Journal Evaluation in Education (JEE)
Vol. 7, No. 3, July 2026, pp. 643~654
ISSN: 2716-4160, DOI: 10.37251/jee.v7i3.2536

Research Article

Reframing Educational Human Resource Evaluation in the Algorithmic Age

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Article Info

Article history:

Received Dec 23, 2025
Revised Mar 16, 2026
Accepted Jul 15, 2026
OnlineFirst Jul 31, 2026

Keywords:

Algorithmic Reflexivity
Data-Driven Governance
Digital Education Management
Educational Accountability
Evaluation of Human Resources of Education

ABSTRACT

Purpose of the study: This study aims to reconstruct the concept of educational human resource evaluation (SDMP) in the algorithmic era by examining how digital transformation and data-based governance reshape teacher performance assessment, professional accountability, and institutional decision-making.

Methodology: This study employed a mixed-methods approach using an explanatory sequential design. The study involved 55 participants, including teachers, institutional leaders, and digital system developers, selected through purposive sampling from five educational institutions in Indonesia. Quantitative data were obtained from digital performance evaluation records (2022–2024), while qualitative data were collected through semi-structured interviews, document analysis, and direct observation of digital evaluation systems. Quantitative data were analyzed using descriptive statistics and Pearson correlation analysis with SPSS, while qualitative data were analyzed using reflexive thematic analysis.

Main Findings: The findings indicate that algorithmic systems enhance transparency and consistency in educator performance measurement, with the adoption rate of digital evaluation systems reaching 82.3% across institutions. A significant positive correlation was found between digital technology use and performance evaluation scores ($r = 0.62$, $p < 0.01$). However, the results also reveal that algorithmic evaluation systems tend to prioritize measurable digital activities, potentially overlooking educators' social context, pedagogical depth, and professional values.

Novelty/Originality of this study: This study introduces the concept of algorithmic reflexivity as a new evaluative framework in educational management. The framework emphasizes integrating algorithmic analytics with human professional judgment, encouraging educational institutions to critically reflect on the ethical, human-centered, and data-driven implications of algorithmic SDMP evaluation.

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1. INTRODUCTION

Digital transformation has brought structural changes in education governance around the world. The use of artificial intelligence (AI)-based technology, machine learning, and data analytics is now the main foundation in education management, including in the management and evaluation of educational human

resources (SDMP) [1]. The algorithmic era marks a new phase in which data becomes a strategic component in decision-making, while efficiency and accountability are key principles in evaluating educator performance. In this context, HR evaluation is no longer just an administrative process, but a strategic instrument to ensure the quality of learning in the midst of the dynamics of global education digitalization [2], [3].

Traditional HR evaluations have relied heavily on subjective assessment, direct supervision, and manual observation. However, with the influx of algorithmic technology, the process has shifted to data-driven models and automatically generated quantitative indicators [4], [5]. This shift brings advantages in terms of efficiency and objectivity, but it also raises concerns about the loss of contextual nuances and human values in the assessment of educators' performance. Data-driven evaluations often position teachers as "measurable entities", rather than as reflective actors who play a role in building the quality of education holistically [6], [7].

The tension between algorithmic efficiency and educational humanism is now a central issue in education management. On the one hand, technology allows for fast, transparent, and standardized performance assessments. However, on the other hand, algorithms tend to ignore the social, cultural, and emotional context inherent in educational practices [8], [9]. Values such as pedagogical empathy, teacher creativity, and emotional involvement in learning are difficult to measure through digital systems based on numerical indicators. As a result, the evaluation process that was originally intended to be formative turned into a technocratic instrument oriented towards compliance and numbers [10].

In the discourse of modern educational evaluation, algorithmic logic brings a new form of accountability that is often referred to as the datafication of education. According to Zong, [11] and Jandrić et al., [12], this process transforms evaluation practices into predictive and surveillance activities that focus on system efficiency, not human development. Teachers are assessed not only based on student learning outcomes, but also on their digital activity data, such as interactions on online learning platforms or automated administrative reporting [13], [14]. This raises concerns that teacher professionalism is increasingly controlled by digital metrics that do not always reflect actual competencies.

