

Optimization of the Internal Quality Audit Process Through the Development of an Integrated Information System

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ABSTRACT –The Internal Quality Audit (IQA) process is a crucial element for maintaining the quality of higher education. However, its implementation at STIMIK Tunas Bangsa Banjarnegara faces challenges, particularly with manual documentation. The use of paper-based forms, decentralized recording of findings, and separate reports often cause delays, data duplication, and difficulty in tracking follow-up actions. This research aims to develop an integrated information system to optimize the IQA process and improve the ease of documentation up to the findings report stage. This study uses a qualitative approach with a case study design. Data was collected through observation to understand the manual workflow and interviews with relevant parties to gather system requirements. The system was developed using the Prototype method and built with the PHP programming language and a MySQL database. The research resulted in a system named SIMATIKA (Sistem Audit Mutu Internal Kampus), all of whose features function well based on BlackBox Testing. These features include audit period management, indicator management, user configuration, and audit assignment. The system also received a score of 86% from a user questionnaire, indicating very good feasibility and acceptance. Thus, SIMATIKA successfully optimizes the IQA process at the campus.

Keywords: Internal Quality Audit, Information System, Integrated, Prototype, PHP

Optimalisasi Proses Audit Mutu Internal Melalui Pengembangan Sistem Informasi Terintegrasi

ABSTRAK – Proses Audit Mutu Internal (AMI) adalah elemen krusial untuk menjaga kualitas perguruan tinggi. Namun, pelaksanaannya di STIMIK Tunas Bangsa Banjarnegara masih menghadapi kendala, terutama dalam hal dokumentasi yang masih manual. Penggunaan borang berbasis dokumen, pencatatan temuan yang tidak terpusat, dan laporan yang terpisah sering kali menyebabkan keterlambatan, duplikasi data, dan kesulitan dalam pelacakan tindak lanjut. Penelitian ini bertujuan mengembangkan sistem informasi terintegrasi untuk mengoptimalkan proses AMI dan meningkatkan kemudahan dokumentasi hingga tahap laporan hasil temuan. Penelitian ini menggunakan pendekatan kualitatif dengan jenis studi kasus. Pengumpulan data dilakukan melalui observasi untuk memahami alur kerja manual dan wawancara dengan pihak terkait untuk menggali kebutuhan sistem. Sistem ini dikembangkan menggunakan metode Prototype dan dibangun dengan bahasa pemrograman PHP serta database MySQL. Hasil penelitian ini adalah sistem bernama SIMATIKA (Sistem Audit Mutu Internal Kampus), yang seluruh fiturnya berfungsi dengan baik berdasarkan pengujian fungsional BlackBox Testing. Fitur tersebut mencakup pengelolaan periode audit, manajemen indikator, pengaturan pengguna, dan penugasan audit. Sistem ini juga mendapatkan skor 86% dari kuesioner pengguna, yang menunjukkan kelayakan dan penerimaan yang sangat baik. Dengan demikian, SIMATIKA berhasil mengoptimalkan proses AMI di kampus.

Kata kunci: Audit Mutu Internal, Sistem Informasi, Terintegrasi, Prototype, SIMATIKA

1. INTRODUCTION

The rapid development in the era of digital transformation has compelled higher education institutions to continuously improve the quality of their services and governance in a sustainable manner. One of the key efforts to ensure and enhance this quality is through the implementation of Internal Quality Audit (IQA). IQA is an integral part of the Internal Quality Assurance System (IQAS), which plays a vital role in evaluating the conformity between academic activities and the established quality standards. The Internal Quality Audit (IQA) serves as a systematic, independent, and well-documented process designed to ensure that institutional activities are carried out according to procedures and that their outcomes meet the standards required to achieve the institution's objectives [1].

The Internal Quality Audit (IQA) is one of the evaluation stages within the cycle that includes Determination, Implementation, Evaluation, Control, and Improvement (PPEPP). Each stage plays an essential role in ensuring that the quality management system established by the higher education institution complies with the National Standards for Higher Education (SNDIKTI) as mandated by government regulations [2].

STIMIK Tunas Bangsa Banjarnegara is one of the higher education institutions in Banjarnegara that regularly conducts Internal Quality Audits (IQA) as part of its quality assurance system. However, the IQA process still faces several challenges, including limited human resources, manual documentation, and low operational efficiency. Currently, the completion of audit forms, recording of findings, and preparation of audit reports are carried out separately using manual documents, leading to delays, data duplication, and difficulties in tracking audit results.

