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Application of Scoring Methods in Web-Based Information Systems to Optimize Incentive Allocation for Honorary Teachers

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Abstract **— The distribution of incentive funds to honorary teachers in Indonesia is generally still carried out evenly without considering the differences in the real conditions of each recipient, resulting in proportional injustice. This study aims to design a prototype of a web-based Management Information System that applies a proportional scoring algorithm to optimize the allocation of incentive funds for honorary teachers. The methodology used is a prototyping approach with dummy data simulations, without field observations at specific institutions. The system is designed using native JavaScript and modelled with Unified Modelling Language (UML). The scoring algorithm weights four main variables: base points, income level, school geographic conditions, and educational level taught. Funds are then distributed proportionally based on each teacher's total points with a maximum limit equivalent to the City Minimum Wage (UMK). The system separates access between teachers and administrators, is equipped with a multilevel approval workflow, timeline-based status tracking, a statistical dashboard, allocation simulations, and reporting in PDF format. The design results show that the proportional scoring algorithm is able to produce a fairer and more transparent distribution than the flat method. Testing the algorithm's logic using simulated data resulted in 100% calculation consistency according to the defined rules. The implications of this research are expected to serve as a framework of reference for philanthropic institutions or zakat managers who wish to digitize the process of data collection and distribution of incentive funds to honorary educators in a more objective, accountable, and equitable manner.**

Keywords— information system; proportional scoring; honorary teachers; incentives; prototyping.

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I. INTRODUCTION

Honorary teachers are a key pillar of education in Indonesia, particularly in remote areas experiencing a shortage of Civil Servant educators. Despite their dedication and workload comparable to that of civil servant teachers, the welfare of honorary teachers remains far from adequate [1][2]. Research shows that the majority of honorary teachers in Indonesia receive salaries below Rp 1,000,000 per month, with some even receiving as little as Rp 300,000 per month, far below the applicable City Minimum Wage [3][4].

This situation has prompted various philanthropic institutions and zakat administrators to provide additional incentive funds to honorary teachers who fall into the asnaf category (those eligible to receive assistance). However, the current common distribution practice remains a flat rate, with every teacher deemed deserving receiving the same amount without considering differences in real conditions such as salary size, teaching location, and educational level [5][6]. This approach is considered proportionally unfair because it ignores the real gradation of needs among beneficiaries.

In addition to issues of distribution equity, the data collection and eligibility verification process for honorary teachers is still largely carried out manually using physical files or spreadsheets. This situation is vulnerable to salary data manipulation, lacks transparency for donors, and is administratively inefficient [7][8]. Digitizing this process has become an urgent need as web-based information technology becomes increasingly mature and accessible.

Web-based information systems have been proven to improve the efficiency and accuracy of data management across various sectors [9][10]. In the context of social assistance distribution, several studies have demonstrated the effectiveness of criteria-based algorithms such as Simple Additive Weighting (SAW) and SMART in determining beneficiaries more objectively [11][12][13]. A similar approach can be adapted to the context of honorary teacher incentive fund distribution by considering relevant variables.

This research aims to design a prototype web-based Management Information System that implements a specific proportional scoring algorithm to optimize the allocation of honorary teacher incentive funds. Unlike the best alternative selection method, the proposed algorithm distributes all available funds to all teachers who have been verified as eligible, with the amount proportional to each individual's point weight. The system also features a multi-level approval

process, status tracking features, and integrated reporting to enhance transparency and accountability in the disbursement process. This integrated approach objectively addresses the fundamental weaknesses of the flat-rate distribution scheme. Furthermore, the flexibility of administrator prerogatives within the verification process ensures that any anomalies in the field can be fairly addressed.

A. Literature Review

1) Welfare and Issues of Honorary Teachers: Honorary teachers in Indonesia face complex systemic problems. Dhobith [1] revealed in his study that the salary gap between honorary teachers and civil servant teachers is significant, despite their relatively equal workload. Research from Future Academia [2] supports this finding by describing honorary teacher salaries as ranging from Rp 300,000 to Rp 1,000,000 per month, far below the standard of living.

Pitriyani et al. [3], in their study of the compensation system for junior high school honorary teachers, concluded that the lack of clear salary standards based on teaching hours and educational level is the root of the problem of compensation inequity. Meanwhile, the Basicedu Journal [4] emphasized that poorly managed teacher welfare often results in suboptimal teacher performance and encourages honorary teachers to seek additional employment.

