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# Staffing Database Application Development Based on YII Framework

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***Abstract*— The development of information systems and technology plays an important role in improving the quality of management activities, one of which is the management of personnel data. The development of a technology-based facility in the 21st century as it is today can provide many benefits, one of which can be used to improve staff performance. This study aims to produce a database application system design for the Faculty of Education, State University of Surabaya based on the Yii Framework and to provide easy management of the staffing database for the Faculty of Education, State University of Surabaya, so that it is properly recorded. This research was conducted using the Research and Development (R&D) method by applying nine of the ten steps proposed by Borg and Gall. The results showed that the Yii Framework-Based Personnel Database Application has been successfully developed with an average score of 85% for each tested category, which means that the Yii Framework-Based Personnel Database Application has reached the category of very feasible to use. With the development of this staffing database, it is proven that it can help the faculty manage its human resource data. Even so, this staffing database application still has some drawbacks, including using the Internet and conventional supervision. Therefore, it still needs continuous improvement. This result also can be used for further research to analyze the impact of YII Framework-Based Personnel Database Application on its user to give more knowledge to the reader, the developer, and stakeholder.**

***Keywords*— Education; database staff; Yii framework.**

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## I. INTRODUCTION

Globalization is an era where Science and Technology are growing very rapidly. The term used to refer to this combination is Industry 4.0, where the combination will affect an organization's operational, tactical, and strategic aspects[1]. The development of increasingly sophisticated technology also brings global changes [2], because Innovation is critical to developing competitiveness and the economy [3]. One positive impact of development is providing convenience for the community [4]. Science and technology have developed in several fields that affect human life, including education. Science and technology also need to be applied in educational institutions because education is required to provide the best service to compete in the era of globalization. The service division referred to, among other things, is the distribution of fast and accurate information and a convenient method for the recipients of the information. Applying some of these things can later be used as a competitive advantage in this era of globalization. In addition to these, other reasons are the basic reasons for the need for the development of science and technology, namely the increasing and increasingly complex demands of human life, one of which is the fast-paced habits that humans do today. Humans in the era of globalization always want something fast-paced, including access to information, especially during the COVID-19 pandemic when the government implements work-from-home policies and distance education (online). One of the goals of developing science and technology in educational institutions is to support management function activities, namely planning, organizing, staffing, coaching, evaluating, coordinating, and budgeting, to support the realization of the aims and objectives of the operational functions of educational organizations. This reaffirms why science and technology need to be applied to educational institutions. Without the development of science and technology, and education, there will never be what is called progress. This is proven by the results of research conducted by Muller and Wulf [5] that technology has become an integrated part of education management, both in theory and in practice. Evidence from the development of science and technology is also marked by the emergence of innovations in the field of sophisticated

technological equipment, which is also very useful for increasing one's motivation and productivity and is also very useful for competing in the era of globalization.

Increasing motivation and productivity is a new challenge for education in developing Human Resources (HR). Hall and James described human resource management as "the process by which to produce an optimal fit among employees, jobs, organizations, and the environment so that employees can achieve the level of satisfaction and workability they want and the organization can also achieve the goals and objectives that have been set" [6].

For an institution to achieve the success it wants, of course, it requires adequate finance, but other than finance, it is no less important to support the success of an institution, namely in terms of its human resources. The growth of an organization depends on how the organization treats its employees and maintains the work environment by sustainably embracing the process [7]. Therefore, an organization must have good employees to complete the required tasks. To produce competent employees, institutions need good human resource management as well. Human resource management's global aim is to reconstruct human resources' influence organizations dynamically and identify the evolution of human resource competencies required by organizations [8]. If an institution manages its human resources very well, the quality of its performance will also continue to increase, which can trigger employee creativity and productivity. The performance of these employees can assist the institution in achieving the desired success because when employees feel satisfied and appreciated for their hard work, they will try to continue to improve their performance. Good human resource management can also actively contribute to solving "grand" problems sustainably by applying ideas from the same economic perspective [9]. The impact in the long term is to improve the quality of the overall performance of the institution. One of the reasons why an institution cannot grow is because of the internal conflict that occurs between employees because of the lack of job satisfaction felt by the workforce. One factor that impacts workers' job satisfaction is public relations and a work environment that is less supportive of workers to improve the quality of their work due to poor management of human resources at the institution [10]. This is why human resource management is very important for an institution.

