

Whistleblowing System Deployment using the Information Technology Infrastructure Library Framework: Evidence from a Public University in Indonesia

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Abstract

The Indonesian government has been urged to implement Whistleblowing system for public services to achieve integrity zone development. Almost all service desk software provides user convenience as well as manages the service process in an organization using standards based on the Information Technology Infrastructure Library (ITIL) v3. The service operation of Whistleblowing system and the service desk systems are almost the same. However, currently only a few studies have examined the implementation of Whistleblowing system which use such a framework in a public higher education institution. This study aims to design and develop a Whistleblowing system which is expected to fulfill the IT Service Management standard and to perform an integration process amongst the community and students. The software was designed and tested in the Universitas Islam Negeri Syarif Hidayatullah Jakarta using the ITIL v3 standards. The result showed that the efficiency parameter value produced a page speed point of 91 % and the fully loaded time was 2.4 seconds. A portability test showed a value of 100 % for the mobile-friendly score while the reliability test with a stress test also showed at 100 %. The alpha testing result was a very good predicate while beta testing received an acceptable score, good category, and classified as grade C. In conclusion, based on the abovementioned tests, this shows that the system can

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be used to manage student services, lecturers, and staff, as well as to integrate the current service within the community.

Keywords: Whistleblowing System, Information Technology Service Management; Information Technology Infrastructure Library; service desk, software development

Introduction

The Indonesian government has urged all public sectors to develop an integrity zone to achieve an overall corruption-free zone. Therefore, it has to generate bureaucratic reformation in some aspects, namely, change management, good governance, human resource management, performance accountability strengthening, surveillance strengthening, and public service quality improvement ([Kementrian PANRB 2019](#)). One way to improve public service quality to achieve a corruption-free zone is to develop a Whistleblowing policy which implements a Whistleblowing system (WBS) ([Gholami and Salihu 2019](#)). The term whistleblowing was created from the way of English policemen who blew their whistle when they saw the event of some crime ([Dasgupta and Kesharwani 2010](#)).

The WBS objective is as a media for receiving any report to find and identify events, conditions, and situations from the users ([Nursalman et al. 2018](#)). The service desk or Helpdesk which may facilitate the WBS objective in an organization is also the main "door" to facilitate communication and collaboration for end-users in the organization which helps in solving individual technical problems and makes it easy to interact with the IT personnel ([Widyaningrum and Affandi 2012](#)). The benefits and capabilities of the service desk are to align the IT business process between departments, to improve the organization management in terms of hardware and assets, to improve the business process efficiency, and to enable data collection analysis for better strategic planning and tracking ([Tang and Todo 2013](#)).

The widest framework for service desk operations is the Information Technology Infrastructure Library (ITIL) ([Pereira and Da Silva 2011](#)). The ITIL was developed by the UK Government to improve IT service management using five major strategies namely, service strategy, service design, service transition, service operation, and continual service improvement. ITIL research was developed worldwide, including in Indonesia. Research conducted by [Wardani et al. 2016](#) built a procedure and policy to enhance the services provided by a government office. The results of this study showed that the ability of the IT management was still partially acceptable, and it was recommended that the ITIL implementation in the government offices must be aligned with business needs and also support the current business processes. Based on that research, the implementation of Information Technology Service Management (ITSM) provides a framework to improve the interaction of IT staff with users which is related to the ITIL. ITIL provides a set of facilities for IT service management and is the most widely accepted IT service management in developed and developing countries, including Indonesia.

Indonesia as one of the developing countries with the largest community in the world has been committed to IT governance and development since early 2010. Much research has been conducted to improve service desk systems using ITSM to replace the traditional service desk in a government organization including the Higher Education Institutions ([Tawar 2013](#); [Widyaningrum and Affandi 2012](#)). However, even by adopting ITSM, most of the organizations did not show improvement in the IT service management level due to barriers during the implementation. Most of the problems were related to the organizational culture and integration into the current business process ([Tang and Todo 2013](#)).

