International Journal of Computer, Network Security and Information System (IJCONSIST) ISSN: 2686-3480
Vol. 7 No. 2, Maret 2026, pp. 41-50

Enhancing Village Decision-Making through an AHP-Based Decision Support System with Centralized Database Integration

Anisa Nurul Wilda
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
Anisanurulwilda0@gmail.com

Wahyu Nofiyan Hadi
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
navoleo7@gmail.com

Moh. Fadel
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
cuexsade007@gmail.com

Arya Dwi Nugraha
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
aryadwinugraha555@gmail.com

Muhammad Ichsan
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
Ichsan29061997@gmail.com

Syifa Ayu Via Mika Bahrul
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
syifaayuvia@gmail.com

Rojil Ghufron
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
rojilghufron77@gmail.com

Olive Khoirul Lukluil Maknun Al Faishol
Data Science
Universitas Pembangunan Nasional "Veteran" Jawa Timur
Surabaya, Indonesia
olive_khoirul.sada@upnjatim.ac.id

Umi Diantika Susilowati
Informatics
Hafshawaty Zainul Hasan University
Probolinggo, Indonesia
umidiantika05@gmail.com

***Abstract*— Digital transformation at the local government level requires reliable human resources, particularly in terms of digital literacy. However, the evaluation of digital literacy is often conducted manually and subjectively, making the results less consistent and difficult to use as a basis for data driven decision making. This study aims to develop a decision support system by integrating the Analytical Hierarchy Process method with a centralized database to support village decision making. The case study was conducted in Clarak Village, Leces District. The proposed system is designed to evaluate digital literacy based on several criteria, including the ability to use digital technology, understanding of digital information, digital security and ethics, and the use of technology in work activities. The research method applies a Hybrid Waterfall SPK approach consisting of requirement analysis, system and database design, implementation, AHP integration, functional testing, validation, and usability evaluation. The centralized database is used to manage user data, criteria, weights, and evaluation results in an integrated manner. The expected result of this research is a prototype of an AHP based decision support system that can produce objective, measurable, and consistent digital literacy evaluations to support effective village level decision making.**

Keywords— decision support system; Analytical Hierarchy Process; centralized database; digital literacy; village decision making

I. INTRODUCTION

Digital transformation has become an essential agenda for public sector organizations, including local government institutions. The adoption of digital systems is expected to improve administrative efficiency, service quality, transparency, and data-driven decision-making. However,

digital transformation is not only determined by technological infrastructure, but also by the digital literacy of users who operate and manage information systems. Recent studies emphasize that digital literacy plays an important role in supporting successful digital transformation because it enables users to understand, evaluate, and apply digital technologies effectively in organizational activities[1] [2].

Digital literacy is a multidimensional capability that includes digital skills, digital competencies, digital thinking, information management, communication, safety, and problem-solving ability. Previous studies have shown that digital literacy assessment is important for identifying user readiness and improving the effectiveness of digital system implementation [3], [4]. In the context of local government, digital literacy becomes increasingly relevant because village officials are required to manage data, use digital platforms, and support administrative services through information technology. Therefore, a structured and measurable digital literacy evaluation model is needed to support better decision-making at the village level [5].

In practice, digital literacy evaluation in local institutions is often conducted manually through simple questionnaires or subjective assessments. This condition may lead to inconsistent results, limited data integration, and difficulties in using the evaluation results as a basis for decision-making. In addition, evaluation data that are stored separately may reduce data accessibility, consistency, and long-term usability. To address these problems, a decision support system is needed to process evaluation data systematically and produce objective decision recommendations[6].

The Analytical Hierarchy Process method is one of the multi-criteria decision-making methods widely used in decision support systems. This method enables decision makers to structure complex problems into hierarchical levels, compare criteria pairwise, calculate priority weights, and produce ranking results based on quantitative analysis. Several recent studies have implemented AHP in decision support systems for evaluation and selection processes, showing that AHP can support more structured, consistent, and measurable decision-making [1].

