Web-Based Education Personnel Management: An Innovation in the Development of Education Management in the 21st Century

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Abstract

In the 21st century, technology-based institutions require clear parameters for evaluating employee performance. Manual performance assessment processes necessitate the development of a technology-driven information system to streamline leadership's evaluation of employees. This study is dedicated to analyzing the prerequisites for designing an information technology-based performance monitoring system tailored for educational staffs, organized into four stages: defining, designing, developing, and disseminating. By involving 71 educational staffs, this study resulted in the creation of the SI-IKAH (Sistem Input Kinerja Harian Tenaga Kependidikan) or the Daily Performance Input System for Education Personnel, specifically designed for the Universitas Pendidikan Indonesia Sumedang Campus. The system comprises modules for collecting personal information, work unit details, types of tasks, work hours, work outcomes, and generating reports for educational staff. This study concludes that the implementation of this system has the potential to boost employees performance motivation, ensure the currency of institutional data, and enhance the efficiency of employee work assessments.

Keywords: *Educational Staff, Information Technology, Information Management, Performance Evaluation.*

INTRODUCTION

The ability of an organization or institution to achieve its goals cannot be separated from human resources (Llorens & Battaglio Jr, 2010). Likewise, in the world of education, there is a great need for human resources having high performance and are competent in their field. One of the human resources in educational institutions, especially tertiary education, which still receives little attention in the field of educational research is educational staffs or academic staffs, while their role in tertiary education institutions is fundamental for quality education and research(Zhou et al., 2009) This also suggests that students performance is as important as the lecturers performance within the scope of tertiary education. Performance is basically inseparable from process, results and efficiency(Siagian, 2020). Performance is the work result that has been achieved, both in quality and quantity, by someone in carrying out their duties in accordance with the responsibilities given to them(Diyanti et al., 2017).

Achieving high performance in educational staffs is not an instant thing but requires time and a long process(Siagian, 2020). The efforts that need to be made to realize high performance of educational staffs can be done by maximizing supervision and coaching, and also assessing the level of work success carried out by educational staffs to ensure that human resources, in this case educational staff, can work at a high level of effectiveness and efficiency(Siagian, 2020). Human resource management is a division that hold hand-in-hand with this. Human resource management is an effort to recruit, develop, motivate and evaluate the organization's human resources as a whole to achieve its goals (Sule & Saefullah, 2005).

Some search results related to research on the topic of human resource management that focus on educational staffs are conducted by Niyivuga et al., (2019) exploring the relationship between monitoring and evaluation practices on the motivation of academic staffs in tertiary education. Their study recommends that policy makers design policies on monitoring and evaluation, which will guide supervisors in implementing monitoring and evaluation. Moreover, Ilori & Amusa, (2018) explored the impact of planning and leadership styles on the

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performance of library staffs in educational institutions in Lagos state. Their research suggests that there is a beneficial relationship between leadership style and library staffs performance, and a negative relationship between authoritarian leadership style and staffs performance. The research results also highlight other elements that can influence staffs performance, such as motivation, work environment, workload, and quantity of training provided. Siagian, (2020a) analyzed the influence of the work environment on the performance of educational staff. The findings reported that the work environment greatly influences the performance of educational staff. A conducive work environment will provide maximum performance from all educational staffs who work there.

In contrast to the abovementioned studies, which tends to examine the correlation between one variable and another variable and its impact on a, and the research has not explored the daily performance input system for educational staff. Thus, this study is aimed at designing a web-based staffs performance evaluation system in one of a popular university in the West Java region. This is important to do, considering that the current availability of evaluation systems does not accommodate the needs of leaders in carrying out monitoring and evaluating the daily performance of educational staff. In addition, web-based system design is a necessity in the era of information technology in realizing effectiveness and efficiency in carrying out tasks or optimal forms of service for an organization(Ayu et al., 2021). Through this study, a product was produced to develop a web-based daily performance evaluation system for educational staffs in tertiary education.

