# DEVELOPMENT OF MANAGEMENT INFORMATION SYSTEMS IN HUMAN RESOURCES AT SEKOLAH TINGGI FARMASI BANDUNG

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## ABSTRACT

Sekolah Tinggi Farmasi Bandung (STFB) is a private high school that has a 3 pieces of course are courses S1 Pharmaceuticals, D3 Pharmacy and Pharmacist Profession. STFB have problems in recruiting staff where there is a mismatch qualification of office staff, while the recruitment of lecturers there are problems due to the recruitment of lecturers too focused on a comparison of the ratio of faculty to students, namely (1: 30) so that the recruitment of lecturers often do not pay attention to the needs of the competence of lecturers who really - really needed by STFB, it could lead to some professors who teach are not in accordance with its competence. The next problem contained in the faculty reward system wherein the performance evaluation results there are many shared values that made Vice Chairman (WK) II difficulty in giving a reward, and the last problem is the lack of monitoring pension. The solution for the recruitment of staff and the recruitment of lecturers is to build a system using the method of recruitment selection Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), while for the problem is to change the reward system of faculty performance assessment criteria that there be a job behavior assessment by the Indonesian Government Regulation No. 46 Year 2011 on Job Performance Assessment of Civil Servants, and establish monitoring systems for retirement.

**Keywords:** Management Information Systems, Information Systems Human Resource Management, Human Resources, College, Technique for Order Preference by Similarity to Ideal Solution

## 1. PRELIMINARY

### 1.1 Background

Sekolah Tinggi Farmasi Bandung (STFB) is a Private School in the field of Pharmacy and is located in Bandung, was established by the Foundation STFB Adhi To Kencana has 3 pieces of course are courses S1 Pharmaceuticals, D3 Pharmacy and Pharmacist Profession. Based on data from employees, all permanent employees in this STFB amounted to 98 people and is divided into three types, namely staff, faculty and structural officials. Where staff numbered 43 people comprising 27 admin staff, laboratory staff 8, 2 security, 2 drivers, and 4 cs. Lecturer amounted to 55 people and consists of 34 lecturers Prodi S1 Pharmacy, 13 lecturers Prodi D3 and 8 lecturers Prodi Pharmacy Pharmacist Profession. While the structural officers are staff or faculty who explicitly have positions in the organizational structure STFB,

Based on the Standard Operational Procedures (SOP) in STFB recruitment of staff is done when there is a need staff sector in part, the recruitment process in STFB started from the administrative selection and then proceed with the interview, after the Head of HR select prospective staff based on the results of the interview, because the this selection stage sees only the result of the interview only, the resulting Head of HR difficulty in selecting candidates for the new staff with appropriate qualifications and the number of required positions. Based on the data of employees, there is a mismatch reception office staff qualification, qualification ketidaksesuaian This resulted in staff positions that have been accepted in these positions must be trained in areas occupied by the staff truly understand their duties.

While the recruitment of lecturers is done to meet the needs of the student faculty ratio is one versus 30 (1:30). Because it is too focused on this ratio, it recruitment is often not attentive to the needs of lecturers with the competencies actually required by STFB, so based on data from the lecturer with subjects that diampunya there are some professors who teach are not in accordance with its competence and it is not in accordance with Government Regulation number 14 Year 2005 on Teachers and Lecturers Article 45 to Article 46 paragraph (1) that the lecturer must teach in accordance with its competence. [1]

The reward system for faculty in STFB there is a problem because a lot happens similarities end performance assessment value due to the number of criteria on the performance of only two votes that is of value P3M and student questionnaire results which lead to the results of the performance appraisal be varied. This leads to the Vice Chairman (WK) II difficulty in giving rewards that refers to the ranking the performance appraisal.

In addition STFB also have a rule that staff must retire at the age of 56 years, while for lecturers follow Rule MENRISTEKDIKTI Republic of Indonesia Number 20 Year 2017 on Issuance of Professional

Allowance Lecturer And Allowances Honorary Professor of Article 3 (1e) which states that the lecturer with a functional position lector head, associate professor and assistant experts have a mandatory retirement age of 65 years and a lecturer with the functional position professors have mandatory retirement age of 70, [2] but the absence of monitoring pension causing still there are 3 staff working with age above retirement age.

