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# Development of an Evaluation Results Management System to Improve Learning Effectiveness

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**A B S T R A K**

This study developed a learning evaluation results management system designed to strengthen the effectiveness of classroom assessment and data-informed instructional decision-making in elementary education. Conventional evaluation practices often rely on fragmented score recording, manual calculation, delayed reporting, and limited use of assessment evidence for remedial or enrichment planning. To address these limitations, this study employed a Research and Development design using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. A mixed-methods approach was applied to integrate expert validation data, user responses, implementation observations, and learning outcome evidence. The developed system includes six integrated features: student score input, automatic score processing, graphical visualization of learning outcomes, individual progress reports, follow-up recommendations, and digital documentation. Expert validation results indicated that the system was highly feasible, with an overall validity score of 88.33%, including content feasibility, media display, and ease of use. Implementation findings showed that the system helped teachers manage evaluation data more efficiently, reduce manual administrative work, identify student mastery patterns, and provide clearer feedback to students. The system also supported more accurate instructional follow-up by distinguishing students who required remedial support from those ready for enrichment activities. These findings demonstrate that evaluation management systems can move beyond administrative scoring functions and become pedagogical tools for continuous learning improvement. This study contributes to the development of digital assessment and learning analytics by offering a practical, teacher-oriented system that connects assessment data, feedback, and instructional action in a coherent evaluation framework within a practical elementary school learning context.

**Keywords:** Effectiveness, Evaluation, Learning, Management, Development, System.



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## A. Introduction

The digital transformation in education has transformed the way teachers design, implement, and evaluate learning. Evaluation is no longer understood solely as an administrative activity to assign final grades, but as a pedagogical process that helps teachers more accurately assess students' learning progress. In the context of modern learning, evaluation data can be a crucial basis for determining remedial strategies, enrichment, and differentiation of learning, as well as providing faster feedback. Learning analytics and digital evaluation systems are increasingly used because they can collect, process, visualize, and interpret learning data more systematically (Masiello et al., 2024; Pan et al., 2024 ; Hakim, 2025) . Therefore, digital-based evaluation data management is crucial so that the learning process is not only based on teacher intuition but also supported by measurable evidence of learning.

Despite the growing demand for data-driven evaluation, many educational institutions still manage evaluation results manually and separately from the learning decision-making process. Teachers typically record grades, calculate averages, determine completion rates, and compile individual student progress reports through simple, unintegrated documents or spreadsheets. This can lead to delays in providing feedback, difficulties in understanding student learning patterns, and limited use of evaluation data to improve teaching strategies. In the context of elementary education, this issue is even more critical because teachers need to understand student progress quickly, concretely, and individually so that subsequent learning activities are aligned with students' needs. Studies on learning analytics in K–12 education also show that analytical technology has the potential to support more equitable, individualized, and assessment-based learning, but still face challenges in terms of evidence of effectiveness, privacy, and teachers' ability to interpret the data (Paolucci et al., 2024 ; Afifah et al., 2025; Saidah & Muhid, 2025) . Thus, effective management of evaluation results is not enough to just store grades, but must help teachers transform data into actionable pedagogical information.

The urgency of developing an evaluation results management system is growing because effective learning depends heavily on teachers' ability to interpret learning evidence and respond to it through appropriate learning actions. Good formative evaluation requires teachers to identify student achievement, understand learning difficulties, provide feedback, and adapt instructional strategies based on actual classroom needs (Hopfenbeck et al., 2023; OECD, 2025 ; Widyanti et al., 2025) . Without a system that supports rapid data processing, teachers risk delays in providing interventions to struggling students. This delay can widen learning gaps because students who have not yet completed the course do not receive appropriate support immediately. Recent research also emphasizes that digital assessment data can help teachers provide more targeted formative feedback if they have access to clear, easy-to-read information that is relevant to learning decisions (Ackerlauer et al., 2026 ; Liani et al., 2025) . Therefore, an evaluation results management system needs to be developed as a tool that connects assessment, feedback, and continuous learning improvement.

The rationale for the importance of this research lies in the need to shift the evaluation function from simply recording grades to a data-driven learning decision-making mechanism. A well-designed evaluation system can help teachers input grades, calculate completion, display learning progress graphs, compile individual reports, and provide recommendations for follow-up learning. These functions are relevant to the concept of actionable learning analytics, namely learning analytics that go beyond data presentation but provide information that can be directly used by teachers and students to improve the learning process (Kennedy et al., 2025 ; Sinaga, 2025) . However, digital systems in education should not only emphasize the technological aspect, because their success is largely determined by the alignment between system design, user needs, classroom context, and pedagogical objectives. Studies of human-centered learning analytics show that teacher and student involvement in system design is crucial to ensure the trustworthiness, security, usefulness, and relevance of learning technology (Alfredo et al., 2024 ; Wrahatnolo et al., 2026) . Therefore, the development of an evaluation results management system needs to be directed at a design that is simple, can be used by teachers, and really helps improve the effectiveness of learning.