Although many studies have applied AHP in decision support systems, most of them focus on employee evaluation, product selection, or academic decision-making. Limited studies specifically integrate AHP with a centralized database for digital literacy evaluation in village-level institutions. This indicates a research gap in the development of an integrated decision support system that combines multi-criteria analysis, centralized data management, and digital literacy assessment in a local government context [7].

Previous studies have applied Decision Support Systems (DSS) and the Analytic Hierarchy Process (AHP) in various village-related decision-making contexts. For example, Yusman et al. developed an AHP-based DSS for selecting village head candidates using Super Decision software, where the main focus was the ranking of candidates based on predefined criteria. Another recent study by Aliya et al. applied a DSS using the Fuzzy AHP and Weighted Product methods to determine village development priorities in Musrenbangdes, mainly emphasizing criteria weighting and alternative ranking for development programs [8].

However, most previous DSS + AHP studies focused primarily on the calculation process and ranking results, while data management and long-term village decision documentation were not the main concern. Therefore, this study differs from previous research by integrating an AHP-based DSS with a centralized database. The centralized database is designed to store criteria, alternatives, assessment data, ranking results, and decision history in one integrated system. This integration is expected to improve data consistency, transparency, accessibility, and traceability in village decision-making processes[9].

Based on this gap, this study aims to develop an AHP-based decision support system with centralized database integration to enhance village decision-making. The case study is conducted in Clarak Village, Leces District. The proposed system evaluates digital literacy based on several criteria, including digital technology usage, digital information understanding, digital security and ethics, and technology utilization in work activities. The main contribution of this study is the development of an integrated system model that can produce objective, measurable, and consistent digital literacy evaluation results to support more effective decision-making at the village level [10].

II. LITERATURE REVIEW

A. Digital Literacy in Local Government Information Systems

Digital literacy is an essential factor in supporting the successful implementation of information systems, especially in local government institutions. It is not limited to the ability to operate digital devices, but also includes the ability to access, evaluate, manage, and use digital information effectively and responsibly [11]. Recent studies explain that digital literacy consists of several dimensions, such as digital skills, digital competence, digital thinking, information management, communication, security awareness, and problem-solving ability. In the context of local government, digital literacy is important because village officials are required to manage administrative data, operate digital platforms, and provide technology-based public services [12].

The success of digital transformation in public sector organizations is strongly influenced by the readiness of human resources. Digital transformation will not be optimal if users do not have adequate digital literacy to operate and utilize information systems. A recent study on public sector digital transformation shows that the digital literacy of government apparatus plays a significant role in supporting the effectiveness of digital-based public services. Therefore, the evaluation of digital literacy is needed to identify user readiness and to support decision-making related to system development, training, and digital service improvement [13].

B. Decision Support System for Data-Driven Decision-Making

A Decision Support System is a computer-based information system designed to assist decision makers in solving semi-structured and unstructured problems. DSS combines data, models, analytical methods, and user interfaces to produce

information that supports objective and rational decision-making. In an organizational context, the use of data in decision-making is influenced by data quality, analytical culture, and data availability [4]. Therefore, DSS is relevant for helping local government institutions process evaluation data systematically and reduce subjectivity in decision-making.

In this study, DSS is positioned as a solution to the problem of digital literacy evaluation that is still conducted manually and subjectively. Manual evaluation often causes inconsistent results and makes it difficult for decision makers to use the data as a basis for planning digital capacity improvement. By using DSS, evaluation data can be processed more systematically, stored properly, and presented in the form of measurable results. This allows village-level decision makers to obtain clearer information regarding the digital literacy condition of system users [14].

C. *Analytical Hierarchy Process in Decision Support Systems*

The Analytical Hierarchy Process is a multi-criteria decision-making method that is widely used in decision support systems. AHP works by structuring complex problems into a hierarchy consisting of goals, criteria, subcriteria, and alternatives. This method uses pairwise comparison to determine the priority weight of each criterion. Recent studies show that AHP can be implemented in web-based systems and can support decision-making involving multiple criteria and multiple users [10]. AHP is also useful because it provides a consistency mechanism through pairwise comparison. However, consistency remains an important issue in AHP-based decision-making because decision makers may provide inconsistent judgments when comparing criteria. For this reason, the use of AHP in DSS should include a consistency test to ensure that the resulting priority weights are valid and acceptable. Several recent studies have applied AHP in evaluation-based decision support systems, such as employee promotion evaluation, showing that AHP can support more structured and measurable decision-making.