This study contributes to the development of an educational workforce management system. Through the products mentioned above, it is expected that a conducive, democratic and accountable work climate will be created because the work environment actually influences the work spirit of the staffs(Ratnasari & Sutjahjo, 2017; Soleh, 2013). Apart from that, psychologically, the existence of a daily performance evaluation system for educational staffs can stimulate staffs' motivation to improve their performance because control over work and feedback can increase employe motivation (Niyivuga et al., 2019; Okumbe, 1998).

THEORETICAL FRAMEWORK

Conceptually, community members devoting their time and energy to help provide education are called educational staffs (Daryanto, 2013). Based on this concept, there are four main categories of educational personnel including: (1) educators, including supervisors, teachers and trainers; (2) educational staffs include supervisors, researchers in the field of education, and librarians; (3) educational technical personnel such as laboratory assistants, and (4) educational unit management personnel including school principals, teachers and trainers(Sudarwan & Khairil, 2012) .This study specifically refers to the concept of Sudarwan & Khairil, (2012) that they are administrative staffs in the education sector, whose function is to support the implementation of education. Professional education experts are needed to ensure high quality education (Danumiharja, 2014; Maulana et al., 2021; Siagian, 2020).

This study was developed within the framework of idea that autonomy and control over work, as well as feedback can increase employee motivation (Okumbe, 2007) , in which in this study focusing on educational staffs in tertiary institutions. Several studies show that feedback has a positive impact on cognitive, emotional, behavioral, and motivational outcomes(Baker et al., 2013; Messmann & Mulder, 2017; Mulder, 2013). Affective outcomes, on the other hand, are more concerned with feelings of satisfaction(Asumeng, 2013; Jawahar, 2010; Mulder & Ellinger, 2013). Behavioral outcomes, on the other hand, examine performance and engagement in development activities, while motivational outcomes focus on a sense of competence and independence. When feedback is given (Mulder, 2013), found that it can only have a good or negative effect if the recipient can accept it.

In addition to the aforementioned points, the findings of the study suggest that academics are more likely to accept performance evaluations when they yield satisfaction or provide ideas for improvement. According to Zhang, (2008), improvement-oriented assessments can produce beneficial effects and possibly strengthen professional-organizational relationships and according to Shah dan Nair, (2012), when appraisals are perceived as a form of control, they can cause stress and tension and may have a negative impact on employee motivation. Therefore, according to a large number of studies, employees in tertiary education prefer intrinsic motivation to extrinsic motivation(Fagan et al., 2018; Hum, 2000; Siddique et al., 2011; Soto-Pérez et al., 2020).

Employee motivation is interpreted as the ability they have to control and influence their own behavior(Ivancevich, 2009) or desires, attitudes and values that influence an individual or someone to do certain things in accordance with individual goals (Rivai, 2004). This motivation greatly influences an employee's performance. Performance is basically the result of work that can be achieved by a person or group of people in an organization in accordance with their respective authority and responsibilities to achieve organizational goals(Mangkuprawira, 2009). The standards for evaluating employee performance can be measured and understood clearly through the amount of work, quality of work, punctuality, attendance and ability to collaborate(Bangun, 2012).

Based on the concepts above, the design of the daily performance input system for educational staffs as the aim of this study was developed based on a framework that this performance assessment is oriented to provide feedback to teaching staffs in an effort to increase the work motivation of educational staffs in monitoring, evaluation activities and also data management in efforts providing the required information.

METODE

Research Design and Procedur

4D Model from Thiagarajan et al., (1974) is a design used in developing a daily performance input system for educational staff. The 4D model describes the four stages taken in this study: define, design, develop and disseminate. The choice of this design was based on the many developments in computerized systems or media in the educational context developed through this 4D model (Istiyono et al., 2020; Munoto et al., 2021; Suparman et al., 2020).

Within this study, the four stages in the 4D model are implemented as follows:

In the defining stage, we conducted a field needs analysis study regarding the daily performance input system by interviewing unit leaders and educational staffs as product users.

In designing stage, we designed a daily performance input system for educational staffs based on the results of the first stage.

In the developing stage, we developed the system by carrying out a series of product-related trials

In the disseminating stage, we socialized products related to the daily performance input system through leadership meeting forums and scientific activities.

