



Developing A Web-Based Lost and Found System For University

(Case Study: Sam Ratulangi University)

Valda Berlian Reswara Palembatas^{1*}, Benny Pinontoan², Dodisutarma Lapihu³, Eliasta Ketaren⁴, Christian Soewoeh⁵, Edwin Tenda⁶

¹⁻⁶ Program Studi Sistem Informasi, Universitas Sam Ratulangi, Indonesia

Email: valdapalembatas106@student.unsrat.ac.id¹, bpinonto@yahoo.com², dlapihu@unsrat.ac.id³, eliasketaren@unsrat.ac.id⁴, christian.suwuh@unsrat.ac.id⁵, tenda.edwin@unsrat.ac.id⁶

*Corresponding Author: valdapalembatas106@student.unsrat.ac.id

Abstract. Lost and found activities at Sam Ratulangi University are still handled mainly through informal communication channels, making reports difficult to organize, trace, and verify. This study develops UnsratFound, a web-based Lost and Found Information System intended to centralize reporting, searching, matching, claiming, and administrative verification. The study applies an applied mixed-methods approach and the Prototyping methodology through communication, quick planning, modelling, prototype construction, and evaluation. Requirements were identified from observation, stakeholder interviews, documented lost-item reports, and literature review. The resulting system provides lost and found reporting, item search and filtering, claim submission, notifications, report verification, claim verification, and administrative monitoring. Functional evaluation using Black Box Testing covered 17 administrator and user scenarios, all of which passed. Usability evaluation involved 10 participants, consisting of eight students and two faculty administrators. The System Usability Scale produced an average score of 86.5, classified as Excellent (Grade A). These results indicate that UnsratFound meets the identified functional requirements and offers a usable, structured approach to lost and found management within the university environment.

Keywords: Information System; Lost and Found; Prototyping; System Usability Scale; Web-Based Application.

1. INTRODUCTION

Sam Ratulangi University hosts a large academic community whose daily mobility across classrooms, laboratories, offices, and public areas creates opportunities for personal belongings to be lost or found. At present, lost and found handling is still carried out mainly through WhatsApp groups and direct communication. This mechanism is not well organized, lacks centralized documentation, and makes previous reports difficult to trace. Based on the researcher's observations, 24 lost-item reports were submitted through the Information Systems Department WhatsApp group in 2025, seven additional cases were reported in September 2025, and 23 more cases were identified outside the department through general WhatsApp groups. In total, 47 lost-item reports were recorded. This condition supports the need for a centralized system for reporting, searching, tracking, and claiming lost and found items.

The existing process also creates difficulties in ownership verification. Students commonly search by asking friends, returning to places they recently visited, or posting in WhatsApp groups. Administrative staff reported that reports are handled manually, there is no proper centralized record, and there is no specific system for tracking cases. Students also indicated that messages may quickly become buried in group conversations and suggested that a dedicated platform should provide item details and a claim verification mechanism.

Previous studies have demonstrated that digital Lost and Found systems can support reporting and retrieval. (Romadhona et al., 2023) developed a web-based Lost and Found application using Waterfall. (Wijaya et al., 2025) designed a campus Lost and Found prototype using Design Thinking. (Ariessanti et al., 2019) developed a web-based model for airline baggage, while (Adiwijaya & Nugroho, 2024) developed a university-based Lost and Found system. The present study focuses specifically on Sam Ratulangi University, uses local primary data, and applies Prototyping to support iterative refinement.

This research therefore focuses on developing UnsratFound as a centralized web-based platform for lost and found management at Sam Ratulangi University. The system is designed to support lost and found reporting, search and filtering, potential item matching, claim submission, notifications, administrative review, and ownership verification. In addition to developing the application, the study evaluates whether the implemented functions operate as required and whether the interface is usable for its intended users. The main contribution lies in combining a university-specific business process, an iterative Prototyping approach, and structured claim verification within a working web application tested in a local development environment.

2. LITERATURE REVIEW

Lost and Found System

A Lost and Found system is a mechanism for organizing communication and information between parties who lose and find items. Its effectiveness depends on systematic recording of item characteristics and on a verification process that supports a proper handover. In a university context, the system can provide a persistent record that is more structured than informal messaging (Kumar et al., 2022; Pede et al., 2025).

