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Decision Support System for Internship Acceptance at Digital Connection Using the Simple Additive Weighting Method

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Abstract: The internship program serves as a bridge for students into the professional world. At Digital Connection, the current manual selection process for internship candidates leads to inefficiency and potential errors. This study aims to implement a Decision Support System (DSS) using the Simple Additive Weighting (SAW) method to improve the efficiency of the internship selection process. The SAW method is selected for its capability to provide accurate assessments based on predefined criteria and preference weights, as well as to rank the best alternatives. The system is developed as a web-based application with full access for HR (Admin), including tests as evaluation criteria. This research has resulted in the creation of a decision support system utilizing the Simple Additive Weighting (SAW) calculation method. System testing, conducted using black-box testing, shows that all primary functions and buttons of the system, such as adding, editing, deleting, searching, logging in, managing criteria and sub-criteria data, managing alternative data, calculating scores, exporting, and logging out, function properly and as expected. Furthermore, user testing with 6 criteria and 10 alternative input data points revealed the highest rank of 100% for Wahyu, followed by Noelino in second place with 76%, Hana in third place with 74%, and the lowest rank for Sanjaya with 58%. These results confirm that the calculation system operates effectively according to the researched method and provides clear ranking evaluations to assist HR (Admin) in determining the most suitable internship candidates. The system was implemented on a website using the waterfall model approach as the development method for the research system.

Keywords: Internship Program; Decision Support System; Simple Additive Weighting; Digital Connections; Recruitment Process.

1. Introduction

Internship programs serve a crucial function in linking academic learning to the professional world, providing students with the opportunity to apply theoretical knowledge in practical settings. These programs play a significant role in helping students develop the skills needed for their future careers while giving organizations the ability to identify promising candidates for potential employment. An efficient selection process is essential for ensuring the best candidates are chosen for the internship, optimizing both individual and organizational success. By ensuring that the most qualified individuals are selected, companies can achieve greater efficiency and more effective resource allocation [1]. Many internship programs currently rely on manual selection processes, where decision-makers assess applicants based on subjective criteria. This approach is prone to inefficiencies, errors, and delays, making the entire process cumbersome and potentially flawed. As organizations seek to improve their recruitment efforts, the introduction of Decision Support Systems (DSS) offers a solution to streamline and optimize these processes. By relying on data-driven approaches, a DSS aids in evaluating candidates based on clearly defined criteria, ensuring objective, consistent, and transparent decision-making [2]. The Simple Additive Weighting (SAW) method, a widely used technique in Multi-Criteria Decision Making (MCDM), provides a framework for evaluating alternatives by assigning weights to various criteria and then calculating the total scores of each alternative. In the case of internship selection, this method can be used to assess candidates based on factors such as academic achievements, skills, prior experiences, and other relevant attributes. This approach not only reduces human bias but also offers a reliable way to rank candidates, helping HR professionals make well-informed decisions about whom to invite into the program [2].

At Digital Connection, a company specializing in business strategy and digital services, the internship program is designed to help students develop skills related to their academic fields. Despite the potential value of this program, the current manual selection method is inefficient and leads to issues such as data errors, delays, and difficulties in retrieving candidate information when needed. These challenges underscore the need for a more effective solution to streamline the selection process, ensuring candidates are evaluated fairly and accurately. This study seeks to address these challenges by implementing a Decision Support System (DSS) utilizing the Simple Additive Weighting (SAW) method to automate and enhance the efficiency of the internship selection process. The research, titled "Decision Support System for Internship Selection at Digital Connection Using Simple Additive Weighting," aims to improve both the accuracy and speed of candidate evaluation by incorporating the SAW method into the decision-making process.

As recruitment processes grow more complex, especially in large organizations, the need for automated and objective decision-making systems becomes increasingly important. Traditional methods of recruitment often rely on subjective judgments, which can lead to inconsistencies and biased decision-making. The introduction of decision support systems (DSS) helps resolve these issues by providing decision-makers with tools to assess candidates based on standardized, objective criteria [3]. These systems use algorithms to process candidate data and provide a structured ranking of applicants, making it easier for HR professionals to identify the most qualified individuals for internships. The Simple Additive Weighting (SAW) method, a key technique in MCDM, is highly effective for evaluating alternatives based on multiple criteria. In the case of internship selection, the SAW method allows for a systematic evaluation of candidates, taking into account various performance indicators such as academic qualifications, skills, experience, and personality traits. By assigning weights to each of these criteria, the SAW method calculates an overall score for each candidate, providing HR teams with an objective ranking of applicants. This method significantly reduces the influence of human biases and ensures that the selection process is fair and transparent [2][4]. In addition to improving the quality of decision-making, a DSS based on SAW also helps to automate many of the tedious and error-prone tasks involved in manual selection, such as data entry, calculation, and ranking. By reducing the manual workload, the system frees up HR personnel to focus on more strategic tasks, such as interviewing candidates and making final decisions. Furthermore, by providing accurate, consistent, and easily interpretable rankings, a DSS can help organizations make more informed decisions faster and with greater confidence.