Universitas Islam Negeri Syarif Hidayatullah also widely known as UIN Jakarta, is one of the largest Universities in Indonesia which has implemented an IT services desk for academic purposes since early 2000 through its portal <https://servicedesk.uinjkt.ac.id/>. All the IT development and management is organized by the Information Technology Division or Pustipanda (*Pusat Teknologi Informasi dan Pangkalan Data*). However, based on previous experience, integration of the business process was one of the main problems for the service desk implementation such as unrecorded email complaints or redundant processes which may prolong the complaint follow-up and produce an inefficient working

process. Such an unintegrated process however may slow IT adoption as well as may lead to ineffective management procedures.

The success of IT service desk development is closely related to the User-Centered methodology which pays more attention to the interaction between humans and the computer. A User-Centered Design (UCD) or also known as human-centered design is an interactive system development approach which is focused on the current business process. The main role of UCD is to produce a system which is easy to use, safe, effective, and efficient. The model of interaction between humans and systems involves three components such as users, user to user interactions and the system itself ([Waddell et al. 2015](#))

Currently, there is a lack of studies that have been conducted to design and implement a WBS through the ITSM framework in a university using a user-centered approach to improve the service. This is especially true amongst the community, which in this case consists of students, lecturers, employees, and other parties who have collaborative activities with the University, which can be integrated through an IT service desk system. This activity is to ensure that the community may be involved in organization monitoring and inspection. UIN Jakarta is committed to address the importance of early detection of any violation within the academic process through the implementation of a service desk operation system. Thus, the objective of this current research is to design, develop, and implement a WBS through a service desk operation system using the ITIL v3 Framework which integrates with the current system to facilitate the community services and students to report any issues to support integrity zone development.

Related Works

Whistleblowing Systems in Indonesia

Much research has been performed concerning the implementation of Whistleblowing systems ([Dasgupta and Kesharwani 2010](#)). One example was [Pamungkas et al. \(2017\)](#) who studied the effects of a Whistleblowing system on financial statement fraud, while ([Nurhidayat and Kusumasari 2018](#)) studied the effectiveness of the implementation of a Whistleblowing system in Indonesia. There has also been highly related research to this current study which examined the implementation of a Whistleblowing system in a public university in Indonesia ([Nursalman et al. 2018](#)). Those authors developed their system in three layers, namely presentation, business, and data layers.

However, there is a great opportunity for universities in Indonesia to implement and develop a Whistleblowing system and renew the current policies to support the communities to proactively advocate the ethical principles and reputation of the universities. Several universities have already implemented a Whistleblowing system, such as *Sistem Pelaporan Dugaan Pelanggaran Universitas Indonesia* ([SPI Universitas Indonesia 2022](#)), *Sistem Informasi Aspirasi Publik Universitas Gadjah Mada* ([Universitas Gadjah Mada 2022](#)), and *Whistle Blowing System Direktorat Logistik ITB* ([Direktorat Logistik ITB 2017](#)). However, these universities have applied different Whistleblowing regulations in their systems such as the scope of the Whistleblowers, Whistleblowing channels, the scope of the violation, and the confidentiality of the Whistleblowers. Furthermore, the current authors have not found any Whistleblowing system development which uses ITSM and ITIL standard.

ITIL and ITSM Implementation in Indonesia

The ITIL was developed by the UK Government to improve ITSM using five major strategies namely: service strategy, service design, service transition, service operation, and continual service improvement. ITIL research was developed worldwide including in Indonesia. Research conducted by [Wardani et al. \(2016\)](#) built a procedure and policy to enhance the services provided by the government office. The results of this study showed that the ability of the IT management was still partially acceptable, and it was recommended that the ITIL implementation in the government office must be aligned with business needs and to support the current business processes.

Previous research has shown that the ITIL application which is mostly implemented in developed countries improved the integration of the current processes in the IT organization ([Marrone and Kolbe](#)

[2011](#)). Most of the literature has proved that ITIL is a collection of best practice information technology governance services in various fields and industries, from manufacturing to finance, large and small industries, private and government ([Iden and Eikebrokk 2013](#)).

