

USING THE ANALYTICAL HIERARCHY PROCESS ALGORITHM FOR ASSESSMENT OF LECTURER PERFORMANCE BASED ON LECTURER EVALUATION

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Abstract

Lecturer performance appraisal in general aims to provide feedback to lecturers in an effort to improve their performance, in increasing the productivity of an organization, and specifically related to various policies towards lecturers, such as promotions in rank or class, promotions, salary adjustments, training and development, planning career, behavior improvement and others. The role of a decision support system will assist management in achieving the objectives of lecturer performance appraisal, such as lecturer career planning, without compromising the parameters that have been determined. The AHP (Analytical Hierarchy Process) method approach is used in designing a structured system with programming language using PHP and MySQL Databases. The system created can be used to help facilitate the head of study programs or academic bureaus in deciding the problems encountered during the lecturer performance appraisal process. then determine the lecturer's performance assessment with the weighted value of all the criteria for each lecturer, and the head of study program or academic bureau can make decisions and policies for assessing the lecturer's performance.

Keywords: *Lecturer Performance Assessment, Analytic Hierarchy Process (AHP), Decision Support System*

1. Introduction

Higher education is one of the important pillars in the development of a nation. As the highest level of education in the national education system, higher education becomes a reference in encouraging the development of a nation. Higher education in Indonesia is a national education subsystem that includes diploma, bachelor, master, specialist and doctoral programs organized by universities. Universities are obliged to provide education, research and community service (Directorate General of Higher Education, 2014).

One of the elements in the implementation of higher education is the lecturer. Lecturers are academic staff in charge of planning and implementing the learning process, assessing learning outcomes, conducting guidance and training, as well as conducting research and community service. Based on the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers, Article 51 Paragraph (1) Point b, that lecturers are entitled

to promotions and awards in accordance with their academic performance (Directorate General of Higher Education, 2014). This reward system related to the aspirations and motivations among lecturers is expected to be one way of developing academic management in each university. In the process of evaluating the performance of lecturers, faculties and universities appoint an assessment team to evaluate lecturers. However, the assessment process is still done manually and implemented in the form of paper which is commonly referred to as a questionnaire, so it takes a long time to process the data. In addition, the assessment is still subjective and not relevant to the actual situation, so it cannot be used as a basis for decision making. To overcome this problem, a decision support system is needed to determine the decisions taken. Decision support system is an interactive information system that provides information, modeling, and manipulating data. This system is used to assist decision making in semi-structured and unstructured situations (Alter, 2002).

2. Underlying Theory

a. Notion of Decision Support System (DSS)

Decision Support System (DSS) or decision support system (DSS) is an interactive information system that provides information, modeling, and manipulating data. This system is used to assist decision making in semi-structured and unstructured situations, where no one knows for sure how decisions should be made (Alter, 2002).

The opinion of some experts that DSS or Decision Support System (DSS) was created to improve the process and quality of decision-making results, where DSS can combine data and knowledge to increase effectiveness and efficiency in the decision-making process (Maharrani, et al., 2010). Decision support systems is an additive, interactive, flexible computer-based information system that was specifically developed to support the solution of unstructured management problems to improve the quality of decision making. Thus, a definition of a decision support system can be drawn, namely a computer-based system that is adaptive, flexible, and interactive which is used to solve unstructured problems so as to increase the value of decisions taken (Khoirudin, 2008). , (2005), in a decision support system there are three types of decision types, namely:

1) Structured Decisions

Structured decisions are decisions that are made repeatedly and routinely. The information needed is specific, scheduled, narrow, interactive, real time, internal, and detailed. The procedure for making decisions is very clear. This decision is mainly made at lower level management. Examples: Decisions on ordering goods and decisions on collection of receivables; determine overtime eligibility, replenish inventory, and offer credit to customers.

2) Semi-structured decisions

Semi-structured decisions are decisions that have the nature that some decisions can be handled by the computer and others still have to be done by the decision maker. The information needed is focused, specific, interactive, internal, real time, and scheduled. Such as evaluating credit, scheduling production, designing marketing plans, and developing departmental budgets.