The SAW method has been successfully applied in a variety of decision-making contexts, from employee recruitment to product selection and resource allocation. One of the strengths of the SAW method is its ability to handle multiple criteria, making it ideal for situations where decision-makers must evaluate and compare alternatives based on several factors. For example, in employee recruitment, SAW has been used to assess candidates based on performance metrics such as qualifications, experience, and behavioral traits. By assigning appropriate weights to each criterion, the system generates a score for each candidate, ranking them according to their suitability for the role [4][5]. A study by Supiandi et al. (2022) demonstrated how the SAW method was effectively used for employee promotion decisions, where candidates were evaluated based on several key performance indicators. The results showed that the SAW method provided a clear, objective ranking of candidates, which helped decision-makers make faster and more accurate decisions [4]. Similarly, other research has shown that the SAW method can be used for evaluating various alternatives in employee performance, training programs, and project selection, all of which rely on multi-criteria decision-making [5].

This research implements the SAW method in a Decision Support System designed to streamline the internship selection process at Digital Connection. The system will be developed as a web-based application, allowing HR professionals to evaluate candidates based on criteria such as academic performance, skills, and personal attributes. The system will automatically calculate scores for each candidate based on the weighted criteria, producing a ranked list of the most suitable candidates for the internship program. The research will also include system testing, using black-box testing to ensure the system functions as intended. User testing will be conducted to assess the system's ability to evaluate candidates effectively and provide accurate rankings. The results of the testing will be used to validate the effectiveness of the SAW-based DSS in improving the internship selection process. The development and implementation of a Decision Support System based on the Simple Additive Weighting (SAW) method aims to enhance the efficiency and accuracy of the internship selection process at Digital Connection. By automating the evaluation and ranking of candidates, the system provides HR personnel with objective, data-driven insights to assist in making informed decisions.

2. Research Method

Data collection for this study involves three main methods: observation, interviews, and literature review. Firstly, observation is used to gather information by directly examining student and internship registration data at Digital Connection, as well as observing the methods previously employed by the company in its internship selection process. This approach allows for an in-depth understanding of existing practices and highlights areas where improvements can be made. Secondly, interviews are conducted with relevant stakeholders, including HR personnel and internship program coordinators, to obtain more precise and detailed information regarding the current selection process and the challenges it faces. The interviews provide valuable insights and allow for a more comprehensive understanding of the decision-making factors involved. Lastly, literature studies are conducted to gather additional data from existing journals, papers, and other reliable sources that are relevant to the development of the decision support system (DSS). This method helps to contextualize the research and learn from similar systems that have been successfully implemented in other organizations.

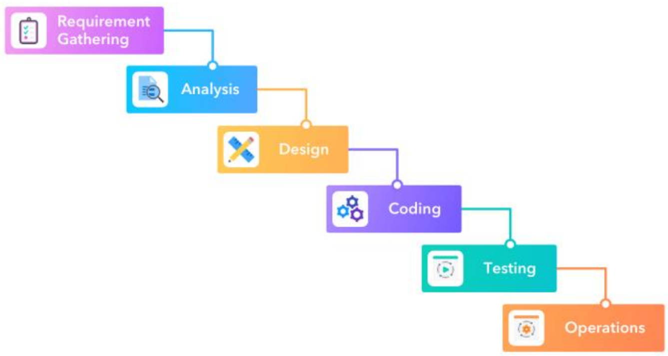

Figure 1. Waterfall Method

For the system development, the Waterfall Method is employed. This method is a well-established Software Development Life Cycle (SDLC) approach widely used in the creation of information systems. The Waterfall method follows a sequential and systematic process, where each phase of the development process must be completed before moving on to the next. This approach is often compared to a waterfall, where progress flows downwards through distinct stages—namely, analysis, design, coding, and testing. One of the key advantages of the Waterfall model is its structured approach, ensuring that each phase of development is thoroughly completed before the next phase begins. As such, it is particularly useful for projects where requirements are well-understood at the start and are unlikely to change during development. The main principle of the Waterfall method is that each stage is dependent on the previous one, and work on a system progresses in a linear fashion, ensuring that all tasks are completed in a structured order [3].