Maulida et al. [14] reinforced the above findings through a literature review analyzing the relationship between salary and recognition factors and honorary teacher job satisfaction. The results of their study confirmed that low salaries are the dominant factor influencing the satisfaction and work motivation of honorary teachers, so that interventions in the form of fair and structured additional incentives are crucial to maintaining the quality of teaching in schools that rely on honorary workers.

2) Digitalization of Zakat Fund Management and Philanthropy: Indonesia's zakat potential is enormous, but its management still faces various challenges, including the lack of a comprehensive database and limited technical capacity of zakat collection institutions [5]. Sunarto et al., as cited in Alwi [6], showed that the implementation of web-based information technology at BAZNAS (National Zakat Agency) can improve the accountability and quality of zakat fund management. Digitizing zakat distribution is also seen as increasing transparency and selectivity in distribution to truly deserving recipients [13].

3) Decision Support Systems for Fund Distribution: Several studies have developed Decision Support Systems (DSS) to support more objective aid distribution. Simanungkalit et al. [11] applied the SMART (Simple Multi-Attribute Rating Technique) method to determine recipients of social assistance for poor families and concluded that this method effectively minimizes inaccurate recipient data. Winata and Yanto [12] specifically designed a zakat distribution DSS using the SMART method, which resulted in more transparent and targeted recipient rankings.

Sembiring et al.'s [15] research on the COVID-19 aid recipient allocation system using the SAW method showed that multi-criteria weighting produced fairer decisions than manual determination. Meanwhile, a systematic review by Haffandi and Hendrik [16] of 15 journals from 2021–2024 concluded that the AHP and TOPSIS methods were superior for performance evaluation, while simple scoring-based methods were more suitable for aid distribution involving multiple recipients with measurable criteria.

Further developments in the field of zakat distribution allocation system were demonstrated by Nurrahman et al. [17], who combined the Random Forest algorithm with the Fuzzy Analytical Hierarchy Process (Fuzzy AHP) to determine zakat recipients more precisely, proving that a hybrid approach based on machine learning and criteria weighting can improve the accuracy of beneficiary selection. Hidayatullah and Putri [18] specifically designed an allocation system for determining BAZNAS scholarship recipients using the AHP method, which resulted in an objective ranking system that could be audited by zakat institution managers. A follow-up study by Haffandi and Hendrik [13] and research published in the journal INFORMASI [19] simultaneously confirmed that the combination of the SMART and SAW methods in a single integrated system can produce more targeted zakat distribution than either method alone, strengthening the theoretical basis for the multi-variable approach proposed in this study.

4) Web-Based Information Systems: Web-based information systems have become a primary solution for digitizing administrative processes in various agencies. Lapihu et al. [7] developed a web-based information system for processing teaching hours for honorary teachers, proven to automate data processing and generate real-time reports. Anwar and Manongga [8] designed a web-based information system for recording government official travel using the waterfall method and black-box testing, with results showing significant efficiency improvements compared to manual recording.

Ibrahim et al. [9], in designing a web-based asset management system using Agile methodology, demonstrated that the MVC (Model-View-Controller) architecture can support complex data management efficiently. Oktiagraha et al. [10] developed a web-based teacher performance management information system that integrates attendance data, teaching hours, and student assessments in a single platform.

5) Prototyping Method in System Development: The prototyping method is a widely used system development approach because it facilitates interaction between developers and users during the development process [20]. Marisa et al. [21] applied the prototype model in designing a web-based information system at SMK Muhammadiyah 3 Pekanbaru and produced a validated system through black box testing and usability assessment. The prototyping approach is considered appropriate for conceptual research that focuses on validating system logic and interface design before full implementation [22].

B. Research Contribution

This research contributes in two key dimensions that distinguish it from previous studies. First, in terms of distribution algorithms, the developed system, hereinafter

referred to as SI-MULIA (Sistem Informasi Manajemen untuk Alokasi Insentif) is a management information system for incentive allocation that implements a Proportional Scoring method specifically designed to replace the flat-rate approach that has dominated the practice of distributing incentive funds for honorary teachers. Unlike conventional SPK methods, which only produce a ranking or selection of the best recipients [11][12], the SI-MULIA algorithm distributes all available funds to all teachers who have been verified as eligible, with amounts calculated proportionally to their individual point weights. Thus, teachers with the direst circumstances in terms of income level, geographic location, and level of education systematically receive a larger portion of the incentives, while all validated recipients retain their rights. This approach represents a concrete implementation of the principle of data-driven distributive justice in the context of managing social education funds.