The study by [3], developed a web-based quality audit system to facilitate checklists, recording of findings, and audit reporting. However, the system has not yet included features for real-time tracking of findings or integration between organizational units.

The study by [4], designed an Internal Quality Audit (IQA) management system using the System Development Life Cycle (SDLC) method, which emphasizes a structured approach to system development. In contrast, this study adopts the Prototype method to enable a more iterative, flexible, and user-oriented development process.

The study by [5], also implemented the Prototyping method for an integrated Internal

Quality Audit (IQA) system. However, it did not include features for automatic scheduling and notifications for auditors and auditees.

This study develops SIMATIKA (Campus Internal Quality Audit System) at STIMIK Tunas Bangsa Banjarnegara by integrating features such as real-time finding tracking, audit scheduling, and automatic notifications to enhance documentation efficiency throughout the IQA process up to the stage of audit findings reporting.

2. RESEARCH METHOD

The system development method used in this study is the Prototype model. Prototyping is a commonly used approach in the system development process. This method is highly effective in minimizing potential misunderstandings between users and analysts, especially when users have difficulty clearly expressing their requirements [6].

System Development Method

This study follows the Prototype-based system development method, which consists of five sequential stages. This approach was chosen because it provides a structured and well-defined process, making it suitable for developing systems based on real user needs. The following illustrates the system development flow using the Prototype method:

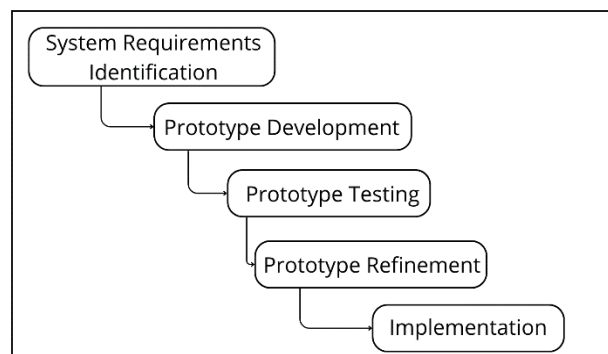


Figure 1. Method Stages Prototype

The following are the stages of the research process:

System Requirements Identification

The initial stage involves identifying system requirements based on data obtained from observations, interviews, and documentation. At this stage, functional requirements are determined, such as features for online IQA form input, recording and tracking of audit findings, and an audit findings summary dashboard. In addition, non-functional requirements are also analyzed, including system usability, security, and efficiency [7].

Prototype Development

After the requirements are identified, a system prototype is created as an initial design. This prototype includes the user interface (UI) design, system process flow, and an overview of the main functions. The prototype serves as an early representation of the system, providing users with a clear visualization of how the final system will look and operate [8].

Prototype Testing

The developed prototype is then tested by users to determine whether the design meets their needs and expectations. Feedback obtained from this stage is crucial for identifying deficiencies or aspects that need improvement.[9].

Prototype Refinement

Based on the testing results and user feedback, the prototype is refined to better meet user needs. Improvements may include enhancing the user interface design, adding new features, or adjusting the system flow to improve usability. This process can be performed iteratively until the prototype fully meets user expectations[10].

Implementation

Once the prototype is considered satisfactory, the next stage is system implementation. In this stage, the prototype is translated into an actual program code using PHP as the programming language and MySQL as the database. The developed system includes several modules such as a login module with different user roles (auditor, auditee, and Quality Assurance Unit), online IQA form input, recording and tracking of audit findings, and an audit findings summary dashboard [11].

Data Collection Method

This study employs a qualitative approach with a case study research design. According to [12], the qualitative research method emphasizes a deep understanding of a social phenomenon or human problem through direct data collection, such as in-depth interviews, observations, and case studies. This approach was chosen because it is suitable for exploring comprehensive information about the ongoing internal quality audit process within STIMIK Tunas Bangsa. Qualitative research does not focus on numerical data but rather on understanding the processes, meanings, and perspectives of individuals directly involved in the phenomenon.

