# Creation and Implementation of a Web-Based Teacher Performance Assessment Information System Utilizing the Simple Additive Weighting (SAW) Approach

*by* Ahmad Habib, Diah Rachma Wati Kusuma, Roenadi Koesdijarto

**Submission date:** 17-Sep-2024 07:41AM (UTC+0700)
**Submission ID:** 2456366738
**File name:** Teknik_1462000134_Diah_Rachma_Wati_Kusuma.pdf (746.08K)
**Word count:** 3002
**Character count:** 16580

*Jurnal Mantik, x (x) (20xx), ISSN 2685-4236 (Online)*

Published by:Institute of Computer Science (IOCS)

Jurnal Mantik

Journal homepage: www.iocscience.org/ejournal/index.php/mantik

# Creation and Implementation of a Web-Based Teacher Performance Assessment Information System Utilizing the Simple Additive Weighting (SAW) Approach.

Ahmad Habib 1, Diah Rachma Wati Kusuma 2, Roenadi Koesdijarto 3

1,3 Departement of Informatics Engineering, Universitas 17 Agustus 1945 Surabaya

2 Jl. Semolowaru No.45, Menur Pumpungan, Kec. Sukolilo, Surabaya, Jawa Timur 60118

A R T I C L E I N F O

*Article history:*

Received: Editor Duties
Revised: Editor Duties
Accepted: Editor Duties

*Keywords:*

Teacher Performance Evaluation;
Simple Addictive Weighting;
Information System;
Performance Evaluation;
UMUX-LITE;
*Alfabet.*

ABSTRACT

This research seeks to establish a teacher performance evaluation system utilizing the Simple Additive Weighting (SAW) method. The objective of this system is to aid school administration in conducting evaluations of teacher performance in an objective and transparent manner, based on a variety of predetermined criteria. The implementation of the system involves the use of interconnected database tables, including those for teachers, criteria, sub-criteria, assessments, and additional components. The final evaluation outcomes are derived from the normalization of criterion scores and the application of appropriate weights, which are subsequently aggregated to determine each teacher's overall score. Furthermore, the system includes extensive data management functionalities that are exclusively accessible to the administrator. It is anticipated that this system will enhance the efficiency and accuracy of the teacher performance evaluation process, yielding data that can inform improved decision-making. The testing methodologies to be employed include Black Box Testing and UMUX-LITE.



*Corresponding Author:*

Ahmad Habib ,
Departement of Informatics Engineering / Teknik /Informatika,
Universitas 17 Agustus 1945 Surabaya,
Jl. Semolowaru No.45, Menur Pumpungan, Kec. Sukolilo, Surabaya, Jawa Timur 60118, Indonesia.
Email: diahrachma0802@gmail.com

## 1. INTRODUCTION

Education is fundamental to a nation's progress as it nurtures the capabilities of its students. As outlined in Law No. 20 of 2003, the objective of education is to establish a learning atmosphere that encourages students to participate actively in spiritual, religious, self-discipline, character development, intellectual growth, moral integrity, and the acquisition of skills essential for their personal development, as well as for the benefit of society, the nation, and the state (Reyhans, Cholissodin, and Adinugroho n.d.). Consequently, the role of educators as facilitators of human resource development in the educational process is of paramount importance.

Educators are professionals dedicated to the instruction and development of students, with primary responsibilities that encompass educating, teaching, guiding, evaluating, and assessing learners (Yusmar and Farell 2020). At SMPN xyz, it is essential for teachers to demonstrate proficient skills and high-quality execution. To evaluate the proficiency of these skills, SMPN xyz implements an annual performance assessment for its educators. Nevertheless, the evaluation process at SMPN xyz encounters several challenges, including insufficient systematization and the potential loss of historical data, which may impede effective data collection and informed decision-making. In response to these challenges, the author has developed a teacher performance evaluation system aimed at resolving the identified issues and offering suitable solutions. This information system is intended to assist the school in managing and organizing teacher performance evaluation data systematically, thereby enhancing the speed and accuracy of the evaluation calculation process and simplifying the generation of performance reports. By utilizing the Simple Additive Weighting (SAW) method, it is anticipated that teacher performance evaluations will be conducted with greater objectivity and precision. Furthermore, the system is constructed using the Rational Unified Process (RUP) methodology, which focuses on an iterative and architecture-driven approach to deliver dependable software solutions that align with the school's requirements.RESEARCH METHOD.