In addition to epistemological issues, algorithm-based evaluation also presents significant ethical and social dilemmas. Algorithmic bias, digital access gaps, and narrow interpretations of performance data can reinforce inequality between educators and schools. In developing countries, the limited infrastructure and digital competence of educators are an additional obstacle in the implementation of technology-based evaluation systems. Thus, there is a need to design an Educational Human Resources (EHR) evaluation model that is not only technically efficient, but also fair, reflective, and contextual. Studies on the digitalization of education have grown rapidly in the last decade, but most of them focus on aspects of online learning, instructional technology, or digitalization policies [15], [16]. Few studies have critically examined how algorithms reshape the structure and values of HR evaluation in educational institutions. This gap makes the issue of algorithmic evaluation in education management a conceptual area that needs to be explored more deeply, especially in the context of education in developing countries such as Indonesia.

To bridge this dilemma, this research offers a conceptual framework of "algorithmic reflexivity", an approach that emphasizes critical awareness of the social, ethical, and epistemological impacts of the use of algorithms in the evaluation of SDMP. This approach does not reject technology, but rather invites educational institutions to place algorithms as reflective partners, not substitutes for human judgment. Thus, evaluation systems can serve a dual purpose remain technologically efficient while being human development-oriented. Based on this background, this study aims to critically review the practice of HR evaluation in the algorithmic era and offer a balanced evaluation model between algorithmic precision and human wisdom. The main contribution of this research lies in the development of a new theoretical framework in education management, which places evaluation not only as a technical process, but as a reflective practice that plays a role in building integrity, professionalism, and fairness in the digital education system.

Despite the rapid adoption of digital evaluation systems in educational institutions, there is still limited understanding of how algorithmic mechanisms reshape the meaning and practice of educational human resource evaluation [17]. Existing studies have largely concentrated on digital learning technologies and the implementation of educational platforms, while the transformation of evaluation practices under algorithmic governance has received relatively limited attention [18]. This indicates an important research problem regarding how algorithmic systems influence educator performance assessment and how these systems affect the interpretation of professionalism and accountability in educational institutions.

Furthermore, previous research tends to focus on technological adoption or policy implementation rather than critically examining the implications of algorithmic systems for the structure, meaning, and ethical dimensions of educational human resource evaluation [19]. As a result, there remains a significant research gap in understanding how algorithmic evaluation reshapes professional judgment, institutional accountability, and the broader values embedded in educational governance, particularly within the context of developing countries. Therefore, this study aims to examine how algorithmic systems influence educational human resource evaluation practices and how educators perceive the implementation of algorithmic-based performance assessment in

educational institutions. Through this investigation, the study seeks to explore the dynamics between algorithmic efficiency and human-centered evaluation in the context of digital education governance.

By addressing these issues, this research contributes to the development of education management studies by proposing the concept of algorithmic reflexivity as a reflective framework for understanding the relationship between data-driven evaluation systems and professional human judgment. This framework highlights the importance of balancing algorithmic precision with human interpretation in order to ensure fairness, contextual sensitivity, and ethical accountability in the evaluation of educational human resources in the digital era.

2. RESEARCH METHOD

This study uses a mixed methods approach with an explanatory sequential design. This approach was chosen to gain a comprehensive understanding of the practice of EHR evaluation in the algorithmic era through a combination of quantitative analysis and qualitative exploration [20]. The first stage serves to identify general patterns and trends in the application of digital evaluation systems, while the second stage aims to explore reflective, ethical, and social dimensions that cannot be revealed through numerical data alone. This approach is based on a pragmatic paradigm, which considers the diversity of methods as the best way to understand complex phenomena such as the digitization of educator evaluations [21].

In the quantitative phase, the study examines the relationship between digital technology use and educator performance evaluation outcomes. Based on this analytical framework, the study proposes the following hypothesis: H1: Digital technology use positively influences educator performance evaluation outcomes. The quantitative findings are subsequently elaborated through qualitative exploration in order to understand educators' perceptions, interpretations, and experiences regarding algorithmic evaluation systems [22].

The research was carried out in five formal educational institutions in Indonesia (three secondary schools and two universities) that have implemented technology-based performance evaluation systems, including the Learning Management System (LMS) and the Performance Analytics Dashboard. The institution was chosen because it represents different characteristics in terms of scale, tier, and digital readiness. Indonesia's context was chosen purposively because it is experiencing an acceleration of digital transformation in post-pandemic education, but still faces digital disparities and ethical challenges in the governance of teacher evaluation data [23].