Based on the description in STFB problem, then it needs a management information system that can address human resource issues as outlined in the form peneilitian thesis with the title Information Systems Development Human Resource Management in the Sekolah Tinggi Farmasi Bandung.

## 1.2 Research Methodology

The method used in the study information system of human resource management in STFB use descriptive method that aims to get a clear picture about things - things whatever deperlukan for this study.
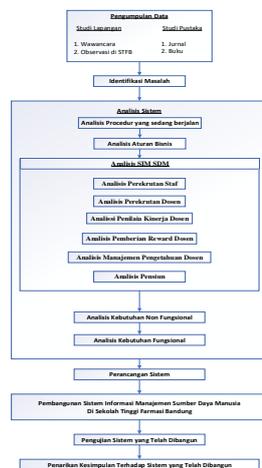


**Gamber 1.** Research Methodology

# 2. RESEARCH RESULT

## 2.1 Information System

Information systems can be interpreted as information from various information that is interrelated and facilitates each other for specific purposes and purposes. [3]

Information systems can also be defined as a system within an organization that connects between daily transaction processing needs, supports operations, is managerial and strategic activities in the organization and provides certain outside parties with the necessary reports. [10]

## 2.2 Management Information System

Management Information Systems can be defined as a computer-based systems that perform data processing, receiving input (input) in the form of data, then process (processing) and produces output (output) in the form of information will be the basis or reference for decision decisions. [4]

## 2.3 Human Resources

Human resource is the human potential that is used as labor to an organization's goals. [5]

## 2.4 Management Information Systems Human Resources

The information system of human resource management is a system created to implement the human resource management activities for petrified HR in a company in taking decisions. [6]

## 2.5 POAC Management Functions

POAC management is a management activity that discount the concept originated from planning (planning), and then continued organizing (organizing), agitation (actuating), and control (controlling). [7] The POAC management functions are as follows:



**Figure 2.** Model POAC

## 2.6 Decision Support Systems

Decision Support System is an interactive computer-based system that assists decision makers by utilizing data and models to solve unstructured problems.

So this computer-based support system can be used for decision making related to semi-structured problems. [8]

Decision support systems are also not a decision-making tool, but a system that helps decision makers to make decisions about a problem, so that decisions can be made more quickly and accurately. This system is not intended to replace decision makers in the decision-making process.[11]

## 2.7 Technique for Order Preference by Similarity to Ideal Solution (TOPSIS),

TOPSIS is a method for decision support systems have a concept where the best value is a value alternative to the alternative that has the shortest distance to the positive ideal solution and also has the longest distance from the negative ideal solution. Steps in TOPSIS method can be explained in the following figure.
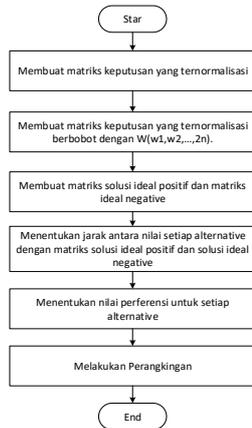
**Figure 3.** Step-by-Step Method of TOPSIS [9]

Based on Figure 3, there are 6 steps in the method of TOPSIS. Here is the explanation for TOPSIS method steps:

a. Make a decision matrix that is normalized by the following formula.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (1)$$

Where :

$r_{ij}$ = Is the result of the normalization matrix keputsan.

i = 1,2, ...., m is a row of a matrix of values.

j = 1,2, ...., n is a column of the matrix of values.

b. Make a decision matrix that is normalized weighted by W (w1, w2, .., wn).

$$Y = \begin{bmatrix} W_{11}r_{11} & \cdots & W_{1n}r_{1n} \\ \vdots & \ddots & \vdots \\ W_{m1}r_{m1} & \cdots & W_{nm}r_{nm} \end{bmatrix} \quad (2)$$

Where:

Y = normalized weighted matrix

W = weight of each criterion

r = matrix normalized

c. Creating an ideal solution matrix of positive and negative ideal solution matrix.