In this concluding project, the author employs the PIECES framework—comprising Performance, Information, Economy, Control, Efficiency, and Service—to conduct a needs analysis (Martono, Rafika, and Larasati 2022). The findings from this analysis are presented in the table below:

Table 1. Analysis PIECES

| PIECES | Old System | New System |
|---|---|---|
| Performance | Evaluating teachers takes time. Creating assessment reports is time-consuming due to manual data entry. | Evaluating teachers is faster than the previous system. Report generation can be done more quickly. |
| Informance | Information presentation takes longer as data must be searched for in documents first. Sometimes data is missing or incomplete, making data retrieval more difficult. | Information is presented faster and more accurately because it is stored in a database. Information is more comprehensive and storage is integrated. |
| Economic | Creating reports incurs costs due to additional salary payments for employees creating reports. | No need to pay employees as reports are systemized and can be filtered as needed. |
| Control | System control is inadequate, with potential for data manipulation. Documents are easily accessed by unauthorized parties. | System controls are interconnected, reducing the potential for manipulation. Access rights are implemented for system usage. |
| Efficiency | There is time wasted in the process of filling out teacher performance assessments. | Filling out teacher performance assessments is faster and more efficient, minimizing data entry errors. |

| | | |
|---|---|---|
| | Errors in entering teacher ratings. | |
| Service | The process of assessment and report creation takes a long time. | The process of assessment and report creation is faster. |

### 2.1 The Simple Additive Weighting (SAW) Approach for Evaluating Teacher Performance.

The Simple Additive Weighting (SAW) method, also known as weighted sum method, aims to find the weighted sum of performance ratings for each alternative across all attributes. Additionally, the SAW method requires the normalization process of decision matrices to compare with all clear alternative points (Dermawan and Triyono 2022).

SAW Process:

1. Criteria and Weight Determination:
   - Identify relevant criteria for decision-making.
   - Assign weights to each criterion, reflecting its importance level.
2. Normalization of Decision Matrix:
   - Convert values in the decision matrix into a comparable form using normalization techniques, such as min-max normalization.
3. Calculation of Final Results:
   - Calculate the final results by weighing normalized values with the weights of each criterion.
4. Ranking of Alternatives:
   - Alternatives with the highest final scores are ranked higher, indicating preference.

Table 2. Teacher performance criteria

| No. | COMPETENCIES | Cost/ Benefit |
|---|---|---|
| A. Pedagogical | | |
| C1 | Mastery of student characteristics | Benefit |
| C2 | Proficiency in educational theories and the foundational principles of effective teaching. | Benefit |
| C3 | The process of creating and organizing educational curricula. | Benefit |

| | | |
|---|---|---|
| C4 | Instructional learning exercises. | Benefit |
| C5 | Advancement of student capabilities. | Benefit |
| C6 | Interaction with students. | Benefit |
| C7 | Appraisal and analysis. | Benefit |
| B. Personality | | |
| C8 | Complying with the religious, legal, social, and cultural standards established in Indonesia. | Benefit |
| C9 | Exhibiting mature and commendable personal attributes. | Benefit |
| C10 | A strong work ethic, a high sense of responsibility, and a deep pride in the teaching profession. | Benefit |
| C. Social | | |
| C11 | Behavior that promotes inclusivity, actions grounded in objectivity, and conduct that is free from discrimination. | Benefit |
| C12 | Interaction with colleagues, educational personnel, parents of students, and the broader community. | Benefit |
| D. Profesional | | |
| C13 | Proficiency in the subject matter, organization, principles, and scientific reasoning frameworks that underpin the taught disciplines. | Benefit |
| C14 | Cultivating professionalism through introspective practices. | Benefit |

Table 3. Criteria Weight

| Description | Score |
|---|---|
| No Evidence | 0 |
| Partially Fulfilled | 1 |
| Fully Fulfilled | 2 |

2.2 System Design

A. Functional Requirements

This table outlines the functional requirements of the system, specifying the tasks and the actors responsible for each task, as shown in Table 4.