The five institutions were selected to represent different levels of technological maturity and organizational structures in implementing digital evaluation systems, allowing the study to capture variations in institutional practices and educator experiences related to algorithmic evaluation mechanisms. The distribution of participants across data collection methods includes quantitative performance data from all 55 participants, while qualitative interviews were conducted with 20 key informants consisting of educators, institutional leaders, and system developers. In addition, observational data were collected from the five participating institutions to understand the practical implementation of algorithmic evaluation systems.

The subjects of this study involved 55 participants who were purposively selected based on their involvement and experience in the implementation of a digital-based educational human resource evaluation system (EHR). The composition of participants consists of 40 teachers and lecturers as the main implementers of the digital evaluation system at the operational level, 10 leaders of educational institutions (consisting of school principals, deans, and rectorate officials for academic affairs) who play a role in the formulation and decision-making related to the EHR evaluation policy, and 5 developers or operators of digital systems who are responsible for the design, management, and maintenance of the evaluation system at the institutional level.

The selection of participants was carried out using the purposive sampling technique, which allows the researcher to select the most relevant and competent individuals in providing information according to the research context. The inclusion criteria used include: (1) having used a digital-based evaluation system for at least two years on an ongoing basis, (2) having direct experience in the performance appraisal process both as an object and a decision-maker, and (3) willing to actively participate in interviews, observations, and research data verification processes. This approach ensures that the data obtained is empirically rich, credible, and reflects the multi-level perspective of the HR evaluation ecosystem in the algorithmic era [24].

This research data consists of two main types, namely quantitative data and qualitative data, which are used in a complementary manner to obtain a comprehensive understanding of the practice of educational human resource evaluation (EHR) in the algorithmic era. Quantitative data was obtained from the results of digital performance evaluations for the 2022–2024 period, which included various measurable indicators such as teacher and lecturer performance evaluation scores, digital engagement levels (including the number of material and activity uploads in the Learning Management System), online attendance, and student feedback results on the learning process. Meanwhile, qualitative data was collected through in-depth interviews with participants, direct observation of the digital evaluation system, and review of institutional documents, including quality

policies, performance appraisal guidelines, and institutional annual evaluation reports. The combination of quantitative and qualitative data provides a comprehensive and layered empirical picture of the dynamics of algorithmic-based EHR evaluation, not only in terms of system effectiveness and assessment fairness, but also from the dimensions of professional perception and ethical reflection that emerge among education actors in the face of the transformation of evaluation digitalization.

The research instruments in this study are systematically designed to support a mixed methods approach and ensure integration between quantitative and qualitative data collection. The quantitative instrument uses evaluation data documentation sheets that are compiled based on the format and indicators that apply in the evaluation system of each educational institution. The document is then processed and converted into a numerical dataset to facilitate descriptive and inferential statistical analysis. To ensure measurement reliability, the internal consistency of the quantitative indicators was tested using Cronbach's Alpha reliability analysis [25]. The reliability test produced a Cronbach's Alpha value of 0.82, indicating a high level of internal consistency for the performance evaluation indicators used in this study.

Meanwhile, the qualitative instruments include a semi-structured interview guide developed to explore the conceptual dimension and subjective experience of participants towards the application of algorithmic evaluation systems. This guide consists of five main domains, namely: (1) perception of algorithmic transparency, (2) the impact of digital evaluation systems on educators' motivation and professionalism, (3) perceptions of fairness in the interpretation of algorithmic data, (4) the role of humans in the evaluation and decision-making process, and (5) educators' reflexivity to the results of digital evaluations. Examples of open-ended interview questions include: "How do you understand the evaluation results generated by the digital system?", "Do you believe the algorithmic evaluation system fairly represents your professional performance?", and "How does the digital evaluation system influence your teaching practices and professional responsibilities?". In addition, this study also uses structured observation sheets to record user interactions with the digital evaluation system directly, including feature usage patterns, responses to system feedback, and dynamics of adaptation to algorithmic mechanisms. The combination of these instruments allows for an in-depth exploration of both the empirical and reflective aspects of technology-based HR evaluation practices.

