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Auditing learning management system using information technology infrastructure library (itil)

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A R T I C L E I N F O

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ABSTRACT

Information security is an important asset in the organization so that the confidentiality, integrity and availability of information must be maintained. One way to do this evaluation is to conduct an audit. Audit is an evaluation process to ensure the level of suitability between a system and predetermined criteria. In this paper, an audit will be carried out on the security of IT services at the Del Institute of Technology. Service audits are conducted to determine the level of security of information technology services used. This audit was conducted using a framework called ITIL (Information Technology Infrastructure Library). ITIL is a framework that functions to manage business services and IT infrastructure with the aim of ensuring that the quality of IT services is in accordance with the criteria. This audit was carried out using data from a questionnaire given to several students of the Del Institute of Technology, where this questionnaire contains five subdomains that will be analyzed to determine whether the security of the services is good or not. It can be concluded that the LMS has implemented service operations properly. The output of this research is a recommendation to further improve the security of IT services.

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1. INTRODUCTION

Information Technology Services are things that need attention because they play an important role for modern business as an increase in company performance. In an organization, infrastructure management is carried out in order to improve the quality of services. Well-managed infrastructure and services will provide a more valuable business. IT Services management that is carried out properly can reduce costs and time due to problems or incidents that occur and damage to infrastructure that affects business processes (Amalia, 2022).

Del Institute of Technology is a higher education institution engaged in information technology. However, in the use of IT services, it is not uncommon for information security problems to be faced by members of the community, especially

students, which has a negative impact on ongoing business processes, so that the security of the information system can be maintained, it is necessary to evaluate the security of the information system periodically. This analysis is carried out on information security services to ensure system security.

E-learning is one of the advancements in education in terms of IT which has been used as a means for learning in a tertiary institution to be more efficient and effective. The learning process using E-learning is very helpful. Del Institute of Technology has a Learning Management System called E-Course.

Lecturers and students according to their responsibilities. By using e-learning, lecturers can share learning materials, give assignments, create discussion forums, and other things according to the wishes of lecturers, while by using e-learning, students can receive information and materials provided by lecturers. The application of e-learning can support user activity, both lecturers and students, in the learning process, the application of e-learning should be in accordance with the vision and mission of the institution (Hastini & Cholil, 2021).E-Course is a learning tool that is used intensely by students and lecturers at the Del Institute of Technology. The E-course can be used by the institution community, such as lecturers, students and interested parties. By using an e-course, lecturers can provide material, assign assignments, open forums, and other learning matters according to the lecturer's wishes, and students can also take absences, submit assignments and view learning material. In e-courses, students can access, enroll in a course, submit assignments and make changes to assignments that have been submitted.

ITIL is a framework that can provide an overview of best practices in an information technology service(Berger, 2020). This framework provides a framework within the enterprise for information technology governance. ITIL focuses on measuring and improving the quality of an information technology service in companies, from a business and customer perspective. If IT management is good, then what the company needs to do is ensure the quality of information system security (Dayal, 2020).

Information Technology Infrastructure Library 3 (ITIL V3) is a standard guideline for managing information technology services and is based on good practice, common practice and best practice in terms of providing support for the services provided. ITILV3 can be relied upon as the most detailed and in-depth standard, so it will be more appropriate to use ITIL V3 compared to other standards in technical and operational terms (Ratnawati, 2021). ITIL V3 has 5 domains, but this research will focus on the Service Operation Domain because this domain is related to the provider and the customer. ITIL provide set of recommendations containing explanations and instructions for information delivery and quality control, technology-based service (Bayona-Oré, 2022).

ITIL V3 is a concept and technique for handling IT services. ITIL V3 helps in realizing the value of IT services to internal and external stakeholders. The ITIL safety management approach describes the establishment of formal safeguards within the management organization (Handayani & Aziz, 2020). Based on its use, ITIL can be said to be a framework whose data can be adapted to the environment or departments that exist in the company (Granulo, 2020). Some of the main benefits of using the ITIL framework are, Improved quality and level of service, Increased customer satisfaction, More effective standardized processes, Aligned with services, processes, and organizational goals (Suryawan, 2018). ITIL already implement in many business for example banking (Arisenta, 2020), retail (Alam, 2020), IT industry (Dayal, 2020), government (Antoni, 2021), etc.