The other utilization of ITIL was found in a Health Care Organization ([Wardani 2019](#)). In that research, the service desk application using the ITIL V.3 framework was applied to handling complaints and information technology management in a hospital. The study concluded that the IT unit has responsibility for all issues of information technology infrastructure including hardware, software, databases, and networks in all departments.

IT Service Desk in Higher Education

The Mexican company Cotemar implemented an IT service information management framework ([Lucio-Nieto et al. 2012](#)) to propose the best services for clients. It introduced various frameworks for information technology service management, such as ITIL and Control Objectives for Information and Related Technologies (COBIT). It was found that implementing IT service management practices may provide useful insights for firms. A customer service desk for education was examined using incident management ([Punyateera et al. 2014](#)). This service desk was part of the service operation of the ITIL version 3 which consisted of best practices for ITSM. The result showed that the service desk could help education managers make decisions more efficiently.

User-Centered Design

Several methods or frameworks are available for website design and one of the well-known methods is the User-Centered Design (UCD) approach. According to [Maguire \(2001\)](#), service desk users should be facilitated with a user-friendly system which allows open communication from the community by entering a single identity and be able to select categories or complaints which need to be reported. The system should automatically transfer the issue to the relevant department and provide an assessment scale that can be used by the user to measure the service.

Previous research has been conducted in private companies to evaluate the implementation of ITSM and found that problems during the implementation could be minimized by designing a service desk application with a user-orientated design. In that study, after re-designing the service desk application interface using the UCD approach, the service improved and was better than the previous application ([Budiyono et al. 2012](#)). Based on quality testing, the application interface design in that study fulfilled the system requirements such as ease of learning, consistency, feedback, efficiency, clear labeling, visual clarity, appropriateness of site type, and conformity to user objectives.

Methodology

This section proposes a methodology based on User-centered Design steps to develop a Whistleblowing system that is aligned with the ITIL v3 standard for the service operation process. [Figure 1](#) shows the specific phases which are summarized below:

- Phase 1- Planning of the process phase is carried out to classify the existing procedures and current service desk performance. Every step within the procedures should have a structured grading for problem classification. Problems that may arise include limited public access, high-cost and unintegrated system, and ineffective working procedures.
- Phase 2. Specification of the 'context of use' phase is to modify the current system into a newly developed design which complies with the parameters of the service operation process based on ITIL v3. Most common service desk operation systems do not allow for public intervention, especially for the higher education academic system. Therefore, a set design model can be included such as a Whistleblowing system to improve public access.
- Phase 3- The specification of the organizational demands phase is used to support the development of related requirements for a Whistleblowing system. UML diagrams are generated to assist in the development of a database.

- Phase 4- Development of a design solution and the evaluation phases are conducted to develop an interface based on the extraction of previous phases which allows access for the public into a newly developed design.