Additionally, the Simple Additive Weighting (SAW) method is utilized as part of the Decision Support System (DSS) to assist in the selection of internship candidates. SAW is a commonly used method in decision-making processes, particularly in scenarios that involve evaluating multiple alternatives based on various criteria. The SAW method is favored for its simplicity and ease of implementation, making it an efficient tool for decision-making, particularly in systems where complex calculations or sophisticated algorithms are not required. The process begins with the determination of criteria that will be used to evaluate each alternative. These criteria are assigned weights based on their importance, and suitability ratings are established for each alternative under each criterion. A decision matrix is then constructed based on these predefined criteria, which is normalized to ensure consistency. Preference calculations are performed using a formula based on the normalized values, and the results are used to rank the alternatives. The final outcome is determined by identifying the alternative with the highest preference value, which is considered the most suitable choice for the internship program [2]. The Waterfall method provides a clear and organized approach to system development, ensuring that all stages are thoroughly addressed before proceeding to the next. This integrated approach is designed to enhance both the efficiency and accuracy of decision-making in the internship selection process.

3. Result and Discussion

3.1 Results

3.1.1 System Analysis Result

This system was built using a web-based architecture. This system applies Simple Additive Weighting (SAW) calculations. The user interface provides actions for the user to enter the desired criteria data and will display alternatives that match the input criteria. The input that will be entered into the system is criteria data, sub-criteria data and alternatives. The output requirement from designing this system application is a recommendation for internship acceptance at Digital Connection.

3.1.2 Data Preparation

Table 1. Weighting Criteria

No	Weight	Value
1	Very Low	0.2
2	Low	0.4
3	Moderate	0.6
4	High	0.8
5	Very High	1.0

The first step in the Simple Additive Weighting (SAW) method is to determine the weighting of the criteria. In this case, the author divides it into a 5-point scale, as shown in Table 1.

Table 2. Criteria

No.	Criteria	Value (Weight)
1	GPA (IPK)	15%
2	Communication Skills	15%
3	Personality and Attitude	15%
4	Technical Skills	20%
5	CV and Portfolio	20%

The determination of alternative values based on the weight of each evaluation criterion becomes a key consideration in the internship acceptance process. From this dataset, values for each alternative (A) will be matched to the relevant criteria. Before proceeding with the matrix normalization process, it is essential to identify whether the criteria are cost or benefit criteria. Generally, benefit criteria are those where the largest value is the best (e.g., higher GPA or better communication skills), while cost criteria are those where the smallest value is preferred.

3.1.3. Analysis of Simple Additive Weighting (SAW) Calculations

Table 3. Alternative Data

No	Name	Recommendations and References (C6)	CV and Portfolio (C5)	Technical Skills (C4)	Personality and Attitude (C3)	Communication Skills (C2)	GPA (C1)
1	Bintang	5	2	5	3	3	2
2	Bayhanu	4	2	5	3	3	2
3	Satriya	4	4	5	3	3	2
4	Hana	5	3	5	3	3	3
5	Sanjaya	1	4	3	3	3	3
6	Agus	1	4	4	3	3	3
7	Bagus	1	5	5	3	4	3
8	Wahyu	5	5	5	5	5	5
9	Aditya	1	4	5	4	4	3
10	Noelino	1	5	5	4	4	3

In the SAW method, determining the types of cost and benefit criteria is essential. Generally, benefit criteria are those where the largest value is the best, and cost criteria are those where the smallest value is preferred. For this study, all five criteria are categorized as benefit criteria because higher values are preferred across all dimensions (e.g., a higher GPA or better communication skills are more desirable).

Table 4. Determining the Type of Criteria

Criterion	Type of Criteria
GPA (IPK)	Benefit
Communication Skills	Benefit
Personality and Attitude	Benefit
Technical Skills	Benefit
CV and Portfolio	Benefit

Since all the criteria are considered benefit criteria, the normalization process will assign higher values as preferable for each criterion.

Table 5. Normalization

No	Name	Recommendations and References (C6)	CV and Portfolio (C5)	Technical Skills (C4)	Personality and Attitude (C3)	Communication Skills (C2)	GPA (C1)
1	Bintang	1	0.4	1	0.6	0.6	0.4
2	Sanjaya	0.2	0.8	0.6	0.6	0.6	0.6
3	Aditya	0.2	0.8	1	0.8	0.8	0.6
4	Hana	1	0.6	1	0.6	0.6	0.6
5	Wahyu	1	1	1	1	1	1
6	Satriya	0.8	0.8	1	0.6	0.6	0.4
7	Bagus	0.2	1	1	0.6	0.8	0.6
8	Bayhanu	0.8	0.4	1	0.6	0.6	0.4
9	Agus	0.2	0.8	0.8	0.6	0.6	0.6
10	Noelino	0.2	1	1	0.8	0.8	0.6

In this table, the values for each alternative are normalized based on the maximum values in each criterion. This normalization step ensures that the values are comparable and on the same scale, which is a key feature of the SAW method. Similar to other decision-making methods, the SAW method uses a formula to perform the calculations, and the steps involved include determining weights, normalizing values, and calculating the total score for each alternative. After normalization, the ranking can be calculated based on the weighted scores, allowing HR to make informed decisions regarding internship candidate selection [2].