Therefore, this study will measure the maturity of ITIL V3 implementation by using ITIL V3 as a standard in the Service Operations domain with the aim of knowing the current condition of E-learning at Del Institute of Technology, namely E-course. With

this research, it is expected to be able to provide changes through suggestions and improvements for E-course Service Operations based on the maturity level shown.

Therefore, seeing how important it is to maintain the security of information in an organization, this research will conduct an IT service security audit using the Information Technology Infrastructure Library (ITIL) framework which aims to find out how information technology services can bridge the company's business development, audit This was done by collecting survey data which was distributed to Del Institute of Technology students to express their opinions using a five-point ordinal scale, namely: very unfavorable (1), not good (2), sufficient (3), good (4), and very good (5), then this data will be processed to obtain results that can be used to measure information security services. Where this research is expected to provide guidelines for recommendations in improving the quality of information security at Del Institute of Technology, so that the confidentiality, integrity, and availability of information is maintained.

2. RESEARCH METHOD

In research there are several stages that must be carried out with the aim of measuring the level of activity in a systematic and structured manner. The several stages of the research are as follows.

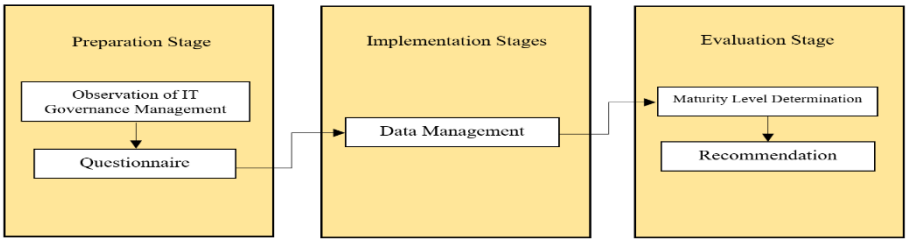

Figure 1. Research Stages

The first stage is the preparatory stage, which consists of two parts, namely observing the management of IT governance by identifying problems within an organization/academy/company and looking for references as a reference in research. Furthermore, making a questionnaire for data collection by compiling questions based on domain service operations and then distributing them according to the identification of problems that have been carried out. The second stage is the implementation stage which includes data management to determine the validity and reliability of the statements. The last stage is the evaluation stage which includes setting the maturity level in IT services and making a report on the results in the form of service quality improvement recommendations (Hadiana, 2017). In this study, the data collection technique used disproportionate stratified random sampling (disproportionate stratified random sampling) which used non-homogeneous population members and could be taken according to interests.

This chapter covers research methods while conducting research using ITIL version 3, starting from identifying problems outlined in the background to the analysis stage to find recommendations for e-courses. These stages will be explained in detail in the research steps carried out in the following section.