Web-Based Applications

A web-based application operates through a browser and provides access to system services through a client-server environment. The approach is appropriate for UnsratFound because students and administrators can access the same information through a common interface without installing a dedicated desktop application (Limbong & Sriadhi, 2021).

Prototyping Methodology

Prototyping is an iterative and evolutionary development approach in which an initial working model is created, evaluated, and refined through repeated stakeholder feedback (Risfiani & Budiman, 2025).

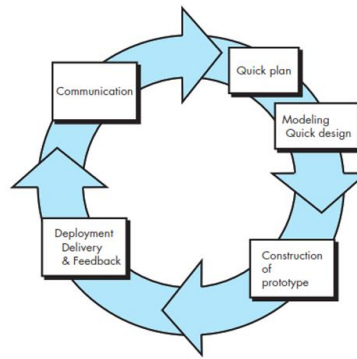


Figure 1. Prototype Model (Source: (Widarti et al., 2024))

The research follows Communication, Quick Plan, Modeling Quick Design, Construction of Prototype, and Deployment, Delivery, and Feedback. This approach is suitable for a system whose interface and workflow requirements benefit from repeated evaluation (Widarti et al., 2024).

System Testing

Black Box Testing evaluates functional behavior by comparing system inputs and outputs without examining internal code (Hasanah & Untari, 2020). SUS is used to assess perceived usability through ten standardized statements on a five-point Likert scale and produces a score ranging from 0 to 100 (Setiawati et al., 2018). These methods provide complementary evidence about functional correctness and usability..

3. RESEARCH METHOD

Type of Research

This research is classified as applied research and adopts a mixed-methods approach. Qualitative methods are used during requirement analysis and system design through observation, interviews, and literature study. Quantitative evaluation is performed through functional testing and the System Usability Scale (SUS). The combination allows the system to be grounded in stakeholder needs and evaluated using measurable results.

Research Stages

The research stages cover problem identification, data collection, the five Prototyping stages, and reporting. Problem Identification and Analysis establishes the practical problem. Data Collection gathers stakeholder and supporting information. Communication identifies requirements and analyzes the existing and proposed business processes. Quick Plan defines scope, actors, workflow, and standard procedure. Modeling Quick Design develops system design. Construction of Prototype implements the approved design. Deployment, Delivery, and Feedback evaluates functionality and usability. Reporting documents the final findings.

Table 1. Research Stages

ID	Stage	Main Output
RS-01	Problem Identification and Analysis	Problem definition and research direction
RS-02	Data Collection	Interview, observation, literature, and supporting data
RS-03	Communication	Stakeholder needs, As-Is/To-Be process, requirements
RS-04	Quick Plan	SOP, system scope, and system actors
RS-05	Modeling Quick Design	Prototype and UML system model
RS-06	Construction of Prototype	Functional web-based prototype
RS-07	Deployment, Delivery, and Feedback	Black Box Testing and SUS evaluation
RS-08	Reporting	Research documentation and conclusions

Data Collection

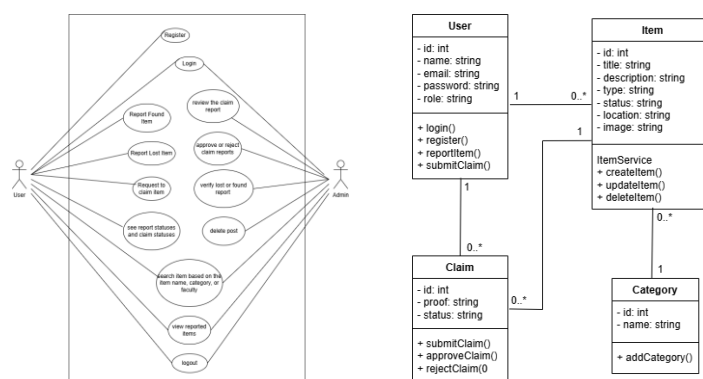
Primary data were collected through stakeholder interviews, direct observation of the existing lost and found process, and prototype testing. Secondary data were obtained from scientific publications, textbooks, and relevant operational references. Actual lost-item reports collected by the researcher were used to describe the practical problem, while dummy data were used where needed during system development and testing.

System Development Method

The study uses the Prototyping model. Communication establishes the needs and problems. Quick Plan defines the operational boundaries and actors. Modeling Quick Design converts the requirements into models and prototypes. Construction of Prototype turns the approved design into a working system. Deployment, Delivery, and Feedback evaluates the prototype and uses the resulting findings to assess whether the system meets the intended requirements.