D. *Centralized Database Integration*

A centralized database is an important component in the development of an integrated decision support system. Through a centralized database, user data, criteria, weights, and evaluation results can be stored in one integrated system. This approach supports data consistency, easier access, and more efficient data management. In data-driven decision-making, data quality and centralized data use are important factors that influence how organizations use data in the decision-making process [15].

In the context of this study, centralized database integration is used to support the management of digital literacy evaluation data. The system is expected to store all evaluation components, including user data, assessment criteria, AHP weights, and final evaluation results. This design allows the system to provide consistent, accurate, and accessible information for village-level decision-making. Therefore, centralized database integration strengthens the role of DSS as a data-based evaluation tool [16].

E. *Research Gap*

Previous studies have discussed digital literacy, decision support systems, and AHP separately. Digital literacy studies generally focus on conceptual frameworks, user competence, or survey-based assessment. Meanwhile, AHP-based DSS studies are commonly applied to employee evaluation, product selection, or other selection problems[17]. However, studies that specifically integrate AHP, centralized databases, and digital literacy evaluation in village-level government institutions are still limited.Based on this gap, this study proposes an AHP-based decision support system with centralized database integration to enhance village decision-making. The novelty of this study lies in the integration of multi-criteria decision-making, centralized data management, and digital literacy evaluation in one system model [6], [18]. The proposed system is expected to produce objective, measurable, and consistent evaluation results that can support decision-making at the village level. TABLE 1 presents the differences between previous DSS + AHP studies and the proposed study. The comparison shows that previous studies mainly focused on the ranking process, while this study emphasizes the integration of AHP with a centralized database to support data consistency, decision documentation, and traceability in village decision-making.

TABLE 1. Comparison of Research Contributions between Previous DSS + AHP Studies and the Proposed Study

Aspect	Previous DSS + AHP Studies	This Study
Main focus	Ranking alternatives or selecting the best candidate/program	Supporting village decision-making through AHP and centralized data management
Method	AHP, Fuzzy AHP, WP, SAW, or other ranking methods	AHP integrated with centralized database
Data management	Mostly focused on calculation and ranking	Stores criteria, alternatives, scores, ranking results, and decision history
System contribution	Helps users determine priorities	Helps users determine priorities and manage decision data in an integrated system
Decision documentation	Limited or not emphasized	Decision records can be stored and accessed for future reference
Research context	Candidate selection, development priority	Village decision-making with

Aspect	Previous DSS + AHP Studies	This Study
	ranking, or administrative selection	centralized database integration

III. RESEARCH METHOD

A. Research Design

This study uses a system engineering approach to develop a decision support system based on the Analytical Hierarchy Process and centralized database integration. The system is designed to support digital literacy evaluation and improve village-level decision-making. The research adopts a Hybrid Waterfall Decision Support System approach, which combines structured software development stages with multi-criteria decision-making mechanisms [19] [20].

The Waterfall model is used to guide the system development process, including requirement analysis, system design, implementation, testing, and evaluation. Meanwhile, the Analytical Hierarchy Process is applied as the decision-making method to determine the priority weight of each digital literacy criterion and to generate measurable evaluation results. The centralized database is used to store user data, assessment criteria, AHP weights, and evaluation results in an integrated manner [21].

B. Research Location and Object

The research was conducted in Clarak Village, Leces District, as the case study location. This location was selected because the village requires a structured and technology-based system to support digital literacy evaluation. The object of this research is the development of a decision support system that can evaluate the digital literacy level of system users in a local government institution [22].

C. Research Stages

The research stages are arranged systematically using the Hybrid Waterfall Decision Support System approach. The stages are shown in Fig. 1.