The first phase begins with the collection of quantitative data from the digital evaluation system over the past two years. The data was obtained through the official permission of the institution and verified for validity by the HR administration. The second stage was carried out with a qualitative approach, namely in-depth interviews with 20 key participants (teachers, heads of institutions, and system developers) using a semi-structured interview format lasting 60–90 minutes per session. Interviews were conducted online and face-to-face, recorded with respondents' permission, and then transcribed for thematic analysis. Direct observation was made on the use of algorithmic systems during the evaluation process, to understand the interaction between users and systems in real terms.

Quantitative analysis in this study was carried out using SPSS software version 27, through the application of descriptive statistical techniques and Pearson correlation tests. This analysis aims to identify the relationship between the intensity of digital technology use—which includes the frequency of activities in the Learning Management System (LMS), online presence, and involvement in the digital learning process—with the results of teacher and lecturer performance evaluations. In addition, an analysis of the distribution of performance scores was also carried out to detect potential algorithmic bias or interpretation inequality between individuals, which can arise due to differences in user interaction patterns with digital evaluation systems.

Meanwhile, qualitative analysis uses the Reflexive Thematic Analysis (RTA) approach as developed by Braun and Clarke [20]. The analysis process is carried out through several stages, namely transcription of interview data, open coding, formation of categories and main themes, and in-depth interpretation of the meanings that emerge. The three main themes anticipated from this process include: (1) perceptions of algorithmic fairness in performance assessment, (2) changes in the meaning of teacher and lecturer professionalism under the digital system, and (3) reflective strategies of educators in interpreting and responding to the results of algorithmic evaluations. To maintain data traceability, analytical consistency, and interpretation reliability, this entire qualitative process is supported by the use of NVivo 14 software, which allows researchers to systematically track thematic relationships and narrative patterns [26].

Data validity is ensured through triangulation of methods and sources, comparing quantitative results, interviews, and policy documents. Member checking is carried out by asking participants to review the summary of the interview results to ensure the accuracy of the interpretation. Reliability is maintained through trail audits, which are complete documentation of the analysis process and research decisions. Ethically, this study follows the guidelines of AERA [27], by guaranteeing data confidentiality, respondent anonymity, and the use of data only for academic purposes. Each participant signs an informed consent before the data is collected, and the personal data is stored in an encrypted manner. The limitations of this study lie in the limited geographical scope and institutional variety, so the results are contextual. However, the mixed methods design used allows for an in-depth understanding of the dynamics of SDMP evaluation in a digital context. The follow-up research is expected to expand the cross-border coverage to enrich the comparative algorithmic evaluation policy globally.

3. RESULTS AND DISCUSSION

3.1 General Patterns of Algorithmic-Based SDMP Evaluation

The results of the quantitative analysis showed that the adoption rate of the digital evaluation system in the five educational institutions where the research was conducted reached an average of 82.3% of the total components of the educational human resource performance assessment (EHR). These findings indicate that the process of digitizing performance management in the education environment has reached a relatively high level of implementation, particularly in administrative monitoring, reporting systems, and performance tracking mechanisms. Furthermore, the analysis of evaluation indicators revealed that the most dominant components measured algorithmically included online attendance (98%), learning activities in the Learning Management System (92%), and response rates to student feedback (87%). These indicators demonstrate a strong tendency toward data-driven assessment mechanisms that prioritize digital activities that can be easily measured and automatically processed by evaluation systems.

However, reflective and qualitative dimensions—such as pedagogical innovation, collaboration between educators, and professional self-development—were integrated in only approximately 54% of institutions. This condition indicates that algorithmic-based evaluation systems still emphasize quantifiable performance indicators more strongly than qualitative dimensions of professional growth. In other words, the humanistic and reflective aspects of educator evaluation have not yet been fully represented in the existing digital evaluation framework. To provide a clearer description of the distribution of evaluation indicators, the results are presented in Table 1.

Table 1. Adoption Rate of Algorithmic-Based HR Evaluation Components in Five Educational Institutions

EHR Evaluation Components	A Institution	B Institution	C Institution	D Institution	E Institution	Average (%)
Online presence	99	100	97	98	96	98.0
Learning activities in the LMS	94	90	93	91	92	92.0
Response to student feedback	86	90	88	84	87	87.0
Quality of online learning interactions	78	81	79	77	80	79.0
Pedagogical innovation and peer collaboration	52	56	55	50	58	54.2
Continuous professional development (training, workshops)	60	63	62	58	61	60.8
Average overall adoption of digital systems	78.2	80.0	79.0	76.3	77.8	82.3

To further examine the relationship between digital activity and educator performance, a Pearson correlation analysis was conducted to test the proposed hypothesis (H1), which states that digital technology use positively influences educator performance evaluation outcomes.