A + = max (y1 + y2 + ...., Yn +)        (3)
A - = min (y1-, Y2-axes, ..., yn-)        (4)

Where:

A + = positive ideal matrix

A - = negative ideal matrix

$y_i$ + = Largest value in each column

$y_i$ − = Smallest value in each column

d. Determine the distance between the value of each alternative with the negative ideal solution matrix of positive and negative ideal solution matrix.

$$D^+ = \sqrt{\sum_{j=1}^{n}(y_i^- - y_{ij})^2} \quad (5)$$

Where:

I = 1,2, ...., M

$D^+$ = Distance of each alternative with positive ideal solution

$$D^- = \sqrt{\sum_{j=1}^{n}(y_{ij} - y_j^-)^2} \quad (6)$$

Where:

I = 1,2, ...., M

$D^-$ = Distance of each alternative with the negative ideal solution

e. Determining the value of preference for each alternati.

$$Vi_= \frac{D_i}{D_i^- + D_i^+} \quad (7)$$

Where i = 1,2, ... m

f. Doing perangkingan.

At this stage it does is ranking the results of the preference value for each alternative.

## 2.8 Analysis of SIM SDM in STFB

Analysis of human resource management in STFB will be described using a model POAC (Planning, Organizing, Actuating, Controlling). Stages POAC models in the information system of human resource management in STFB can be described in Figure 3 below:
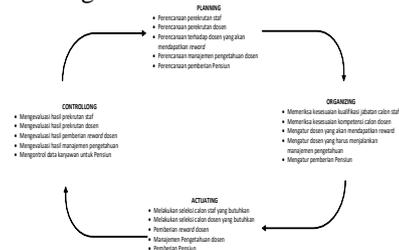


**Figure 4.** SIM POAC Model HR in STFB

### 2.8.1 Analysis Recruitment Staff

1. Planning

At this stage the Head of HR determining occupational requirements and the required amount of staff needed based on demand and vacancy of the monitoring results. In addition the Head of Human Resources must also specify the period of recruitment. Here are the requirements and qualifications of staff positions needed.

**Table 1.** Staff Number and Qualification Requirements

| office | Total requirement | qualifying Position |
|---|---|---|
| staff Information Technology | 1 | 1. Male / Female min 20, max 35 years |
| | | 2. Minimum D3 in IT |

This recruitment will be selected by using TOPSIS method with several development stages. Here are the stages of development on TOPSIS method.
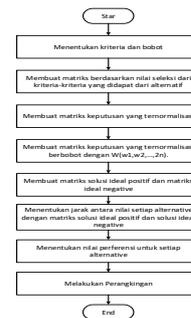


**Figure 5.** Stages of development TOPSIS Method

The criteria and weights used for staff recruitment selection is as follows.

**Table 2.** Recruitment Assessment Criteria and Weightings

| Criteria | weights Ratings | code Criteria |
|---|---|---|
| the ability to self | 40% | C1 |
| Interview | 30% | C2 |
| Education | 20% | C3 |
| Age | 10% | C4 |

2. Organizing

Once approved Head of Human Resources began to recruit. Head of HR will make the selection of administrative staff or checking whether candidates meet the qualifications of existing IT staff positions in Table 1.

3. actuating

At this stage, the Head of HR staff make the selection of candidates based on criteria that already exist include the ability to self test, interview, and selection of new staff by education and age.

In accordance with case studies drawn assumed the data contained in the recruitment of new staff candidates in 2018 who have passed the administrative selection and have passed all the tests. Here is the calculation process TOPSIS method.

a. The first step to enter the value of each potential staff into the matrix.

**Table 3.** Candidates Value Matrix IT Staff

| Alternative | variable | | | |
|---|---|---|---|---|
| | C1 | C2 | C3 | C4 |
| Raka Aditama Sandas | 2 | 3 | 4 | 4 |
| Galina Saputra | 3 | 4 | 3 | 3 |
| Apriyanto | 3 | 2 | 4 | 3 |
| Febri Yanto | 2 | 2 | 3 | 4 |
| Encep Suryana | 4 | 3 | 4 | 3 |
| Adam Reynaldi | 4 | 2 | 3 | 4 |
| WEIGHT | 40% | 30% | 20% | 10% |

b. The second step mmenghitung decision matrix normalized by using the formula (1). Here are the results of the process of normalization matrix.