Second, from a digital governance perspective, this research contributes to the transformation of technology-based zakat and philanthropy management. Nuryana [23] emphasized that the implementation and transformation of management information systems in the digital era is a necessity for organizations seeking to improve their operational effectiveness, while a study on the role of digitalization in enhancing transparency and accountability in governance [24] confirmed that an integrated web-based system can reduce the potential for irregularities and increase stakeholder trust. SI-MULIA responds to these findings by presenting a multi-level verification flow equipped with administrator prerogative features, namely the ability to issue Approved, Revised, or Rejected decisions along with auditable records as a form of intelligent adaptation to the complexity of real conditions in the field that cannot always be accommodated by standard rules. The combination of an objective Proportional Scoring algorithm and an adaptive verification mechanism makes SI-MULIA a prototype incentive distribution system that is not only mathematically fair but also procedurally accountable.

II. Research Methodology

A. Research Approach

This research is a conceptual and prototyping study that focuses on the potential implementation of the design model and algorithm testing using dummy data simulations. The research is not based on direct field observations or in-depth interviews at specific institutions, and therefore does not claim to have been tested in real institutions. This approach was chosen to validate the effectiveness of the algorithm and user experience design in a controlled manner before implementation.

B. Prototyping

System development follows the prototyping stages, consisting of: (1) system requirements analysis based on literature review and problem identification; (2) scoring algorithm design; (3) interface design (mockup); (4) writing prototype code using native JavaScript; (5) algorithm testing simulations with dummy data; and (6) evaluation of simulation results. The system modelling uses the Unified Modelling Language (UML), which includes Use Case Diagrams, Activity Diagrams, and Class Diagrams.

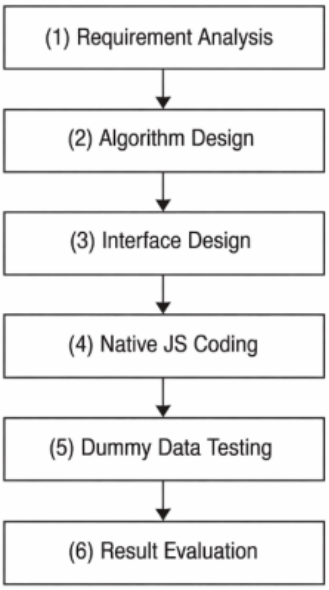

Fig. 1 System Development Stages Using Prototyping Methodology

C. Proportional Scoring Algorithm

The core of this system is a proportional scoring algorithm that calculates the points weighted for each verified honorary teacher. The variables and weights used are as follows:

TABLE I
VARIABLES AND SCORING WEIGHTS

No	Scoring Variables and Weights		
	Variables	**Condition**	**Point**
1	Basic Point	All teachers are validated	+1
2	Income Level	Salary ≤ Rp 500.000 (Very Low)	+2
		Salary ≤ Rp 800.000 (Pre-Prosperous)	+1
3	Geographical Condition	Schools in remote areas	+1
4	Teaching Level	SMA/SMK/MA (Senior High School)	+3
		SMP/MTs (Junior High School)	+2
		SD/MI (Elementary School)	+1

After the total points are calculated for each teacher with approved status, funds are distributed proportionally using the following formula:

$$Incentive\_i = (Point\_i \,/\, \Sigma Point\_total) \times Incentive\_Total \quad \ldots (1)$$

Where Incentive_i is the incentive received by the i-th teacher, Point_i is the total points of the i-th teacher, ΣPoint_total is the sum of all validated teacher points, and Incentive_Total is the funds available during the distribution period. The calculation results are also limited by a Limit Cap that does not exceed the local UMK value to prevent receipts that exceed the eligibility limit.

D. System Architecture and Technology

The prototype was built using native JavaScript (Vanilla JS) for the client side, without any additional front-end frameworks, to maintain portability and ease of understanding the algorithm logic. The database was designed using a relational model with the following main entities: Teacher,

File, Verification Status, School, District, Distribution Period, and Transfer History. The admin interface utilizes PDF report generation through Puppeteer integration, which allows for automatic export of fund distribution reports.

E. Testing Design

Testing was conducted using 20 sets of dummy teacher data with varying combinations of salary, school location, and education level. Testing included: (1) testing the consistency of the scoring algorithm calculations; (2) testing the maximum distribution limit (Limit Cap); (3) testing the multilevel approval flow for Approval, Revision, and Rejection cases; and (4) testing the profile edit limit (maximum 2 times per month).