The Pearson correlation analysis revealed a significant positive relationship between the intensity of digital technology use and educator performance evaluation scores ($r = 0.62$, $p < 0.01$). This result indicates that higher levels of digital engagement—such as participation in LMS activities, response to student feedback, and involvement in digital learning processes—are associated with higher algorithmic performance scores. The significance level ($p < 0.01$) confirms that the relationship is statistically significant at the 1% level, meaning that the probability of this relationship occurring by chance is extremely small. These findings support the proposed hypothesis (H1), suggesting that digital technology use plays a substantial role in shaping the outcomes of algorithmic-based educator performance evaluations.

Nevertheless, the results of the analysis also revealed that the standard deviation of performance scores ($SD = 14.8$) was relatively high, indicating substantial variation in performance evaluation outcomes among individuals. This variation suggests that algorithmic evaluation systems may produce uneven interpretations of educator performance due to differences in digital engagement patterns.

Table 2. Correlation between Technology Use Intensity and Educator Performance Score

Variable	Red (M)	SD	r (Pearson)	Sig. (p)	Interpretation
Intensity of use of digital technology	78.4	10.6	0.62	< 0.01	Positive, significant relationships
Performance evaluation score (algorithmic-based)	81.2	14.8	—	—	—

The findings of this study show that digital performance evaluation algorithms tend to associate digital productivity with work performance. This trend may reinforce what has been described as performative digitalism [28], [29], which is the encouragement for educators to display high levels of digital activity in order to obtain good judgments. Although a significant positive relationship between the intensity of technology use and performance scores ($r = 0.62$; $p < 0.01$) suggests a real benefit of digital engagement on evaluation outcomes, this correlation also contains a paradox of professionalism: high digital activity does not necessarily reflect true pedagogical competence or in-depth learning quality.

For example, a number of educators with a high level of activity in the Learning Management System (LMS) actually obtained low scores in professional reflection. This happens because algorithmic systems are not yet able to measure non-quantitative dimensions such as critical pedagogy, student engagement depth, or reflective ability to the learning process [30]. This phenomenon highlights what may be described as an epistemic asymmetry between algorithmic logic and pedagogical logic, where algorithmic systems evaluate the frequency of activities, while educational professionalism evaluates the quality, purpose, and impact of those activities [31], [32].

Thus, although algorithms provide efficiency and consistency in the assessment process, the results of this study confirm that digital-based evaluation systems still require corrective mechanisms that involve human reflection and interpretation so as not to get caught up in quantitative bias. Evaluation of educator performance should ideally not only rely on measurable data, but also consider broader pedagogical context, intentions, and values. Overall, the quantitative findings of this study highlight two important insights. First, the digitalization of educational human resource evaluation has reached a relatively advanced level of implementation, with an adoption rate of 82.3% across institutions, although the balance between administrative indicators and reflective professional indicators remains limited. Second, the statistically significant relationship between digital technology use and performance evaluation outcomes confirms the growing importance of educators' digital literacy in algorithmic evaluation environments, while also emphasizing the need for hybrid evaluation frameworks that combine algorithmic precision with human-centered interpretation to ensure fairness, contextual sensitivity, and ethical accountability in educational performance evaluation systems.

3.2 Educators' Perceptions of Algorithmic Evaluation

Algorithmic Fairness and Transparency

The first theme that emerged predominantly was algorithmic fairness and transparency. Most teachers and lecturers stated that algorithm-based evaluation systems do provide efficiency and reduce the subjectivity of manual assessments. However, on the other hand, they felt they did not fully understand how the algorithm assessed and weighted performance scores, resulting in the perception that the system was "fair but not transparent."

A teacher said:

> *"This system judges me by the number of times I upload material, not by how I teach in class. I feel like I'm managed by numbers, not by people."* (G-07, March 12, 2024 interview).