To improve efficiency, effectiveness, and performance is highly expected by system actors, such as the personnel administration system. To realize a fast and valid personal administration data management system as expected, it is necessary to have supporting factors. The development of information systems and technology plays an important role in improving the quality of management activities, one of which is personnel data management. Davis [11] defines a management information system as a system that integrates between machines and humans. It serves to present information to be able to support the management operations function and decision-making process in an institution. This system is supported by using several things, including hardware and software from computers, operating manual procedures, analysis models, planning, control, decision-making, and a database. Based on this explanation, it can be said that MIS always has a close relationship with computers. This means that the processing of this information system is computer-based or can be called a computer-based information system. One thing that comes to mind when talking about something that can be used to store, process, and provide personnel data is the personnel database.

The database is a storage space that is commonly used to store data. In a database, there is operational data and a description of the data. [12] also explains that the database can be defined as a space where data are interconnected with logical descriptions of the data, which are deliberately designed to assist institutions in finding the information they need. This database will be a source of data that can be used together to provide the information needed by an institution. This statement is also reaffirmed by Cannolly and Begg [12], that the database is not only intended for one department within an institution but is a source of data for the institution as a whole. To operate a database, it is not enough to use the database itself but also a system that can be used to manage the database later. This system is called a Database Management System (DBMS).

Making web applications requires a framework that can assist in their development, one of which is the Yii Framework. Yii framework is one of the PHP frameworks that has high popularity among developers who use PHP. This YII framework is also an open source one. Based on the official website, Yii Framework is a component-based PHP framework designed to develop large-scale web applications with high power. YII framework and high capabilities also provide the ability to reuse (reusability) maximum in web programming and increase development speed significantly.

Implementing the YII framework on a web-based application will make the application's development easier. This is because the YII framework is very light and has also been equipped with a sophisticated caching mechanism. For this reason, the YII framework is very suitable for developing web-based applications with high traffic, such as portal development, forums, content management systems (CMS), e-commerce systems, and so on. Yii Framework adopts the MVC (Model – View – Controller) concept to run its design pattern.

As the human need for information increases, the speed of information transmission continues to grow until it reaches high speeds [13]. The increasing complexity of public communication services requires organizations to develop appropriate strategies and tactics. In Indonesia, the government has developed a bureaucratic reform program to overcome this problem [14]. This program is an effort to fundamentally renew and change the system of governance, especially regarding the aspects of institutions, management, and human resources. The mission of this program is to create a professional, integrated, and high-performing government bureaucracy. Officially this program began to be implemented in 2010 with the enactment of Presidential Regulation Number 81 of 2010 concerning the Grand Design of Bureaucratic Reform 2010-2025. In addition, with regard to staffing or labor, research conducted by Laddha et al. [15], related the contribution of information and communication technology (ICT) to labor productivity using a panel data approach shows the results that ICT affects labor productivity, so investment in technology Information communication is needed to increase labor productivity. Modern online

technologies contribute to the educational process's sustainability during emergencies and will become integral to university education even after the pandemic [16]. Based on some of the research results above, the urgency of technology development in an organization, including universities, can be seen where the university has a large student and staff population. In this study, the research will focus on the university's human resource management, which is related to its personnel.

The Faculty of Education is one of the State University of Surabaya faculties. As an educational institution with a good reputation, the Faculty of Education State University of Surabaya still uses conventional methods to manage its personnel data. With so many teaching and educational staff, the Faculty of Education State University of Surabaya should have used an even more effective way to manage its staffing data. So that personnel-related information can also be easily updated and easily searched for data if needed.

Overcoming the problems mentioned above can be done through computerization by building a support system. Based on this background, the researchers conducted this study. This study aims to produce a database application system design for the Faculty of Education State University of Surabaya based on YII Framework. Also, this study facilitates the management of the staffing database of the Faculty of Education State University of Surabaya so that it is recorded properly.