III. RESULT AND DISCUSSION

A. Teacher Interface Design

On the user (teacher) side, the system is designed with a structured onboarding flow. The process begins when newly registered teachers are directed to the Teacher Dashboard Page (dashboard.ejs). This page displays a visual eligibility status card using color coding: green for eligible, blue for verification, yellow for revision, and red for ineligible. In addition to the status indicator, the dashboard also provides a summary of the total accumulated incentive funds received and a history of recent transfers.

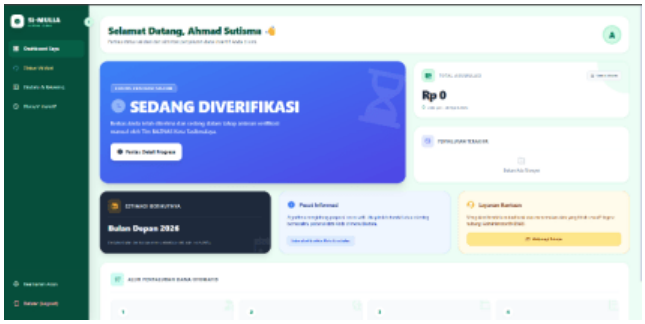

Fig. 2 Teacher Dashboard Page Interface Displaying Eligibility Status Card and Incentive Summary.

The next step in the onboarding process is filling in the data on the Administration Form Page (administration.ejs). This form contains fields for National Identification Number (NIK), domicile data, teaching institution, actual salary, and bank account number. A key element on this page is a dynamic dropdown (cascading dropdown) for selecting the school of origin, which is automatically filtered by district. This mechanism ensures the consistency of the geographic data that forms the basis for calculating geographic condition points in the scoring algorithm.

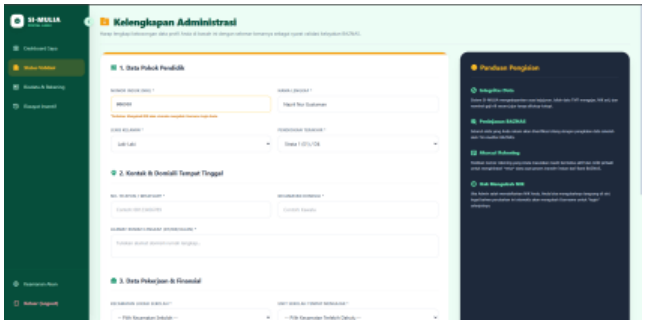

Fig. 3 Administration Form Page Interface Displaying Teacher Data Input with Dynamic District Dropdown.

After submitting a file, teachers are directed to the Progress Timeline Page (progress.ejs) which displays an interactive stepper or timeline. This page visually tracks the file's status: whether it is still in the queue, requires revision, or has been officially approved by the admin. Teachers cannot access the main dashboard features before the file is approved, so feature access rights are limited according to the verification status. This approach adopts the principle of progressive disclosure which ensures users only see information relevant to their current situation [25].

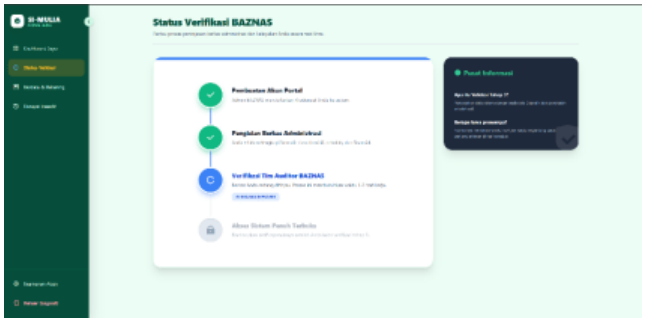

Fig. 4 Timeline Progress Page Interface Displaying an Interactive Timeline of Teacher File Verification Status.

The three statuses that teachers can receive are: (1) Waiting, when the file is in the verification queue; (2) Revised (marked yellow), when the admin finds data that needs to be corrected with a written reason; and (3) Permanently Rejected (marked red), which results in account access being blocked. This status tracking feature is important for increasing user confidence in the ongoing process [26].

Once the file is approved, teachers can access the Biodata & Account Page (profile.ejs) to review and update the inputted data. To maintain data security leading up to the disbursement period, the system limits editing of account or important biodata to a maximum of two times per calendar month. This restriction is designed as a mechanism to prevent data manipulation that could affect the results of fund allocation calculations.