Table 4. Functional Requirement

| No. | Functional Requirement | Actor |
|---|---|---|
| 1 | Login | All User |
| 2 | Managing User Accounts | Admin |
| 3 | Managing Teacher Data | Teacher |
| 4 | Teacher Performance Assessment | School Principal |
| 5 | Teacher Performance Reports | Admin |

B. Functional Requirements

This section includes a use case diagram that visually represents the interactions between different actors and the system, showing the functional requirements in action.


Figure 1. Use Case Diagram

C. Entitiy Relationship Diagram (ERD)

This section features an Entity Relationship Diagram (ERD), illustrating the relationships between different entities within the system, helping to understand the database structure.

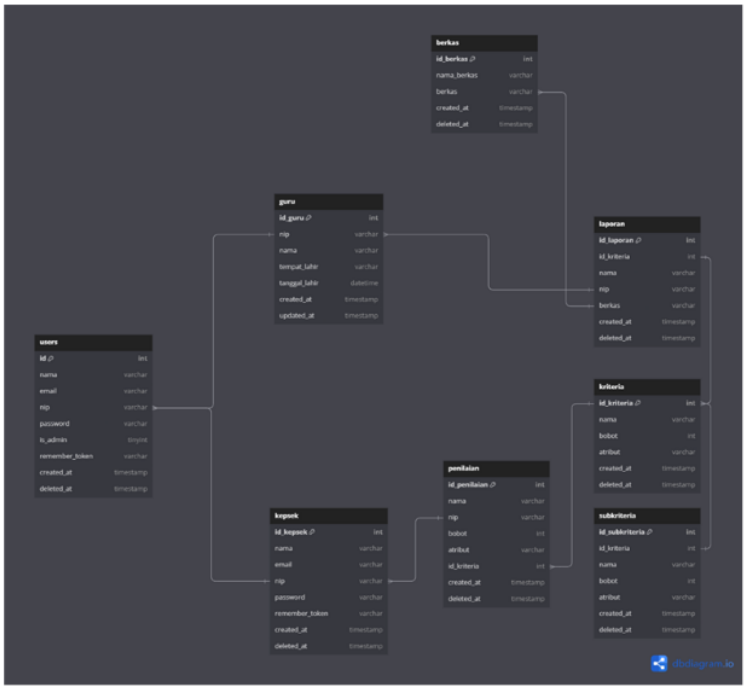


Figure 2. Entitiy Relationship Diagram (ERD)

## 2. RESULTS AND DISCUSSIONS

### 3.1 Achieved Results

A. Login Page

The login page for the admin to access the system. The admin must enter the correct username and password to gain access to the main dashboard.


Figure 3. Login Page

B. Criteria Page

A page displaying the list of teacher performance assessment criteria. The admin can view, add, edit, or delete assessment criteria.

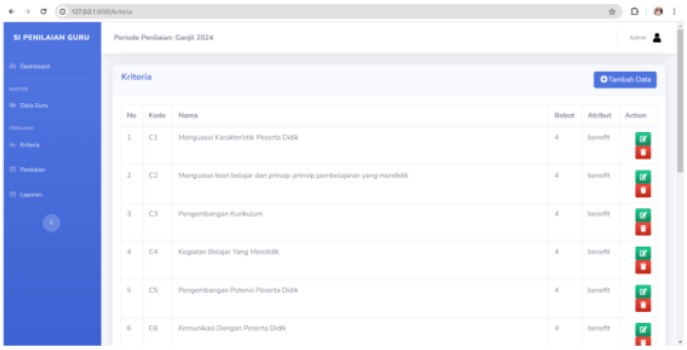


Figure 4. Criteria Page

C. Teacher Performance Assessment Page

A page for the School Principal to enter the names of the teachers to be assessed. The principal must select teachers from the available list.

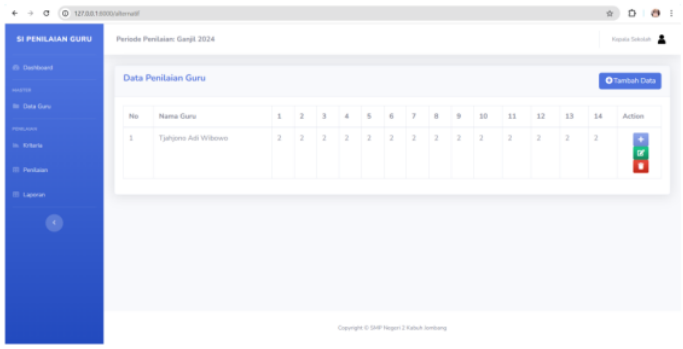


Figure 5. Teacher Performance Assessment Page

D. Report Page

A report page for users to view the results of the assessments. There is a feature to export teacher performance reports into the desired format (e.g., PDF or Excel).