UML Modelling

UML is used in the research method to model system behavior and structure before implementation. The Use Case Diagram identifies the interactions of the two main implemented actors, User and Admin. The Class Diagram represents the main data structures of User, Item, Claim, and Category. These models provide the design reference for the prototype and implementation.

**Figure 2.** Use Case and Class Diagram

Testing Method

Functional testing uses Black Box Testing to verify that each tested feature produces the expected result under normal operating conditions. The evaluation is divided into administrator and user functions. Usability testing uses SUS after participants interact with the system according to their roles. Ten participants are involved: eight students and two faculty administrators. Functional results are summarized by the number of scenarios that pass. SUS responses are converted using the standard scoring procedure: odd-numbered positive statements use response minus one, even-numbered negative statements use five minus response, and the resulting sum is multiplied by 2.5. The final usability result is obtained from the mean of the respondent scores.

4. RESULTS AND DISCUSSION

Communication

Interviews were conducted with administrative staff and students. Administrative staff explained that cases are received through direct communication or messaging applications and are handled manually. Students reported that they commonly ask friends, revisit previous locations, or use WhatsApp groups to search for items. They also stated that information can be difficult to find after messages are buried in group chats.

Table 2. Stakeholder Interviews

ID	Stakeholder	Main Finding
SI-01	Administrative staff	Reports are handled manually; there is no centralized record or specific system.
SI-02	Students	Lost and found cases are often searched through friends, locations, and WhatsApp groups.
SI-03	Students	A dedicated website is considered useful for reporting and searching.
SI-04	Students	Claimants should provide proof or item details before an item is returned.

The interview findings became the basis for the subsequent Quick Plan and system requirements.

Business process analysis was conducted by comparing the current As-Is process with the proposed To-Be process. In the existing process, the owner searches independently, shares information through WhatsApp or friends when the item is not found, waits for responses, and may receive the item directly from the finder. The process contains no centralized administrator or formal record. The proposed process introduces users, Security Officers, Faculty Administrators, and the UnsratFound system.

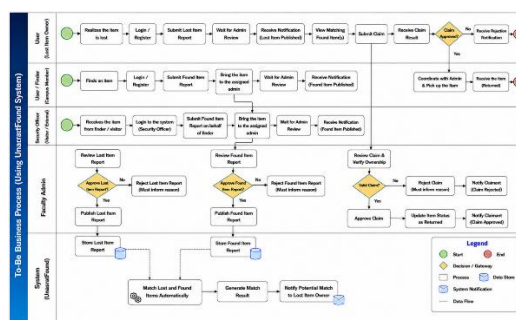


Figure 3. Proposed Business Process

Lost and found reports are submitted through the system and reviewed by the administrator. Approved reports are published. The system can compare lost and found reports and notify a potential owner. A claim is then submitted and verified before the item is returned. The communication results establish the functional direction of the system and connect the identified problems to explicit system requirements. No interface or implementation decision is treated as final at this stage; those decisions are developed in later prototyping stages.

Quick Plan

This stage converted the requirements into an operational plan. The proposed system is limited to lost and found cases occurring within Sam Ratulangi University. Reports are handled according to the selected Area Faculty, regardless of the reporter's faculty. Found-item reports must be verified before publication. External visitors cannot access the system directly and must report found items through a Security Officer. Ownership must be verified before a found item is returned.

Standard Operating Procedure (SOP)

The proposed SOP was adapted from an interview-based review of Lost and Found procedures at Shopping Centres. The reference procedure included reporting items to reception, announcements to potential owners, temporary storage of unclaimed items, longer-term storage after seven days, and identification before collection. For the university context, the procedure was adjusted to Faculty Administrators and Security Officers and to web-based reporting.

For a lost item, the user logs in, submits a report, and waits for Faculty Administrator review. For a found item, the finder submits a report and delivers the item to the assigned administrator. External visitors hand found items to a Security Officer, who submits the report and delivers the item to the responsible administrator. A claimant searches for a potential match or receives a notification, submits a claim, and waits for ownership verification. Approved claims proceed to collection and the item status changes to Returned. Perishable food items follow a specific handling rule: they may be reported and stored temporarily, but if unclaimed

within 24 hours the food is disposed of because of its perishable nature. Faculty Administrators only handle reports assigned to their selected Area Faculty, while the Super Administrator manages Faculty Administrator accounts and monitors reports.