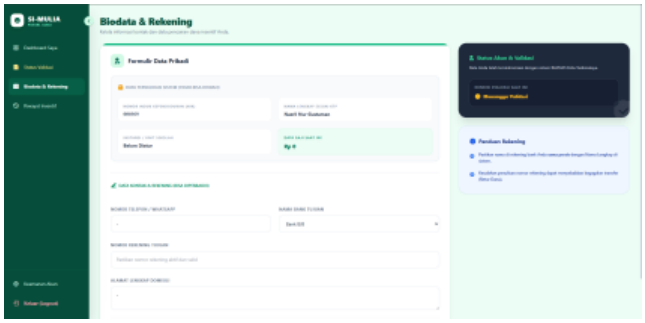

Fig. 5 Biodata & Account Page Interface Displaying Teacher Data and Limited Editing Features (Maximum 2 Times/Month).

Historical transparency for teachers is provided through the Incentive History Page (history.ejs). This page displays a ledger detailing each influx of funds, complete with the month and year of disbursement. Access to this historical data gives teachers the ability to independently verify each receipt, ultimately improving overall system accountability.

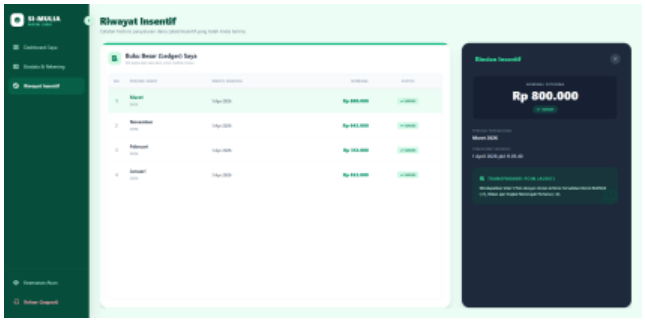

Fig. 6 Incentive History Page Interface Displaying Transparent Ledger Table of Fund Receipts per Period.

Complementing the teacher-side module, the Account Security Page (settings.ejs) provides a standalone feature for teachers to change passwords to maintain account security. This feature is independent of the biodata editing restrictions, allowing teachers to update their account security whenever needed without impacting their data change quota.

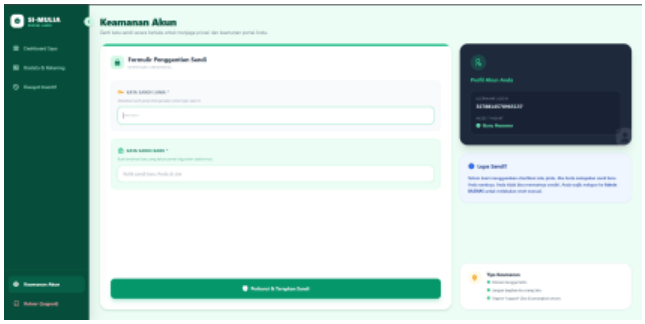

Fig. 7 Account Security Page Interface Showing Self-Update Password Feature for Teachers.

B. Administrator Interface Design

The administrator panel is designed as a complete control center for BAZNAS officers in managing the entire fund distribution cycle. The first page accessed by the administrator is the Statistics Dashboard (index.ejs), which presents an executive summary of the total cash budget, the total number of registered employees, the number of validated asnaf (recipients of the charity), and a graph showing the distribution of the most asnaf areas per sub-district. The data visualization on this page allows decision-makers to quickly understand the demographic distribution of beneficiaries without having to navigate through the raw data.

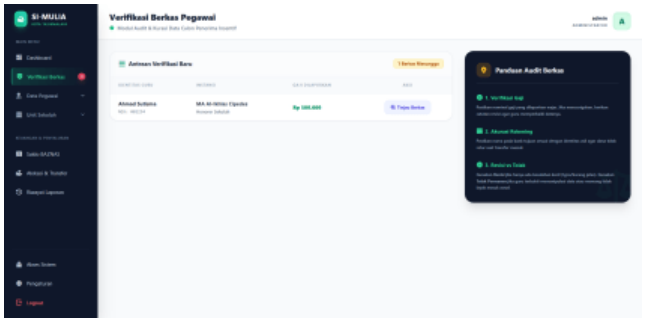

Fig. 8 Admin Statistics Dashboard Interface Displaying Budget Executive Summary, Number of Employees, and Asnaf Distribution Graph.

The core feature of the administrator panel is the File Verification Page (verification-file.ejs), which serves as the admin's main "workbench." This page displays a queue of teachers who have recently submitted files. Admins can click on a name to view a summary of the individual's details (salary, school, TMT), and then issue a decision to validate, revise, or reject. For both revision and rejection actions, admins are required to include a reason note that can then be viewed by the teacher concerned. This flow is in line with the principle of transparency in the management of system-based social assistance [11].

