

Design of End-to-end Student Research Administration Application using Rapid Prototyping Method in Universitas Advent Indonesia

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Abstract

In this study, an end-to-end student thesis research administration application is proposed, which provides a comprehensive solution to the problems of the thesis administration process at Universitas Advent Indonesia, especially in the midst of the current pandemic. The rapid prototyping method is used to ensure that the resulting application can be developed quickly while receiving input from users to improve the application according to user requirements. The development of the application was started by conducting interviews with application users, followed by making application prototypes. The application was developed using web-based technologies (PHP and VueJS); thus, the application can be accessed using a web browser. Afterward, an integration was carried out between the developed prototype and the existing campus academic system. The proposed application provides the following features: research (thesis) title submission and approval, research guidance recording, proposal seminar approval, proposal seminar scheduling, proposal seminar grade input, proposal seminar revision records, proposal seminar revision completion approval, final defense approval, final defense scheduling, final defense's grade input, final defense revision records, final defense revision completion approval, and final thesis book bundle completion approval. Therefore, the development of the application provides an end-to-end system that is able to help the student thesis research administration process in Universitas Advent Indonesia.

Keywords: information system, web application, research administration

INTRODUCTION

The year 2020 is a historic year in the life of people around the world. In that year, a pandemic that originally spread from the Chinese city of Wuhan caused tremendous disruption in every aspect of human life. The virus that causes pneumonia (respiratory disorders) called COVID-19 can be transmitted from human to human without any powerful cure. Therefore, governments in various countries take ways that can prevent transmission from happening, namely by avoiding activities that gather many people and advising people to stay at home: working from home, learning from home, worshiping from home.

One of the government's efforts to suppress COVID-19 transmission is to limit face-to-face meetings in schools and ask educational institutions to organize the online teaching and learning

process over the Internet. The implementation of the online teaching and learning process does not require teachers and learners to come to the place of education. This causes not only the teaching and learning process that is done online but also the administrative process that occurs in educational institutions must follow. Therefore, it is important to provide tools that support the administrative processes in the campus can minimize daily administrative tasks and provide better service (Gautam & Shrestha, 2012). Furthermore, implementing a digital solution can enrich the university campus's structure and culture that can ensure quality assurance in teaching, research, and administrative management (Moșteanu, 2021).

University in Indonesia as higher education institution requires students to conduct research as one part of the three main duties of higher education and also the requirement to obtain a Bachelor/Master's degree. Student research is usually poured in the form of writing baby thesis for undergraduate students and thesis for graduate students. This research requires a no small administrative process, along with the demands of the University's quality assurance system and the Government Accreditation Board, to conduct all processes in accordance with established guidelines.

Indonesian Adventist University (UNAI), located in West Bandung, West Java, has an active student count of 1607 people from various regions in Indonesia and from various neighboring countries. In the Odd Semester of the 2020/2021 school year, more than 90% of students do not live in the area around the campus; within a radius of $\leq 50\text{KM}$. Therefore, the administrative process for the completion of research must be carried out online.

The administration of student research completion at UNAI is not a simple process. This research process starts from the submission of the research title to the reporting of the completion of the thesis bundle. Although in passing, it seems like this is a process that is common and easy to do but involves many things that require filling out forms, signatures, and approvals on paper. In the midst of pandemic conditions, administrative procedures that rely on paper and wet signatures will be difficult to perform. Students who live in areas far from campus will be bothered if they have to come to campus just to take the paper form to be used. Subsequent processes that require approval in the form of signatures on the form used will also require a physical meeting; Something that can be avoided in the midst of the current pandemic conditions. Therefore, a new mechanism or system is needed that can overcome the problems of management of this research administration.

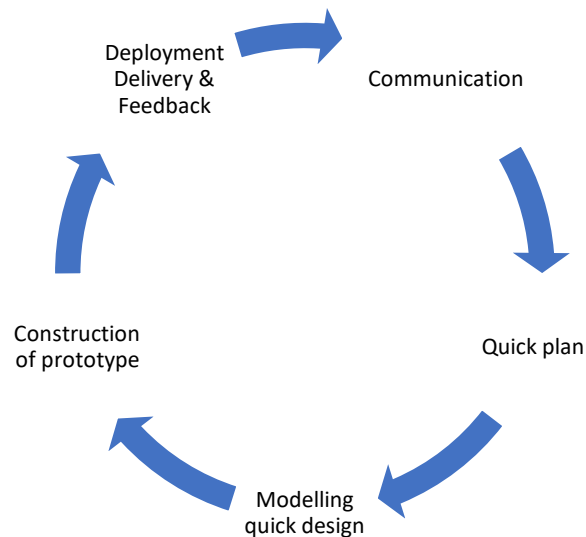
In this study, the team of authors proposed the design of an application that is expected to replace the end-to-end process of research administration (thesis/ thesis), which covers all aspects of the process that was previously done using paper into a web-based application that can be accessed from the Internet using a computer or smartphone of students, lecturers or UNAI administrators.