1. Observation

The researcher conducted direct observations of internal quality audit activities at STIMIK Tunas Bangsa. Both participatory and non-participatory observations were carried out to examine how the audit process was conducted, who was involved, and what documents were used. The results of these observations were used to understand the audit workflow and identify potential problems in the

process. According to Eko Hardi Ansyah [13], one of the main purposes of direct observation is to record events and behaviors accurately to reflect what actually occurs.

2. Interview

The interview technique was used to explore in greater depth the opinions, needs, and expectations of relevant parties such as the Head of the Quality Assurance Unit (UJM), internal auditors, and auditees. Semi-structured interviews were conducted using open-ended questions, allowing respondents to provide detailed and comprehensive answers. Information obtained from the interviews served as valuable input for system feature design. According to Edi [14], an interview is a conversation process between an interviewer and an interviewee with a specific purpose, guided by a structured framework, and conducted either face-to-face or through communication tools.

3. Documentation

The researcher collected related documents such as audit forms, previous audit reports, the internal quality audit organizational structure, and applicable standard operating procedures (SOPs). These documents were used to obtain written evidence and served as the basis for developing the data structure and business processes in the system [15].

System Testing

System testing is an essential stage in software development aimed at ensuring that the developed system operates according to requirements and functions correctly. In this stage, all system features and workflows are checked to identify errors (bugs), deficiencies, or inconsistencies with the initial design. Black Box Testing is a software quality testing method that focuses on software functionality. The purpose of black box testing is to identify incorrect functions, interface errors, data structure issues, performance problems, and initialization or termination errors [16].

Website testing

Website testing using the black box testing method is a technique to evaluate website functionality and security. Implementing this method is considered effective for short-term testing because it can be conducted using open-source tools or manual testing tools [17].

Likert Scale

The Likert scale is one of the most widely used measurement instruments in social and educational research to assess respondents' attitudes, perceptions, or opinions. In its application, respondents are asked to express their level of agreement or disagreement with a statement using a graded scale, typically ranging from "strongly disagree" to "strongly agree." This scale allows researchers to convert respondents' answers into

numerical scores for further analysis. However, there is often a misconception that any scale with multiple levels is a Likert scale, whereas not all such scales actually qualify as one [18].

Score	Percentage (%)	Category
81 - 100%		Very Good
61 - 80%		Good
41 - 60%		Fair
21 - 40%		Poor
0 - 20%		Very Poor

Likert Scale Formula Used:

Ideal Score (IS)

$$IS = N \times Q \times S_{max}$$

Where:

N = Number of respondents

Q = Number of questions

S_{max} = Maximum score

Actual Score (AS)

$$AS = f \times b$$

Where:

f = Number of respondents selecting a certain response category

b = Weight of the response

Total Percentage (100%)

$$P = \frac{AS \times 100\%}{IS}$$

Sampling

Sampling is a technique of selecting a portion of members from a population that is considered to represent the overall characteristics of that population. In research, the use of sampling techniques is essential because researchers often face limitations in time, cost, and resources, making it impossible to study the entire population. According to Sugiyono [19], a sampling technique is a method used to determine the number of samples that will serve as the actual data sources, taking into account the nature and distribution of the population. Thus, the quality of research data is highly influenced by the accuracy of the sampling technique chosen.

3. RESULTS AND DISCUSSION

This research is an independent study conducted to develop the Campus Internal Quality Audit Information System (SIMATIKA). The research object focuses on the internal quality audit process within STIMIK Tunas Bangsa Banjarnegara, particularly involving the Quality Assurance Unit (UJM) as well

as the auditors and auditees. The purpose of this study is to address the institution's need to digitalize the internal quality audit process so that it can be conducted more effectively, in an integrated, and well-documented manner. The research object was selected because the internal quality audit process at the institution has traditionally been conducted manually, using printed documents, paper-based forms, and a time-consuming reporting process. With the implementation of SIMATIKA, it is expected that all processes from form input and validation to tracking of findings can be carried out centrally and online.