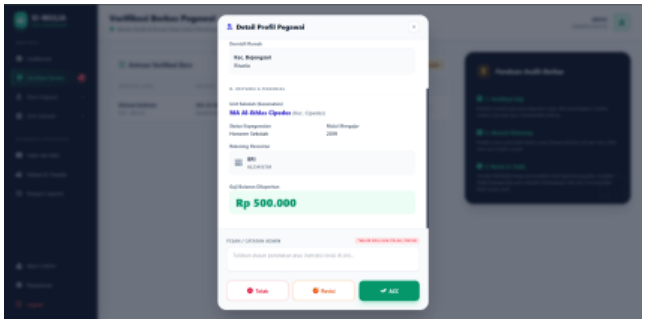

Fig. 9 File Verification Page Interface Displaying Teacher Submission Queue and Approved/Revised/Rejected Decision Panel.

The Employee Directory page (data-teacher.ejs) provides a database of all registered honorary teachers. This page features a quick search and filters based on validation status (Validated, Queued, Revised, and others), allowing administrators to efficiently navigate large amounts of data. Meanwhile, the Employee Profile Details page (detail-teacher.ejs) displays comprehensive data on individual teachers, including special eligibility badges if there are any exceptions noted by the administrator, along with their personal transfer history.

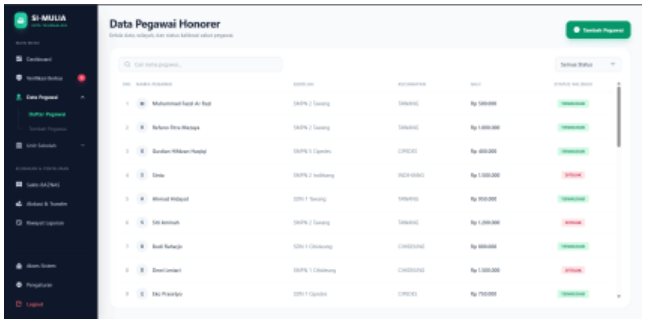

Fig. 10 Employee Directory Page Interface Displaying a Table of All Teachers with Search and Status Filter Features.

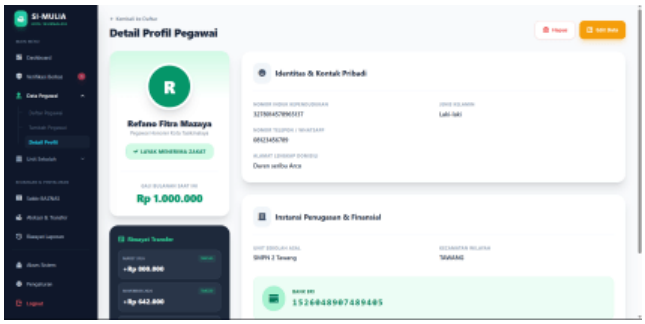

Fig. 11 Employee Profile Detail Page Interface Displaying Comprehensive Individual Teacher Data and Special Eligibility Badges.

The system also allows administrators the prerogative to grant exceptions based on specific considerations. For example, a teacher with a salary slightly exceeding the normal eligibility limit (>Rp 1,000,000) may still be approved if the administrator has a justifiable reason, and the system will still accommodate the teacher in the scoring calculation.

To support validation of teacher work location data, the system provides a School Unit Management Page (data-school.ejs) containing a database of schools throughout Tasikmalaya City, categorized by sub-district. This page serves as the primary reference for verifying teachers' schools of origin and determining geographic location points. Furthermore, the BAZNAS Balance Management Page (saldo-baznas.ejs) records all incoming cash as a source of funds for allocation, providing administrators with full visibility into budget availability before running distribution simulations.

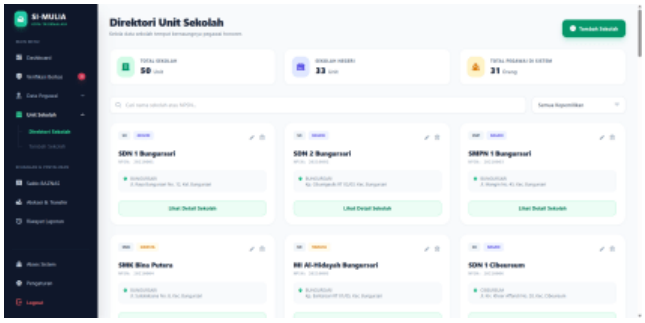

Fig. 12 School Unit Management Page Interface Displaying a Database of Sample Schools Throughout Tasikmalaya City