$$r = \begin{bmatrix} 0,2626 & 0,4423 & 0,4619 & 0,4619 \\ 0,3939 & 0,5898 & 0,3464 & 0,3464 \\ 0,3939 & 0,2949 & 0,4619 & 0,3464 \\ 0,2626 & 0,2949 & 0,3464 & 0,4619 \\ 0,5252 & 0,4423 & 0,4619 & 0,3464 \\ 0,5252 & 0,2949 & 0,3464 & 0,4619 \end{bmatrix}$$

c. The third step is to make a decision matrix normalization with the weight (W = [0.4 0.3 0.2 0.1]), the weight of the matrix calculation using the formula (2). Here are the results of the calculation of the weighted normalization mantriks.

$$Y = \begin{bmatrix} 0,1050 & 0,1327 & 0,0924 & 0,0462 \\ 0,1576 & 0,1769 & 0,0693 & 0,0346 \\ 0,1576 & 0,0885 & 0,0924 & 0,0346 \\ 0,1050 & 0,0885 & 0,0693 & 0,0462 \\ 0,2101 & 0,1327 & 0,0924 & 0,0346 \\ 0,2101 & 0,0885 & 0,0693 & 0,0462 \end{bmatrix}$$

d. The fourth step is to determine the ideal solution positive and negative iedal dengna solution using the formula (3) and (4). Here is a positive ideal solution and negative ideal solution.

**Table 4.** Ideal Solution Positive

| variables | Ideal Solution Positive ()A$^+$ |
|---|---|
| C1 | .2101 |
| C2 | .1769 |
| C3 | .0924 |
| C4 | .0462 |

**Table 5.** Ideal Solution Negative

| variables | Ideal Solution Negative ()A$^-$ |
|---|---|
| C1 | .1050 |
| C2 | .0885 |
| C3 | .0693 |
| C4 | .0346 |

e. The fifth step is to calculate the distance of each alternative with positive ideal solution and negative ideal solution based on the formula (5) and (6). Here are the results of calculation of the distance between the ideal solution.

**Table 6.** Distance Between Ideal Solution

| Alternative | D$^+$ | D$^-$ |
|---|---|---|
| Raka Aditama Sandas | .1140 | .0512 |
| Galina Saputra | .0585 | .1024 |
| Apriyanto | .1035 | .0566 |
| Febri Yanto | .1393 | .0116 |
| Encep Suryana | .0457 | .1163 |
| Adam Reynaldi | .0914 | .1057 |

f. The sixth step is to calculate the value of preference for each alternative by the formula (7). Here are the results of a calculated value of the preference.

**Table 7.** Alternative referrers Calculation Results

| Alternative | Results value V |
|---|---|
| Raka Aditama Sandas | .3099 |
| Galina Saputra | .6364 |
| Apriyanto | .3535 |
| Febri Yanto | .0769 |
| Encep Suryana | .7179 |
| Adam Reynaldi | .5363 |

g. Then make perangkingan from the calculation of the alternative preferences.

**Table 8.** Results on Ranking

| Alternative | Results Value |
|---|---|
| Encep Suryana | .7179 |
| Galina Saputra | .6364 |
| Adam Reynaldi | .5363 |
| Apriyanto | .3535 |
| Raka Aditama Sandas | .3099 |
| Febri Yanto | .0769 |

Based on the results on ranking has been done, there is one candidate who has the highest grade staff on behalf of Encep Suryana with the value 0.7179.

4. controlling

At this stage the Head of HR check the results of the selection, whether in accordance with what has been planned at the planning stage or not.

**2.8.2 Recruitment Analysis Lecturer**

1. Planning

Determine the number and competence of lecturers needed at each study program in STFB, in determining the number of lecturers required seen in the number ratio of the number of students (1:30).

After seeing the vacancy will be monitored teacher in each department of each clump field of

science in order to see the emptiness of lecturers in every field of science there.

2. Organizing

Once approved Head of Human Resources began to recruit. Head of HR will select administrative or check whether prospective lecturers meet key competencies.

3. actuating

At this stage, the Head of HR and WK II tests based on predetermined criteria and also make the selection by using tools that TOPSIS method, in which the results will be used as an alternative to determine which new faculty candidates who pass the selection.