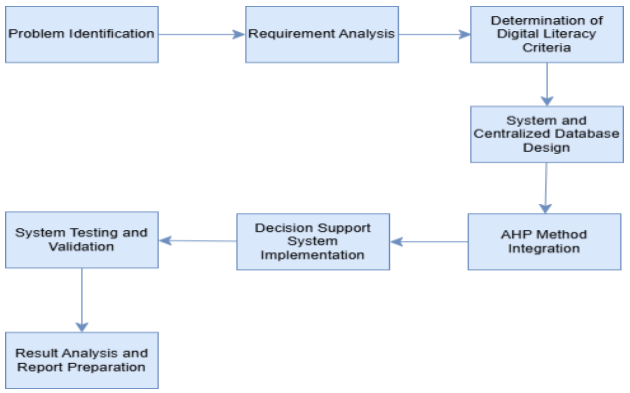

Fig. 1. Research Flow

D. Data Collection Techniques

The data collection techniques used in this study are presented in TABLE 2.

TABLE 2. Data Collection Technique

Data Type	Data Source	Collection Method
Digital literacy criteria and subcriteria	Scientific literature and system requirements	Literature study
System requirement data	Village officials and system users	Observation and interview
Digital literacy assessment data	Respondents or system users	Questionnaire
AHP pairwise comparison data	Experts and selected users	AHP questionnaire
Evaluation result data	Decision support system	System documentation

E. Research Variables

The variables in this study consist of input variables, process variables, and output variables, as shown in TABLE 3.

TABLE 3. Research Variables

Variable Type	Description	Indicators
Input variable	Data used as the basis for digital literacy evaluation	Digital technology usage, digital information understanding, digital security and ethics, technology utilization in work activities
Process variable	Data processing mechanism using AHP	Criteria weight, pairwise comparison value, consistency ratio
Output variable	Final result generated by the decision support system	Digital literacy score, ranking or category, evaluation recommendation

F. AHP Calculation Produre

The Analytical Hierarchy Process method is used to determine the weight of each digital literacy criterion. The AHP calculation procedure consists of several steps. First, the decision hierarchy is structured based on the goal, criteria,

subcriteria, and alternatives. Second, pairwise comparison matrices are created using the Saaty scale from 1 to 9. Third, the matrices are normalized to obtain the priority weight of each criterion. Fourth, consistency testing is conducted to ensure that expert judgments are logically acceptable.

The consistency test is carried out by calculating the Consistency Index and Consistency Ratio. If the Consistency Ratio value is less than or equal to 0.1, the judgment is considered consistent and can be used in the decision-making process. If the Consistency Ratio value is greater than 0.1, the pairwise comparison must be reviewed and corrected.

G. System Design

The proposed system is designed as a web-based decision support system with a centralized database architecture. Users access the system through a browser, while the server manages application logic and AHP calculations. The centralized database stores all system data, including user data, criteria data, comparison values, criteria weights, and evaluation results.

H. System Testing and Validation

System testing is conducted to ensure that the developed system works according to the specified requirements which can be seen in TABLE 4. The testing includes functional testing, AHP validation, and usability testing.

TABLE 4. System Testing Plan

Testing Type	Purpose	Expected Result
Functional testing	To ensure that each system feature works properly	All features run according to user requirements
AHP validation	To compare system calculation results with manual AHP calculation	The system produces accurate and consistent AHP results
Usability testing	To evaluate ease of use from the user perspective	The system is easy to understand and operate
Database testing	To ensure that data are stored and retrieved correctly	Data are consistent, integrated, and accessible

I. Data Abalysis Techique

Data analysis is conducted using the AHP-based decision support system. The collected data are stored in the centralized database and processed through several stages. As shown in TABLE 5, the digital literacy evaluation hierarchy is arranged. Second, the pairwise comparison matrix is calculated to obtain the priority weight of each criterion. Third, the consistency ratio is calculated to validate the expert judgment. Fourth, the final digital literacy score is calculated based on the criteria weights and respondent assessment data. The final score is classified into digital literacy categories and displayed by the system as an evaluation result. The results are then analyzed to determine the level of digital literacy and to support village-level decision-making.