Previous studies have shown that learning analytics, learning dashboards, and digital feedback systems have been extensively researched in relation to improving learning quality. Banihashem et al. (2022) demonstrated that learning analytics can strengthen feedback practices in technology-based learning environments, particularly when the available data helps educators and students understand learning progress. Khor and Neo (2023) found that learning analytics can support personalized learning through collecting student progress data, classifying learning needs, predicting outcomes, visualizing classroom dynamics, and

strengthening feedback loops. Pan et al. (2024) also emphasized that learning analytics-based interventions in learning management systems can provide important insights for learning design, although their effectiveness depends on the quality of the design and the context of implementation. Furthermore, Paulsen and Lindsay (2024) demonstrated that learning analytics dashboards are shifting from simply presenting data to more learning-centered designs. Further findings from Chen (2024) suggest that learning analytics-based feedback can improve learning regularity, online activity completion, and student academic achievement in blended learning contexts. The dominance of these findings shows that digital evaluation systems have strong potential to improve learning if the data produced is easy to understand, relevant, and immediately usable for pedagogical action.

However, previous research still leaves a number of limitations that need to be addressed through the development of more contextual systems. Most learning analytics studies still focus on higher education, learning management systems, or online learning environments, while studies specifically developing simple systems for managing evaluation results at the elementary school level are more limited (Paolucci et al., 2024; van Kessel et al., 2025). Several studies also show that learning dashboards are often robust in their data visualization, but not always sufficient to assist teachers in linking data to remedial decisions, enrichment, or improvement of instructional strategies (Masiello et al., 2024; Paulsen & Lindsay, 2024). Furthermore, the development of evaluation technology often faces challenges such as low teacher data literacy, the risk of data misinterpretation, limited evidence of impact on learning outcomes, and a lack of attention to real-world classroom contexts (Alfredo et al., 2024; Paolucci et al., 2024). This gap highlights the need for research that not only describes the importance of digital evaluation but also develops evaluation results management systems that are practical, easy-to-use, and oriented toward learning follow-up. Therefore, the research gap in this study lies in the limited development of evaluation results management systems that integrate grade input, automated processing, results visualization, student progress reports, and learning action recommendations within a single framework for improving learning effectiveness.

Based on these gaps, this study aims to develop a learning evaluation results management system that can help teachers process, analyze, visualize, and utilize evaluation data more effectively. Specifically, this research is directed at producing a system that includes features for inputting grades, automatic grade processing, graphical presentation of learning outcomes, student progress reports, and recommendations for follow-up in the form of remedial or enrichment programs. The theoretical contribution of this research lies in strengthening the study of data-based learning evaluation, particularly in connecting the concepts of formative evaluation, learning analytics, and learning decision-making. Its practical contribution lies in providing a system that can help teachers expedite the processing of evaluation results, understand student needs, provide more timely feedback, and develop evidence-based learning strategies. This research is also expected to form the basis for the development of a learning evaluation system that is more adaptive, simple, and tailored to school needs. Thus, the evaluation results management system is positioned not only as an assessment administration tool, but also as a pedagogical instrument to continuously improve learning effectiveness.

## B. Method

### a. Research Design

This study employed a Research and Development design with a mixed methods approach. This design was chosen because the research aimed to produce a product in the form of a learning evaluation results management system while simultaneously testing the feasibility, practicality, and effectiveness of the system in a learning context. The development model used was ADDIE, which consists of five stages: analysis, design, development, implementation, and evaluation. The ADDIE model is considered relevant because it provides a systematic workflow starting from identifying user needs, system design, prototype development, limited implementation, and product evaluation. In educational technology research, user needs-based development design is important so that the resulting product is not only technically feasible but also appropriate to the pedagogical context and practical needs of teachers in the classroom (Tinoca et al., 2022; Wiley et al., 2024 ; Ulya et al., 2023) . The mixed methods approach was used because this study required quantitative data, such as validation scores, practicality, and learning outcomes, as well as qualitative data, such as teacher responses, validator suggestions, and observations of system use.

b. **Location and Time of Research**

This research was conducted in an elementary school that needed a more systematic and data-driven management of learning evaluation results. The research location was chosen because teachers still face challenges in recording grades, processing evaluation results, preparing student progress reports, and providing prompt learning follow-up. The research was conducted over one semester to ensure all stages of ADDIE could be fully implemented, from needs analysis to system evaluation. The research period included preparation, data collection, system design, expert validation, product revision, limited trials, and analysis of implementation results. The elementary school context was chosen because at this level, teachers need to monitor student learning progress individually, making an easy-to-use evaluation system that presents data clearly crucial. System development in the elementary education context is also relevant to studies of learning analytics in K–12, which emphasize the need for data-driven systems to help teachers make more informed learning decisions (Paolucci et al., 2024; Rundquist et al., 2024).