RESEARCH METHODOLOGY

Figure 1 shows the paradigm of *software prototyping* methods that begins with the communication process, where software developers meet with relevant parties to define the purpose of software development and identify known needs. By using this method can be planned

a plan quickly that can produce the model quickly as well. Once the model is produced, the prototype can be immediately built and tested by the stakeholders. The input provided obtained from *the prototype* trial can be used as input for the completion of the application software submitted in this research proposal.

Figure 1: Prototyping paradigm in software development (Pressman, 2010)



Design of research administration system in UNAI

Indonesia's constitution No. 12 of 2012 on Higher Education defines three main duties of universities as the obligation of universities to organize education, research, and community service. In the same Law, articles 5(c) and (d) emphasize the purpose of higher education aimed at resulting in Science and Technology through research that is beneficial for progress, general welfare, and educating the life of the nation. As a derivative of the Law on Higher Education, universities require students to conduct research in the form of a Baby Thesis for Undergraduate students (S-1), a Thesis for Master students (S-2), and a Dissertation for Doctoral students (S-3).

The implementation of the Thesis / Dissertation may vary depending on internal rules in higher education institutions. UNAI, as an accredited higher education institution (B) by BAN-PT, requires its students to conduct research and complete a thesis depending on the level of study taken. According to the manual of Scientific Writing and Thesis published by the Institute of Research and Community Service (LPPM), in the implementation of thesis / Thesis, students will be guided by one person or at most two supervisory lecturers approved by the Head of the Study Program. The administrative process that must be carried out by students to complete the Thesis / Thesis at UNAI is: 1) Submission of title 2) Thesis guidance 3) Approval of registration of proposal seminar session 4) Scheduling of proposal seminar session 5) Recording of revision of proposal seminar session 6) Entering the value of proposal seminar session 7) Approval of completion of the revision of proposal seminar session 8) Approval of final session registration 9) Scheduling of

final session 10) Recording of revision of final session 11) Enter the final trial value 12) Approval of the completion of the final hearing revision 13) Enter the final trial value 14) Approval of thesis/thesis bundle. Detailed explanations for each process are found in this research method section.

Figure 2: Use case diagram of the end-to-end research administration system (Pressman, 2010)