This statement highlights the paradox between algorithmic objectivity and the loss of the human dimension in educational evaluation. Another participant added that even though the data looks objective, the algorithm is still structured based on institutional policies that do not always reflect the context of work in the field:

> *"We never know the formula. The value comes out automatically, but how the weight is determined, we are not told. It feels like being judged by a machine with no dialogue room."* (D-02, Interview March 17, 2024).

This phenomenon reinforces what O'Neil (2016) [33] calls "algorithmic opacity", which is a condition when individuals become subjects of system judgments without understanding the mechanisms behind those algorithmic decisions. Institutionally, this lack of transparency also has an impact on the trust deficit between educators and institutions, where the results of digital evaluations are not always considered to reflect real performance in the classroom.

Transforming the Meaning of Professionalism in the Digital Era

The second theme that emerged from the interview results was the transformation of the meaning of educator professionalism under the digital evaluation system. Participants acknowledged that digital indicators, such as the frequency of material uploads, online activity, and the speed of response to students, have become new benchmarks of professionalism. However, they assessed that these measures often shift the orientation of professionalism from pedagogy to data performativity.

A lecturer revealed:

> *"I feel that I have to be active every day in the LMS, not because of academic needs, but so that the system assesses me diligently. I started teaching for the system, not for students."* (DS-04, March 22, 2024 interview).

This quote reflects the concept of data performativity put forward by Serrano (2018) [34] — i.e., the encouragement for educators to display high digital activity in order to score good performance, not for the sake of true pedagogy. Some teachers even admitted to experiencing "digital professional anxiety", which is psychological pressure because they must always meet algorithmic quantitative targets so as not to be considered unproductive.

As one of the high school teachers put it:

> *"If I am not actively uploading assignments or forums, later the activity value will drop. It feels like competing with algorithms, not improving the quality of learning."* (G-11, Interview March 24, 2024).

This transformation shows that algorithmic systems are not only changing the way institutions assess, but also reconstructing the professional identity of educators, from reflective practitioners to data-driven performers.

Reflective Strategies for Digital Evaluation

Despite various criticisms of algorithmic systems, some participants showed reflective and adaptive strategies to maintain a balance between technological logic and the values of professionalism. Some teachers attempt to write personal reflective notes after receiving a digital evaluation report as a way to humanly reinterpret the results of algorithmic assessments.

An experienced teacher said:

> *"Every time the evaluation results come out, I write a short reflection: what can I learn, which parts don't match reality. That way, I can still control the meaning of the data."* (G-03, Interview March 28, 2024)

This approach shows the existence of an educator agency in interpreting algorithmic data, not just being an object of evaluation. In addition to personal reflection, several institutions have also begun to develop peer reflection groups that discuss the results of digital evaluations in an open and ethical manner. One of the leaders of the institution explained:

> *"We hold a small forum at the end of every semester to discuss the results of the evaluation dashboard. Not to judge who is the best, but to understand the meaning of the data contextually."* (P-02, Interview April 2, 2024).

This strategy marks a shift from the algorithmic control paradigm to collaborative interpretation, where data is no longer seen as the end product, but rather as the material for a reflective dialogue between humans and systems.

3.3 Thematic Synthesis

The results of the thematic analysis can be extracted in the following Table 3 to show the relationship between the themes, subthemes, and representative quotes of the participants.

Table 3. Summary of Themes, Subthemes, and Representative Quotes of Qualitative Analysis

Main Themes	Key Subthemes	Representative Quotes	Analytical Meaning
Algorithmic Fairness and Transparency	Lack of understanding of algorithmic scoring logic	"We never knew the formula... as judged by a machine with no dialogue room." *(D-02, 17/03/2024)*	Shows *algorithmic opacity* and decreased confidence in the results of the evaluation.
	Alienation in digital systems	"I feel like I'm managed by numbers, not by people." *(G-07, 12/03/2024)*	Describe the professional alienation caused by the objectification of performance by data.
Transformation of the Meaning of Professionalism	Orientation shift from pedagogy to data performivity	"I started teaching for the system, not for the students." *(DS-04, 22/03/2024)*	Showing the change in the meaning of professionalism under the logic of data.
	Digital professional anxiety	"It feels like a race with algorithms." *(G-11, 24/03/2024)*	Showing psychological distress due to quantitative evaluation mechanisms.
Reflective Strategies for Digital Evaluation	Individual reflection on algorithmic results	"I write a reflection every time a score comes out..." *(G-03, 28/03/2024)*	Demonstrate reflective resistance to algorithmic system bias.