c. **Population and Sample or Participants**

The population of this study was elementary school teachers and students involved in the learning evaluation process. Participants were selected using a purposive sampling technique, which is the selection of participants based on their direct involvement in the use of the evaluation results management system. The main participants consisted of classroom teachers as system users, students as subjects of learning evaluation, and expert validators consisting of learning media experts, educational evaluation experts, and learning material experts. Inclusion criteria for teachers were having experience in conducting learning evaluations, managing student grades, and being willing to use the system during the trial phase. Inclusion criteria for students were participating in the learning process in the classroom where the system was implemented and having evaluation data before and after system use. Participants who did not participate in the entire implementation process or had incomplete evaluation data were not included in the final analysis. The choice of purposive sampling was deemed appropriate because development research requires participants who are relevant to the product's needs, not randomly selected respondents without a direct connection to the system being developed.

d. **Research Instruments**

The research instruments used included a needs analysis sheet, an expert validation sheet, a teacher practicality questionnaire, a student response questionnaire, a learning outcome test, an interview guide, a system usage observation sheet , and evaluation result documentation. The needs analysis sheet was used to identify problems faced by teachers in managing learning evaluation results, the types of data needed, the expected report formats, and the required system features. The expert validation sheet was used to assess the system's feasibility in terms of content, interface appearance, ease of use, feature clarity, graphic readability, and suitability of the system to learning evaluation needs. The teacher practicality questionnaire was used to assess the efficiency of system use, ease of value input, data processing speed, the usefulness of learning outcome graphs, and the benefits of student progress reports. The student response questionnaire was used to determine the extent to which learning outcome reports and feedback provided by teachers through the system were easily understood by students. The learning outcome test was used to compare student achievement before and after system use. The interview guide and observation sheet were used to obtain qualitative data regarding teacher experiences, obstacles to system use, and suggestions for product improvements. The preparation of the instrument refers to the principles of developing educational instruments which emphasize the suitability of indicators, measurability of items, readability of statements, and relevance to research objectives (Vargas et al., 2024).

e. **Validity and Reliability of Instruments**

The instrument's validity was tested through content validity, involving experts with expertise in learning evaluation, instructional media, and educational technology. The experts were asked to assess each instrument item based on relevance, clarity, construct representation, and suitability for the research objectives. The expert assessment results were analyzed using a content validity index, such as Aiken's V, to determine whether the instrument items were valid, needed revision, or were unsuitable for use. Content validity techniques are important because development research instruments must be able to represent the constructs being measured and be appropriate to the context of product use (Kania et al., 2024). After the instrument was declared content valid, the practicality and user response questionnaires were pilot tested to check readability

and response consistency. The reliability of the questionnaire was analyzed using Cronbach's alpha to determine the internal consistency of the instrument items. Good reliability values indicate that the instrument has adequate measurement stability, although interpretation of Cronbach's alpha still needs to consider the number of items, respondent characteristics, and measurement context (Edelsbrunner et al., 2025).

f. **Data Collection Procedures**

The data collection procedure was carried out in accordance with the ADDIE stages. In the analysis stage, researchers conducted initial observations, teacher interviews, and reviewed evaluation documents to identify real-world problems in managing learning evaluation results. Data collected at this stage were used to determine system requirements, key features, and the reporting formats required by teachers. In the design stage, researchers developed a system plan that included user flow, menu structure, grade input format, automated processing, graphic visualization, student progress reports, and recommendations for follow-up learning. In the development stage, the system design was developed into a prototype, which was then validated by media experts, evaluation experts, and content experts. Input from validators was used to revise the system's appearance, features, instruction language, and completeness of functions. In the implementation stage, the system was tested on teachers and students in a real-life learning process. In the evaluation stage, researchers collected validation data, practicality, user responses, observations, interviews, and student learning outcomes to assess the system's final quality. This step-by-step procedure is in accordance with the principles of development research which places the design, trial, revision, and evaluation processes as important parts in producing educational products that are suitable for use (Tinoca et al., 2022; Cela-Ranilla et al., 2025).

g. **Data Analysis Techniques**

Quantitative data were analyzed using descriptive and inferential statistics. Expert validation and system practicality data were analyzed by calculating the average score, feasibility percentage, and interpretation categories, such as very valid, valid, fairly valid, less valid, or invalid. User response data were analyzed through percentages and mean scores to determine the level of teacher and student acceptance of the system. Learning outcome data were analyzed by comparing scores before and after system use. Normality testing was performed using the Shapiro–Wilk test to determine whether the data were normally distributed. If the data were normally distributed, score differences were analyzed using a paired sample t-test, while if the data were not normally distributed, the Wilcoxon signed-rank test was used. Learning outcome improvements were analyzed using N-Gain to determine low, medium, or high improvement categories. Quantitative analysis can be performed using SPSS, JASP, Jamovi, or other relevant statistical software with a significance level of 0.05. The use of this quantitative analysis is important so that claims of system effectiveness are not only based on user perceptions but also supported by measurable learning outcome data.