System Actors

The planned actors are User, Faculty Administrator, Security Officer, and Super Administrator. The two main implemented application actors shown in the use case model are User and Admin, with the operational administrator role encompassing the relevant administrative responsibilities described in the business process and standard procedure.

Modeling Quick Design

First Iteration

The first iteration included login and registration, the administrator dashboard, claim verification, the user homepage, report submission, item list, and item detail pages. Evaluation showed that the Login Page, Homepage, Lost Item Report Page, Item Detail Page, and Admin Dashboard were valid. Registration, Item List, and Claim Verification were partially valid and required refinement.

Table 3. 1st Prototyping Iteration

ID	Component	Result	Improvement
IT1-01	Login Page	Valid	Retain the design
IT1-02	Registration Page	Partially Valid	Add phone number field
IT1-03	Homepage	Valid	Retain the design
IT1-04	Lost Item Report Page	Valid	Retain the design
IT1-05	Item List Page	Partially Valid	Improve browsing and filtering presentation
IT1-06	Item Detail Page	Valid	Retain the design
IT1-07	Claim Verification Page	Partially Valid	Display original report for comparison
IT1-08	Admin Dashboard	Valid	Retain the design

The identified improvements were carried into the second iteration. The refinement included a phone number field, the original found-item report on the claim verification page, a notification page, and a simplified navigation bar.

Second Iteration

The second low-fidelity iteration incorporated the proposed refinements. Registration was expanded with the phone number field, the claim verification page displayed the original report together with the claim, and the notification page provided a dedicated location for report and claim updates. All revised components were evaluated as valid, allowing the design to proceed to the high-fidelity stage.

Third Iteration

The third iteration produced a high-fidelity prototype representing the final interface layout, visual elements, and system features. It included complete login and registration forms, an administrator dashboard with system statistics and pending cases, a user homepage with search and report access, an item reporting form, an item list with search and filtering, an item detail page, and a notification page. All evaluated components of the third iteration achieved valid results. Because the design satisfied the identified requirements, no additional revisions were required. The high-fidelity prototype was finalized as the reference for the next stage.

Table 4. Iteration Result

ID	Iteration	Main Outcome
IT-01	1st Low-Fidelity	Identified improvements in registration, list browsing, claim verification, notifications, and navigation.
IT-02	2nd Low-Fidelity Refinement	All revised components valid.
IT-03	3rd High-Fidelity	All evaluated components valid; ready for implementation.

Construction of Prototype

The approved design was implemented as a functional web-based prototype using Laravel (Bagwan & Ghule, 2019), Bootstrap (Gaikwad & Adkar, 2019), and MySQL in a local environment with XAMPP and Visual Studio Code (Lubis, 2025). The system interface was deliberately presented in two main sections, administrator interface and user interface to reflect the operational roles described in the research.

Administrator Interface

The administrator side provides a dashboard, report review, claim verification, returned-item history, and outdated-report management. The dashboard summarizes pending reviews, active reports, incoming claims, and returned items. The report review page allows administrators to inspect the item category, incident date, location, reporter information, and action buttons. The claim verification page displays claimant information and submitted evidence alongside the original report. The outdated-report page filters reports older than 30 days and provides a deletion function.

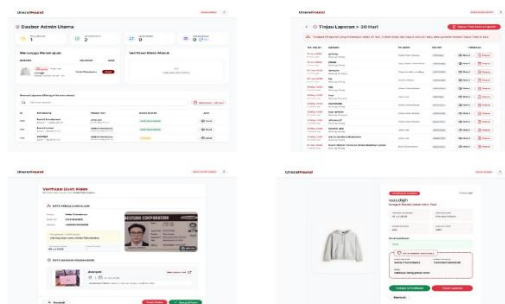


Figure 4. Administrator Interface

User Interface

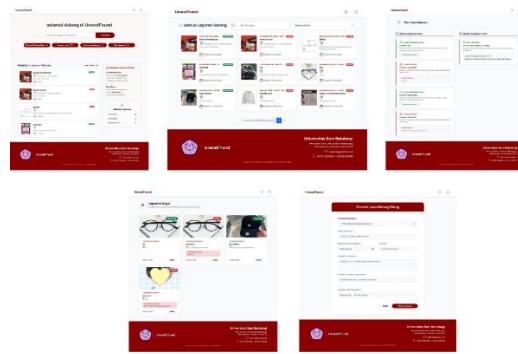


Figure 5. User Interface

The user side provides the homepage, report catalog, reporting flow, personal reports, returned items, profile management, and notifications. The homepage provides search and quick access to personal reports, returned-item history, the report catalog, and report creation. The report page allows the user to select between losing and finding an item and then provide item information, location, date, description, contact information, and supporting images. The all-item report page provides a searchable view of published lost and found items. Users can monitor their submitted reports through the personal reports page and receive status information through the notification center. Profile information and password editing are also provided.