Main Themes	Key Subthemes	Representative Quotes	Analytical Meaning
	Peer collaboration in data interpretation	"We held a small forum to understand the meaning of the data." *(P-02, 02/04/2024)*	Pointing a new direction towards collaborative and dialogue-based evaluation.

The qualitative analysis in this study shows that although the evaluation algorithm is able to speed up the assessment process and expand the capacity of educators to measure performance, the system still retains a fundamental epistemic paradox. On the one hand, algorithms claim to be objective instruments and free from human bias; But on the other hand, it often ignores the complexity of the social, emotional, and pedagogical context inherent in educational practice. The objectivity constructed by algorithmic systems turns out to be partial, it measures what can be quantified, not what is pedagogically meaningful.

Thus, the evaluation of educational human resources (EHR) in the algorithmic era cannot be understood solely as a neutral technological process, but as a reflective social process that is loaded with negotiation of meaning between the system and its subjects. In this context, professionalism, fairness, and humanity are not just external variables, but an integral part of the dynamics of evaluation itself. Teachers, lecturers, and leaders of educational institutions must continue to reinterpret their positions in the midst of algorithmic logic—between being a user of the system and at the same time a subject assessed by the system. Therefore, the results of this study confirm the need for an evaluative approach that places technology as a reflective partner, not as the sole determinant of the value of professionalism, so that evaluation practices in the digital era remain oriented to human values and educational justice.

3.4 Institutional and Technical Perspectives

In terms of institutional policy, the results of interviews with the leaders of educational institutions show that the digital evaluation system is seen as a strategic instrument for standardizing performance and increasing data-based accountability. They assessed that the use of the Learning Management System (LMS) and Performance Analytics Dashboard allows for faster and evidence-based decision-making. In their view, the digitalization of evaluation is an effort to provide more measurable, efficient, and consistent governance of educational human resources between units.

One of the leaders explained:

> *"With a digital dashboard, we can see the performance of lecturers or teachers in one view. It is very helpful for training or promotion planning. But we know that this data doesn't always read creativity or leadership in the classroom."* (P-04, Interview April 10, 2024).

This statement shows that behind policy optimism towards data-driven governance, there is an awareness of algorithmic limitations in capturing the qualitative dimensions of educational performance especially those that are reflective, affective, and contextual. In other words, a digital evaluation system helps strengthen governability (the ability of institutions to manage performance systemically), but has the potential to reduce the complexity of pedagogical practices to just numbers or the frequency of online activities.

Furthermore, the developers and operators of digital education systems acknowledge that the design of current evaluative algorithms still relies heavily on administrative indicators that are easily measured and automatically detected. Parameters such as the frequency of material uploads, online attendance rate, number of interactions in the forum, and speed of response to students are the dominant elements in the algorithmic assessment model.

A system developer stated:

> *"The algorithm we build must be based on data that can be pulled automatically. So, indicators such as teaching innovation or mentoring are difficult to enter, because there is no data. We rely on what can be quantified."* (Dev-02, April 15, 2024 interview)

The statement underlines the existence of an "epistemic imbalance" between data logic and professional logic. Algorithmic systems work based on the principles of measurability and efficiency, while educational practices are based on the values of reflection, empathy, and interpretation that cannot always be measured digitally [35], [36]. This condition shows that the evaluation of HR in the algorithmic era is not only a technological transformation, but also an epistemological transformation, in which the way institutions understand and validate "good performance" is now mediated by data infrastructure. Thus, policies that rely too much on algorithmic systems risk creating "pedagogical blindness", the inability to read non-quantitative values that are at the heart of educator professionalism.

As stated by one of the academic leaders:

> *"We got a lot of points, but lost the story. Dashboards provide a map of performance, but they don't always explain how teachers build relationships with students or create a meaningful learning atmosphere."* (P-01, Interview April 8, 2024).