Qualitative data were analyzed through data reduction, coding, categorization, the formation of themes, and drawing conclusions. Qualitative data were obtained from teacher interviews, observation notes, validator comments, and open-ended user responses. During the data reduction stage, researchers selected information relevant to system feasibility, ease of use, implementation barriers, and system benefits for the learning evaluation process. Next, the data were coded into several categories, such as feature requirements, report readability , grade processing efficiency, graphic clarity, feedback benefits, and recommendations for follow-up learning. The results of the qualitative analysis were then compared with the results of the quantitative analysis to gain a more comprehensive understanding of system quality. Mixed methods data integration was carried out by linking validation scores, learning outcomes, user responses, and interview findings, so that research conclusions were not solely based on numbers but also considered the real experiences of users. This integration aligns with the human-centered learning analytics approach, which emphasizes the importance of user engagement, data clarity, and the system's relevance to pedagogical needs (Alfredo et al., 2024; Wiley et al., 2024).

h. **Research Ethics**

This research was conducted with adherence to the principles of academic ethics, data confidentiality, and participant protection. Prior to data collection, the researcher requested permission from the school and explained the purpose, procedures, benefits, and potential risks of the research to the teachers and students involved. Teacher and student participation was voluntary and based on explicit consent. The identities of the school, teachers, and students were kept confidential through the use of codes or initials in all research documents. Student evaluation data were used solely for research purposes and were not published in a form

that could identify specific individuals. The researcher also ensured that the use of the system did not disrupt regular learning activities and did not harm students. This principle is crucial because research based on digital systems and evaluation data is directly related to privacy, data security, and user trust in educational technology. Recent studies on learning analytics emphasize that privacy, security, user control, and trust must be primary concerns in the development of educational data-driven systems (Alfredo et al., 2024; Paolucci et al., 2024).

## C. Results and Discussion

### a. Result

This section presents the results of the development of a learning evaluation results management system designed to assist teachers in managing, analyzing, and utilizing evaluation data more effectively. The research results are organized based on the system development stages: needs analysis, system specifications, expert validation, system implementation, and the system's contribution to learning effectiveness. The presentation of the results focuses on data obtained from the system design, validation results, key features, and the findings of the use trials. Thus, this section not only demonstrates the successful development of the system but also explains how the system functions as a data-driven learning evaluation tool.

#### 1. Results of Learning Evaluation Management Needs Analysis

The needs analysis results indicate that the management of previous learning evaluation results still faces several major obstacles. Teachers still need a system capable of assisting with the process of recording grades, processing data, compiling reports, and providing follow-up learning in a faster and more structured manner. Manual grade management has the potential to cause delays in assessing student learning progress, especially when teachers must process various types of assessments, such as assignments, daily assessments, projects, mid-term exams, and final exams. Furthermore, evaluation data that has not been digitally documented makes it difficult for teachers to observe patterns of student learning achievement, both individually and as a class. These findings form the basis for developing a learning evaluation results management system that functions not only as a grade administration tool but also as a support for learning decision-making.

Based on these needs, the system was developed to include several key functions: student grade input, automatic grade processing, graphical presentation of learning outcomes, student progress reports, follow-up recommendations, and data storage and documentation. Each feature is designed to allow teachers to more easily access evaluation results and use the data to improve learning strategies. With this system, teachers no longer need to manually process grades, as the system can automatically calculate average grades, completion percentages, and classification of learning outcomes. The system also allows evaluation results to be displayed in reports and graphs, making them easier for teachers, students, and schools to understand.

#### 2. Specifications of the Learning Evaluation Results Management System

The development results indicate that the learning evaluation results management system has six key, integrated features. These features are designed to address teachers' needs in managing evaluation data, from grade input to learning follow-up. Detailed system specifications are presented in Table 1.