Deployment, Delivery, and Feedback

The final stage evaluated the implemented prototype through functional and usability testing.

Black Box Testing

Functional testing was conducted using Black Box Testing. Seven administrator scenarios and ten user scenarios were evaluated, producing 17 scenarios in total.

Table 5. Functional Testing

ID	Testing Components	Test Scenario	Input/Action	Expected Result	Actual Result
AD-01	Admin Login	Login with correct data.	Input correct email and password.	Go to Admin Dashboard.	Pass
AD-02	Admin Login	Login with wrong data.	Input wrong email or password.	Show error message.	Pass
AD-03	Dashboard	View real-time summary.	Open main dashboard.	Show total active reports, claims, etc.	Pass
AD-04	Review Report	Approve or reject new reports.	Click "Setujui" or "Tolak" on a report.	Report status is updated.	Pass
AD-05	Verify Claim	Check and verify user's claim.	Compare proof, click Approve or Reject.	Claim is processed and saved.	Pass
AD-06	Returned History	View returned items list.	Open "Riwayat Barang Dikembalikan".	Show all completed items.	Pass
AD-07	Delete Old Data	Delete reports older than 30 days.	Click "Hapus Total Semua Laporan".	Old data is deleted.	Pass

ID	Testing Components	Test Scenario	Input/Action	Expected Result	Actual Result
US-01	User Login	Login with correct data.	Input correct email and password.	Go to User Dashboard.	Pass
US-02	User Login	Login with wrong data.	Input wrong email or password.	Show error message.	Pass
US-03	Search Item	Search items using keyword.	Type item name and press Enter.	Show matched items.	Pass
US-04	Filter Catalog	Filter items by category.	Select category from dropdown.	Show filtered items.	Pass
US-05	Select Report	Choose report type.	Click "Buat Laporan".	Show Lost / Found popup modal.	Pass
US-06	Submit Report	Fill and submit report form.	Fill form, upload photo, click submit.	Data saved with "Pending" status.	Pass
US-07	My Reports	Check personal report status.	Open "Laporan Saya".	Show user's reports and status.	Pass
US-08	Returned Archive	View returned items list.	Open "Riwayat Dikembalikan".	Show completed items in greyscale.	Pass
US-09	Edit Profile	Update profile and password.	Change input data and click save.	User data is updated.	Pass
US-10	Notifications	View system alerts.	Click the bell icon.	Show admin notes and instructions.	Pass

All administrator functions tested in the thesis passed, including correct and incorrect login, dashboard access, report review, claim verification, returned-item history, and deletion of outdated data. All user functions tested also passed, including login, item search, filtering, report submission, report monitoring, returned history, profile editing, and notifications.

System Usability Scale

Usability evaluation involved 10 participants, consisting of eight students and two Faculty Administrators.

Table 6. Usability Testing

Respondent	SUS Score
R1	85.0
R2	75.0
R3	97.5
R4	92.5
R5	85.0
R6	90.0
R7	87.5
R8	92.5
R9	90.0
R10	70.0
Average	86.5 (Excellent)

Participants used the system according to their roles before completing the ten-item SUS questionnaire. The cumulative score was 865 and the average SUS score was 86.5. This value falls in the Excellent category with Grade A, indicating strong perceived usability and user acceptance.

5. CONCLUSION

UnsratFound was successfully developed as a web-based Lost and Found Information System for Sam Ratulangi University. The system responds to the limitations of informal WhatsApp-based reporting by centralizing lost and found information, providing search and reporting facilities, supporting claim submission, and introducing administrative verification. The Prototyping methodology enabled the design to be refined through three iterations before implementation. Functional testing covered 17 administrator and user scenarios and all 17 scenarios passed. Usability evaluation with ten participants produced an average SUS score of 86.5, categorized as Excellent (Grade A). These findings indicate that the prototype meets the identified functional requirements and is perceived as easy to use by the evaluated participants.