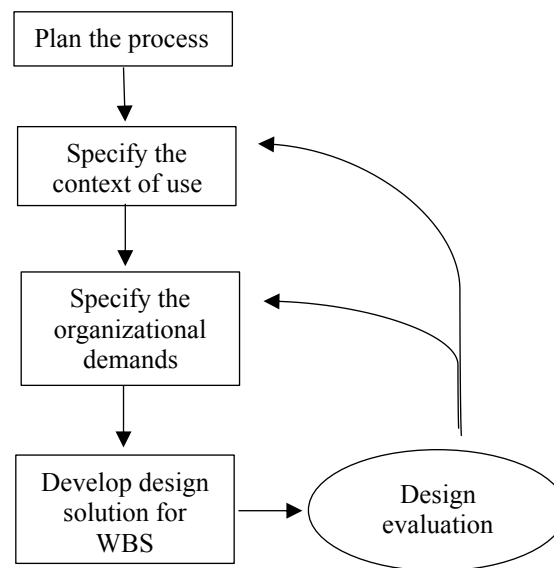


Figure 1. Research Framework

Develop a Process Plan

The first phase of the system operation improvement for an organization is to develop a process plan based on input from the head of Pustipanda and the Internal Auditor staff. It is necessary to understand and consider the basic process within the organization. When developing the process plan, it is important to determine the current procedures and problems that may arise within the organization as well as with the end-users. To encourage the improvement of system design throughout different developers, this research phase was conducted with the application of the ITIL v.3 service operation. The most important advantage of developing such a framework is the ability to integrate with the current system as well as a standard service desk service operation which is easily understood throughout the whole organization. For example, in the existing system the community or students send messages via e-mail or call to the operations section, so it is necessary to determine who the caller is that wants to be informed or wants to ask about some aspect of UIN Syarif Hidayatullah.

The operation section of UIN Syarif Hidayatullah records existing problems and provides solutions to existing problems, recording using a Pustipanda service desk. The society or students accept solutions to these problems and the operation section reports to a manager. Furthermore, from a data management perspective having the classification of functional output allows efficient data search, filtering, and export based on the function of the asset. As an example, if the estate management team wanted to analyze the operational performance of heating for a whole university campus, it would be possible to extract data from multiple systems (such as finance, resource management, and scheduling) based on the functional output. [Figure 2](#) is an explanation of the system currently running at UIN Syarif Hidayatullah.

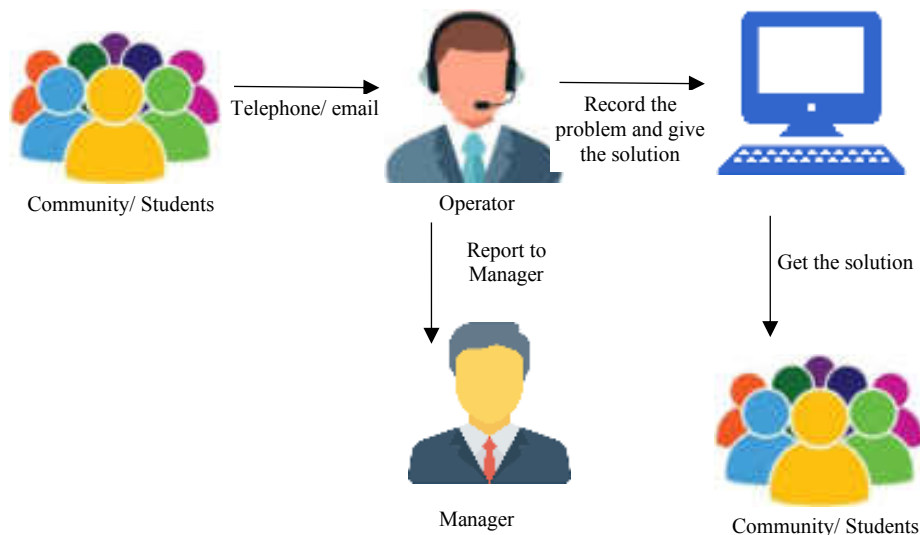


Figure 2. Current Procedures for Reporting Purposes in UIN Jakarta

Specify the Context of Use

The second phase is to identify the ‘context of use’ of the new system which is based on ITIL v.3 service operation classification based on Pustipanda’s IT Support leader as seen in [Table 1](#). An event management process is defined as a state for management to configure the IT service. The objective of the process is to make sure that the services are being monitored regularly. The context of use for this process generates notifications and well as notification detection, while the incident management process is a process for any unplanned situation occurring with the IT service. The objective of this process is to repair the normal service as soon as possible to reduce the impact on the business process. The functional output of the incident process is data restoration.

The access management process aims to provide access rights for authorized users and to prevent entry by non-authorized users. An example of this process for WBS is identity verification, logging steps, and role classification. The last process is the problem management process. The key objectives of this process are to prevent problems and minimize the incidents using appropriate identification. The context of use of this process is such as data storage, databases, and directory services. The outcome of this step is a classification of the system that specifies the structure of Whistleblowing system based on the specific requirement.