**Table 1.** Specification of the Learning Evaluation Result Management System

| No. | System Features | Function Description | Users | Output Generated |
|---|---|---|---|---|
| 1 | Student Grade Input | Teachers enter student grades based on subject, type of assessment, and cognitive, affective, and psychomotor aspects. | Teacher | Student grade data is stored in a database. |
| 2 | Automatic Value Processing | The system calculates the average value, percentage of learning completion, and classification of completion or incomplete automatically. | System | Recap of grades per student and per class. |
| 3 | Presentation of Learning Outcome Graphs | The system displays evaluation results in the form of bar or line graphs to facilitate analysis of learning progress. | Teachers and students | Average value graph and learning completion graph. |
| 4 | Student Progress Report | The system generates individual student learning progress reports based on evaluation results. | Teachers and parents | Student learning progress report. |
| 5 | Follow-up Recommendations | The system provides remedial or enrichment recommendations based on | Teacher | Recommendations for follow-up |

| | | | | |
|---|---|---|---|---|
| | | student evaluation results. | | learning. |
| 6 | Data Storage and Documentation | The system stores all evaluation data as digital archives that can be accessed again. | Admin and teachers | Digital archive of learning evaluation data. |

Table 1 shows that the developed system not only functions to record grades but also provides a more comprehensive evaluation management flow. The grade input feature forms the basis for data collection, while automated processing helps teachers obtain a summary of learning outcomes without time-consuming manual calculations. The graphical presentation of learning outcomes strengthens the analysis function because teachers can visually read student progress. Student progress reports provide more targeted information for teachers and parents, while follow-up recommendations help teachers determine whether students need remedial or enrichment programs. With digital storage, evaluation data can also be documented more securely and easily traced.

## 3. Expert Validation Results of the System

Expert validation was conducted to assess the system's feasibility before use in the learning process. Validation focused on three main aspects: content feasibility, media presentation, and ease of use. Validation results showed that all aspects achieved a feasibility percentage above 85%, placing the system in the highly valid and usable category. Details of the validation results are presented in Table 2.

**Table 2.** Expert Validation Results of the Evaluation Management System

| No. | Validation Aspects | Eligibility Percentage | Category |
|---|---|---|---|
| 1 | Content suitability | 88% | Very valid |
| 2 | Media display | 90% | Very valid |
| 3 | Ease of use | 87% | Very valid |
| | Overall average | 88.33% | Very valid |

Table 2 shows that the media display aspect achieved the highest percentage, namely 90%. This result indicates that the system has a display design that is considered clear, easy to read, and in accordance with user needs. The content appropriateness aspect achieved a percentage of 88%, which means the features and information in the system are in accordance with the needs of managing learning evaluation results. The ease of use aspect achieved a percentage of 87%, which indicates that the system is quite easy to use by teachers in inputting data, reading evaluation results, and accessing student progress reports. The overall average of 88.33% indicates that the system is in the very valid category and can proceed to the trial use stage.

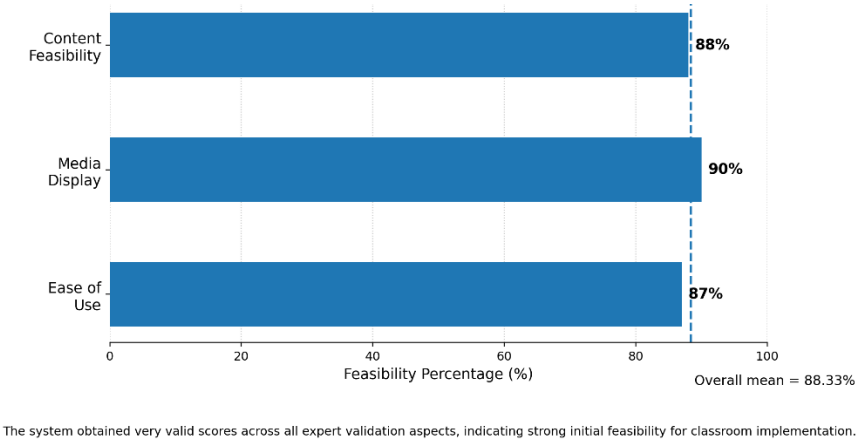


**Figure 1.** Expert Validation Results of the Evaluation Management System

Figure 1 shows a comparison of validation results across the three main aspects of the system. Media display received the highest score, while ease of use received a slightly lower score than the other two aspects. This difference indicates that although the system has been deemed highly valid, the ease of use aspect still needs attention to make the system simpler, more intuitive, and easier for teachers to use. Overall, this graph confirms that the system has met the initial product feasibility standards and can be used in the learning process after minor improvements based on validator feedback.

## 4. Results of System Implementation in Learning Evaluation Management

The results of the system's trial use indicate that it helps teachers manage evaluation results more

quickly, in a structured, and easily analyzed manner. Teachers can enter student grades based on the type of assessment used in the lesson. Once the data is entered, the system can assist in automatic score processing, eliminating the need for teachers to manually calculate averages and completion rates. The system also generates graphs and reports that make it easier for teachers to monitor student learning progress. This makes the evaluation process more efficient because learning outcome data can be directly used to determine follow-up learning.