Research Cite and Participant

This study was conducted at Indonesian Education University (UPI, *Universitas Pendidikan Indonesia*), a renowned institution dedicated to educational development, with campuses located in various districts across the provinces of West Java and Banten, Indonesia. The specific research site was the UPI campus situated in the Sumedang district of West Java Province, which will be referred to as 'UPI Sumedang' hereafter. This choice of location was informed by the relatively larger population of educational staffs at UPI Sumedang compared to other UPI campuses in different regions.

This study involved a total of 71 educational staffs, distributed across 8 distinct work units. Specifically, the academic unit comprised 11 staffs, the finance unit consisted of 9 staffs, the personnel unit had 9 staffs, the infrastructure unit had 20 staffs, the security unit had 6 staffs, the security unit had 8 staffs, the information technology unit had 2 staffs, and each study program was represented by 6 staffs.

Data Collection and Data Analysis

In the initial stage, data were gathered through surveys and interviews using a purposive sampling technique. The survey, comprising 16 open-ended questions distributed via Google Forms, focused on the daily performance of the staffs. Before participating, strict research ethics procedures were followed, including explaining the survey's purpose, the role of education personnel, ensuring the confidentiality of personal data, and obtaining informed consent. Additionally, interviews were conducted to gain deeper insights into the survey

findings, employing a combination of interview questions and a questionnaire, which produced qualitative data. Moving to the second stage, researchers designed the product themselves, and no specific instruments were used. In the third stage, data were acquired from assessment results presented in numerical format and test outcomes, generating quantitative data.

Thematic inductive analysis, combined with content analysis techniques, was used to analyze several types of qualitative data collected in this study. Coding and categorization were carried out to avoid overlapping data. NVivo 12 Plus program was used to make coding and categorization easier. SPSS software was also used to analyze qualitative data.

FINDING AND DISCUSSION

Define Stage

In this stage, needs analysis regarding the system for monitoring the daily performance of educational staffs was carried out. The results of distributing questionnaires to 71 educational staffs indicated that a system for monitoring the daily performance of educational staffs is an urgent need in the work environment. The results of data analysis on a number of questionnaires distributed to participants show motives that indicate the need for the system. In terms of a concept map, the results of data analysis using the help of the NVivo 12 Plus application is depicted in Figure 1 below.
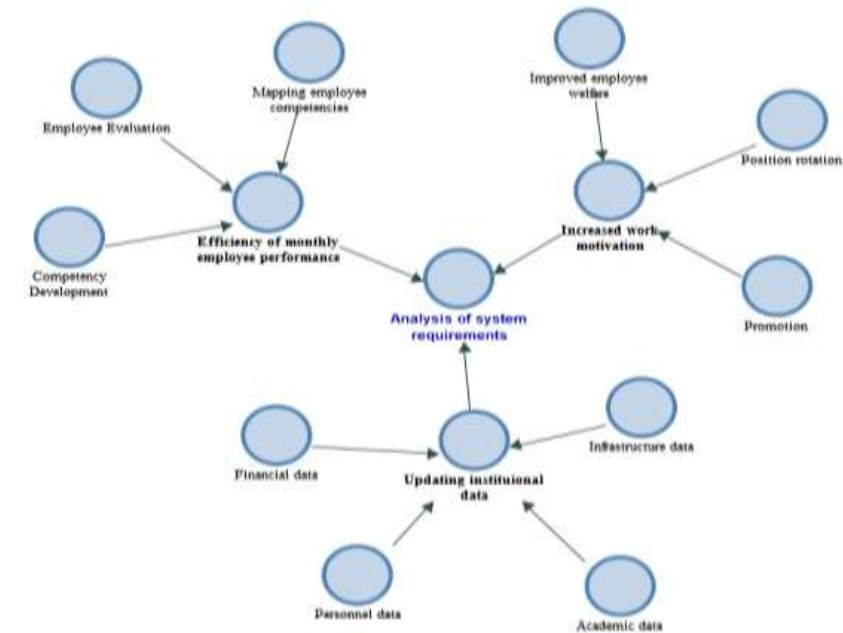

Figure 1. Analysis of system requirements.