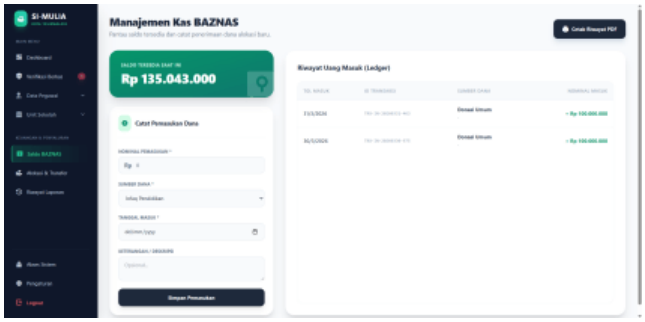

Fig. 13 BAZNAS Balance Management Page Interface Displaying Cash Incoming Recording as a Source of Allocation Funds.

C. *Scoring Algorithm Simulation*

The crucial page that serves as the main demonstration of the algorithm is the Fund Calculation & Allocation Page (allocation-dana.ejs). On this page, the administrator enters the target amount of aid to be distributed. The system then automatically runs the Proportional Scoring Algorithm and displays a real-time preview of the fund distribution table before the administrator executes the transfer. The simulation was conducted on 20 dummy teacher data with diverse profiles. Table II shows an example of the calculation results for five teachers in one simulation scenario with a total fund of IDR 20,000,000:

TABLE II
EXAMPLE OF SCORING CALCULATION SIMULATION RESULTS

Teacher	Scoring Calculation Simulation			
	Variables	Condition	Point	Fund (Rp)
G1	350.000	Senior High School	7	2.187.500
G2	700.000	Junior High School	4	1.250.000
G3	900.000	Elementary School	2	625.000
G4	400.000	Senior High School *	8	2.500.000
G5	600.000	Junior High School *	4	1.250.000
...	...	...	...	...
Total	—	—	32	10.000.000

* Schools in the suburbs / remote areas (geographics point +1)

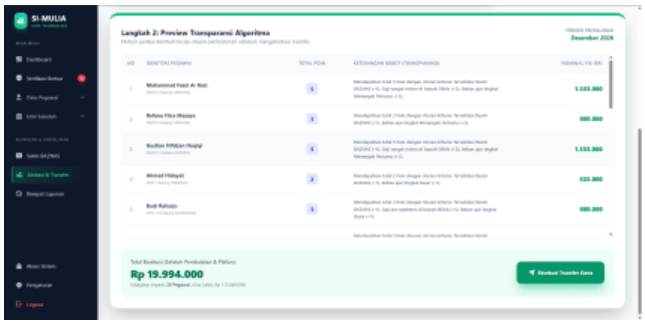

Fig. 14 Calculation & Fund Allocation Page Interface Displaying a Preview of the Proportional Distribution of Scoring Algorithm Results.

Simulation results show that G4 teachers teaching at high schools in remote areas with very low salaries earned the highest score (8 points) and received the largest funding allocation. Conversely, G3 teachers teaching at elementary schools with salaries above the pre-prosperity level earned the lowest score and received the smallest funding allocation.

This demonstrates that the algorithm successfully reflects the real gradation of needs among recipients.

Algorithm consistency testing across 20 dummy data scenarios demonstrated 100% compliance with the defined weighting rules. No inconsistencies were found in point calculations or in the proportional distribution of funds. The Limit Cap test also functioned correctly, where in scenarios with very large total funds, the allocation per teacher was limited to not exceed the established minimum wage.

D. Comparison of Flat vs. Proportional Scoring Methods

As an illustrative comparison, using a total of IDR 10,000,000 for five teachers in the simulation scenario above, the flat method would provide each teacher with IDR 2,000,000 without considering differences in conditions. Meanwhile, the proportional scoring method distributes funds ranging from IDR 625,000 to IDR 2,500,000 based on their individual points. Teachers with the direst circumstances (G4, salary IDR 400,000, high school in a remote area) receive 25% more than the flat average, while teachers with relatively better conditions (G3) receive proportionally less.

This difference reflects the principle of distributive justice argued in various studies on criteria-based aid distribution [11][12][16]. The proportional scoring method is not only fairer individually but also more accountable because every allocation decision can be traced back to measurable and verifiable variables.