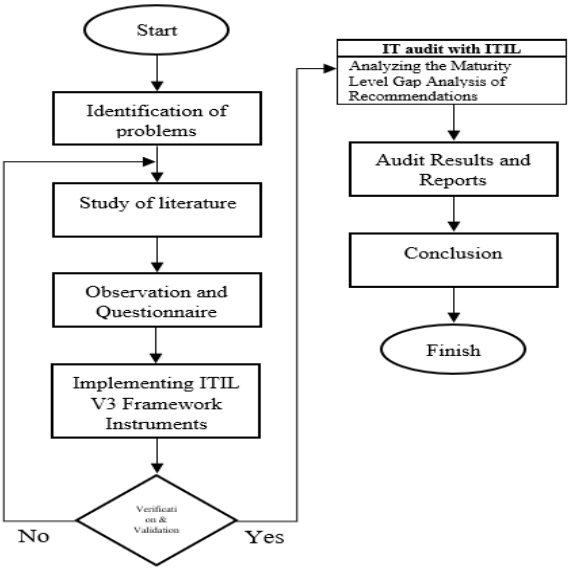

Figure 2. Stages of the Research Method

2.1 Information Technology Infrastructure Library (ITIL)

The IT infrastructure library (ITIL) was developed by The Government of Commerce which is a government institution in collaboration with an independent IT service management forum (ITSMF) organization in IT services, as well as with the British Standards Institute (BSI). ITIL is a framework that has the function of managing business services and IT infrastructure with the aim of ensuring the achievement of quality managed service support. The ITIL framework has several benefits including increasing IT service satisfaction to customers, saving financial expenses through reduced rework, increasing company revenue and using resource management. Within the ITIL framework, it is divided into five service cycles namely Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. At the service design stage, it contains sequential IT organization guidelines for conversion to business strategic objectives and becomes a collection of IT services. Service strategy is a guideline stage for managing and operating IT but also in the form of corporate asset strategy. Service transition contains guidance for transforming the results of a new IT service design into an operational environment. Service operation is the stage of all operational activities in the daily management of IT services. Continual service improvement is a guide for compiling and maintaining service quality. ITIL components can be fit to the requirements of the educational process (Santoso, 2019).

3. RESULTS AND DISCUSSIONS

This chapter will describe the results of the analysis of the data obtained based on observations of the e-course, and recommendations that will be given in making future improvements. And data collection was also carried out using a questionnaire technique to obtain data that met the established standards. The results of observations and questionnaire responses will be a benchmark to see the discrepancies that occur. Inappropriate results, namely, the current condition of the e-course is still not suitable according to ITIL V3. The following is a description of the results of the analysis and suggestions for improvement for each process and work function of service operations based on ITIL V3. The results of observations made by researchers on the e-course

Service Operations conducted by students based on the responses given by students to the questionnaire questions that have been given are as follows:

3.1 Data Collecting

The object of this research is the Service Operation e-learning which is an e-course that is conducted by considering that campus is experiencing problems with the standards for carrying out Service Operations every day. Before conducting research, the auditor will make observations on the Del Institute of Technology Information System. Observation (Observation) is a technique for obtaining basic data obtained by directly observing objects in the field. Observations made on the Del Institute of Technology e-course system. There is also a guide to the use of the e-course by students, which will become secondary data in observing service operations in the e-course.

The type of observation used is observation on participation which is carried out by participating directly in the environment of the object of study. In making observations, researchers will participate in carrying out activities within the object of study and experience the services provided by the e-course as the object of study. Thus, with participant observation, more complete and better data will be obtained to interpret the services in the e-course.

The Questionnaire is a technique used for data collection. Questionnaires are used as a tool to obtain data on E-course research. The questions contained in the questionnaire were in the form of open or closed questions. In research to make it easier for respondents to choose answers, questionnaires will be distributed using closed questions with the answer choices that have been provided. The High-Level Assessment model used in the questionnaire is contained in the ITIL V3 maturity level guidelines. With the use of this model for the questionnaire, it will provide an indication of the maturity of ITIL implementation in E-Course service operations so that results will be obtained regarding the advantages and disadvantages of e-courses in implementing ITIL V3. The standard used in making the questionnaire is the maturity value in ITIL V3. There are five levels that will be the assessment points of the E-course service operations.

3.2 Validity and Reliability Test

The first step that needs to be taken in distributing the questionnaire is to test all items (questions) to measure the validity and reliability of the research instrument. If there are errors in the presentation of the questionnaire, then these statements should be deleted and replaced with questions that are easier for respondents to understand with the aim of making it easier to process further information. When the questionnaire statements submitted are valid, then these statements can be used for research information. Furthermore, the research instrument will be distributed to respondents who are not a sample when conducting instrument trials.

3.4 Determine Maturity Level (Maturity Level)

Maturity level mapping in e-course Service Operations is carried out after data collection and document evaluation have been completed. After that, a determination of the five levels of the ITIL V3 maturity assessment will be carried out, namely initial, repeatable, defined, managed and optimized.