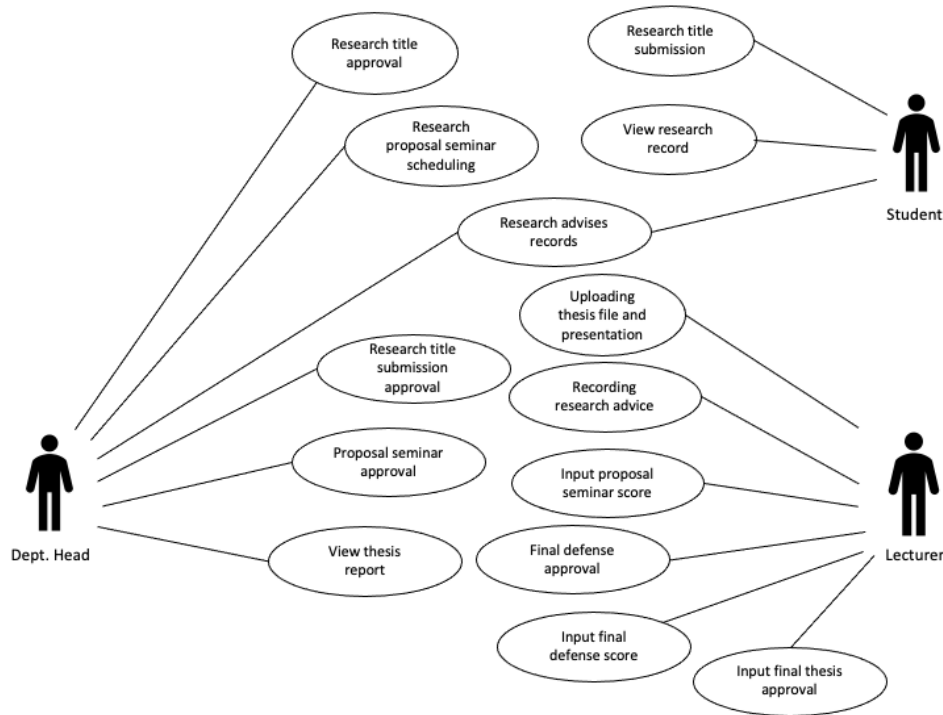


Figure 2 shows the Use Case Diagram in this study where there are three actors who play a role, The Administrator of the Study Program / Faculty, in this case, can be done by the Head of the Study Program, students who conduct research, and lecturers who act as supervisors and examiners in the process of research completion. The following is an explanation of the Use Case in Figure 2.

Submission of research title. To be able to conduct research, students must first submit a research title. The title of this research must be approved by the guidance lecturer and must be approved by the Chairman of the Study Program and the Dean of the Faculty.

Thesis guidance. After the guidance lecturer is approved and determined by the Study Program and Faculty, then students can start research in accordance with the direction of the guidance lecturer. Whenever students do guidance, students or guidance lecturers should record the activity.

Approval of the registration of the proposal seminar/final session. After the writing of scientific work, students are judged by the guidance lecturer is feasible, and the amount of guidance is sufficient, then students can apply to attend the proposal seminar/final session.

Scheduling of the final proposal/final seminar. When students are ready to attend the hearing and have met the requirements set, the administration of the Study Program schedules a seminar session/final session of the proposal in accordance with the agreement between students, guidance lecturers, and examiner lecturers.

Recording of revisions to the proposal seminar session/final session. At the time of the hearing, in accordance with the agreement made, students, guidance lecturers, and guardian lecturers must record the input or revisions obtained.

Enter the value of the proposal seminar/final session. When the final proposal seminar session has been completed, the guidance lecturer and examiner must provide the value that becomes the value of the student proposal seminar session.

Approval of the completion of the revised proposal seminar session/final session. After the student completes the revision and input obtained at the proposal seminar/final session, then the student must ask for approval for the completion of the revision of the proposal seminar session/final session from the guidance lecturer and examiner.

Approval of thesis/thesis bundle. At the end of the Thesis process, the student's scientific papers are bundled in accordance with the provisions set by the Study Program. This bundle must be submitted to the designated parties and must have approval that the bundle has been submitted.

All of the processes mentioned above will be integrated into a web-based application that will be accessible to all interested parties using the web browser on each user's computer or smartphone without the use of paper.

RESULTS

Below is the result of the designed end-to-end research administration application in UNAI. The new functionalities were integrated into the current so-called "online system" that serves as the information system on the campus. Therefore, the designed system could use the existing login, roles, and framework to be able to provide the necessary solution faster. Below are some of the screenshots of the application.

Figure 3 shows the research menu opened on the left side with the sub-menu available below. In the figure, the find research title page is opened where the student can search for the previously recorded research title. When the student types the keyword and clicks the find button, the application will show the search results in the table below.

Figure 3: Research title search function on the system.

online system

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FIND RESEARCH TITLES

How to use

- Use this facility to find previous/published research title in the database
- Type the title and klik the find button and the system will display the results below

Find a title

Find

SEARCH RESULTS

| No. | Student ID | Name | Major | Title | Main Advisor | Additional Advisor | Status |
|-----|------------|------------------------------------|--------------------|---|-------------------------------|--------------------------|------------------------|
| 1 | 0781008 | Harmonvikler Dumoharis Lumban Raja | Teknik Informatika | Implementasi Mikrokontroler Pic 16877a Dalam Perancangan Robot Obstacle Avoidance | Yusran Tarihoran, S.E., M.T. | Dr. Albinur Limbong, | Detail |
| 2 | 0982001 | Logo Sabathino Davidson Koreludji | Sistem Informasi | Analisa Dan Perancangan Sistem Informasi Administrasi Kepegawaian Di Kantor Kecamatan Parongpong Berbasis Visual Basic 6.0 | Yulianus Palopak, S.Si., M.T. | Dr. Albinur Limbong, | Detail |
| 3 | 1081013 | David Glorius Perwiratama Paillin | Teknik Informatika | Analisis Dan Perancangan Sistem Basis Data Penilaian Kinerja Dosen Fakultas Teknologi Informasi Di Universitas Advent Indonesia | Yusran Tarihoran, S.E., M.T. | Henry Pandia, S.T., M.T. | Detail |