4. controlling

Evaluating the results of the recruitment and selection as a basic reference does placement lecturer.

### 2.8.3 Analysis Performance Assessment Lecturer

Assessment of faculty performance in STFB used to determine the remuneration incentive (reward) and also to determine where the lecturer should follow knowledge management. At this stage of the implementation of performance assessment at this faculty there are some steps done for performance assessment.

1. Determination Criteria and Weights
   The performance appraisal criteria proposed in this study are based on the Government Regulation of the Republic of Indonesia Number 46 of 2011 concerning Assessment of Work Performance of Civil Servants
2. Determination Period Rate Kineja lecturer
3. Determine who judge and who rated
4. Assessment Process.

### 2.8.4 Providing Analysis Reward

1. Planning

At this stage WK II will see the results of performance appraisal as the reference of reward.

2. Organizing

At this stage WK II lecturers selects which ones will direkomendasrikan to get the reward, based on the terms set by the Chairman STFB. Terms of lecturers who will get the reward can be seen in Table 9 below:

**Table 9. Requirements to Get Reward**

| Terms Get Reward | |
|---|---|
| The final value of faculty performance ratings greater than or equal to 3 ($\geq 3$) | Getting pringkat three (3) top ranking the results of performance evaluation of lecturers |

The results of this selection will be given to the Chairman STFB. If there is the same highest value of more than 3 (three) lecturer, then that will determine the reward is Chairman STFB to see the contribution of the faculty work.

3. actuating

This stage is the stage of the faculty reward system that had previously been approved by the Chairman STFB.

4. controlling

At this stage WK II will evaluate the reward, whether the reward was really up to the faculty should be rewarded or not.

### 2.8.5 Analysis of Knowledge Management

1. Planning

At this stage WK II will see the results of performance appraisal as a reference to determine which ones should follow the faculty of knowledge management.

2. Organizing

At this stage of selecting lecturers WK II which must implement knowledge management based on the terms specified in STFB. Terms lecturer who must implement knowledge management can be seen in Table 10 below:

**Table 10.** Knowledge Management Terms

| Knowledge Management Terms |
|---|
| Have a final value appraisal is less than two ($<2$) |

3. Actuating

Stage where the lecturer who has been selected by the table 10 to implement knowledge management.

4. Controlling

At this stage WK II will evaluate the results of the implementation of knowledge management lecturer one way to look at the results of the assessment of faculty performance in future periods. Is the faculty performance gain after implementing management changes pengtahuan, if there is no change then it should follow the management faculty of knowledge anymore.

### 2.8.6 Retirement analysis

1. Controlling

At this stage the Head of HR will control employee data to see where the staff and faculty of an age approaching retirement age limit.

2. Planning

At this stage the Head of HR and WK II staff and faculty will commemorate one year before reaching age pension age to carry out pension preparation

3. Organizing

At this stage, the Head of HR and WK II will take care of pension preparation to be given to staff and faculty who will retire. That takes care of training is appropriate and in accordance with the interests and talents of staff and faculty who will retire.

4. Actuating

This stage is the provision of training for staff and faculty to retirement preparation period that has been prepared beforehand. Staff and faculty who will retire must implement pension preparation period until retirement time actually arrived. As for the

severance pay calculation and administration will be carried out by the Foundation Adhiguna Kencana.

## 2.9    Data analysis

Data analysis aims to determine what data is required and will be applied by the system. The data will be described in the form of the entity, the following data will be diterpakan relationship in the information system of human resource management in STFB:
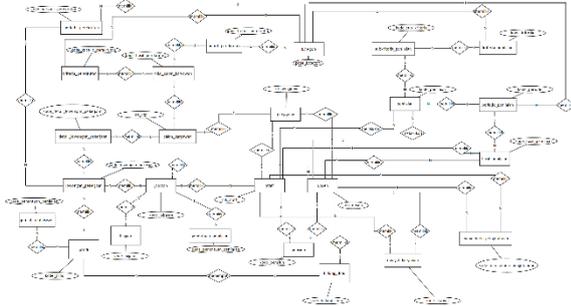