## II. Materials and Method

This research uses the Research and Development (R&D) method. Gall and Borg [17] revealed that Research and Development (R&D) in education is an industrial development model that aims to design and develop products where the results will be used for learning. The results of the design of the learning products are then tested in the field, evaluated, and refined so that they can produce learning products that are under the standards and are effective, efficient, and of good quality to be used. Among the various "Research and Development (R&D) models that exist, the model proposed by Borg and Gall is a model that specifically directs research and development in the field of education, especially learning. The model proposed by Borg and Gall [17] is more commonly known as the ten-step model. The ten main steps of "Research and Development (R&D) proposed by Gall and Borg are presented in Fig. 1 [18].

This study uses the Research and Development method by developing a staffing database application at the Faculty of Education, State University of Surabaya. The author uses this research method to develop educational products. This research was carried out under the sequence of stages of the research and development method developed by Gall and Borg, namely analyzing needs, then formulating goals, followed developing research plans, then developing products that have been planned. The last stage is product trials three times, followed by a revision stage at each trial stage before the product is disseminated and implemented to the public.

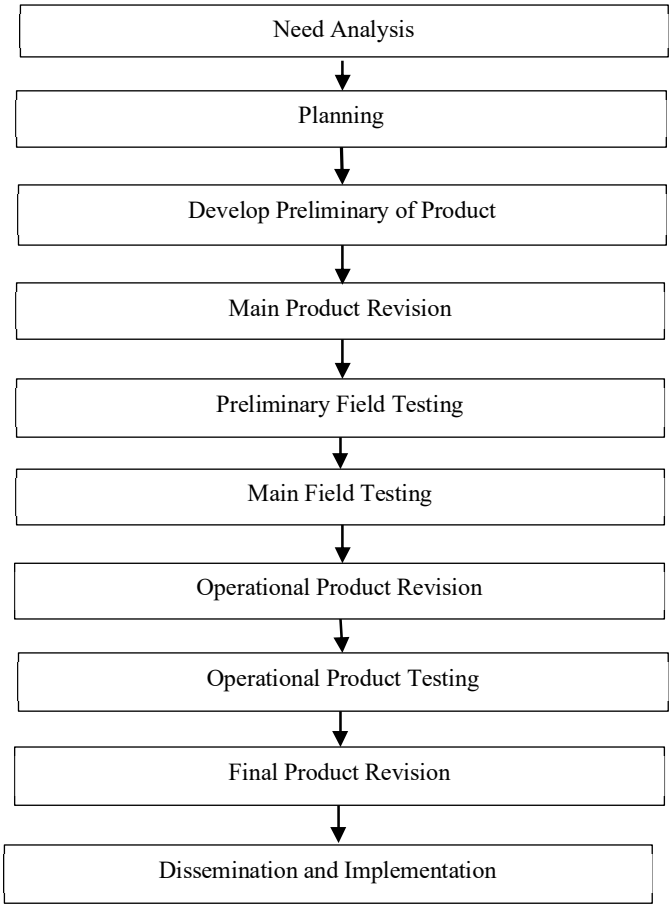


Fig. 1 Borg and Gall Research and Development Stages

## III. Results and Discussion

### A. Results

The development of the personnel database application is one part of implementing a management information system (MIS) in higher education institutions. Generally, when we mention the Management Information System (MIS) the first thing that comes to mind is the technology (computer) used by an organization to manage data. This research covers assisting in carrying out routine tasks, conducting evaluations, and facilitating decision-making, as well as conventional management activities, such as recording agendas, archives, etc. Information systems in education are efforts to use technology during the teaching and learning process to get more effective results [19]. A system is a series of system components that are connected with several criteria. So, it can be concluded that the development of management information systems is an effort made to create new innovations in the technology field, which is expected to facilitate computer-based management activities. The following are the results of each stage of development of the Civil Service Database Application, Faculty of Education, State University of Surabaya, based on the YII Framework.