Implementation findings also indicate that the system helps teachers identify students who have achieved mastery and those who still need assistance. Data presented in recaps and graphs allows teachers to more clearly see patterns of student learning outcomes. Students who have not achieved mastery can be directed to remedial classes, while students who have achieved good results can be provided with enrichment programs. The availability of student progress reports also helps teachers provide more targeted feedback. A summary of the system implementation results is presented in Table 3.

**Table 3.** Implementation Results of the Evaluation Management System

| No. | Implementation Aspects | Key Findings | Impact on Learning |
|---|---|---|---|
| 1 | Value management | It is easier for teachers to enter and save student grade data. | Evaluation administration becomes more orderly and documented. |
| 2 | Data processing | The system helps to calculate the average value and learning completion automatically. | The processing time for evaluation results becomes more efficient. |
| 3 | Analysis of learning outcomes | Teachers can read the evaluation results through recaps and graphs. | Identifying students' strengths and weaknesses becomes easier. |
| 4 | Feedback | Evaluation results can be conveyed to students more clearly. | Students find it easier to understand their achievements and aspects that need improvement. |
| 5 | Follow-up learning | The system supports remedial and enrichment recommendations. | Advanced learning strategies become more targeted. |
| 6 | Evaluation documentation | Data is stored in digital archives. | Evaluation data is more easily retrievable for ongoing monitoring. |

Table 3 shows that the use of the system has had a positive impact on several important aspects of managing learning evaluations. The system helps teachers reduce the administrative burden previously handled manually. Furthermore, faster data processing allows teachers to immediately determine follow-up learning actions. These findings demonstrate that the system not only accelerates the process of recording grades but also strengthens the evaluation function as a basis for learning improvement. Thus, the system can be positioned as a pedagogical tool that supports data-driven learning.

## 5. Results of System Effectiveness on the Learning Process

The system's effectiveness is evident in its ability to expedite the processing of evaluation results, clarify student progress information, and assist teachers in determining follow-up learning strategies. Prior to the system's use, managing evaluation results tended to be time-consuming because teachers had to record, calculate, and compile reports separately. Once the system was in place, the process became more integrated, as grade data could be directly processed into recaps, graphs, and progress reports. This enabled teachers to make faster and more objective learning decisions.

In addition, the system helps improve the quality of feedback provided to students. Evaluation results, presented in reports and graphs, make learning outcomes easier to understand. Teachers can explain aspects students have mastered and those that still need improvement based on available data. The system also enables teachers to provide more appropriate follow-up, both in the form of remedial and enrichment. The relationship between system features and learning effectiveness is presented in Table 4.

**Table 4.** Relationship between System Features and Learning Effectiveness Indicators

| No. | System Features | Learning Effectiveness Indicators | Form of Contribution |
|---|---|---|---|
| 1 | Input student grades | Availability of neat and complete evaluation data. | Teachers have a more structured database of learning outcomes. |
| 2 | Automatic processing | Efficiency of evaluation processing time. | Teachers can obtain a summary of grades and completion more quickly. |

| | | | |
|---|---|---|---|
| 3 | Learning outcome graph | Ease of reading student development. | Teachers can identify learning achievement patterns visually. |
| 4 | Student progress report | Clarity of learning outcome information. | Students and parents receive development information that is easier to understand. |
| 5 | Follow-up recommendations | Remedial precision and enrichment. | Teachers can develop further strategies based on the evaluation results. |
| 6 | Digital documentation | Continuity of learning monitoring. | Data can be reused for subsequent learning evaluations. |

Table 4 shows that each system feature has a direct relationship with learning effectiveness indicators. The automatic grade input and processing features contribute to the efficiency of evaluation administration. The graphs and student progress reports contribute to the clarity of learning outcome information. The follow-up recommendation feature strengthens the evaluation function as a basis for developing remedial and enrichment programs. Meanwhile, digital documentation supports the sustainability of student progress monitoring over a longer period.

**6. Final Findings of System Development**

Overall, the research results indicate that the developed learning evaluation results management system has fulfilled its basic function as a digital-based evaluation tool. The system is able to assist teachers in entering grades, processing data, displaying graphs, compiling student progress reports, providing follow-up recommendations, and storing evaluation data digitally. Expert validation results indicate that the system is categorized as highly valid with an average feasibility score of 88.33%. Implementation results also show that the system supports teacher work efficiency, accelerates evaluation result analysis, and assists in the preparation of learning follow-up actions.

The final findings of this study confirm that systematic management of evaluation results can improve learning effectiveness. This effectiveness is evident in three main aspects: efficient data processing, clarity of learning outcome information, and accurate learning follow-up. The developed system not only assists teachers with administrative aspects but also supports data-driven learning decision-making. Therefore, a learning evaluation results management system can be used as a solution to improve the quality of the evaluation process and support more focused, responsive, and sustainable learning.