**Figure 6.** Entity Relational Diagram

## 2.10    Diagram Context

Context diagram illustrate the relationship between the potential users with a system that will be built where there is a data flow of data input and output data. Diagram context for the information system of human resource management in STFB are as follows:
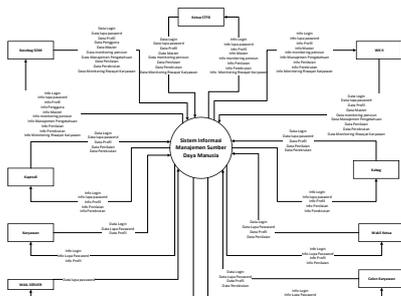


**Figure 7.** diagram Context

## 2.11    Data Flow Diagrams

Data flow diagrams(DFD) is used to illustrate the functional process system associated with the data flow to the internal and external entities. DFD for HR in STFB SIM can be seen in Figure 8 below:
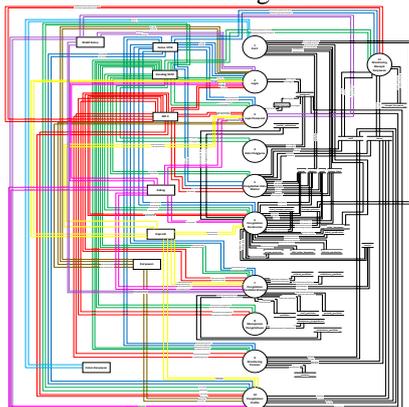


**Figure 8.** Data Flow Diagrams

## 2.12    System planning

The system design is done after the analysis phase of the system has been completed. The system design includes drawing, planning and making sketches or arrangement of several separate elements into one unified whole.

## 2.13    Relation Scheme

Relation schema is the skeleton of a table containing the attributes associated with each table by each of the key attributes that exist in each of these tables. Here is a relation schema information system of human resource management in STFB:
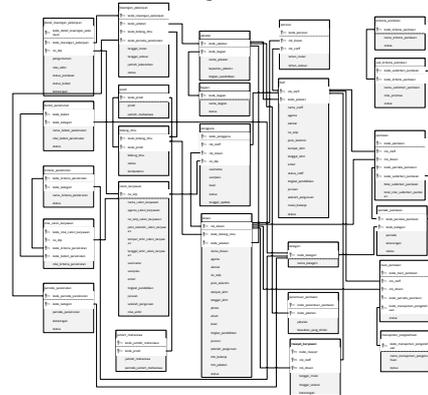


**Figure 9.** Relation scheme

## 2.14    Designing Interfaces

The design of the interface is done to image display systems that will be built. The design of the interface on the system of human resource management information can be seen in Figure 10 below:
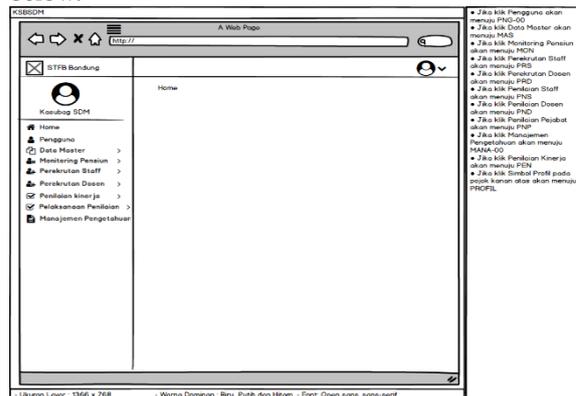


**Figure 10.**  Interface Design Head of HR

## 2.15    Network Design Semantics

This design is made to see the interconnectedness of each interface that was created earlier. The design of semantic networks in management information systems human resources can STFB dilihan in Figure 11 below:
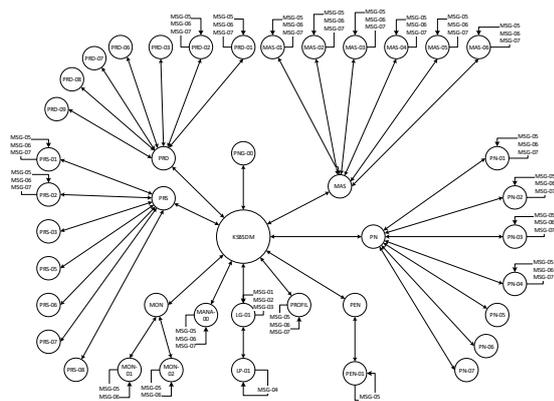
**Figure 11.**Semantic Network Design Head of HR

## 2.16 Testing Systems

The test system is done with the intent of finding errors - errors or omissions in the information system under test. This test also has the objective to determine whether the systems that have been made were appropriate and meet the objective of making the information systems.