$$R_{ij} = \begin{cases} \dfrac{xy}{Max_i^{xy}} \; if\ j\ is\ a\ Benefit\ Attribute \\ \dfrac{Min_i^{xy}}{xy} \; if\ j\ is\ a\ Cost\ Attribute \end{cases}$$

The ranking results based on the Simple Additive Weighting (SAW) method are presented in Table 6. Each candidate's score is calculated by summing the weighted values across six criteria: Recommendations and References (C6), CV and Portfolio (C5), Technical Skills (C4), Personality and Attitude (C3), Communication Skills (C2), and GPA (C1). The scores are expressed as percentages to provide a clear comparison among the candidates. Based on the calculation results of the Vi values for each prospective intern, the ranking table can be created as follows:

Table 6. Ranking Results

Name	Recommendations and References (C6)	CV and Portfolio (C5)	Technical Skills (C4)	Personality and Attitude (C3)	Communication Skills (C2)	GPA (C1)	Total Score	Rank
Wahyu	15%	20%	20%	15%	15%	15%	100%	1
Noelino	3%	20%	20%	12%	12%	9%	76%	2
Hana	15%	12%	20%	9%	9%	9%	74%	3
Bagus	3%	20%	20%	9%	12%	9%	73%	4
Aditya	3%	16%	20%	12%	12%	9%	72%	5
Satriya	12%	16%	20%	9%	9%	6%	72%	6
Bintang	15%	8%	20%	9%	9%	6%	67%	7
Bayhanu	12%	8%	20%	9%	9%	6%	64%	8
Agus	3%	16%	16%	9%	9%	9%	62%	9
Sanjaya	3%	16%	12%	9%	9%	9%	58%	10

From the table above, it can be concluded that the acceptance of prospective apprentices with the highest percentage value is Wahyu with a percentage of 100%, followed by Noelino with a percentage of 76% and Hana 74%.

3.1.4 System Planning

At this stage, the system is designed using Unified Modeling Language (UML) diagrams, including the workflow diagram, use case diagram, and activity diagrams. These diagrams serve as a blueprint for the system's structure and functionality, ensuring a clear understanding of the process and interaction among components.

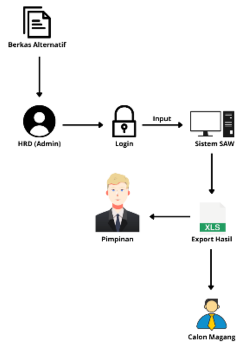

Figure 2. Built Workflow System

This system operates in a one-way manner, where prospective interns undergo competency tests, interviews, and submit the required documents requested by Digital Connection (DCON). Once all requirements are met, HR (Admin) logs into the system and inputs the candidate's name along with the scores for each criterion and sub-criterion. The system then performs calculations, including normalization, and determines the ranking points based on the evaluations. Subsequently, HR (Admin) exports this data to Excel as a report for the management and shows it to the prospective interns as an announcement of their acceptance or rejection.

Use cases show the correlation of interactions between actors in use cases in a system whose aim is to determine the actor's process in interacting with a system [5].

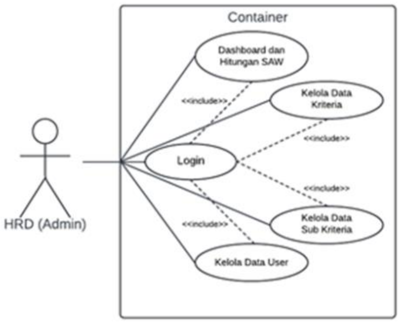

Figure 3. Use case Diagram Internship Acceptance Decision Support System on Digital Connections

The system is designed using a Use Case Diagram to depict the interaction between the primary actor, the HR (Admin), and the functionalities of the system. The HR (Admin) serves as the key user responsible for managing the internship selection process. This process involves logging into the system, defining criteria data, managing sub-criteria, inputting alternative data (candidate information), and analyzing the scores calculated by the system [6]. These functionalities ensure a structured, systematic, and objective approach to candidate evaluation. To provide a more detailed understanding of the system's operational workflow, Activity Diagrams are employed to represent the processes within the system. These diagrams are outlined as follows:

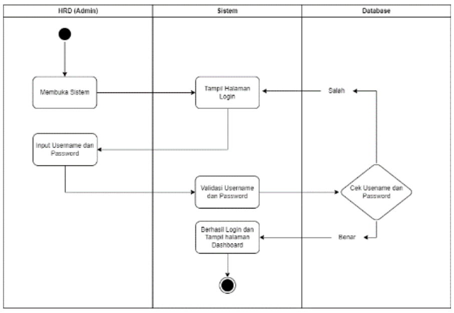

Figure 4. Login Activity

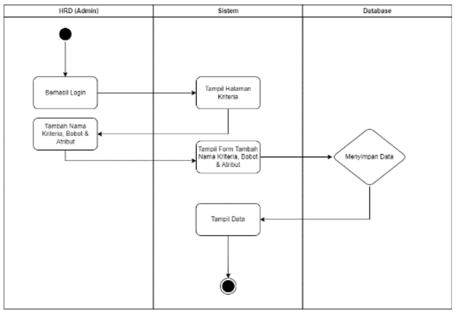

Figure 5. Criteria Management Activity

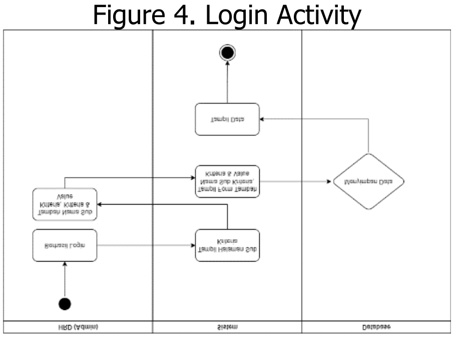

Figure 6. Sub Criteria Management

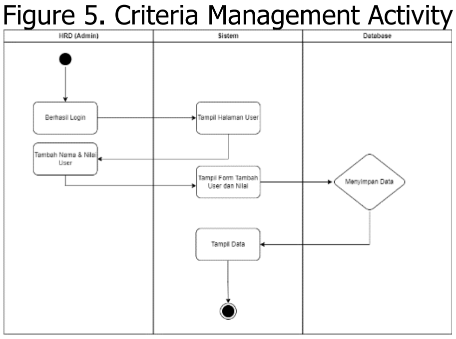

Figure 7. Activity Manage Alternatives

The Login Activity Diagram outlines the authentication process required to access the system. The HR (Admin) enters their credentials to gain secure access. Upon successful authentication, the user is directed to the dashboard, which provides access to all key system functionalities, including criteria management, sub-criteria configuration, and candidate evaluation. This diagram illustrates the process by which the HR (Admin) manages evaluation criteria. The HR can add, update, delete, and organize the criteria that serve as the fundamental measures for assessing candidates. Establishing clear and structured criteria ensures a standardized and objective evaluation process aligned with the organization’s requirements. The Sub-Criteria Management Activity Diagram provides an overview of how sub-criteria, which are subsets of the main evaluation criteria, are managed. For example, under the broader criterion of "Technical Skills," sub-criteria such as "Programming Expertise" or "Problem-Solving Abilities" can be defined. This level of granularity ensures that candidates are evaluated comprehensively across multiple dimensions. This diagram details the workflow for managing alternative data, which represents candidate information. The HR (Admin) is responsible for inputting candidate data, assigning scores to each criterion and sub-criterion, and initiating the system's computation process. The system then performs normalization and calculates the final rankings based on the scores, providing an objective evaluation and facilitating data-driven decision-making for candidate selection. These diagrams collectively provide a comprehensive and structured representation of the system's functionalities, highlighting the critical role of the HR (Admin) in interacting with the system to manage the internship selection process. By employing tools such as normalization and ranking, the system ensures an efficient, accurate, and fair evaluation of candidates, reducing potential bias and human error while improving the overall decision-making process.

3.1.5 Implementation

The implementation phase adheres to the workflow established in the previous sections, ensuring a smooth and systematic operation of the system. Upon successful login, the HR (Admin) is directed to the dashboard page, which serves as the central interface for managing user data and input values. The dashboard provides functionalities for entering candidate information and evaluation criteria, enabling seamless access to all core features of the system.