Based on Figure 1, there are three factors requiring a daily monitoring system for educational staff. Firstly, regarding the efficiency of monthly employee performance assessments, the performance inputted every day will become input in evaluating staffs performance monthly. This also becomes a reference for leaders in efforts to develop the competencies of the employees concerned, mapping employee competencies. Secondly, related to the importance to increase the motivation of educational staff. Therefore, every performance reported by staffs becomes a reference in improving employee welfare, position rotation and/or promotion. Lastly, the need for updating institutional data including infrastructure data, financial data, academic data and personnel data is important for institutional purposes such as accreditation of institutions and study programs.

Design Stage

Based on the previous stage, we then designed an application called the SI-IKAH . The design consists of 6 modules comprising 4 data entry modules and 2 modules containing information from the data entry results. The arrangement of the six modules is as follows:

Education Personnel Biodata Collection Module

Education Work Unit Data Collection Module

Education Personnel Work Types Information Module

Education Personnel Work Hours Collection Module

Education Personnel Work Results Collection Modules

Education Personnel Work Report Printing Modules

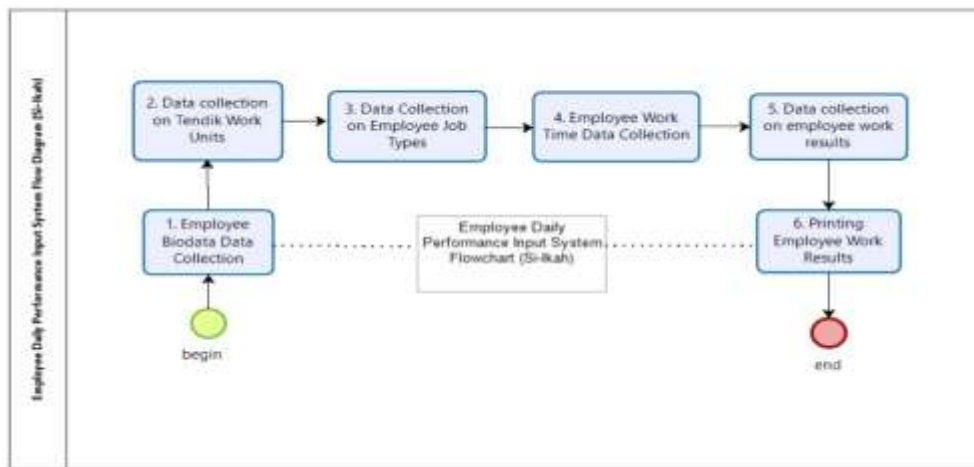Furthermore, the design and flow of the six modules are presented in Figure 2 and Figure 3.
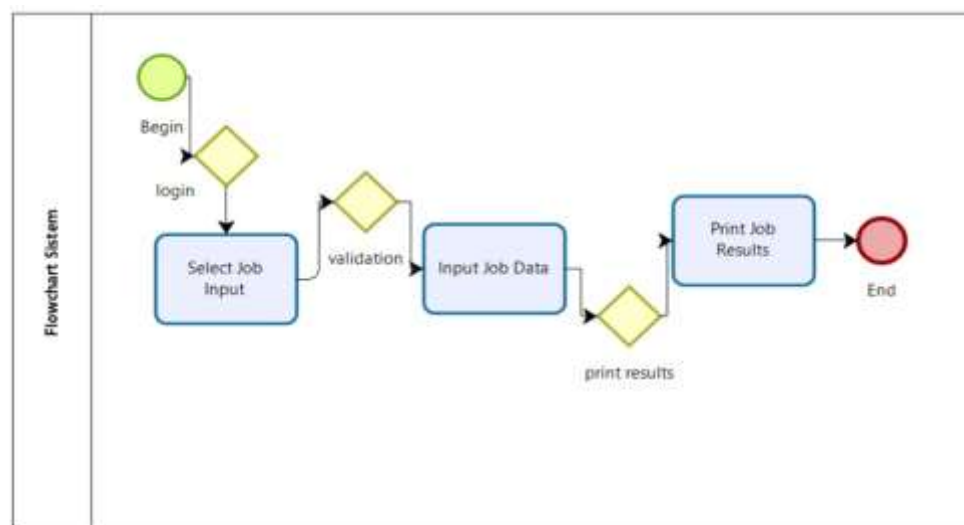
Figure 2. SI-IKAH System Design.