Figure 4: Final defense administration page from lecturer's side.

online system

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RESEARCH FINAL DEFENSE

STUDENT

Student ID - Student Name: 1782006 - Helpin Elnur Nitya

Research title: PERANCANGAN SISTEM INFORMASI HIMA FTI UNAI BERBASIS WEB

Date and time: Tuesday, 27th April 2021, 15:00-17:00

Final defense place/room: Zoom

Head examiner: Prof. Dr. Marlinda Siahaan,

Member Examiner: Yusran Tarihoran, S.E., M.T.

Main Advisor: Andrew F. Pakpahan, S.Si., M.T., Ph.D

Research file (Word) [Download file](#)

Research file (Powerpoint) [Download file](#)

Helpin Elnur Nitya
1782006
Information System

Figure 4 shows the final defense administration page from the lecturer's side, where the lecturer can view the scheduled final defense time download the research file in Word or in PowerPoint format. Therefore, the student does not need to send the file to the examiner lecturer because the lecturer can download the final defense files directly from the application.

Figure 5: Final defense administration page from lecturer's side – input final defense score and final defense revision approval.

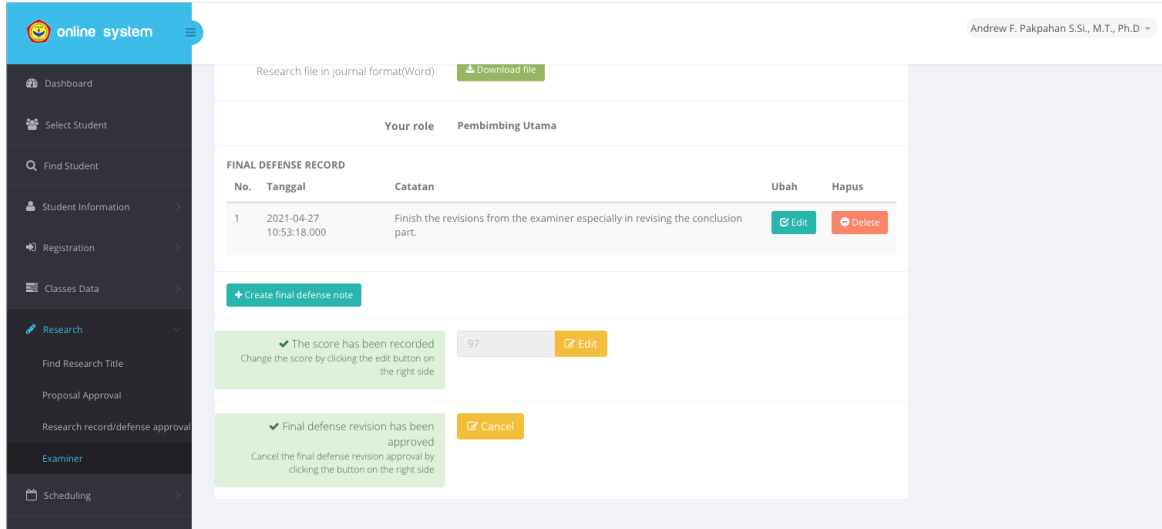


Figure 5 shows the final defense administration page where the lecturer can input the revision note for the student, input the final defense score and approve the final defense revision when it has been completed by the student. This page replaces the paper-based form previously used by the examiner to write their grade and revision notes. The department's administrator gets to benefit from this application by reducing paper usage and simplifying the administration.

CONCLUSION

The application provides the following features: research (thesis) title submission and approval, research guidance recording, proposal seminar approval, proposal seminar scheduling, proposal seminar grade input, proposal seminar revision records, proposal seminar revision completion approval, final defense approval, final defense scheduling, final defense's grade input, final defense revision records, final defense revision completion approval, and final thesis book bundle completion approval. Therefore, the development of the application provides an end-to-end system that is able to help the student thesis research administration process in UNAI. In the near future, we plan to improve the application to accommodate unique aspects or preferences from different departments or faculty in UNAI.

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