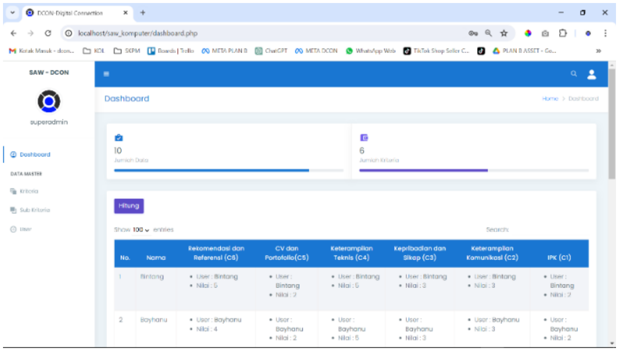

Figure 8. Calculation Dashboard

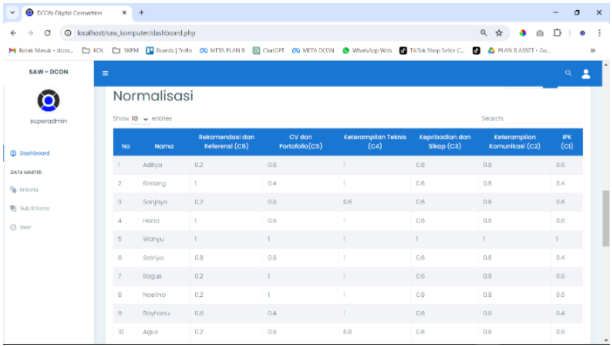

Figure 9. Normalized Data Display

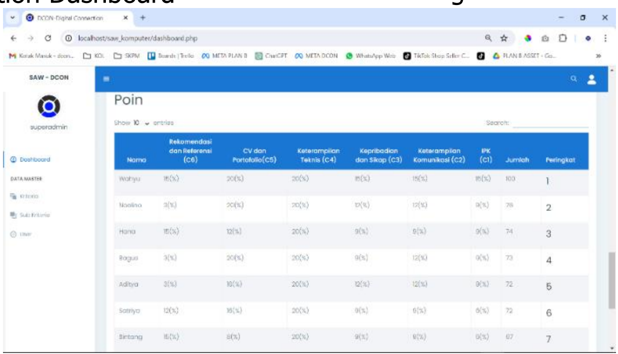

Figure 10. Display of Ranking Data

From the dashboard, calculations are conducted using the Simple Additive Weighting (SAW) method. The SAW method processes the input data, including scores assigned to each criterion and sub-criterion, to normalize the values and calculate the overall scores for each candidate. This calculation step ensures objective and reliable evaluation based on predefined criteria and weight assignments. Once the calculations are complete, the system displays the results of the normalization process. The normalized data is presented in a clear and structured format, allowing the HR (Admin) to review and verify the data accuracy. Subsequently, the system generates a ranking for each candidate based on their normalized scores. The rankings provide a comprehensive overview of each candidate's evaluation results, highlighting their performance and overall suitability. To facilitate reporting and documentation, the system includes an export functionality. This feature allows the HR (Admin) to export user scores, normalization results, and ranking data into an Excel document, making it easy to share results with management and maintain formal records of the internship selection process. The implementation ensures an efficient, accurate, and transparent internship selection process. The system automates key steps such as calculations, normalization, and ranking generation, reducing human errors and saving time. The exportable data further supports the documentation and reporting needs of the organization, making the entire process more streamlined and reliable.

3.1.6 Testing

System testing is conducted to ensure that the designed system meets the desired functional requirements and operates without errors. To achieve this, the Black Box Testing method is used. This testing approach focuses on verifying the functionality of the system without delving into its internal code or structure. The primary objective is to identify and eliminate any bugs or errors in the developed system. The results of the testing are presented in the following table:

Table 7. Black Box Testing Results

No.	Input Data	Expected Result	Observation Result	Conclusion
		Login Testing		
1	Login	Redirected to the login page	The login page appears	Succeed
2	Input username and password correctly	Redirected to the dashboard page	The dashboard page appears	Succeed
3	Enter the wrong username and password	Stay on the login page and the form returns blank	Stay on the login page and the form returns blank	Succeed
		Criterion Testing		
4	Click the criteria menu	Redirected to the criteria page	The criteria page appears	Succeed
5	Adding data	Data increases	Data increases	Succeed
6	Changing data	Data changes	Data changes	Succeed
7	Deleting data	Data is deleted	Data is deleted	Succeed
8	Searching for data	Data is successfully searched	Data is successfully searched	Succeed
		Sub Criteria Testing		
9	Click the sub-criteria menu	Redirected to the sub-criteria page	The sub-criteria page appears	Succeed
10	Adding data	Data increases	Data increases	Succeed
11	Changing data	Data changes	Data changes	Succeed
12	Deleting data	Data is deleted	Data is deleted	Succeed
13	Searching for data	Data is successfully searched	Data is successfully searched	Succeed
		Alternative Testing		
14	Click the User (Alternative) menu	Redirected to the User (Alternative) page	The User (Alternative) page appears	Succeed
15	Adding data	Data increases	Data increases	Succeed
16	Changing data	Data changes	Data changes	Succeed
17	Deleting data	Data is deleted	Data is deleted	Succeed
18	Searching for data	Data is successfully searched	Data is successfully searched	Succeed
		Calculate Value Testing		
19	Click the dashboard menu and click calculate	Redirected to the dashboard page, and calculation appears	Redirected to the dashboard page, and calculation appears	Succeed
20	Click export	Redirected to export Excel	Redirected to export Excel	Succeed
		Logout Testing		
21	Click the admin icon, then click the logout menu	Logout and return to the login page	Logout and return to the login page	Succeed

The testing results indicate that all system functions operate as expected, confirming that the system is free from bugs or errors. Each module, including login, criteria management, sub-criteria management, alternative management, calculations, export functionality, and logout, has been successfully tested and validated. The successful implementation of these functionalities demonstrates that the system meets the desired requirements and is ready for use. By employing the Black Box Testing method, the system's performance and reliability have been thoroughly validated, ensuring a smooth and efficient operation.