Table 1. Context of Use for Whistle Blowing System

ITIL v.3 Service Operation Classification	Context of use for WBS
Event Management Process	Generate notifications, notification detection
Incident Management Process	Data Restoration
Access Management Process	Identity verification, logging, role classification
Problem Management Process	Storage, directory services, data centre

Specify the Organizational Demands

The third step is to specify the organizational demands to develop an information system to improve the efficiency, effectiveness, and transparency to achieve the objective of implementation. The organization determines the capabilities of the Whistleblowing system which relates to the current working process. The outcome of this phase is a developed design that is based on organizational hierarchical relationships. This step is still led by Pustipanda's IT Support leader.

Develop Design and Evaluation

The fourth phase is to develop and evaluate the proposed design which is led by Pustipanda's System Developer leader based on the previous phases. [Figure 3](#) illustrates the proposed system for service as the service desk system in UIN Syarif Hidayatullah.

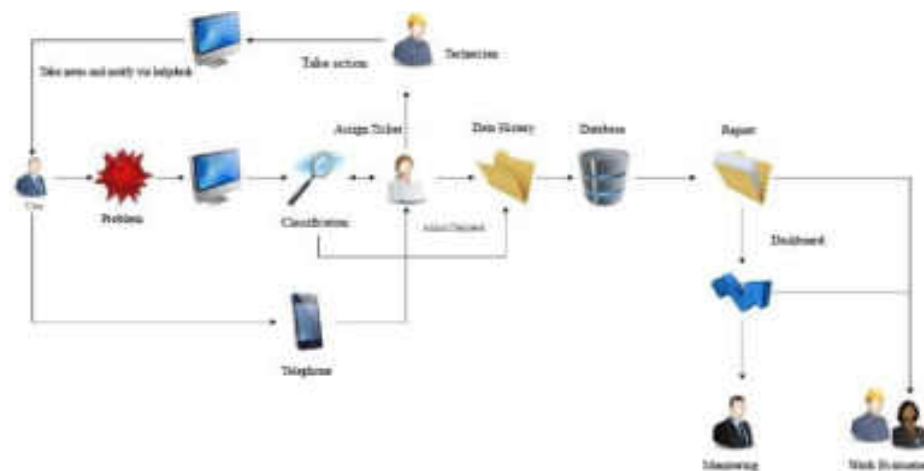


Figure 3. Service Desk System Design for UIN Syarif Hidayatullah Jakarta

[Figure 3](#) shows that the system starts with a user who has a problem, then the user conveys the problem experienced through the system that has been created. After the problem has been written into the system, the system will send details of the problem to the UIN Syarif Hidayatullah service desk Jakarta. The admin service desk will classify the problem manually by looking at historical data information that has been previously made available and recorded in the database. If the problem that occurs includes minor issues and can be solved easily, the admin service desk will respond to the problem via telephone directly to the user in question and provide remedial solutions that can be tried by the user. However, if the solution provided does not resolve the problem, the admin will assign a technician/ agent to immediately resolve the problem for the user. The proposed design uses Unified Modelling Language (UML) with the following steps:

(1) Identify Actor

An actor is administrators, lecturers, students, third parties, and society.

(2) Identify Use Case

The use case is functional that has relations with the actor. The use-cases for this system are:

- Login
- Create Ticket
- Checking Ticket Status

- View Ticket
- View Knowledge Base
- Manage Ticket Data

(3) Class Diagram Model

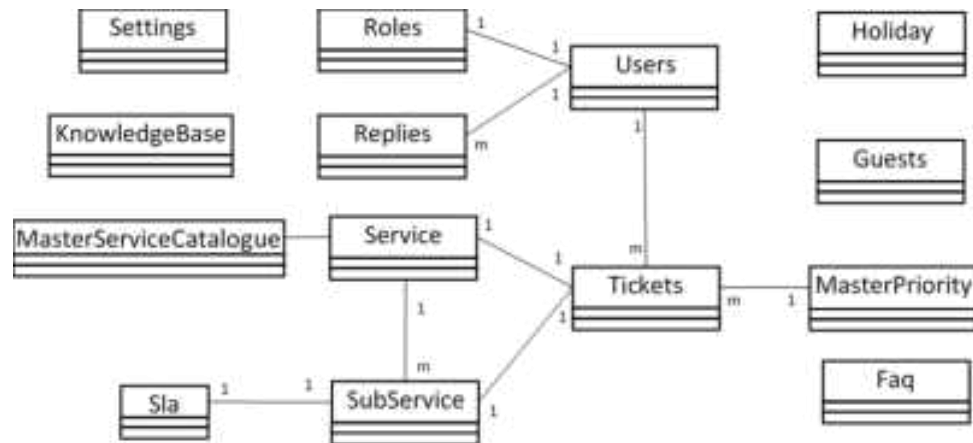


Figure 4. Class Diagram for Service Desk System Design for UIN Syarif Hidayatullah Jakarta

[Figure 4](#) is the developed design of the class diagram of the service desk. This database is built using the migration feature in the Laravel framework which makes it very flexible if there are table additions and subtractions. This design consists of 13 tables with 8 related tables.

(4) User Interface Design

[Figure 5](#) shows the user interface design of the system mockup homepage which has two sub-menus i.e., Internal Civitas Academica and Public.

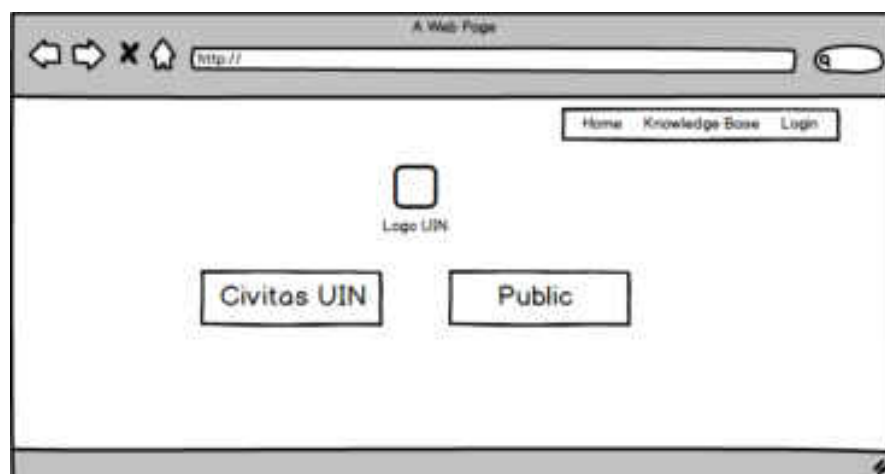


Figure 5. Mockup Homepage

For the Internal Civitas user simply log in using active user, however, for a public user it has to fill up the identity form first. Once the user log in successfully, it will appear service catalog menu as shown in [Figure 6](#). While [Figure 7](#) illustrates the create ticket form menu.