3) Unstructured Decisions

Unstructured decisions are decisions that are complicated to handle because they do not occur repeatedly or do not always occur. This decision requires experience from various external sources. This decision generally occurs at the management level.

4) Decision Support System Components

According to Turban, et al., (2005), the Decision Support System consists of four subsystems. Based on all these definitions, a decision support system should include three main components, namely DBMS (Database Management System), model management and user interface. The knowledge management subsystem is optional, but can provide many benefits because it provides intelligence for the three main components. The schematic of the components of a decision support system is shown in Figure 2.1.

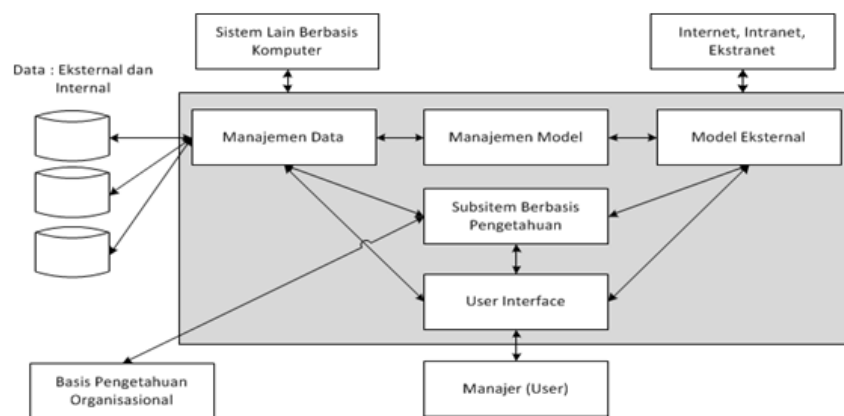


Figure 1. Decision Support System Components (Turban, et al., 2005).

5) Analytic Hierarchy Process (AHP)

The source of the complexity of decision problems is not only due to uncertainty or imperfect information. However, there are other causes, such as the many factors that influence the available choices, with various criteria. In the Multi Criteria Decision Making (MCDM) problem, the decision maker assesses a set of decision alternatives based on criteria. Basically AHP is a general theory of measurement that is used to find the best ratio scale from discrete or continuous pairwise comparisons. AHP is very suitable and flexible to be used to make decisions that help a decision maker to make efficient and effective decisions based on all the aspects it has. The types of AHP include (Bound in Setiawan, 2009:4):

- Single criteria
Single criteria is to choose one alternative with one criterion.
- Multi-criteria
Multi-criteria is decision making that involves several with more than one criterion and choosing one alternative

6) Basic Principles of AHP

In solving problems with the AHP method, there are several basic principles that must be understood (Mulyono, 2004:335-337):

7) Decomposition

This principle is the solution of complete problems into their elements to form a hierarchical decision-making process where each element or elements are interconnected. If you want to get accurate results, solving is done on the elements until it is impossible to do further solutions so that several levels of the problem are obtained. The decision hierarchy structure can be said to be complete and incomplete. A hierarchy is called complete if all elements at a level are related to all elements at the next level, while an incomplete decision hierarchy is the opposite of complete. alternative.

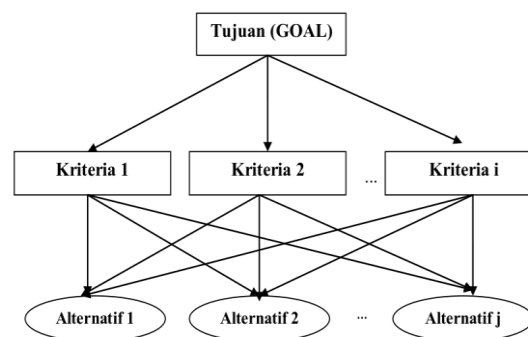


Figure 2 Decision hierarchy from AHP

8) HTML Programming Language

HTML stands for Hyper Text Markup Language. HTML documents are pure text files that can be created with any text editor. This document is known as a web page. An HTML document is a document that is displayed in a web browser search. This document generally contains information or application interfaces on the internet (Sidik, 2005).