Figure 3. SI-IKAH System Data Input Flowchart.

The display of the application in the web version is shown as in Figure 4.
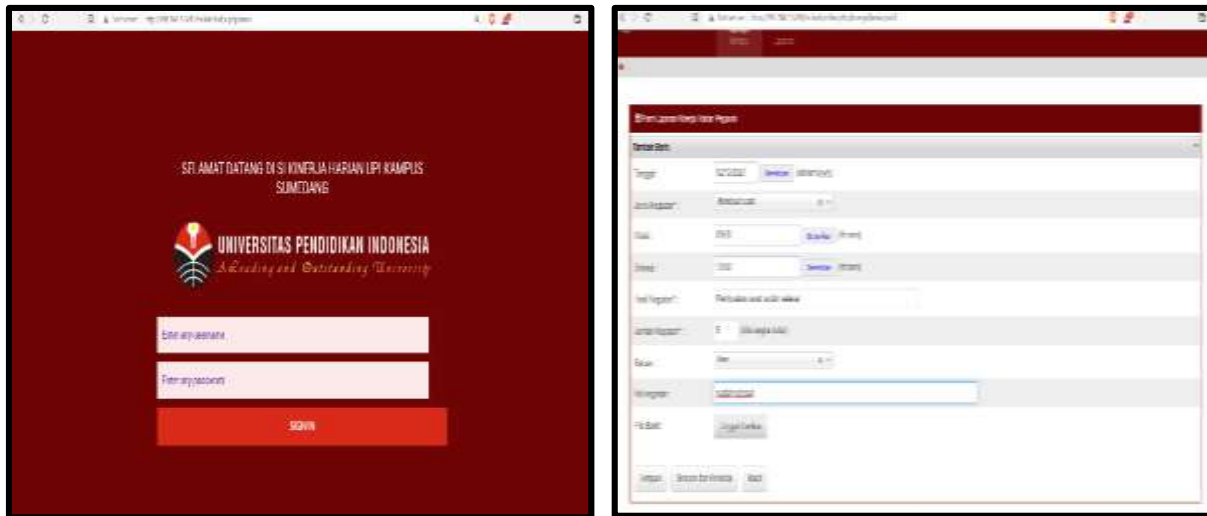

Figure 4. Display of Application on Web.

Developing Stage

System Development

The modules designed were developed using the PHP programming language and using the MySql database which can be downloaded on https://www.apachefriends.org/index.html, Next, the editor created the programming script using Sublime Text which can be downloaded for free on the page https://www.sublimetext.com. The stages of development of the SI-IKAH system are presented in the figures below:

Webserver with xampp

Programming language with PHP
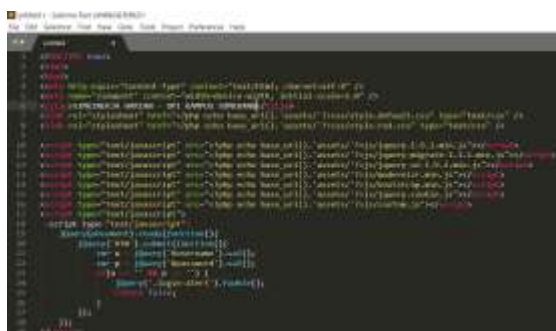
Editor Script Program with sublime text