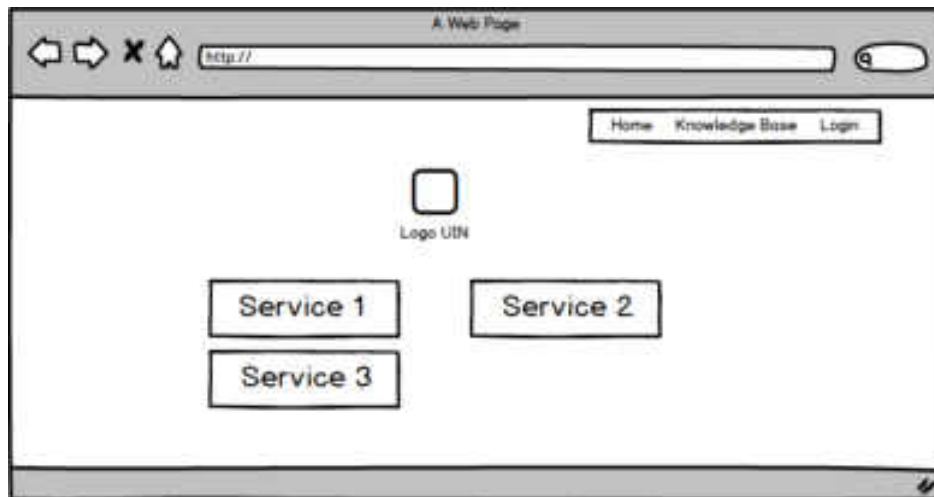


Figure 6. Service Catalog Menu

A web browser window titled "A Web Page" with a navigation bar containing "Home", "Knowledge Base", and "Login". Below the navigation bar is a "Submit a Ticket" form. The form includes fields for "Name", "Email", "Mobile", "Service", "Sub-Service", "Title", and "Detail". There are also buttons for "Attachment File" and "Submit".

Figure 7. Create Ticket Menu

Result and Discussions

The system is built on the Internet so that the users should have an Internet connection to utilize the service desk system (see [Figure 8](#)).



Figure 8. Architecture Design for Service Desk System Design for UIN Syarif Hidayatullah Jakarta

Based on the UCD Framework, the newest system to be developed and implemented should be based on the needs of the users. Thus, it is necessary to evaluate and test the system based on the proposed methods. Currently, the system may be accessed locally through <http://helpdesk.uinjkt.ac.id>.

User Acceptance Testing

User Acceptance Testing is a test carried out by end-users in which a staff/ employee of the company acts as a user and directly interacts with the system to verify whether the functions of the software are following the needs/ functions ([Al Fatta 2007](#)). This test uses a questionnaire which is addressed to four software experts, one agent, and one programmer. In developing commercial software and hardware, acceptance tests are usually referred to as "Alpha tests" (carried out by in-house users) and "beta tests" (which are carried out by users who are using or will use the system). If all aspects of Alpha testing are run successfully, the software developer has fulfilled the aspects of integration testing ([Kartanti 2016](#)). The results of the next alpha test are calculated and compared with a Likert scale as in [Table 2](#). In this study, the questionnaire used in beta testing was the SUS (Software Usability Scale) questionnaire. Data analysis in beta testing is the analysis of acceptance (usability) ([Pressman and Maxim 2014](#)). The SUS value obtained is then compared with the scale in [Figure 9](#) acceptability score, adjective rating, and grade scale, usability value will be better if they approach 100 ([Lewis 2018](#)).

Table 2. Likert Scale ([Riduwan and Akdon 2006](#))

Percentage Score	Information
0 % to 20 %	Very bad
21 % to 40 %	Bad
41 % to 60 %	Neutral
61 % to 80 %	Good
81 % to 100 %	Very good

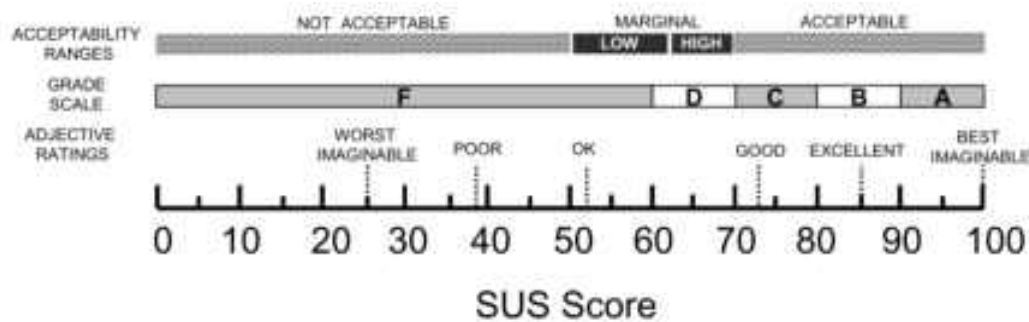


Figure 9. SUS Score ([Bangor et al. 2009](#))