*1) Need Analysis:* The development of information systems on a large scale is usually very complex [20]. However, research related to the development of information technology has become very popular in recent years [21]. At this needs analysis stage, the researcher conducted initial data collection and analysis of research needs. Initial data

collection is done to obtain information that can be used to facilitate the implementation of research and what risks may occur in the process. Risks should be described in as much detail as possible at this identification stage. The descriptive format explains in as much detail as possible any risks that may occur to support the needs analysis and planning stages effectively. Needs analysis in this study was carried out using three methods, namely literature review from relevant previous research, observation, and interviews with the object of research staffing staff (Lecturers and Education Personnel) Faculty of the Education State University of Surabaya. From the study literature, the researchers found that it is important for an organization to integrate dan upgrade its public communication services with information technology and communication. Besides that, the researchers also identified the existing facilities and infrastructure at the Faculty of Education State University of Surabaya regarding software, hardware, and internet networks. Human resources also cannot be separated from the identification of researchers as application users later.

*2) Planning:* The second stage that researchers must carry out is planning. At this planning stage, the researcher plans in detail the products to be developed based on the results of the needs analysis that has been carried out. Some of the things that must be done include determining the purpose of making the product, aspects of the personnel database application that will be developed, determining the procedure for making the product, and taking care of research permits, and last is making a basic concept design of the product to be developed. Indeed, based on the identification results in the previous stage, the main goal is to accelerate the development of academic services.

*3) Develop Preliminary Product:* After the previous stage, the researcher has determined the aspects of the product be developed. At this stage, the researcher develops a plan or basic design of the concept that has been made in the previous stage, among which the first thing to do is make a graphic design, compile source code engineering, and make the design of the website's front-page layout. In the development process, researchers use several software to support application development. The following is the main view of the Faculty of Education, State University of Surabaya Service Application:

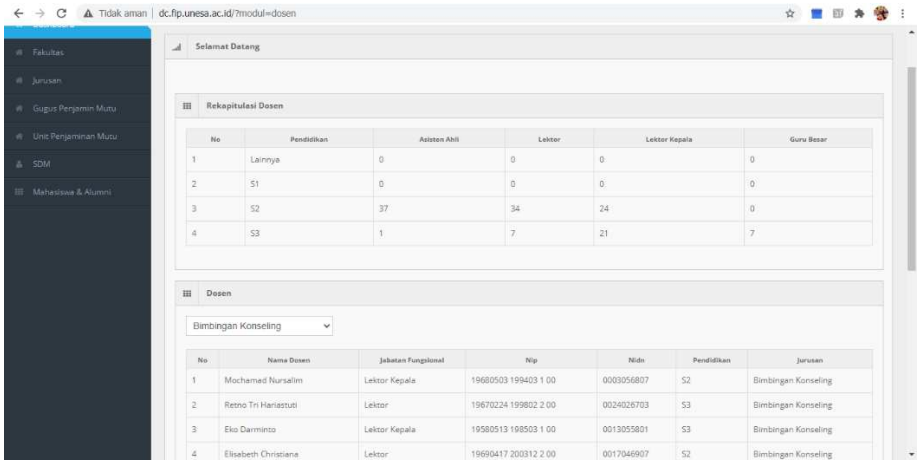


Fig. 2 Lecturer Data Display

The explanation of each feature is as follows:

TABLE I
FEATURE OF THE APPLICATION

| No. | Features | Functions |
|---|---|---|
| 1. | Login | The login menu is a page menu used by lecturers and education staff to enter the Personnel website of Faculty of Education State University of Surabaya. |
| 2. | Lecturer's data display | Lecturer data display is a menu that displays identity data for lecturers at the Faculty of Education, State University of Surabaya |
| 3. | Education Personnel Data Display | Education Personnel Data Display is a menu that displays identity data for personnel at the Faculty of Education, State University of Surabaya |
| 4. | Lecturer Achievement Data Display | Lecturer Achievement Data Display is a menu feature that displays the achievements of lecturers at the Faculty of Education, State University of Surabaya |
| 5. | Lecturer Research Data Display | Lecturer Research Data Display is a menu feature that displays the results of research conducted by lecturers of the Faculty of Education, State University of Surabaya |
| 6. | Lecturer PKM Data Display | Lecturer PKM Data Display is a menu that displays information related to community service activities that have been carried out by lecturers of the Faculty of Education, State University of Surabaya |
| 7. | Lecturer Publication Data Display | Lecturer Publication Data Display is a website menu feature that displays the results of publications made by lecturers of the Faculty of Education, State University of Surabaya, both books and scientific articles. |

*4) Preliminary Field Testing:* After the product design has been made, the next step that the researcher must do is to test the product. This fourth stage aims to conduct initial testing of the product designs that have been made. This initial test is limited in nature, aiming only to test whether the

application program that has been made can run well and smoothly. In a limited trial for users, researchers took a sample of 5 people who were future users of this application.