9) MySQL (My Structured Query Language)

MySQL is a database management system software (Database Management System) which is very popular among web programming. MySQL is the most popular database used to build web applications that use a database as a source and data management. The popularity of MySQL is possible because of its ease of use, fast query performance, and sufficient for the database needs of small and medium-sized companies. MySQL is a database used by leading sites on the internet to store their data (Sidik, 2005).

3. Method

The research method used is a literature study by reading books and journals related to decision support systems, and the Multiple Attribute Decision Making (MADM) decision-making method using the Analytic Hierarchy Process (AHP) method. The purpose of the

literature study is to obtain reference sources to facilitate the implementation of this research.

a. Hardware

The hardware used in the study of the Lecturer Assessment Decision Support System at the Medan Institute of Technology is a laptop unit with the following specifications:

- Processor: Intel(R) Core(TM) i5 3427U CPU @ 1.80GHz (4 CPUs),
- Memory: 4096MB RAM
- DirectX Version: DirectX 11
- Card name: Nvidia Geforce 710M
- Hard disk: 500 GB

The software used are:

- Windows Ultimate 64 bit Operating System
- Sublime Text
- XAMPP
- Google Chrome Browser, Mozilla Firefox

b. System Development Method

The system development method used is following the System Development Life Cycle (SDLC) framework, where the SDLC framework itself consists of many methods, one of which is the waterfall method. The stages in the waterfall method are system planning, analysis, design and implementation as shown in Figure 3.1

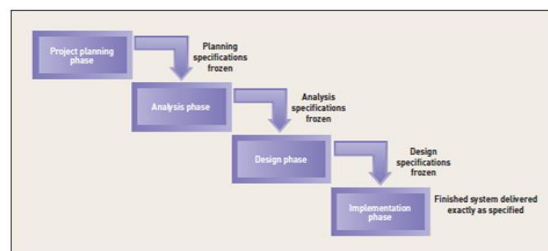


Figure 3. Waterfall method (Satzinger, 2009).

4. Result And Discussion

1. Calculation of consistency ratio

This calculation is used to ensure that the value of the consistency ratio (CR) ≤ 0.1 . If it turns out that the CR value is greater than 0.1, then the pairwise comparison matrix must be corrected.

a. Application Display Results

➤ Login Page

The screenshot shows a login form titled "Login" in a blue box. Below the title, there are two input fields: "NIM" and "Password". At the bottom of the form is a blue button labeled "Login". The entire form is set against a light blue background.

Figure 4. Login Display

The screenshot shows an "Input Mahasiswa" form. It contains five input fields: "Nim", "Nama", "Angkatan", "Semester", and "Jenis kelamin". The "Jenis kelamin" field has two radio button options: "Laki-laki" and "Perempuan". At the bottom is a blue button labeled "Simpan". The form is titled "Input Mahasiswa" in a blue box at the top right.

Figure 5. Admin Menu Display

➤ Menu Display

Data Mahasiswa

Cari berdasarkan nama

NIM	Nama	Angkatan	SMS	JK	Status
15210057	AGUS C B PRATAMA	2015	8	L	aktif
15210111	ALI SOFYAN SAPUTRA	2015	8	L	aktif
15210012	ANGGIT ARI UTOMO	2015	8	L	aktif
15210025	ANJU ALFREDO AMBARITA	2015	8	L	aktif
15210055	CHARISMA NOVERSEL GIAWA	2015	8	L	aktif
15210119	EZER RIKKY SINAGA	2015	8	L	aktif
15210046	MUHAMMAD IQBAL	2015	8	L	aktif
15210063	PATAR M MANALU	2015	8	L	aktif
15210056	VICKY EDO H NABABAN	2015	8	L	aktif
15210012	ANGGIT ARI UTOMO	2015	7	L	aktif
16210009	AYU YULAN SARI	2016	7	P	aktif
16210031	CINDI MANIK	2016	7	P	aktif
16210011	EVAN FRINALDO SINAGA	2016	7	L	aktif
16210013	KHAIYURI	2016	7	P	aktif
16210042	LAMTOGU VINSENSIUS SIHALOHO	2016	7	L	aktif