TABLE 5. Pairwise Comparison Matrix

Criteria	C1	C2	C3	C4
C1. Digital Technology Usage Ability	1.00	2.00	2.00	3.00
C2. Digital Information Understanding	0.50	1.00	1.00	2.00
C3. Digital Security and Ethics	0.50	1.00	1.00	2.00
C4. Technology Utilization in Work Activities	0.33	0.50	0.50	1.00

IV. RESULT AND DISCUSSION

A. AHP Weighting Result

The AHP calculation was conducted to determine the priority weight of each digital literacy criterion. As shown in TABLE 6, the four main criteria were used in this study, namely digital technology usage ability, digital information understanding, digital security and ethics, and technology utilization in work activities. The pairwise comparison was obtained from expert assessment and processed using the AHP method.

TABLE 6. AHP Weighting Result

Criteria	Weight	Percentage	Priority
Digital Technology Usage Ability	0.424	42.4	1
Digital Information Understanding	0.227	22.7	2
Digital Security and Ethics	0.227	22.7	3
Technology Utilization in Work Activities	0.122	12.2	4
Total	**1.000**	**100**	

Based on the AHP calculation, the highest priority weight was obtained by digital technology usage ability with a weight of 0.424 or 42.4 percent. Digital information understanding and digital security and ethics each obtained a weight of 0.227 or 22.7 percent, while technology utilization in work activities obtained a weight of 0.122 or 12.2 percent. The consistency test

showed that the lambda maximum value was 4.010, the Consistency Index was 0.003, and the Consistency Ratio was 0.004. Since the Consistency Ratio value was lower than 0.10, the pairwise comparison was considered consistent and acceptable for the decision-making process.

The results of this study indicate that the AHP method can provide a structured mechanism for determining decision priorities based on weighted criteria. This finding is in line with previous studies showing that AHP is useful for multi-criteria decision-making in village governance and public administration contexts. However, the contribution of this study is not limited to producing priority rankings. The proposed system also integrates the decision-making process with a centralized database, allowing decision data to be stored, managed, and accessed systematically. This feature strengthens the transparency and accountability of village decision-making because criteria, alternatives, assessment values, and final ranking results can be documented in an integrated system.

Compared with previous DSS + AHP studies that mainly emphasized weighting and ranking, the proposed model provides an additional contribution through centralized data integration. This integration is important because village decision-making often involves repeated processes, changing alternatives, and the need for administrative documentation. Therefore, the system can support not only one-time decision-making but also continuous and traceable decision management.

B. Digital Literacy Evaluation Result

The digital literacy evaluation was tested using data from 20 respondents. Each respondent was assessed using a scale of 1 to 5. The score was then converted into a 100-point scale and multiplied by the AHP weight of each criterion. TABLE 7 is the digital literacy evaluation result. The final digital literacy score was 73.12. Based on the classification category, this score belongs to the moderate category. The result indicates that the digital literacy level of the respondents is generally sufficient, but improvement is still needed, especially in the digital security and ethics criterion, which obtained the lowest converted score of 66.00.

TABLE 7. Digital Literacy Evaluation Result

Criteria	Average Score	Converted Score	Weight	Weighted Score
Digital Technology Usage Ability	3.85	77.00	0.424	32.65
Digital Information Understanding	3.60	72.00	0.227	16.34
Digital Security and Ethics	3.30	66.00	0.227	14.98
Technology Utilization in Work Activities	3.75	75.00	0.122	9.15
Final Score				**73.12**

TABLE 8. Digital Literacy Category Distribution

Category	Score Range	Number of Respondents	Percentage
High	75–100	6	30 percent
Moderate	60–74	11	55 percent
Low	0–59	3	15 percent
Total		**20**	**100 percent**

The distribution shows that 85 percent of respondents were classified into the moderate and high categories, while 15 percent were classified into the low category. This result indicates that most users have sufficient digital literacy, but several users still require further digital training.

C. System Testing Result

System testing was conducted through functional testing, AHP validation, database testing, and usability testing. The functional testing involved 20 test scenarios covering login, user management, criteria management, AHP calculation, evaluation result display, and recommendation output. TABLE 9 is the system testing result.