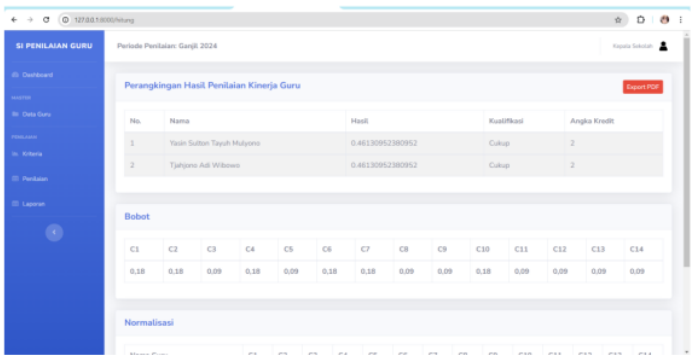


Figure 6. Report Page

## 3.2 System Testing

### 1. Black Box Testing

Black Box testing is a method that verifies the application's execution results based on the given input (test data) to ensure that the application's functionality meets the requirements (Mintarsih 2023).

Table 5. Blackbox Testing

| No. | Testing Scenario | Expected Result | Testing Result |
|---|---|---|---|
| Login | | | |
| 1 | Enter the correct username and password, then click the login button. | The system grants access and the user enters the dashboard. | Matches |
| 2 | Enter the username without the password or vice versa, then click login. | The system denies access. | Matches |
| 3 | Enter the incorrect username and password, then click the login button. | The system denies access. | Matches |
| Managing User Accounts | | | |
| 4 | Add a new account. | The new account is successfully added. | Matches |
| 5 | Delete an account. | The account is successfully deleted. | Matches |
| 6 | Edit an account. | The account is successfully edited. | Matches |
| Managing Teacher Data | | | |
| 7 | Add new teacher data. | The new teacher data is successfully added. | Matches |
| 8 | Delete teacher data. | The teacher data is successfully deleted. | Matches |
| 9 | Edit teacher data. | The teacher data is successfully edited. | Matches |
| Teacher Performance Assessment | | | |
| 10 | Input teacher performance assessment criteria data. | The criteria data is successfully saved. | Matches |
| 11 | Calculate teacher performance | The teacher performance | Matches |

| | | | |
|---|---|---|---|
| | based on the input criteria. | calculation results are displayed correctly. | |
| 12 | Display teacher performance assessment results. | The teacher performance assessment results are displayed correctly. | Matches |
| Teacher Performance Reports | | | |
| 13 | Generate teacher performance reports in PDF format. | The teacher performance report is successfully generated in PDF format. | Matches |
| 14 | Display teacher performance reports on the screen. | The teacher performance report is displayed correctly on the screen. | Matches |
| 15 | Print teacher performance reports. | The teacher performance report is successfully printed. | Matches |

2. UMUX-LITE (Usability Metric for Experience Lite)

These two items are scored [user score - 1], and their sum is divided by 12 and multiplied by 100, then the average score of all respondents is calculated (Inayah et al. 2024).

Table 6. UMUX-LITE Testing

| Nama | Role | Pertanyaan Ke- | | Hasil UMUX-Lite |
|---|---|---|---|---|
| | | 1 | 2 | |
| Tasmilah, S.Pd. | Kepala Sekolah | 7 | 7 | 100 |
| Mochamad Choirul Huda | Admin | 7 | 7 | 100 |
| Erika Widya Rohmatrismaysi | Teacher | 6 | 5 | 75 |
| Mohammad Naufal Fawwaz Bassam | Teacher | 6 | 6 | 83.33 |
| Tika Fardina | Teacher | 5 | 7 | 83.33 |
| Yasin Sulton Tayuh Mulyono | Teacher | 7 | 6 | 91.66 |
| Uswatun Khasanah | Teacher | 6 | 6 | 83.33 |
| Sari Dewi Kemukus | Teacher | 7 | 7 | 100 |
| Nur Mahmudi | Teacher | 5 | 6 | 75 |
| Dhanang Setyo Ervana | Teacher | 5 | 5 | 66.66 |
| **Total Skor** | | | | 79.83 |

The UMUX-LITE score calculated from 10 respondents resulted in an average score of 79.83. Based on the UMUX-LITE rating, a score of 79.83 falls into grade B, which means acceptable and good.