*5) Main Product Revision:* After the product has been tested on a limited basis, the researcher must take the next step to revise or improve the weaknesses or product deficiencies found during the limited trial. The results of the limited trial show that the product still needs improvement in the product description. Therefore, at this stage, more improvements are made using a qualitative product approach, with the aim of providing a better description of the items in the product.

*6) Main Field Testing:* The next stage that researchers must do after making product improvements is to conduct product testing more broadly. This stage is carried out with the aim of seeing the effectiveness of the product design that has been made. The results of this field trial will later be collected and then will be observed to see the level of effectiveness and efficiency of the product. Material experts and media experts first validated the personnel database application. Material validation will be carried out by a lecturer in Education Management, Faculty of Education, State University of Surabaya, who has a background in accordance with the material being developed. This validation aims to obtain information, criticism, and suggestions so that the developed personnel database application becomes a quality product. As for media experts, it is done to get input related to the design, appearance, and access speed related to applications that have been developed.

*7) Operational Product Revision:* After the product is tested for the second time, at this stage, the product will be repaired again. The purpose of product improvement at this stage is to improve the product so that it can be even better. Based on the pilot activities carried out through the test subjects, two fundamental obstacles were found in developing the Yii Framework-based personnel database application.

*8) Operational Product Testing:* This stage is the final trial stage, with more samples used. The results of product improvements in the previous stage will be applied at this stage. The following are the results of field trials in the form of diagrams.


Fig. 3 Operational Product Test Result

Functional categories get an average value of 80%. This value is obtained from the real value obtained in the field divided by the maximum value. The maximum value for each item is 5, while the number of samples used is 30 people, so the maximum value is 150. Out of 30 samples, 120 points real value is obtained, while the maximum value is 150. Therefore, the final percentage result is 80%. Likewise, the design category gets a percentage of 80%, obtained from the total real value, which is 120 divided by the total maximum score, which is 150. Followed by the ease-of-use category, which gets the highest percentage, which is 85%. This value is obtained from the total real value, which is 128 divided by the maximum total value, which is 150, resulting in 85.33%, which is then rounded up to 85%. While the suitability of needs category got the lowest result of the four categories tested, even so, the total was still 75% which was included in the feasible category. This 75% is obtained from the real value, which is 113 divided by 150, so the result is 75.33%, rounded up to 75%.

*9) Final Product Revision:* This stage is the last stage of product refinement before the product is implemented in the environment. This last product improvement stage is seen as indispensable to measuring the developed product's accuracy. At this stage, it is expected to be able to produce products that have a level of effectiveness that can be accounted for. Product revisions are made based on input from media experts, material experts, and application users.

*10) Dissemination and Implementation:* After the product revision, the application is published through the http://dc.fip.unesa.ac.id page so that all Faculty of Education State University of Surabaya staff can take advantage of this staffing database application facility. The existence of a staffing database application for academic service activities is very helpful, especially in the conditions of the covid-19 pandemic. All forms of academic services can be done online (anytime and anywhere).

## *B. Discussion*

The development of information systems and technology plays a vital role in improving the quality of management activities, one of which is personnel data management. The personal data management system comes to mind when talking about something that can be used to store, process, and provide personnel data. The personal data management system was developed to provide convenience to its users in collecting and managing their data digitally [22]. A website-based personal management system was created to produce a system that can better manage personnel data with the maximum level of accuracy and truth to increase employee productivity. With the prosperity of Cloud Computing, more users and data providers will host their data-based management systems using virtual media so that they can be accessed using website-based applications or via mobile phones [23]. Therefore, developing a website-based personnel information system can be one of the right solutions to overcome human resource management problems in an institution. Therefore, an institution needs to develop its personal information system to be website-based, aiming to manage personal data in a more structured and organized manner which can later be used for all employees in an institution.