3.2 Discussion

The system developed for internship selection at Digital Connection utilizes a web-based architecture with the integration of the Simple Additive Weighting (SAW) method. The system allows HR personnel to input various criteria and sub-criteria data, followed by the evaluation of candidates through a ranking process based on predefined values. The system is designed to provide objective recommendations for internship acceptance, thus minimizing the inherent bias and inefficiency associated with traditional manual selection processes. The system is built around a simple user interface, where users input various data points including criteria, sub-criteria, and alternatives. The system then processes this input to generate a ranking of internship candidates. The use of the SAW method ensures that candidates are evaluated based on multiple criteria, such as GPA, communication skills, personality, technical skills, and CV/portfolio. This structured approach ensures that the evaluation process is systematic and consistent, eliminating the potential for subjective decision-making [4]. The criteria used in this system are weighted according to their importance. For example, technical skills, CV/portfolio, and GPA are assigned higher weights (20% each), while communication skills, personality, and references are assigned lower weights (15% each). This prioritization reflects the key attributes that Digital Connection values most in selecting candidates for internships. These weights are then used to normalize the data and generate a ranking based on candidate scores.

The normalization process is crucial in the SAW method. Since the system evaluates various types of criteria—such as benefit criteria (where higher values are better)—the normalization process converts raw scores into a uniform scale, making it possible to compare candidates across different attributes. The types of criteria are categorized as either benefit or cost, where benefit criteria are those for which higher values are preferred (e.g., GPA, technical skills), and cost criteria would be those where lower values are preferred. However, in this study, all the criteria were classified as benefit criteria because higher scores are desirable for all attributes [4]. After normalizing the data, the SAW formula is applied to compute the total score for each candidate. The resulting preference scores are used to rank candidates, with the highest score indicating the most suitable candidate for the internship position. For example, the candidate "Wahyu" received the highest ranking with a score of 100%, followed by "Noelino" with 76%, and "Hana" with 74%. This ranking reflects the overall suitability of each candidate based on the weighted evaluation criteria [2].

The results demonstrate the effectiveness of the SAW method in selecting the most suitable candidates for the internship program. By applying the SAW method, the system provides a clear and objective ranking, which HR personnel can use to make informed decisions. The candidate "Wahyu" ranked the highest, achieving a perfect score, which indicates that this candidate met the criteria most comprehensively. In contrast, candidates like "Sanjaya" and "Bintang" ranked lower due to lower scores in key areas such as communication skills and technical skills. The systematic approach ensures that candidates are evaluated fairly based on the most relevant criteria, reducing the potential for human error and bias. The normalization process plays a crucial role in making the data comparable, as it standardizes the values across all candidates and criteria. This approach ensures that no single criterion—such as GPA or technical skills—dominates the decision-making process unless explicitly weighted to do so. For example, the normalization of scores for "CV and Portfolio" and "Technical Skills" ensures that these criteria are treated equally, despite their different units of measurement.

The system underwent thorough testing to ensure that it functions as expected. Black box testing was conducted to verify that the system operates correctly in terms of both input and output. Various scenarios, such as login attempts, data entry, and calculations, were tested, and all tests passed successfully. The system accurately handled the input data, processed the calculations, and generated the correct ranking for each candidate. Additionally, the export feature worked as intended, allowing HR personnel to easily export the results to Excel for further review and reporting. These results highlight the robustness of the system, confirming that it meets the requirements for internship candidate evaluation.

The system operates in a simple, user-friendly manner, allowing HR personnel to input data and obtain results without technical expertise. After logging in, HR can access a dashboard where they can manage criteria, sub-criteria, and alternative data. The system's ability to normalize the data and perform SAW calculations on-the-fly ensures that HR personnel can quickly obtain an objective ranking of candidates. This ease of use is essential for ensuring that the system is adopted by HR staff without extensive training or support. Furthermore, the workflow is designed to support efficiency at every step of the selection process. From inputting data to viewing results and generating reports, the system streamlines the entire process. This efficiency reduces the time spent on manual evaluations and enhances the decision-making process by providing real-time results.

The internship selection system developed for Digital Connection proves to be a valuable tool in enhancing the efficiency and accuracy of candidate evaluations. By utilizing the Simple Additive Weighting (SAW) method, the system provides an objective, transparent, and consistent approach to ranking candidates based on multiple evaluation criteria. The normalization process ensures that the data is comparable across different criteria, while the SAW formula calculates a fair and reliable ranking for each candidate. Testing results confirm that the system functions as expected, providing HR personnel with an effective decision support tool for internship selection. With further refinements and potential integrations, the system can be scaled to meet the needs of larger recruitment processes, offering even greater efficiency and accuracy in decision-making.