TABLE 9. System Testing Result

Testing Aspect	Number of Test Cases	Successful Test Cases	Success Rate
Login and user management	3	3	100 percent
Criteria management	4	4	100 percent
AHP pairwise comparison	4	4	100 percent
AHP weight calculation	3	3	100 percent
Evaluation result display	3	3	100 percent
Recommendation output	3	3	100 percent
Total	**20**	**20**	**100 percent**

The result of functional testing showed that all 20 test scenarios were successfully executed. This means that the system achieved a functional success rate of 100 percent. The AHP validation was conducted by comparing the calculation results generated by the system with manual calculation. The system produced a final score of 73.12, while the manual calculation also produced a final score of 73.12. Therefore, the difference between system calculation and manual calculation was 0.00. This result indicates that the AHP calculation module works accurately.

TABLE 10. AHP Validation Result

Calculation Type	Final Score	Difference
Manual calculation	73.12	0.00
System calculation	73.12	0.00

Database testing was conducted using 100 data records consisting of user data, criteria data, AHP weight data, and evaluation result data. The test showed that all data could be stored, retrieved, updated, and displayed correctly. The database testing success rate was 100 percent.

D. Usability Testing Result

As shown in TABLE 11, the usability testing was conducted using 10 questionnaire items with 20 respondents. Each item was assessed using a Likert scale from 1 to 5. The maximum score was 1000, obtained from 20 respondents multiplied by 10 items and 5 as the highest score. The total score obtained from respondents was 862.

TABLE 11. Usability Testing Result

Assessment Component	Score
Number of respondents	20
Number of questionnaire items	10
Maximum score	1000
Obtained score	862
Usability percentage	86.2 percent
Category	Very Good

The usability testing result showed a score of 86.2 percent, which belongs to the very good category. This indicates that the system is easy to understand, easy to operate, and suitable for supporting digital literacy evaluation at the village level. The numerical results show that the proposed system can support digital literacy evaluation objectively and measurably. The AHP calculation produced a Consistency Ratio of 0.004, which is lower than the maximum threshold of 0.10. This proves that the expert judgment used in the pairwise comparison was consistent and acceptable.

The final digital literacy score of 73.12 indicates that the respondents are in the moderate category. The highest contribution came from digital technology usage ability with a weighted score of 32.65, while the lowest criterion was digital security and ethics with a converted score of 66.00. This finding suggests that digital security and ethics should become the main priority for future digital literacy improvement programs.

The functional testing result showed a success rate of 100 percent, meaning that all system features worked according to the requirements. The AHP validation result also showed no difference between manual calculation and system calculation. In addition, the usability testing score of 86.2 percent indicates that the system is acceptable and easy to use by users. Overall, the integration of AHP and centralized database in the proposed decision support system provides a structured, objective, and data-driven approach for village decision-making. The system not only produces digital literacy scores, but also provides categories and recommendations that can be used as a basis for planning training and improving digital capability at the village level.

V. CONCLUSION

This study developed an AHP-based Decision Support System integrated with a centralized database to support village decision-making. The system assists users in determining decision priorities through structured criteria weighting and alternative ranking. In contrast to previous DSS + AHP studies that mainly focused on ranking alternatives, this study adds centralized database integration to support data consistency, decision documentation, transparency, and future data retrieval.

However, this study has limitations. The number of respondents was still relatively small, and the implementation was limited to one village. These limitations may affect the generalizability of the findings. Therefore, future studies are recommended to involve a larger number of respondents, include multiple villages, and compare the proposed model with other decision-making methods such as Fuzzy AHP, TOPSIS, SAW, or hybrid DSS models.

This study developed an AHP-based Decision Support System integrated with a centralized database to enhance village decision-making, particularly in evaluating digital literacy in Clarak Village, Leces District. The system was designed to overcome the limitations of manual evaluation, which tends to be subjective, inconsistent, and not integrated with structured data management. The development process followed the Hybrid Waterfall Decision Support System approach, while the Analytical Hierarchy Process method was applied to determine the priority weight of each digital literacy criterion. This is in line with the research objective to develop a centralized database-based decision support system by integrating the AHP method for objective and measurable digital literacy evaluation.