Database systems require software to make an application survive and run as planned [24]. Making web applications requires a framework that can aid their development,

including the YII Framework. Yii framework is one of the PHP frameworks that has high popularity among developers who use PHP. This YII framework is also an open-source one. Based on the official website, Yii Framework is a component-based PHP framework designed to develop large-scale web applications with high power.

This staffing database application was developed to improve the quality of administrative services at the Faculty of Education State University of Surabaya, as well as improve the skills and science and technology skills of educators and educational staff of the Faculty of Education the State University of Surabaya, which are expected to have a positive impact on the effectiveness and efficiency of staff management activities at the Faculty of Education, UNESA. In the current era of globalization, changes are urgently needed in various fields so that information can be conveyed and understood better.

The results of the development of this website-based personnel application show that the YII Framework-based Personnel Database Application is in the near-perfect category for use with a final percentage of more than 85%, which means that the development of the YII Framework-based personnel application has been proven to be able to facilitate data management. Staffing at the Faculty of Education State University of Surabaya. Thamrin et al. [25] also shows that web application development developed based on the YII framework to collect data on Covid-19 symptoms in Indonesian society is very effective, with a percentage of 90.5 %. Zarlis et al. [26] also showed relevant results, namely the YII framework-based application as a medium used to input final project scores or student theses at universities proved effective and efficient. Likewise, Pasaribu and Sunarya [27] shows the results of developing a website-based school library using the YII framework at a senior high school can facilitate recording and managing data so that it is more effective and time efficient.

The results of some of the studies above can be interpreted that developing information systems or website-based applications in the current era of globalization is very important. This can also be proven by several research results, such as research conducted by Medina-Ortiz et al. [28] who develop user-friendly website-based applications. This research shows that the application named DMAK is proven by users saying that this application has very high usability and ease of use, they even compare it with other methods and tools, and they say that DMAK has a high degree of precision and model and classification can be compared to the results using the latest software. Research conducted by Fonseca et al. [29] shows relevant results, namely that the development of a data science-based information system has been shown to reduce the time required to collect data can also reduce the occurrence of human errors, and can produce useful reports and summaries according to regional subgroups. Furthermore, Vo and Sharp [30] developed an open education physics resource website, called OpenPhys, showed the results that this open -source website allows other educators to be able to review the content that has been created and also recreate the content, feedback from students regarding the usefulness of OpenPhys also shows that most of the students stated that it is very useful, and also very user friendly, and other good feedback. This shows that the development of an open-education physics resource website, OpenPhys is very effective. The results of other research related to website-based applications developed in the world of education are Yen-Mei et al. [31] that shows that with the existence of Mobile microlearning, students become more knowledgeable, more certain in making decisions, and also able to increase students' confidence in performing skills.

Based on the results of several studies as described above, it can be reaffirmed that the development of information systems or web-based applications is very important for an institution. It is especially beneficial for managing human resources as one aspect that can support the success of an institution. In addition, the ability to develop their own website-based applications will provide its own benefits for an institution, for example, educating the initial cost of manufacturing and those related to administration and others [32]. The Faculty of Education, State University of Surabaya, has made appropriate efforts to improve the quality of its human resource management, namely by developing a staffing database application based on the YII framework, which has been proven to be effective in helping manage staffing data of the Faculty of Education State University of Surabaya.

## IV. Conclusion

Human resources are indeed a very important aspect for an institution because in order to be able to support and improve their performance, it is necessary to develop infrastructure that suits their needs, one of which is the use of technology to assist their work. The YII Framework-Based Personnel Database Application was developed to provide easy data management for employees and teach the Faculty of Education, State University of Surabaya staff. The study results show that the YII Framework-Based Personnel Database Application has been successfully developed with an average score of 85% for each tested category, which means that the Yii Framework-Based Personnel Database Application has reached the category of very feasible to use. Even so, this staffing database application still has some drawbacks, including using the Internet and conventional supervision. Therefore, it still needs continuous improvement to be able to continue to be preserved. This result also can be used for further research to analyze the impact of YII Framework-Based Personnel Database Application on its user, to give more knowledge to the reader, the developer, and the stakeholder.

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