E. Approval Flow and Transparency

The multi-level approval flow designed within this system serves as a data quality control mechanism before entering the calculation stage. Administrators have full control to validate teacher claims for salary data and school locations.

The entire fund disbursement track record can be accessed through the Disbursement Report History Page (history-distribution.ejs). This page serves as a digital archive of all previous disbursement batches. The integrated Report Generator feature allows administrators to print official fund distribution reports in PDF format using Puppeteer. The system's stored ledger history also allows for regular financial reconciliation. The combination of these features collectively supports the principles of good governance in the management of social funds [27].

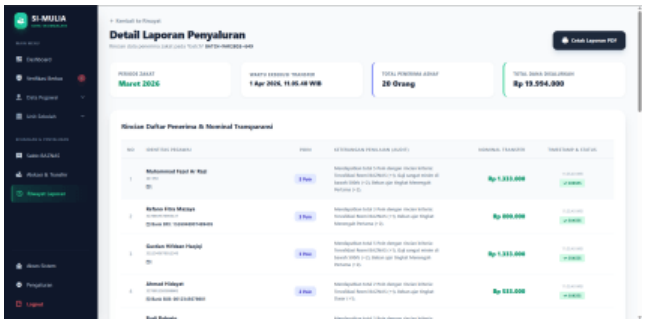

Fig. 15 Distribution Report History Page Interface Showing Distribution Batch Archives and PDF Export Features.

System access management is managed through the System/User Access Page (management-user.ejs), which allows admins to add or remove administrator and teacher accounts. This feature ensures that system access rights are always controlled and can be updated according to operational needs. Complementing the entire system infrastructure, the Algorithm Settings Page (settings.ejs) allows admins to set global variables such as the asnaf limit number and the UMK value used as a reference for calculations. This page allows the system to adapt to policy changes without requiring code modifications.

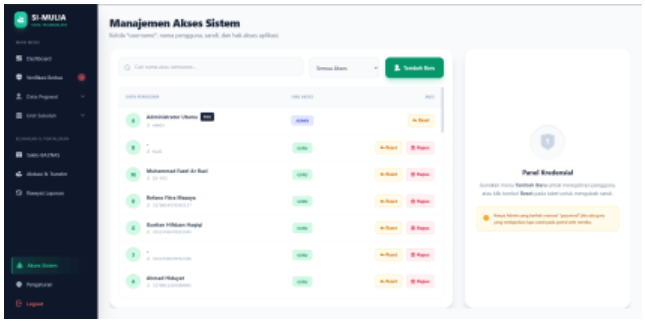

Fig. 16 User Management Page Interface Displaying Administrator and Teacher Account Access Settings.

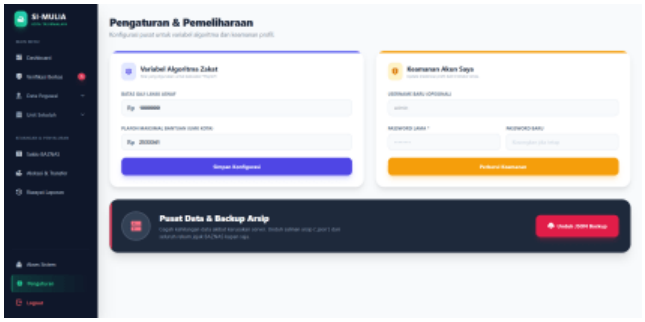

Fig. 17 Algorithm Settings Page Interface Displaying Global Variable Configuration of Asnaf Limits and UMK Values.

IV. CONCLUSION

This research successfully designed a prototype web-based Management Information System with a proportional scoring algorithm to optimize the allocation of incentive funds for honorary teachers. The developed algorithm weights four main variables (baseline points, income level, geographic location, and education level) and distributes funds proportionally to all verified teachers, with a maximum limit equal to the minimum wage (UMK).

Simulation results using dummy data indicate that the proportional scoring algorithm is able to produce a fairer distribution and better represent the gradation of real needs compared to the flat method. Algorithm consistency testing yielded 100% accuracy according to the defined rules. The system was also successfully integrated with a multilevel approval flow, timeline-based status tracking, statistical dashboard, allocation simulation, and PDF reporting, all of which collectively support process transparency and accountability.

The implications of this research are expected to serve as a reference framework for philanthropic institutions, zakat managers, or local government agencies seeking to digitize and optimize the incentive distribution process for honorary teachers. For further research, it is recommended to test the system in real institutions to measure implementation effectiveness, as well as explore the addition of new variables such as the number of dependents or length of service to improve the accuracy of distribution fairness.

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