3.3 Implementation of the SAW Method

Weights for Each Criterion:

- C1: 0.14, C2: 0.14, C3: 0.11, C4: 0.14, C5: 0.11, C6: 0.14, C7: 0.14, C8: 0.11, C9: 0.11, C10: 0.11, C11: 0.11, C12: 0.11, C13: 0.11, C14: 0.11

Decision Matrix:

- Moh. Nyoto: [4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4]
- Adhitya Wahyu Pradana: [2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2]

Normalized Decision Matrix:

- Moh. Nyoto: [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
- Adhitya Wahyu Pradana: [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5]

Final Score Calculation:

- Moh. Nyoto:
  (1∗0.14)+(1∗0.14)+(1∗0.11)+(1∗0.14)+(1∗0.11)+(1∗0.14)+(1∗0.14)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)=1.6071(1*0.14) + (1*0.14) + (1*0.11) + (1*0.14) + (1*0.11) + (1*0.14) + (1*0.14) + (1*0.11) + (1*0.11) + (1*0.11) + (1*0.11) + (1*0.11) + (1*0.11) =
  1.6071(1∗0.14)+(1∗0.14)+(1∗0.11)+(1∗0.14)+(1∗0.11)+(1∗0.14)+(1∗0.14)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)+(1∗0.11)=1.6071

- Adhitya Wahyu Pradana:
  (0.5∗0.14)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.14)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)=0.9107(0.5*0.14) + (0.5*0.14) + (0.5*0.11) + (0.5*0.14) + (0.5*0.11) + (0.5*0.14) + (0.5*0.14) + (0.5*0.11) + (0.5*0.11) + (0.5*0.11) + (0.5*0.11) + (0.5*0.11) + (0.5*0.11) =
  0.9107(0.5∗0.14)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.14)+(0.5∗0.14)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11)+(0.5∗0.11) =0.9107

Final Results:

- Moh. Nyoto: 1.6071 (Good)
- Adhitya Wahyu Pradana: 0.9107 (Poor)

## 3. CONCLUSION

The research and implementation undertaken lead to the conclusion that the Decision Support System (DSS) designed for ranking teacher performance through the Simple Additive Weighting (SAW) method is effective in evaluating and ranking based on multiple criteria. The SAW method facilitates data normalization and the objective weighting of criteria, which results in precise and reliable rankings. The use of the Laravel framework in the implementation process enhances system development and usability, allowing educational institutions to make informed decisions based on the data provided. The findings from the research suggest that this system serves as a valuable resource in the teacher performance assessment process, achieving a high level of accuracy, contingent upon the careful weighting of criteria in alignment with established policies. Furthermore, based on the results and observations gathered during the research and implementation phases, recommendations for future system enhancements include refining the user interface and user experience, incorporating advanced data analysis capabilities such as graphical representations, trend analysis, and detailed reporting, as well as performing additional validation and testing across various educational institutions to ensure the system's adaptability and dependability in diverse contexts.

ACKNOWLEDGEMENTS

We wish to convey our heartfelt appreciation to all individuals and organizations that have played a role in the successful completion of this research and implementation project. Our deepest thanks go to Ir. Roenadi Koesdijarto, MM., and Ahmad Habib, S.Kom., MM., for their exceptional guidance, expertise, and unwavering support during this endeavor. Their valuable insights and recommendations were instrumental in determining the direction and results of this study. We also recognize Universitas 17 Agustus 1945 Surabaya for offering the necessary resources and facilities that enabled us to conduct this research effectively. Additionally, we extend our gratitude to all participants and stakeholders who generously contributed their time and perspectives; this project would not have been achievable without their involvement. Finally, we would like to thank our families and friends for their continuous encouragement and understanding throughout this journey.