Figure 6 Student Data Display

Data dosen

Cari berdasarkan nama

NIDN	NIP	Nama	Status
0274020006	127422001	ABDULLAH MUHAJIR ST M Kurni	aktif
088021012002	1012002	BENI SATRIA ST MT	aktif
0480200003	127422000	DICKY ABDILLAH ST M Kurni	aktif
01210006102	0120000009	Dr H HERMANDEY SET ALAN MT AM JPM AER	aktif
088021012004	1012004	Dr H MAHARUL HAQIL MT JPM AER	aktif
088021012000	1012000	Dr H ZULKARNAIN LUBIS MT	aktif
088021012001	1012001	DR. HELMA WIDYA M Kurni	aktif
088021012003	1012003	NIRO SRI WADYUDI S Kurni M Kurni	aktif
102000007	100420008	Mhd ZULFANDYURI SIAMBATOR ST M Kurni	aktif
088021012003	1012003	SOLLY ARIZA ST M Kurni M Kurni	aktif

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Reputation

Student

➤ Lecturer Data Display

Figure 7. Lecturer Data Display

Daftar pertanyaan	
Kompetensi Pedagogik	
Kesungguhan dalam mempersiapkan perkuliahan	hapus
Keteraturan dan ketertiban penyelenggaraan perkuliahan	hapus
Kemampuan mengelola kelas	hapus
Kedisiplinan dan kepatuhan terhadap aturan akademik	hapus
Penguasaan media dan teknologi pembelajaran	hapus
Kemampuan melaksanakan penilaian prestasi belajar mahasiswa	hapus
Objektivitas dalam penilaian terhadap mahasiswa	hapus
Kemampuan membimbing mahasiswa	hapus
Berpresepsi positif terhadap kemampuan mahasiswa	hapus
Kompetensi Profesional	
Penguasaan bidang keahlian yang menjadi tugas pokoknya	hapus
Keluasan wawasan keilmuan	hapus
Kemampuan menunjukkan keterkaitan antara bidang keahlian yang diajarkan dengan konteks kehidupan	hapus

➤ Questionnaire Question Data Display

Adil dalam memperlakukan sejawat	hapus
Kompetensi Sosial	
Kemampuan menyampaikan pendapat	hapus
Kemampuan menerima kritik, saran, dan pendapat orang lain	hapus
Mudah bergaul di kalangan sejawat, karyawan, dan mahasiswa	hapus
Mudah bergaul di kalangan masyarakat	hapus
Toleransi terhadap keberagaman di masyarakat	hapus
Tambahkan daftar pertanyaan baru	pedagogik <input type="button" value="tambahkan"/>
<input type="button" value="Lihat pertanyaan yang dihapus"/>	

Figure 9. Display of Questionnaire Data

➤ Tampilan Hasil Penilaian Kinerja Dosen



Figure 10. Display of Assessment Results

5. Conclusion

From the results of the discussion, several conclusions were obtained, including:

- 1) The system created can be used to solve decision-making problems in solving lecturer performance appraisal problems. Help facilitate the Head of Study Program in deciding the problems encountered during the lecturer performance appraisal process.
- 2) The AHP (Analytical Hierarchy Process) method is suitable to be applied in determining the lecturer's performance appraisal by determining the weight value of all the criteria for each lecturer, and the head of study program can make decisions on the lecturer's performance appraisal.
- 3) Facilitate the making of the required reports including the report on the results of the assessment of the performance of the lecturer, the report on the results of the weighting, the results of the assessment of the performance of the lecturers who are being worked on to help make decisions on the assessment of the performance of the lecturers.

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