Database MySql Server

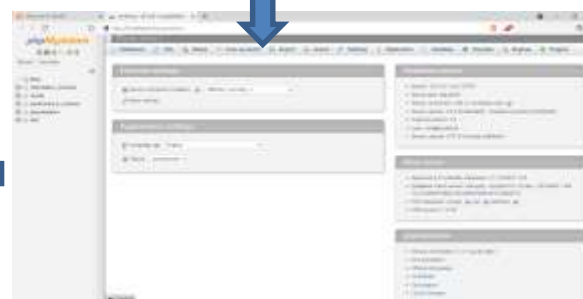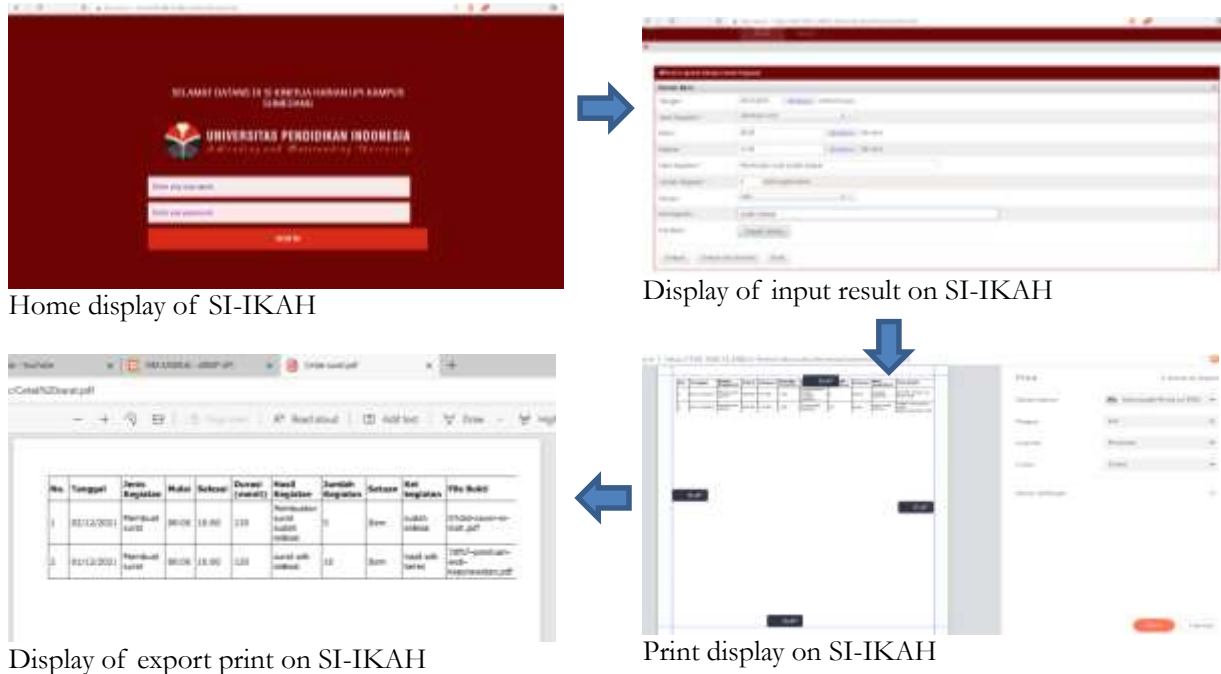Home display of SI-IKAH

Display of input result on SI-IKAH

Display of export print on SI-IKAH

Print display on SI-IKAH

Figure 5. SI-IKAH Development Stage.

Limited Trial

After the system was developed, a survey related to system satisfaction was done for a limited trial on 10 non-sample people. In this trial, the instrument validity was tested used and a system satisfaction survey was done. The survey instrument used consists of 5 dimensions which include tangibility, reliability, responsiveness, assurance, and empathy(Gui et al., 2009; Irawan, 2008). The results of the instrument validity test are as follows:

Table 1. Result of Instrument Validity Test.

Indicator	Sub-Indicators	Validity	Criteria	Mean	Criteria
	Application access speed to the database	0.638	Medium		
Reliability	Database protection system	0.722	High	0.709	High
	Speed of report generation	0.751	High		
	Backup function in the application	0.725	High		
	Ease of features/short-keys to remember and understand	0.685	Medium		
Responsiveness	Speed of response to input	0.700	High	0.712	High
	Ease of learning the application	0.752	High		
Assurance	Application accuracy in producing reports	0.673	Medium	0.723	High
	Clarity of information provided if there is an error	0.773	High		
	Completeness of the "help" menu	0.672	Medium		
Empathy	Ease of changing applications as needed	0.676	Medium	0.667	Medium
	Work is completed more easily and quickly	0.652	Medium		
Tangible	Completeness and application documentation	0.671	Medium	0.714	High
	Ease of studying documentation	0.756	High		