Performance System Testing

This test was performed by testing three aspects in ISO 25010, namely efficiency, portability, and reliability. Efficiency testing was verified using the website testing software Gtmetrix to obtain page speed values from the developed service desk system ([Swathy 2016](#)). A page speed score is also one of the references to determine efficiency, a higher value meaning the website has a good load speed ([Singh and Verma 2014](#)). Portability testing was undertaken using four browsers and the [www.smallseotools.com](#) website to test the ability of the service desk system to adapt to the access environment ([Kumar et al. 2019](#)). Stress testing was done using WAPT software with parameters of 20 users in 3 minutes ([Rina and Tyagi 2013](#)).

Alpha testing achieved a success percentage of 100 % with a very good predicate on the Likert scale in [Table 2](#) of all aspects according to the functions designed according to needs in the ITIL V3 framework. The beta testing obtained a SUS value of 71.25, according to [Figure 9](#), categorized as good and in grade C. Such a result suggests the system in the future would need improvement in the user experience so that the system would be easy to use and could be used by everyone. Efficiency testing showed the average response time of the system was 2.48 seconds with a score of 91 % using PageSpeed and a score of 91 % using Yslow. A response time under 5 seconds indicates that the system is built well and gives users the convenience to access it. Testing was conducted to run on various browsers (Mozilla Firefox, Google Chrome, Microsoft Edge, and Opera) without any errors found in the display or functionality. This result indicated that the system may be opened in all browsers and devices without reducing the functionality of the system. Stress testing showed a value of 100 %, said to have met the GR 282 Telcordia standard, and had good quality because a strong system may simultaneously receive many access requests.

The service operation of a Whistleblowing system ([Nursalman et al. 2018](#)) and a service desk system ([Black and Larsson 2004](#)) are almost the same in terms of the workflow, therefore the design applied the service desk ITIL v3 standard ([Fitriani and Ginardi 2019](#)). The user acceptance testing and performance testing results ([Anggraini et al. 2020](#)) show that the system presented good scores.

Research Implications

The implementation of a Whistleblowing system by using a service desk which is part of the ITIL standard in a service operation may improve the development system since it is best practice for ITSM and a professional discipline that concerns itself with the effective design, deployment, and management. A good service desk in a higher education institution improves efficiency and community appreciation by allowing the community to interact directly with the University as well as to increase efficiency after the implementation of the ITSM. A good service desk may lead to effective communication amongst end users.

Conclusion

The main goal of the current study was to design and develop a Whistleblowing system in a public Higher Education Institution as directed by the Indonesian government to achieve a corruption-free zone. Since the service operation of a Whistleblowing system and a service desk system are almost the same in terms of the workflow, therefore the design applied the service desk ITIL v3 standard. From the test results obtained it was apparent that a website-based service desk that can be accessed by the public, allowing complaints and questions from outside parties can be recorded and find the right solution to achieve an integrity zone as part of the Indonesian government requirement. Based on the system analysis, the quality of the IT service desk of UIN Jakarta showed good results in several unit testing procedures such as alpha testing, beta testing, efficiency testing, portability testing, and stress testing.

For further research, it is necessary to develop a mobile-based application, so that it would be easier and faster to report or request service and to integrate the system with social media to increase the impact on the community. There are other future research opportunities that may be developed for example implementation of reminders for service level agreement. Ticket reporting calculation may be implemented by using a particular algorithm to support the executive decision.

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How to cite:

Afrizal, S. H. N., Wardhani, L. K., Wahyu, F. N., Anggraini, N., Shofi, I. M., and Setiadi, Y. 2022. "Whistleblowing System Deployment using the Information Technology Infrastructure Library Framework: Evidence from a Public University in Indonesia," *Jurnal Sistem Informasi (Journal of Information System)* (18:1), pp. 31- 44.