### 2.16.1 Black Box Testing

Testing system of human resource management information using test data that the data contained in the Sekolah Tinggi Farmasi Bandung.

**Table 11.** Black Box Testing

| Cases and Test Results (Data True) | | | |
|---|---|---|---|
| Data Enter | Hope | Observation | Conclusion |
| Prodi: S1 Pharmaceuticals Period: 2018 Number of students: 1095 | Mempilkan system message "The number of students S1 Pharmaceuticals has successfully added" | Data on the number of students is stored on the system. | [√] received [ ] rejected |
| Cases and Test Results (Data One) | | | |
| Data Enter | Hope | Observation | Conclusion |
| Prodi: S1 Pharmaceuticals Period: 2018 Number of students: 1095 | Mempilkan system message "The number of students S1 Pharmaceuticals are already present on the system" | Data is not stored and the system returns to the input data. | [√] received [ ] rejected |
| Cases and Test Results (Data Empty) | | | |
| Data Enter | Hope | Observation | Conclusion |
| Prodi: Period : Number of students: | The system gives an error message in the empty field. | Data is not stored and the system returns to the input data. | [√] received [ ] rejected |

Based on test results BlackBox has been conducted on the information system of human resource management in the Sekolah Tinggi Farmasi Bandung, it can be concluded that each process contained in the system are in accordance with the initial design but still allow for errors in syntax, the system is also functionally meet the needs of system as expected.

### 2.16.2 End User Testing

End user testing was conducted to determine whether the system has been built has been consistent with the objectives of the research conducted or not. This end user testing conducted by interviewing all prospective users of these systems in the Sekolah Tinggi Farmasi Bandung.

Based on the responses from interviews with all prospective users of information systems of human resource management. That a system built to help the Chair STFB, WK II, Head of HR, Kaprodi, Head, Head and employees in performing activities of HR activities at the Sekolah Tinggi Farmasi Bandung.

## 3 CLOSING
### 3.1 Conclusion

After doing the analysis, design, and testing it can be a conclusion to the Management Information System of Human Resources in Sekolah Tinggi Farmasi Bandung is as follows:

1. Management Information System of Human Resources in the Sekolah Tinggi Farmasi Bandung to assist the Head of HR in view the needs of staff and faculty who have been reported by each Chief and Head of the Program, so that the Head of HR no longer need to determine the qualifications and competency of prospective staff and faculty needed. This system can also help in determining the new staff and faculty are in need STFB based on the result of selection by using TOPSIS.

2. Management Information System of Human Resources in the Sekolah Tinggi Farmasi Bandung can help all structural in assessing the performance of subordinates, with the assessment criteria of faculty performance he had asked to reduce the problems of shared values on the results of judging the performance of the lecturer, it can facilitate WK II recommend lecturers who will be rewarded even if does not rule out the possibility kesamaaan value will still occur.

3. Information Systems Human Resource Management in the Sekolah Tinggi Farmasi Bandung Head of HR can help in providing the pension rights of staff and faculty based on the results of monitoring of existing pensions.

### 3.2 Suggestion

Based on the conclusions that have been described above, it is expected in the future on Information Systems Human Resource Management in the Sekolah Tinggi Farmasi Bandung is as follows:

1. TOPSIS method used for recruitment selection has the disadvantage that the lack of weighting the priority is a priority count against the criteria, it is useful to improve the validity of the

weight value calculation criteria. TOPSIS method then it will be more effective if combined with other methods such as AHP.

2. In order to facilitate the prospective staff and faculty in conducting a written test either test the ability themselves to staff as well as psychological test for lecturers, it would be better if it held the addition of an online test facility. that prospective staff and faculty do not have to do a written test again in the Sekolah Tinggi Farmasi Bandung and can be directly selected for the next stage.

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