**b. Discussion**

The findings indicate that the development of the learning evaluation result management system responds to a fundamental weakness in conventional assessment practices, namely the fragmentation of score recording, data processing, reporting, and instructional follow-up. This result is meaningful because evaluation data can only improve learning when it is transformed into pedagogically actionable information rather than remaining as administrative records. Conceptually, the system supports the logic of formative assessment, in which evidence of student learning must be interpreted quickly and used to adjust teaching strategies, provide feedback, and determine remedial or enrichment actions. This finding is consistent with Hopfenbeck et al. (2023) and OECD (2025), who argue that assessment becomes educationally valuable when it informs instructional decisions in a timely and targeted manner. It also aligns with Masiello et al. (2024) and Pan et al. (2024), who emphasizes that learning analytics can strengthen educational decision-making by organizing and visualizing learning data regularly. However, the present study extends these arguments by showing that a relatively simple evaluation management system can operationalize data-based decision-making in a school context, not only in advanced learning management systems or higher education environments. Therefore, the first contribution of this study lies in repositioning evaluation management from a clerical activity into a strategic mechanism for improving learning effectiveness.

The integration of six main system features, namely score input, automatic processing, graphical visualization, student progress reports, follow-up recommendations, and digital documentation, shows that the system was designed as a complete evaluation cycle rather than a single-purpose scoring tool. This finding is important because fragmented digital tools often help teachers store scores but do not necessarily assist them in interpreting student progress or planning instructional responses. Theoretically, the system reflects the principle of actionable learning analytics, which requires data systems to move beyond description and support concrete pedagogical action. Kennedy et al. (2025) argue that learning analytics becomes meaningful when the information generated can directly guide users in improving learning processes, and this study supports that position through the presence of remedial and enrichment recommendations. The findings also resonate with

Banihashem et al. (2022), who found that analytics-based feedback is most useful when it helps teachers and students understand learning progress more clearly. Compared with Khor and Neo (2023), who emphasize predictive and personalized learning analytics, this study offers a more practical and context-sensitive contribution by focusing on teachers' immediate needs in managing classroom evaluation data. Thus, the novelty of the system lies not in technological complexity, but in the pedagogical integration of data collection, interpretation, reporting, and follow-up within one accessible evaluation framework.

The expert validation results further demonstrate that the developed system has strong initial feasibility, as all validation aspects were categorized as highly valid, with an overall percentage of 88.33%. This finding suggests that the system's content, interface design, and usability are quite aligned with the needs of learning evaluation management. From a theoretical perspective, these results support human-centred learning analytics, which emphasizes that educational technology should be understandable, usable, trustworthy, and relevant to users' instructional contexts. Alfredo et al. (2024) and Wiley et al. (2024) similarly argue that user-centred design is crucial because the effectiveness of digital learning systems depends not only on technical performance, but also on how well users can interpret and apply the information provided. The highest validation score on media display indicates that the visual presentation of the system was considered clear and appropriate, supporting Paulsen and Lindsay's (2024) view that learning dashboards should move from simple data presentation toward meaningful learning support. However, the slightly lower score for ease of use implies that usability remains a critical issue, especially for teachers who may have different levels of digital literacy. This finding provides a critical reminder that valid educational technology still requires continuous refinement so that its functions remain simple, intuitive, and pedagogically transparent.

The implementation results show that the system helps teachers manage evaluation results more efficiently, particularly by reducing manual calculations, organizing assessment records, and presenting learning outcomes in more readable formats. This finding is significant because efficiency in evaluation management can create instructional space for teachers to focus more on diagnosing learning difficulties and designing appropriate interventions. In relation to formative assessment theory, faster data processing allows feedback to occur closer to the learning event, making it more useful for both teachers and students. This supports Chen (2024), who found that analytics-based feedback can improve learning regulation and academic engagement when students and teachers receive clear information about learning progress. Similar findings were reported by Pan et al. (2024), who showed that learning analytics interventions can provide valuable insight for instructional design, although their impact depends on implementation quality and context. Nevertheless, the present study differs from many previous studies because it focuses on the practical management of evaluation results rather than on complex online learning behavior data. This contextual distinction strengthens the argument that digital evaluation systems can improve learning effectiveness even when implemented in basic classroom assessment activities, provided that the system directly supports teachers' decision-making needs.