Based on the AHP calculation, the highest priority criterion was digital technology usage ability with a weight of 0.424 or 42.4 percent, followed by digital information understanding with 0.227 or 22.7 percent, digital security and ethics with 0.227 or 22.7 percent, and technology utilization in work activities with 0.122 or 12.2 percent. The consistency test produced a Consistency Ratio value of 0.004, which is lower than the maximum threshold of 0.10. This result indicates that

the pairwise comparison matrix was consistent and acceptable for the decision-making process.

The digital literacy evaluation involving 20 respondents produced a final score of 73.12, which falls into the moderate category. The distribution of respondents showed that 6 respondents or 30 percent were in the high category, 11 respondents or 55 percent were in the moderate category, and 3 respondents or 15 percent were in the low category. These results indicate that most respondents have sufficient digital literacy, although improvement is still needed, especially in the digital security and ethics criterion, which obtained the lowest converted score of 66.00.

The system testing results showed that all 20 functional test scenarios were successfully executed, resulting in a functional success rate of 100 percent. The validation of AHP calculation also showed no difference between manual calculation and system calculation, with a difference value of 0.00. In addition, usability testing involving 20 respondents and 10 questionnaire items produced a usability score of 86.2 percent, which is categorized as very good. These results indicate that the proposed system is accurate, functional, and easy to use.

Overall, the integration of AHP and a centralized database provides a structured, objective, and data-driven decision support model for village-level digital literacy evaluation. The system can generate evaluation scores, categories, and recommendations that can be used as a basis for planning digital training and improving the digital competence of village officials. Future research may expand the system by involving more respondents, adding more digital literacy indicators, and implementing the system in other villages to test its scalability and broader applicability.

VI. REFERENCES

[1] J. Arnaud, H. São Mamede, and F. Branco, "The relationship between digital transformation and digital literacy - an explanatory model: Systematic literature review," *F1000Res*, vol. 13, p. 253, Apr. 2024, doi: 10.12688/f1000research.146991.1.

[2] I. Rodiyah and Z. O. Bolanitan, "Enhancing Digital Literacy in Village Government for Effective SID Program Implementation," *IJPPR*, vol. 24, Jan. 2024, doi: 10.21070/ijppr.v24i0.1335.

[3] R. Rismayani, H. Sy, H. Herlinda, St. N. N. Mz, and F. Tulwahdah, "Implementasi Analytical Hierarchy Proses Pada Sistem Pendukung Keputusan Pemilihan Beras Berkualitas," *Komputika*, vol. 13, no. 1, pp. 93–101, Apr. 2024, doi: 10.34010/komputika.v13i1.11423.

[4] D. Peng and Z. Yu, "A Literature Review of Digital Literacy over Two Decades," *Education Research International*, vol. 2022, pp. 1–8, May 2022, doi: 10.1155/2022/2533413.

[5] Dian Pratama, Eny Haryati, and Dian Ferriswara, "Digitization of Population Administration Services : Analysis of the Need to Improve Digital Literacy of Village Government Apparatus," *Parlementer*, vol. 2, no. 1, pp. 26–39, Feb. 2025, doi: 10.62383/parlementer.v2i1.507.

[6] A. Akmaludin, A. D. Suriyanto, N. Iriadi, T. Sukendar, and B. Santoso, "AHP-SMART Method as Evaluation Decision Support for Employee Promotion," *SinkrOn*, vol. 7, no. 2, pp. 341–350, Feb. 2022, doi: 10.33395/sinkron.v7i1.11228.

[7] E. Atar, F. Güler, and Y. Usta, "Digital transformation in local governance: a study on opportunities and challenges in Türkiye," *Transforming Government: People, Process and Policy*, vol. 19, no. 4, pp. 725–747, Nov. 2025, doi: 10.1108/TG-03-2025-0053.

[8] P. Sijabat, "Decision Support System for Determining the Village Secretary Using the Analytic Hierarchy Process Method in the Village of Kubah Sentang Pantai Labu," *JICT*, vol. 13, no. 2, pp. 59–71, Oct. 2022, doi: 10.35335/jict.v11i2.16.

[9] I. N. Z. Aliya, R. Hadiwiyanti, and R. Permatasari, "Determination of Village Development Priorities Based on Decision Support System Using the FAHP-WP Method," *JITU*, vol. 7, no. 2, pp. 69–80, Dec. 2024, doi: 10.56873/jitu.7.2.5887.