Based on the results of validity and reliability tests given to 10 non-sample people, the reliability indicator obtained an average validity value of rcount (0.709) > rtable (0.632) which was included in the valid category and had high validity criteria. The responsiveness indicator obtained an average validity value of rcount (0.712) > rtable (0.632), which was included in the valid category and had high validity criteria. The assurance indicator obtained an average validity value of rcount (0.723) > rtable (0.632), which was included in the valid category and has high validity criteria. The empathy indicator obtained an average validity value of rcount (0.667) > rtable (0.632), which was included in the valid category and had moderate validity criteria. Tangible indicators obtained an average validity value of rcount (0.714) > rtable (0.632) included in the valid category and had high validity criteria [38], [39]. After carrying out a validity test, a reliability test was then carried out to measure the

stability or consistency of the instrument when given to the same subject even by different people. The results of the reliability test assisted by using the IBM SPSS 26 application produced a value of 0.914 which was included in the very high category [38], [39]. Thus, this instrument was suitable to be used to measure service satisfaction with the SI-IKAH system.

After the instrument was declared suitable for use, the instrument was then distributed to the same 10 people during the validity test. The assessment and categorization criteria were carried out by determining the average obtained during limited trials and then converting it and categorizing it in the form of qualitative categories as follows:

Table 2. Ideal Category Assessment Criteria (Sukarjo (2006).

Quantitative Range Score	Qualitative Category
X ≥ Mi + 1.50 SBi	Excellent
Mi + 1.5 SBi ≥ X ≥ Mi	Good
X > M ≥ Mi – 1.5 SBi	Fair
Mi – 1.5 SBi > X	Poor

Note:

$\bar{x}$: Ideal mean.

M_i : Ideal score mean.

SB_i : Standard deviation of ideal scores.

M_i : $\frac{1}{2} x\ (highest\ ideal\ score + lowest\ ideal\ score)$.

SB_i : $\frac{1}{6} x\ (ideal\ highest\ score - ideal\ lowest\ score)$.

The results of calculating the ideal category assessment criteria in this study are as follows:

Table 3. Assessment Criteria.

Score Range	Category
X ≥ 3.25	Excellent
3.25 < X ≤ 2.50	Good
2.50 < X ≤ 1.75	Fair
1.75 > X	Poor

The results of the limited trial are as follows:

Table 4. Result of Limited Trial Test.

Indicators	Sub-Indicator	Mean	Category	Mean of Indicator	Category
	Application access speed to the database	2.50	Good		
Reliability	Database protection system	2.70	Good	2.45	Poor
	Speed of report generation	2.50	Good		
	Backup function in the application	2.10	Poor		
	Ease of features/short-keys to remember and understand	2.20	Poor		
Responsiveness	Speed of response to input	2.20	Poor	2.30	Poor
	Ease of learning the application	2.50	Good		
	Application accuracy in producing reports	2.60	Good		
Assurance	Clarity of information provided if there is an error	2.70	Good	2.65	Good
	Completeness of the "help" menu	2.70	Good		
Empathy	Ease of changing applications as needed	2.70	Good	2.57	Good
	Work is completed more easily and quickly	2.30	Poor		
Tangible	Completeness and application documentation	2.70	Good	2.55	Good
	Ease of studying documentation	2.40	Poor		
Mean		**2.49**	**Poor**	**2.49**	**Poor**

The results of limited trials show that several indicators are in the poor category, such as reliability having an average of 2.45 and responsiveness having an average of 2.30. This indicates that improvements to SI-IKAH are needed to increase service satisfaction.

Wider Trial

After several indicators were improved, we conducted a more extensive trial of SI-IKAH on a sample of 71 people. Table 5 presents the results of the wider SI-IKAH trial as follows:

Table 5. Result of Wider Trial.