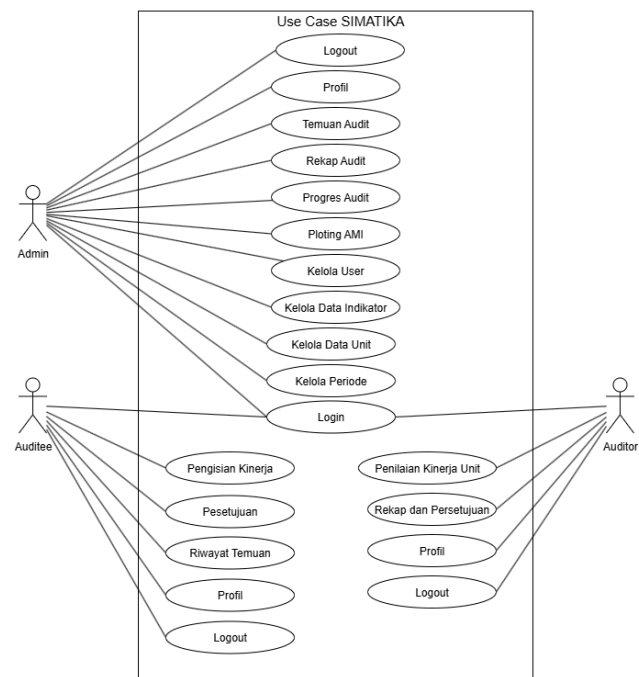


Figure 2. Use Case Diagram SIMATIKA

A use case is a method for describing the interaction between users and the system being developed [20]. The Use Case Diagram in Figure 2 illustrates that the admin has several activities, including logging in, managing audit periods, managing unit data, managing indicator data, managing user accounts, plotting the IQA schedule, viewing progress, viewing audit findings, editing profiles, and logging out.

The auditee can perform activities such as logging in, filling out performance data, providing approval, viewing the history of findings, editing profiles, and logging out.

Meanwhile, the auditor can perform activities such as logging in, evaluating unit performance, providing approval, editing profiles, and logging out.

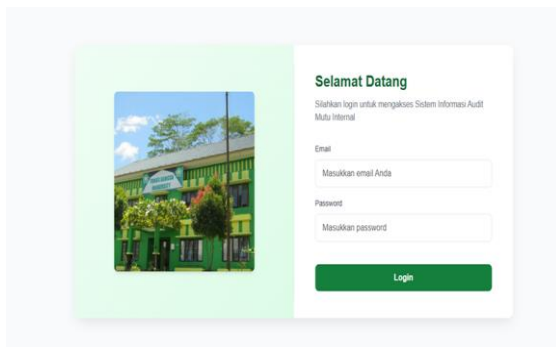


Figure 3. Impementation Design Login

The login design implementation is shown in Figure 3 where users are required to enter their registered email and password to access the system.

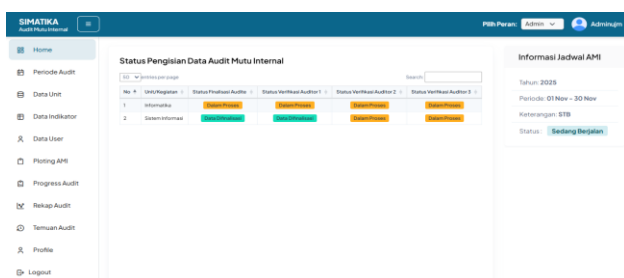


Figure 4. Admin Dashboard Design Implementation

The Admin Dashboard design implementation is shown in Figure 4, which displays information regarding the status of internal quality audit data entry as well as details of the IQA schedule, including the year, period, and current status.

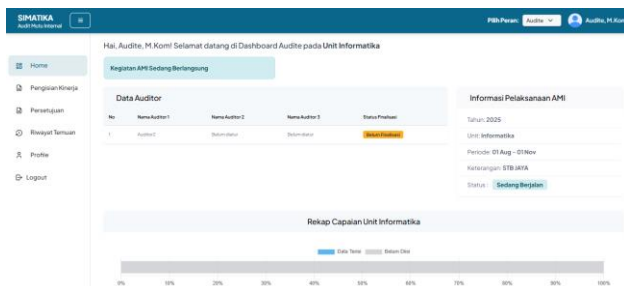


Figure 5. Auditee Dashboard Design Implementation

The Auditee Dashboard design implementation is shown in Figure 5, which displays a welcome page for the auditee, information about the implementation of the Internal Quality Audit (IQA), and a graph showing the progress of the completed data.

