results from Mr. Prihandoko, an assessor and the Executive Board Secretary of the Independent Accreditation Institute of Informatics and Computer or known as LAM INFOKOM. Table 2 shows the validation findings. Every feature satisfies PPEPP specifications, as shown in table 2, except the RTL Report function. Table 2 shows some of the features aligned with PPEPP. The final feature of the system that was utilized as an example, did not work, so it may be concluded that 96.87% of the 32 characteristics were suitable. The IQA system has to be improved, although it generally satisfies the five steps required for PPEPP evaluation. Expert has validated this problem and proposed improvements, especially in separating reports and the inclusion of a function that enables university officials to verify reports.

Table 2. Instrument Design Using PPEPP

PPEPP by SPMI	Internal Quality Audit System	Result	
		Yes	No
Establishing the vision and mission of the institution or study program	Display the vision and mission of the institution or study program	✓	
Establishing standards of higher education	Display standards of higher education (SN-DIKTI + Standards by College)	✓	
Auditee Level	Login	✓	
Determination	Listing of standard statements and questions.	✓	
Implementation	Upload proof of implementation documents, previously the white button	✓	
	Upload proof of implementation documents, previously the yellow button	✓	
	Upload proof of implementation documents, previously the green button	✓	
	Upload proof of implementation documents, previously the red button	✓	
	Revision	✓	
	Success Factors	✓	
	Problem Factors	✓	
Control/ Recommendation	Completion Schedule	✓	
	Responsible Part	✓	
…….……			
LP3M Level	Create Report	✓	

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	Report Validation	✓	
	Input/Delete User	✓	
	Input Standard/Indicator	✓	
	Delete Standard/Indicator	✓	
Report Menu (Visualization)	Audit Report	✓	
	RTM Report	✓	
	RTL Report		✓

Table 3. UAT Results

No	Use Case	Users	Response to the IQA System	Response to Each Case (%)
1	Test name: Login	17 (out of 23 total registered users)	3.69	73.91
2	Test name: Managing Instrument and Data	1 (out of 1 total registered LP3M)	4	80
3	Taste name: visualization and audit report	1 (out of 1 total registered LP3M)	5	100
4	Test name: instrument revision	3 (out of 4 total registered auditors)	3.75	75
5	Test name: filling out instrument by Auditors	4 (out of 4 total registered auditors)	3.75	75
6	Test name: filling out instrument by Auditee	13 (out of 17 total registered auditees)	3.3	66
7	Test name: creating an audit report	1 (out of 1 total registered LP3M)	4	80
		1 Expert Validator	4	80
Total				**89.98**

As shown in table 3, user questions are based on the system case and are addressed directly by the system's end user. The evaluation is as shown in table 3 since each example has a different user. Users rate cases 1, 3, 4, and 5 on a 5-point. Users in case 2 and 7 complete a 4-point. In case 6, ten users complete a 5-point, two complete a 4-point, and one completes a 3-point rating. For all result, the user answer has 89.98% value.

The IQA system utilized in this research is aligned with the PPEPP cycle criteria using the FODA approach. Table 2 demonstrates that the FODA concept has been appropriately applied to classify every component of the IQA system. Users may do audit duties more easily since all functionalities are integrated. The PPEPP cycle was at least consistent with the IQA system of one of the institutions that served as an exemple. The IQA system utilized as an example may generally be used to reflect the IQA system at other universities.

According to the UAT results, the IQA system's features to be acceptable and useful. Using the UAT approach testing allows for comparison and differentiation with similar studies, such as research by [12], which have not demonstrated the function testing of the FODA

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outcome aspects. As demonstrated by the UAT findings, every aspect of the IQA system works flawlessly and complies with the standards-based internal quality audit procedure of higher education institutions.

CONCLUSION

The current research has completed the analysis of the university IQA system features with FODA. FODA can analyze features that are consistent with the fulfillment of PPEPP as well as features that need to be added to the IQA system. This research has succeeded in meeting the research objectives by showing how SPMI in the PPEPP framework can be implemented in line with the needs of the university's internal multi-audit using FODA.

This study creates prospects for further growth in the feature analysis. FODA outcomes can be validated by users with different ap-proaches such as system integration test-ing (SIT) to ensure modules that support all features are well integrated. Validation results can be combined to provide input for the development of the IQA system, ensuring that the SPMI based on PPEPP in higher education is well implemented and meets the expected quality standards.

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