3.5 Ongoing service analysis (IT Governance Management Observations)

From the data collection results, this study aims to analyze services that are currently operating to measure the condition of technology services on the Del Institute of Technology campus. IT services that are currently running include the learning management system ECourse which is used as a place for students to collect assignment artifacts, then there is SSO (Single Sign On) which is used to manage student identities when using IT services.

3.6 Service Needs Analysis (Observation of IT Governance Management)

After knowing the status of the service that is currently operating, the following is a presentation of the results of the analysis of information technology services using the ITIL framework.

Tabel 1. Service Needs Analysis

No	Service Standards	IT Services
1	Internet Service	• Providing internet services that can meet the needs of students because there are 20% of the results of the respondents' answers giving an assessment that they do not agree • Providing access to internet services throughout the campus area, because in the results of the respondents 34.7% of respondents agreed that access to internet services is still only available in certain areas
2	Hosting Service	Hosting services are good because 41% of respondents gave an adequate rating
3	Repository	Repository service is good because 46% of respondents gave an adequate rating
4	Digital Library	The Digital Library service is good because 48.3% of respondents gave a good rating
5	Information System	The Digital Library service is good because 67.8% of respondents gave a good rating

3.7 Questionnaire Analysis

Analysis of the questionnaire was carried out after knowing the results of observations of ongoing service analysis and analysis of service needs. The questionnaire given is a statement that has been analysed according to the needs of a service security audit at the Del Institute of Technology.

The questionnaire for the e-course system audit is as follows:

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SA : Strongly Agree, Point = 5
A : Agree, Point = 4
E : Enough, Point = 3
D : Disagree, Point = 2
SD : Strongly Disagree, Bobot = 1

3.8 Data Analysis and Management

Analysis of the questionnaire was carried out after knowing the results of observations of ongoing service analysis and analysis of service needs. The questionnaire given is a statement that has been analyzed according to the needs of a service security audit at the Del Institute of Technology.

The questionnaire for the e-course system audit is as follows:

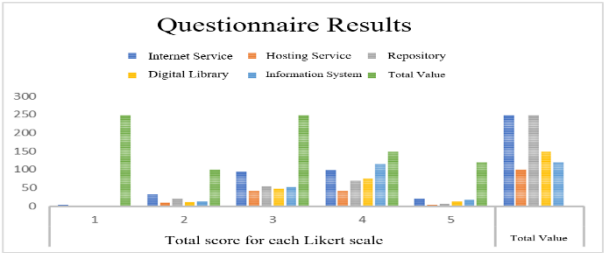

Figure 3. Questionnaire Results

a. Internet Service

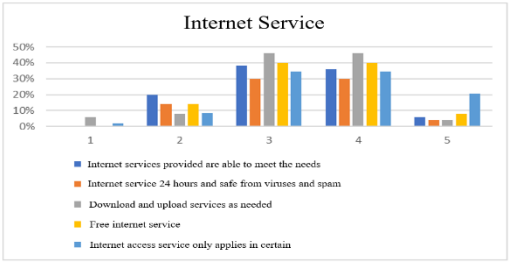

Figure 4. Sub Domains A

b. Hosting Service

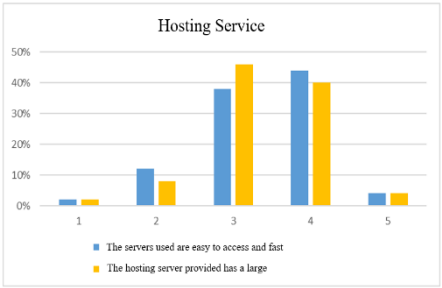

Figure 5. Sub Domain B

c. Repository

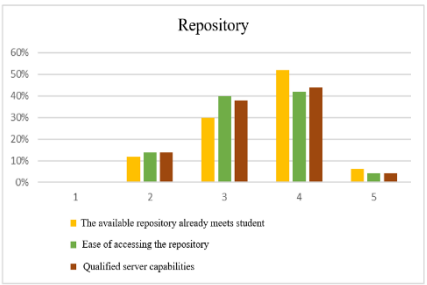

Figure 6. Sub Domain C

d. Digital Library

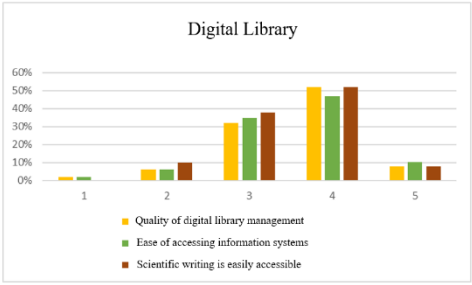

Figure 7. Sub Domain D

e. Information System

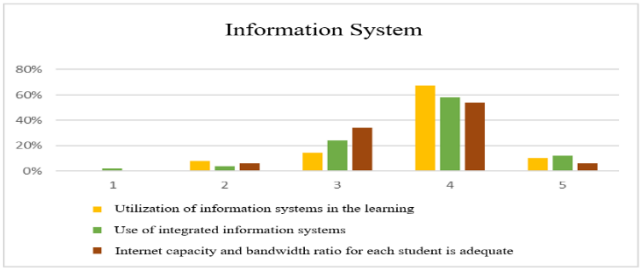

Figure 8. Sub Domains E

3.5 Analisis Maturity Level

The analysis of the maturity level in the data collection from the results of the questionnaire, that is obtained from the calculation of the data that has each index value in each of its sub-domains. The Measurement of maturity level can be seen in the table below.

Table 3. Analysis of Maturity Level Results.

No.	Sub Domain	Value	Level	Maturity
1	Internet Service	4	4	Managed
2	Hosting Service	3	3	Defined
3	Repository	3	3	Defined
4	Digital Library	4	4	Managed

Based on the maturity level results above, it can be concluded that the results of the maturity level assessment questionnaire on the Internet Services subdomain are at 4, then Hosting Services are at level 3, then Repositories are at level 3, Digital Library servicess are at level 4 and information systems are at level 4. So an average maturity level was created, namely at level 3.6.

3.6 Recommendation

The following are the results of recommendations to be given to sub-domains that are not in line with expectations for service security at the Del Technology Institute based on the Information Technology Information Library (ITIL) framework is Internet Services . From the results of distributing questionnaires to the Internet Service subdomain, the value obtained is 3, this is because the dominant respondent assesses number 3. To achieve the expected value, namely number 4, it is recommended to provide internet services that can meet the needs of students and provide access to internet services in

the entire campus area.

4. CONCLUSION

Based on the research that has been carried out on the object of study, namely the e-course, it can be concluded that the e-course has implemented service operations properly. This refers to the average maturity level or gap analysis value obtained based on observation and analysis. The maturity value obtained is 3.84 and is at level 4, namely Managed and Measurable. Based on the maturity value, it can be said that service operations, namely processes and activities on e-courses carried out by students, have been going well according to the guidelines and systems that have been integrated and easy access for users. By sharing knowledge, increasing capacity, and consistency within an organization. An IT services process management strategy helps an organization identify the IT services needed to achieve its strategy and enhance organizational sustainability. Service level management also helps determine how IT services are delivered over a period of time. ITIL also supports value creation by increasing competitive effectiveness and market space by increasing customer satisfaction. ITIL adds value by identifying and prioritizing critical IT services to enhance organizational stability, prevent incidents, or identify vulnerabilities within the organization to respond to incidents before they occur. It can be concluded that the ITIL framework/ framework offers a holistic approach in the context of IT governance. ITIL applications contribute to many aspects of organizational sustainability by controlling and managing technological change to improve IT service utilization and organizational stability as information technology and business parallel with ITIL can enhance communication. The results of the questionnaire to students showed that the Internet Services subdomain obtained a rating of 4 out of 5, the Hosting Services subdomain received a rating of 3 out of 5, then the Repository subdomain obtained a rating of 3 out of 5, the Digital Library subdomain obtained a rating of 4 out of 5 and the Information Systems subdomain obtained a rating 4 out of 5.Therefore domain service operation is 3.6 which means service security at the Del Institute of Technology is quite good. Further research is to analyse and design the LMS that comply user needs and ITIL measurement.

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