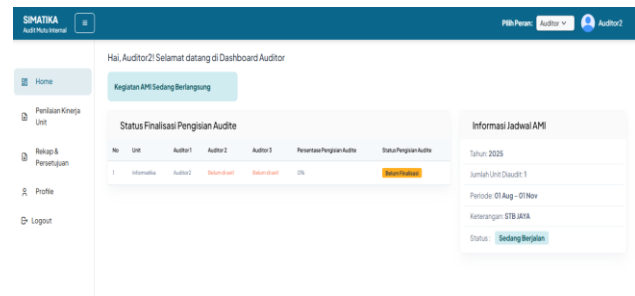


Figure 6. Auditor Dashboard Design Implementation

The Auditor Dashboard design implementation is shown in Figure 4.70, which displays a welcome page for the auditor, information about the implementation of the Internal Quality Audit (IQA), and the finalization status of the auditee.

This study conducted system testing using the black box testing method. The purpose of this testing is to ensure that each feature in the system operates according to the functional requirements. The tester provides specific inputs to the system and then observes the resulting outputs to determine whether they match the expected results. If the output corresponds to the expectations, the feature is considered successful; otherwise, it is classified as failed or erroneous and requires correction. Based on the tests conducted, the results for the features and elements within this application are as follows:

Table 2. Instrument Black Box Testing Admin

No	Test Scenario	Expected Output	Result	Error Message
1.	Login and enter username and password	Successfull y enters the admin dashboard	Suc cess	None
2.	Click all available menus	Navigates to the selected page	Suc cess	None
3.	Click the add period menu and create a new period	Successfull y adds a period schedule	Suc cess	None
4.	Click the add unit menu and create a new unit	Successfull y adds a unit	Suc cess	None
5.	Click the add user menu and create a new user	Successfull y adds a user	Suc cess	None
6.	Click the add indicator menu and	Successfull y adds an indicator	Suc cess	None

	create a new indicator			
7.	Click the plotting menu and perform plotting	Successfully performs plotting	Success	None
8.	Click the progress menu	Displays the progress chart	Success	None
9.	Click the audit recap menu	Displays the audit recap per unit	Success	None
10.	Click the audit findings menu and select a unit	Displays the audit findings page for each unit	Success	None
11.	Click the audit findings menu and download unit findings	Downloads the unit findings PDF file	Success	None
12.	Click profile and select edit	Successfully updates the profile	Success	None

Table 3. Instrument Black Box Testing Auditor

No	Test Scenario	Expected Output	Result	Error Message
1.	Login and enter username and password	Accesses the auditor dashboard and displays the audit schedule	Success	None
2.	Click all available menus	Navigates to the selected page	Success	None

No	Test Scenario	Expected Output	Result	Error Message
3.	Click the unit assessment menu and select a unit	Successfully displays the selected unit	Success	None
4.	Click the unit assessment menu, select a unit, and fill in the	Displays the findings form	Success	None

	findings form			
5.	Click the unit assessment menu, select a unit, and fill in the recommendation form	Displays the recommendation form	Success	None
6.	Click the unit assessment menu, select a unit, and confirm the achievement	Successfully confirms the achievement	Success	None
7.	Click the approval recap menu, select a unit, and approve the unit	Displays a message indicating successful finalization	Success	None
8.	Click profile and select edit	Successfully updates the profile	Success	None

Based on Table 3 presents the results of system testing using the black box testing method to verify that each function operates as intended. Based on eight test scenarios, all system functions were executed successfully, with the result marked as "Success" and no error messages encountered. The tests covered processes such as login, menu navigation, unit assessment, completion of findings and recommendation forms, achievement confirmation, approval procedures, and profile updates. These results indicate that all core features of the auditor system function properly according to the design, produce the expected outputs, and demonstrate successful execution in every process without any errors.