Another important finding is that the system strengthened the quality of feedback and follow-up learning actions through graphical reports, individual progress information, and recommendations for remedial or enrichment activities. This result means that evaluation data becomes more interpretable and more connected to instructional planning, which is essential for responsive teaching. Theoretically, this finding reinforces the relationship between assessment literacy, formative feedback, and differentiated instruction, because teachers can only adjust learning effectively when they have clear evidence of student needs. Ackerlauer et al. (2026) argue that digital assessment data can support more targeted formative feedback when the information is accessible, relevant, and easy to interpret. The present findings are also consistent with Paolucci et al. (2024), who note that learning analytics in K–12 education has the potential to support more equitable and individualized learning, although challenges remain in teachers' interpretation of data and evidence of effectiveness. Critically, the system's contribution should not be interpreted as replacing teacher judgment, but as strengthening teachers' ability to make more evidence-informed decisions. In this sense, the study expands the concept of learning analytics by showing that the value of data is not located in automation itself, but in the interaction between system-generated information and teacher pedagogical reasoning.

Overall, the findings position this study within the global literature on learning analytics, digital assessment, and educational technology development by offering a contextually grounded model of evaluation management for classroom-based learning improvement. Previous studies have often emphasized learning analytics in higher education, blended learning, or learning management system environments, while the

development of simple and teacher-oriented evaluation systems for school-level use remains relatively limited (Paolucci et al., 2024; van Kessel et al., 2025). This study addresses that gap by demonstrating how evaluation data can be managed through an integrated system that connects score processing, visualization, reporting, documentation, and instructional follow-up. At the conceptual level, the findings modify existing learning analytics discourse by emphasizing that effective analytics does not always require sophisticated prediction models, but requires pedagogically meaningful data flows that teachers can use directly. At the practical level, the system offers a model for improving assessment efficiency, feedback clarity, and continuity of learning monitoring. Nevertheless, the findings should be interpreted critically because the study mainly demonstrates feasibility and implementation potential, while broader evidence of long-term learning impact still requires further empirical testing across different schools, subjects, and student populations. Therefore, this study contributes a new perspective by framing evaluation result management as a bridge between digital assessment, formative feedback, and data-informed instructional improvement.

## D. Conclusion

This study concludes that the development of a learning evaluation results management system provides a meaningful solution to the limitations of conventional assessment management, particularly in score recording, data processing, reporting, and instructional follow-up. The system was successfully designed as an integrated digital tool consisting of six main features: student score input, automatic score processing, graphical presentation of learning outcomes, student progress reports, follow-up recommendations, and digital documentation of evaluation data. These features demonstrate that the system does not merely function as an administrative scoring application, but as a pedagogical instrument that helps teachers transform evaluation data into actionable information for improving learning. The expert validation results further confirmed the feasibility of the system, as the average validation score reached 88.33%, placing it in the highly valid category. The validation scores for content feasibility, media display, and ease of use indicate that the system is appropriate, understandable, and sufficiently practical for classroom evaluation management. Therefore, the developed system can be considered feasible for supporting teachers in managing learning evaluation results more systematically, efficiently, and transparently.

The implementation findings show that the system contributes to learning effectiveness by accelerating the processing of evaluation data, improving the clarity of student learning information, and supporting more accurate instructional follow-up. Through automatic calculations and visual reporting, teachers can identify student achievement patterns, determine mastery levels, and distinguish students who require remedial support from those who are ready for enrichment. This finding confirms that the effectiveness of evaluation management depends not only on the availability of assessment data, but also on the ability of teachers to interpret and use that data for instructional decision-making. The system also strengthens feedback quality because learning outcomes can be presented in a clearer and more accessible format for teachers, students, and potentially parents. In this respect, the study contributes to the development of data-informed teaching practices by positioning evaluation as a continuous process of diagnosis, feedback, and learning improvement. Although further testing across broader educational contexts is still needed, the findings provide strong initial evidence that an integrated evaluation management system can improve the efficiency, accuracy, and pedagogical value of classroom assessment. Thus, this study offers both a practical contribution for teachers and a conceptual contribution to the advancement of digital assessment, formative evaluation, and learning analytics in school-based education.

## E. Author Contributions Statement

Adelia Nurul Asfin contributed to the conceptualization of the study, formulation of the research focus, development of the learning evaluation result management system, and preparation of the original manuscript draft. Pipinwastari contributed to the design of the research methodology, refinement of the system development stages, and organization of the research instruments. Julia Kartikasari Hatibie contributed to the validation process, analysis of system feasibility, and interpretation of expert validation results. Nurhikmah contributed to data collection, documentation of implementation activities, and analysis of teacher and student responses during the system trial. Eprirayanti contributed to the development and review of the system features, particularly the score input, automatic processing, and reporting functions. Nurhasanah contributed to the analysis of learning effectiveness, interpretation of evaluation results, and preparation of the discussion section.

Restiani Lapi contributed to the literature review, theoretical alignment, and integration of relevant concepts related to formative assessment and learning analytics. Nurandini Mardiani Pratama contributed to manuscript editing, language refinement, formatting, and reference organization. Adi Mulyono contributed to supervision, critical review of the manuscript, validation of the final academic structure, and approval of the final version for submission. All authors have read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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