[10] D. Iswanto, M. Miskan, D. Elani Putri Zohandy, and W. Siti Solikha, "Public Sector Digital Transformation: Analysis of Digital Literacy of Government Apparatus in Kepatihan Village, Menganti District, Gresik Regency," *JPAP*, vol. 10, no. 2, pp. 134–146, Sep. 2024, doi: 10.30996/jpap.v10i2.11732.

[11] F. Topaloğlu and E. Bozbay Korkmaz, "Desıgnıng AHP Based Decısıon Support System: E-Commerce Sıte Selectıon," *NATURENGS MTU Journal of Engineering and Natural Sciences Malatya Turgut Ozal University*, May 2024, doi: 10.46572/naturengs.1478408.

[12] H. Tinmaz, Y.-T. Lee, M. Fanea-Ivanovici, and H. Baber, "A systematic review on digital literacy," *Smart Learn. Environ.*, vol. 9, no. 1, p. 21, Dec. 2022, doi: 10.1186/s40561-022-00204-y.

[13] I. Isabella, E. Agustian, T. Baharuddin, and A. H. H. Ibrahim, "Bridging e-government with digital literacy: A literature review," *JGR*, vol. 14, no. 1, special issue, p. 361, Feb. 2025, doi: 10.22495/jgrv14i1siart12.

[14] A. K. AbdulKareem and K. A. Oladimeji, "Cultivating the digital citizen: trust, digital literacy and e-government adoption," *TG*, vol. 18, no. 2, pp. 270–286, May 2024, doi: 10.1108/TG-11-2023-0196.

[15] Á. Szukits and P. Móricz, "Towards data-driven decision making: the role of analytical culture and centralization efforts," *Rev Manag Sci*, vol. 18, no. 10, pp. 2849–2887, Oct. 2024, doi: 10.1007/s11846-023-00694-1.

[16] B. Deta and S. M. I. Bedanaen, "Comparison of SAW, AHP, and TOPSIS Methods in a Decision Support System for Teacher Performance Evaluation," *RH*, vol. 5, no. 5, pp. 1995–2008, Oct. 2025, doi: 10.54518/rh.5.5.2025.798.

[17] R. V. Françozo *et al.*, "A web-based software for group decision with analytic hierarchy process," *MethodsX*, vol.

11, p. 102277, Dec. 2023, doi: 10.1016/j.mex.2023.102277.

[18] S. Carpitella, V. Kratochvíl, and M. Pištěk, "Multi-criteria decision making beyond consistency: An alternative to AHP for real-world industrial problems," *Computers & Industrial Engineering*, vol. 198, p. 110661, Dec. 2024, doi: 10.1016/j.cie.2024.110661.

[19] I. Lidyawati, R. W. Astuti, and S. Puspitorini, "Implementation of the Analytical Hierarchy Process Method for the Muaro Jambi Community Health Center Service Performance Assessment System," *JABT*, vol. 5, no. 2, pp. 82–89, May 2024, doi: 10.35145/jabt.v5i2.153.

[20] D. Ramadhan and L. Marlinda, "Decision Support System for selecting study programs using the AHP method," *SinkrOn*, vol. 7, no. 4, pp. 2547–2555, Oct. 2022, doi: 10.33395/sinkron.v7i4.11821.

[21] S. Nurhidayarnis, A. Putri, R. Z. I. Z. Ismail, M. D. B. Ginting, and W. L. Nurrafa, "Implementation of Analytic Hierarchy Process Method In the Decision Support System for Selecting Department in University," *IJATIS*, vol. 1, no. 2, pp. 103–111, Sep. 2024, doi: 10.57152/ijatis.v1i2.1138.

[22] A. Akmaludin, A. D. Suriyanto, N. Iriadi, B. Santoso, and T. Sukendar, "Decision Support System for SmartPhone Selection with AHP-VIKOR Method Recommendations," *SinkrOn*, vol. 8, no. 2, pp. 657–665, Apr. 2023, doi: 10.33395/sinkron.v8i2.11845.

This page is intentionally left blank