Table 4. Instrument Black Box Testing Auditor

No	Test Scenario	Expected Output	Result	Error Message
1.	Login and enter username and password	Accesses the auditee dashboard and displays the audit schedule	Success	None

					SK	K	C	B	SB
2.	Click all available menus	Navigates to the selected page	Succes	None	3.	The system is easy to use without special training			
3.	Click the performance input menu and select a code	Displays the performance input form	Succes	None		The system layout is neat and well-structured			
4.	Click the approval menu and select send approval	Successfully finalizes the data	Succes	None		The available features meet user needs			
5.	Click the findings history menu and select a period	Displays the history, findings description, and recommendation on description	Succes	None		The data input process is easy to perform			
6.	Click profile and select edit	Successfully updates the profile	Succes	None		The system runs stably without errors			
					8.	The system stores and processes data properly			
					9.	The displayed data matches the input			
					10.	The system provides a fast response			

Based on Table 4 presents the results of black box testing conducted on the auditee system to ensure proper functionality of each feature. The testing included six scenarios, covering the login process, menu navigation, performance input, approval submission, viewing of findings history, and profile editing. All scenarios produced the expected outputs, with each process completing successfully and no error messages detected. These results confirm that the auditee system operates effectively and reliably, meeting its functional requirements and allowing users to perform all intended actions without encountering system errors.

In addition to feature testing, this study also conducted system testing using a questionnaire as a means to obtain feedback and suggestions from users regarding the developed system. The researcher prepared 10 questions representing the main aspects of the system, and the questionnaire was distributed to 4 respondents who are the direct users of the system.

Table 5. Questionnaire

No	Question	Strongly Disagree				
		SK	K	C	B	SB
1.	The system has an attractive interface					
2.	The menus and navigation are easy to understand					

Based on Table 5 presents the instrument used to assess user satisfaction with the developed system. The questionnaire consists of ten statements evaluated using a Likert scale with five levels: Strongly Disagree (SK), Disagree (K), Neutral (C), Agree (B), and Strongly Agree (SB). The statements focus on various usability aspects, including interface attractiveness, ease of navigation, user-friendliness without training, layout organization, feature adequacy, data input simplicity, system stability, accuracy of displayed data, proper data processing, and response speed. This instrument aims to measure the overall user perception and satisfaction regarding the system's functionality, usability, and performance quality.

Abbreviations:

SD = Strongly Disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly Agree

Table 6. Respondent's Name

No	Name	Description
1.	Ibu Khalimatufofiah, M.Kom	Admin
2.	Ibu Heni Rahmawati, M.Kom	User
3.	Bapak Muh. Zia Ulkhaq, M.Kom.	User
4.	Bapak Purwanto, M.Kom	User

Admin Questionnaire Results

The questionnaire results from one respondent

(admin) indicate the following:

1. The system has an attractive interface 80%.
2. The menus and navigation are easy to understand 100%.
3. The system layout is neat and well-structured 100%.
4. The system is easy to use without special training 80%.
5. The available features meet user needs 100%.
6. The data input process is easy to perform 100%.
7. The system runs stably without errors 100%.
8. The system stores and processes data properly 100%.
9. The displayed data matches the input 80%.
10. The system provides a fast response 60%.

User Questionnaire Results

The questionnaire results from three respondents (users) indicate the following:

1. The system has an attractive interface 80%.
2. The menus and navigation are easy to understand 93%.
3. The system layout is neat and well-structured 80%.
4. The system is easy to use without special training 73%.
5. The available features meet user needs 87%.
6. The data input process is easy to perform 93%.
7. The system runs stably without errors 93%.
8. The system stores and processes data properly 80%.
9. The displayed data matches the input 80%.
10. The system provides a fast response 87%.

Based on the overall results of the questionnaire consisting of ten questions, the system achieved an overall score of 86%. With this result, the system is considered feasible for use. The results were obtained using the Likert scale calculation as follows:

$$\begin{aligned}\text{Total Actual Score} &= 45 + 127 = 172 \\ \text{Total Ideal Score} &= 50 + 150 = 200 \\ \text{Total Percentage} &= \frac{172 \times 100\%}{200} \\ &= 86\%\end{aligned}$$

4. CONCLUSION

Based on the results of the research conducted, it can be concluded that the development of the Internal Quality Audit Information System (SIMATIKA) was successfully designed and implemented to integrate the entire internal quality audit process at STIMIK. The system supports various key features, including audit period management, indicator management, unit and user configuration, and audit plotting processes. The results of the functional testing using the Black Box

Testing method showed that all tested features operated as expected without significant errors. Furthermore, the user satisfaction evaluation using the Likert scale obtained an actual score of 172 out of an ideal score of 200, equivalent to 86%. This score falls under the "Very Good" category, indicating that the developed system is well-received by users and effectively meets the needs in supporting the internal quality audit process.

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