Future development may extend the system across all faculties and administrative units, integrate official university authentication, introduce email or push notifications, improve search and matching, provide better communication between administrators and users during claim verification, and evaluate the system with a larger and more diverse participant group.

REFERENCES

- Adiwijaya, A. A., & Nugroho, A. (2024). Perancangan sistem Lost & Found di Universitas Nasional Karangturi berbasis web. *Pixel: Jurnal Ilmiah Komputer Grafis*, 17(2), 138–148. <https://doi.org/10.51903/pixel.v17i2.2169>
- Ariessanti, H. D., Yusup, M., & Sanni, I. (2019). Model sistem Lost and Found pada pencarian bagasi di maskapai penerbangan. *Journal of Innovation and Future Technology (IFTECH)*, 1(1).
- Bagwan, K. I., & Ghule, D. G. (2019). A modern review on Laravel-PHP framework. *IRE Journals*, 2(12), 1–3.
- Gaikwad, S. S., & Adkar, P. (2019). A review paper on Bootstrap framework. *IRE Journals*, 2(10), 349–351. https://www.think247.com/vertical?s_pt=sou
- Hasanah, F. N., & Untari, S. R. (2020). *Buku ajar rekayasa perangkat lunak* (M. Suryawinata, Ed.; 1st ed.). UMSIDA Press.
- Kumar, S., Bhatnagar, D., Gahlot, D., Gola, B. S., & Rajput, G. (2022). Web-based lost and found system. *MIT International Journal of Computer Science and Information Technology*, 11(1). <https://www.researchgate.net/publication/376856933>
- Limbong, T., & Sriadhi. (2021). *Pemrograman web dasar* (J. Simamarta, Ed.; 1st ed.). Yayasan Kita Menulis.
- Lubis, M. D. S. (2025). Design perancangan sistem informasi website penjualan kopi berbasis web menggunakan text editor Visual Studio Code. *Jurnal Widya*, 6(1), 34–52. <https://jurnal.amikwidyaloka.ac.id/index.php/awljurnal@amikwidyaloka.ac.id/editor.jurnalwidya@gmail.com>

- Pede, D., Ranawat, V., Shete, R., Gole, S., & Kolhe, T. (2025). Lost and found web application. *International Journal of Innovative Science and Research Technology*, 10, 1242–1244. <https://doi.org/10.38124/ijisrt/25may811>
- Risfiani, R., & Budiman, T. (2025). Perancangan sistem informasi pengelolaan arsip duplikat STNK berbasis web menggunakan metode prototype. *INTERNAL (Information System Journal)*, 8(2), 199–208. <https://doi.org/10.32627/internal.v8i2.1723>
- Romadhona, Y., Sjahrunnisa, A., & Yuhana, U. L. (2023). Lost and found: An application to search and find lost items. *Kumpulan Jurnal Ilmu Komputer (KLIK)*, 10.
- Salsabila, Z. N., & Putra, I. G. N. A. C. (2024). Rancangan sistem cari dan temu barang hilang di Universitas Udayana berbasis web. *Jurnal Nasional Teknologi Informasi dan Aplikasinya*, 2(4), 737–746. <https://doi.org/10.24843/JNATIA.2024.v02.i04.p09>
- Setiawati, A., Rahim, A., & Kisbianty, J. (2018). Pengembangan dan pengujian aspek usability pada sistem informasi perpustakaan (Studi kasus: STIKOM Dinamika Bangsa Jambi). *Processor*, 13(1).
- Widarti, E., Joosten, Pratiwi, P. Y., Pradnyana, G. A., Indradewi, I. G. A. A. D., Kamilah, N., Bahtiar, A. R., Maysanjaya, I. M. D., & Sepriano. (2024). *Buku ajar pengantar sistem informasi* (Efitra, Ed.; 1st ed.). PT. Sonpedia Publishing Indonesia. <https://www.researchgate.net/publication/377153671>
- Wijaya, G. G. C., Putra, I. N. T. A., & Naryantika, M. N. (2025). Perancangan aplikasi mobile Lost and Found di lingkungan kampus menggunakan metode design thinking. *Jurnal Informatika dan Teknik Elektro Terapan*, 13(3). <https://doi.org/10.23960/jitet.v13i3.6585>