REFERENCES

Dermawan, Muhammad Fathoni, and Gandung Triyono. 2022. "Sistem Penunjang Keputusan Metode Simple Additive Weighting (SAW) Untuk Penilaian Kinerja Guru Pada SDN Joglo 08 Pagi."

Inayah, Syifa' Septiana Dwi, Rosalina Alda, Bintang Ahmada Farhan Adama, and Ariq Cahya Wardhana. 2024. "Analisis Pengalaman Pengguna Shopee: Evaluasi Dengan UMUX dan UMUX-Lite." *Teknika* 13(1): 120–26. doi:10.34148/teknika.v13i1.770.

Martono, Aris, Ageng Setiani Rafika, and Winda Larasati. 2022. "Rancang Bangun Sistem Informasi Akademik untuk Sekolah Menengah (Studi Kasus SMA Nusantara 1)." *Journal Sensi* 8(1): 40–52. doi:10.33050/sensi.v8i1.2183.

Mintarsih, Mintarsih. 2023. "Pengujian Black Box Dengan Teknik Transition Pada Sistem Informasi Perpustakaan Berbasis Web Dengan Metode Waterfall Pada SMC Foundation." *Jurnal Teknologi Dan Sistem Informasi Bisnis* 5(1): 33–35. doi:10.47233/jteksis.v5i1.727.

Reyhans, Muhammad Dio, Imam Cholissodin, and Sigit Adinugroho. "Pengembangan Aplikasi Pemantauan Kinerja Guru untuk Peningkatan Kualitas Pembelajaran berbasis Web (Studi Kasus: SDN Mulyorejo 1 Malang)."

Yusmar, Anita, and Geovanne Farell. 2020. "RANCANG BANGUN SISTEM INFORMASI PENILAIAN KINERJA GURU BERBASIS WEB DENGAN MENGGUNAKAN FRAMEWORK CODEIGNITER 3 (Studi Kasus SMK Negeri 2 Padang Panjang)." 8(4).

# Creation and Implementation of a Web-Based Teacher Performance Assessment Information System Utilizing the Simple Additive Weighting (SAW) Approach

ORIGINALITY REPORT

| 18% | 13% | 8% | 12% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | Submitted to Universitas Islam Negeri Raden Fatah<br>Student Paper | 2% |
| 2 | Submitted to Universitas Warmadewa<br>Student Paper | 2% |
| 3 | Submitted to RMIT University<br>Student Paper | 2% |
| 4 | journal.ubpkarawang.ac.id<br>Internet Source | 1% |
| 5 | Satria Abadi, Miswan Gumanti. "Simple Additive Weighting: Determination of The Local Government Officials Tanggamus Region", bit-Tech, 2023<br>Publication | 1% |
| 6 | ejournal.ikado.ac.id<br>Internet Source | 1% |
| 7 | jurnal.unidha.ac.id<br>Internet Source | 1% |

| | | |
|---|---|---|
| 8 | dirdosen.budiluhur.ac.id<br>Internet Source | 1 % |
| 9 | ejournal.raharja.ac.id<br>Internet Source | 1 % |
| 10 | senafti.budiluhur.ac.id<br>Internet Source | 1 % |
| 11 | Submitted to Universitas 17 Agustus 1945 Surabaya<br>Student Paper | 1 % |
| 12 | ejournal.ubhara.ac.id<br>Internet Source | 1 % |
| 13 | www.stmik-budidarma.ac.id<br>Internet Source | 1 % |
| 14 | jurnal.unprimdn.ac.id<br>Internet Source | 1 % |
| 15 | vdocuments.net<br>Internet Source | 1 % |
| 16 | Submitted to Universitas Muhammadiyah Sidoarjo<br>Student Paper | 1 % |
| 17 | Submitted to El-Sewedy Education<br>Student Paper | <1 % |
| 18 | Submitted to Southampton Solent University<br>Student Paper | <1 % |

| | | |
|---|---|---|
| 19 | www.syncfusion.com<br>Internet Source | <1% |
| 20 | repository.binadarma.ac.id<br>Internet Source | <1% |

| | | | |
|---|---|---|---|
| Exclude quotes | Off | Exclude matches | Off |
| Exclude bibliography | Off | | |

# Creation and Implementation of a Web-Based Teacher Performance Assessment Information System Utilizing the Simple Additive Weighting (SAW) Approach

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13