Indicator	Sub-Indicators	Mean	Category	Mean per Indicator	Category
	Application access speed to the database	.,61	Excellent		
Reliability	Database protection system	3.59	Excellent	3.47	Excellent
	Speed of report generation	3.44	Excellent		
	Backup function in the application	3.25	Excellent		
Responsiveness	Ease of features/short-keys to remember and understand	3.41	Excellent	3.38	Excellent
	Speed of response to input	3.28	Excellent		
	Ease of learning the application	3.46	Excellent		
Assurance	Application accuracy in producing reports	3.39	Excellent	3.42	Excellent
	Clarity of information provided if there is an error	3.45	Excellent		
	Completeness of the "help" menu	3.46	Excellent		
Empathy	Ease of changing applications as needed	3.44	Excellent	3.43	Excellent
	Work is completed more easily and quickly	3.38	Excellent		
Tangible	Completeness and application documentation	3.45	Excellent	3.48	Excellent
	Ease of studying documentation	3.51	Excellent		
Mean		3.44	Excellent	3.44	Excellent

The results of broader trials show that all indicators and sub-indicators in the Si-IKAH usage satisfaction survey obtained an overall average of 3.44 and were in the very good category. This shows that SI-IKAH is suitable for use for information technology needs for management of UPI Sumedang educational staff.

Disseminating Stage

In this stage, socialization was carried out as research product in leadership meetings so that it can be implemented in the work environment. The socialization results received appreciation from the staffs in efforts to effectively and efficiently manage educational staff. Apart from that, socialization was also carried out in scientific forums such as seminars and scientific publications as a form of academic diplomacy.

The findings above provide an understanding that human resources, in this case staff, are an important aspect for the success of an educational institution, especially in tertiary education, therefore human resources must be handled as effectively as possible through human resources administration (Primayana, 2016). For effectiveness in handling human resources in the 21st century, a WEB-based system is necessary (Okello-Obura & Ssekitto, 2015). In the context of this study, a WEB-based system was produced which facilitates staffs to report daily performance in a system called SI-IKAH. This system is a reference for policy makers in the work environment in developing staffs competency or providing rewards and punishment.

The existence of SI-IKAH received a quite positive response from educational staffs. This was shown in the results of product trials using five indicators including Reliability, Responsiveness, Assurance, Empathy and Tangible showing an average value of 3.44 or included in the good category. This means that the product was ready to be implemented and accepted by users. There was acceptance of this product because users feel that SI-IKAH was not a form of control from superiors to subordinates which could cause stress and tension or may have a negative impact on employee motivation(Shah & Nair, 2012). However, as a system that is oriented towards improvement and benefits various parties, it is also possible to strengthen professional-organizational relationships(Zhang, 2008).

After implementation, there are four advantages of the SI-IKAH system. First, employee biodata was documented in a data base. Second, the performance assessment system for each student could be carried out online so that it was effective and efficient. Third, the performance of the staff, especially at UPI Sumedang environment, was recorded automatically, which makes it easier for the personnel department to obtain data on the performance results of each staff, and fourth, the leader promptly received performance reports from the educational staff, which became instrumental in formulating policies related to adjusting incentives, transfers, or promotions for the staff.".

CONCLUSION

This study concludes that the SI-IKAH system, developed as a result of this study, offers a viable solution for managing educational staff within tertiary institutions. The SI-IKAH system comprises six modules: the Education Personnel Biodata Collection Module, Education Work Unit Data Collection Module, Education Personnel Work Types Information Module, Education Personnel Work Hours Collection Module, Education Personnel Work Results Collection Module, and the Education Personnel Work Report Printing Module. Implementing this system has the potential to significantly boost employee performance motivation. In the context of institutional management, it facilitates the continuous updating of data and enhances efficiency in evaluating employee performance. Furthermore, the implications of the SI-IKAH system include providing a foundation for leaders to formulate policies aimed at achieving organizational objectives, such as equitable workload distribution, recognition of employee performance, and competency mapping for sub-unit leadership positions within the organization.

LIMITATION

This study has limitations in that the population only involves educational staffs at one campus and the focus of the research is only on designing a daily performance assessment system for educational staffs. It is very possible for the results of this study to be developed in other contexts.

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