4. Related Work

Various studies have examined the application of decision support systems (DSS) using different methodologies across a wide range of fields. Sumarlinda et al. (2022) conducted research on a DSS for mapping lecturer publications, applying the K-Means clustering method to classify and analyze publication data [7]. Similarly, Sumarlinda and Lestari (2021) utilized K-Means for mapping blood pressure and heart rate, showcasing its capability in handling health-related data [8]. These studies underline the flexibility of clustering techniques in DSS applications for various data types. The Simple Additive Weighting (SAW) method, a popular approach in decision analysis, has been applied extensively in decision support systems due to its simplicity and effectiveness in multi-criteria decision-making. Supiandi et al. (2022) applied SAW in a DSS for employee promotions, using it to evaluate various factors and rank candidates accordingly [2]. Ristiana and Jumaryadi (2021) employed SAW to determine the best wedding organizer packages, demonstrating its utility in consumer choice [9]. Additionally, Simanullang and Simorangkir (2021) used SAW in a DSS to aid in hiring decisions, ensuring a structured and objective evaluation of candidates [10]. Similarly, Sukaryati and Voutama (2022) implemented SAW to select the best employees, confirming its effectiveness in recruitment [11]. Yusman et al. (2022) also used SAW to optimize the employee recruitment selection process at PT Pelindo I, illustrating its broad application in human resource management [12].

Furthermore, recent studies have expanded the use of SAW to different areas, including selection systems for various organizational needs. Gunawan et al. (2023) implemented SAW in a DSS for selecting paper grades, demonstrating the method's adaptability in diverse fields beyond recruitment [13]. Alfiansyah and Zufria (2023) applied decision support systems using the Analytic Network Process (ANP) and TOPSIS methods for career recommendations for graduates in Islamic Broadcasting Communication Studies, highlighting the integration of multiple decision-making techniques in educational and career guidance [14]. Similarly, Julisawati and Mardiyati (2023) used a DSS with the Profile Matching Method to select high school majors for students at SMPN 210 Jakarta, further showing the versatility of DSS in educational decision-making [15].

In recent years, there has been a growing interest in applying SAW for more specific purposes. Siringo-Ringo and Sugara (2023) developed a DSS to select the best internship candidates using the SAW method, providing a clear ranking of interns based on multiple criteria [16]. Similarly, Butar et al. (2023) combined SAW with the Analytical Hierarchy Process (AHP) to improve the recruitment process in security services companies, showing how SAW can be integrated with other methods for more robust decision-making [17]. Tanjaya and Leo (2019) used SAW and the Weight Product (WP) method for new employee acceptance at CV Karya Lestari Abadi, demonstrating the flexibility of SAW in employee recruitment and selection [18]. Meri (2020) applied SAW to the selection of new teacher candidates at an integrated Islamic elementary school, further confirming SAW's efficacy in educational [19]. Finally, Batubara and Hasugian (2023) developed a DSS for employee recruitment using both AHP and SAW methods, showcasing the utility of SAW in combination with other decision-making techniques in human resource management [20].

These studies collectively highlight the widespread applications of decision support systems across diverse fields, illustrating how methods like SAW, AHP, TOPSIS, and clustering techniques are utilized to support decision-making in contexts ranging from employee recruitment to educational selection. This research builds upon these studies by focusing on the implementation of a DSS using the Simple Additive Weighting (SAW) method for internship selection at Digital Connection (DCON) Company. While the aforementioned studies predominantly apply DSS in employee recruitment, career guidance, and educational selection, this research differentiates itself by targeting the internship acceptance process. The findings from previous studies using SAW in human resources, such as recruitment and promotions, provide a foundation for adapting and implementing this method for selecting the most suitable candidates for internship positions. This study extends the applications of SAW by tailoring it to the specific of internship selection, further demonstrating the versatility of the method in decision-making processes within organizational settings.

5. Conclusion

Digital Connection, a company specializing in business strategy with services such as branding and rebranding, digital marketing, social media management, software and website development, and marketplace management, offers an internship program aimed at enhancing its corporate image and preparing students for the professional world. However, the existing internship selection process is still manual, involving participant data entry, competency tests, and participant evaluation through manual weighting. This approach has proven inefficient, error-prone, and time-consuming, and it complicates the retrieval of selection data. To improve this process, an automated and modernized system is necessary. This study introduces the Simple Additive Weighting (SAW) method to streamline the internship selection process and enhance both efficiency and accuracy in evaluating candidates. The SAW method was chosen for its ability to provide reliable assessments based on predefined criteria and assigned preference weights. The developed system is a web-based application that enables HR (Admin) to input candidate data, perform normalization calculations, and generate rankings based on evaluations. By automating the selection process, the system speeds up data processing and simplifies reporting. The system was tested using six criteria and ten input data points, with results showing the highest ranking at 100% and the lowest ranking at 58%. These results confirm that the system can produce clear and accurate evaluations, allowing HR (Admin) to easily identify the most suitable candidates for the internship program. The SAW-based system provides a more efficient and accurate solution for internship selection at Digital Connection. The automation of key processes and the objective ranking of candidates enhance decision-making, improving the overall efficiency of the recruitment process.

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