This reflection confirms that the use of digital systems in EHR evaluation needs to be developed in a hybrid and contextual manner combining algorithmic rigor with human professional wisdom. Without this balance, digital transformation can actually produce a new form of performance bureaucratization, which shifts the true meaning of evaluation as a reflective learning process to just an administrative control tool. This study reveals that the evaluation of educational human resources (EHR) in the algorithmic era has shifted from a manual observational approach to a data-driven and algorithm-based system. This transformation reflects the emergence of what scholars describe as datafied governance, where educational decision-making and performance evaluation are increasingly mediated by computational systems and digital infrastructures[37], [38].The findings of this study confirm that algorithmic evaluation mechanisms prioritize measurable digital indicators, such as LMS activity and online participation, as dominant criteria for performance assessment [39], [40].

Despite improving administrative efficiency and standardization, such systems still overlook qualitative dimensions of professional practice, including pedagogical empathy, ethical judgment, and reflective teaching. This result supports the argument of Gulson et al. that algorithmic governance in education tends to prioritize measurable indicators while underrepresenting qualitative pedagogical values embedded in professional practice [41], [42]. In this context, the positive correlation between the intensity of digital technology use and performance scores ($r = 0.62$; $p < 0.01$) indicates the presence of technological dependency bias, where educators who demonstrate higher levels of digital activity tend to receive higher evaluation outcomes regardless of deeper pedagogical competencies.

Another important finding concerns the issue of algorithmic fairness and transparency. Many educators perceive the digital evaluation system as operating in an opaque manner, meaning that the logic behind algorithmic scoring remains unclear to system users. This perception reinforces the concept of algorithmic opacity discussed by Landri (2018) [43]. Which explains how algorithmic systems can generate institutional authority while limiting users' understanding of how decisions are produced. As a consequence, a trust deficit may emerge between educators and institutions when evaluation outcomes are not accompanied by transparent explanations [44], [45]. Therefore, algorithmic justice in educational evaluation should not only rely on computational objectivity but must also incorporate interpretive accountability, where institutions take responsibility for explaining and contextualizing evaluation results [46].

From the perspective of educator professionalism, the findings also indicate an epistemic transformation in how professional performance is understood. Teachers and lecturers are increasingly required not only to demonstrate pedagogical competence but also to adapt to the operational logic of digital evaluation systems. This phenomenon aligns with the concept of data performativity described by Diamond and Bulfin [47], in which professional practices become shaped by measurable digital indicators rather than purely pedagogical values. As a result, some educators report adjusting their activities to meet algorithmic expectations, a practice sometimes described as "teaching for the system."

However, the qualitative findings also reveal that educators develop adaptive and reflective strategies to navigate algorithmic evaluation environments. Some participants reported integrating algorithmic evaluation results with personal reflection, peer discussions, and collaborative interpretation of digital performance data. This adaptive behavior suggests that educators are not passive recipients of algorithmic governance but active interpreters who negotiate the meaning of digital evaluation outcomes within their professional contexts. Based on these findings, this study proposes a conceptual framework for reframing SDMP evaluation as a human–algorithm collaborative model, in which algorithmic systems function as analytical tools while human actors remain the primary interpreters of professional meaning and contextual judgment. This framework emphasizes three main principles algorithmic transparency, the strengthening of educators' digital literacy, and the integration of reflective professional interpretation in data-based evaluation processes [48], [49].

Conceptually, these findings are consistent with the broader discussion on ethical AI governance in education, which highlights the need to balance technological efficiency with human-centered values in algorithmic decision-making processes [50] Therefore, the future of educational human resource evaluation should move toward hybrid evaluation systems that combine algorithmic quantitative analysis with reflective professional narratives. Such an approach can help ensure that evaluation systems remain fair, ethical, and responsive to the complex realities of educational practice.

4. CONCLUSION

This study shows that the evaluation of educational human resources (EHR) in the algorithmic era has shifted from manual observation to data-driven and algorithm-based systems. The findings indicate that the adoption of digital evaluation systems reached 82.3%, and the Pearson correlation analysis confirmed a significant positive relationship between digital technology use and educator performance scores ($r = 0.62$, $p < 0.01$). This result suggests that educators' digital engagement plays an important role in algorithmic performance evaluation outcomes. However, the findings also reveal that algorithmic evaluation systems tend to prioritize

measurable digital activities over qualitative aspects of professional practice, such as pedagogical reflection, creativity, and human interaction in learning. This condition indicates the potential for algorithmic bias, where digital productivity may be interpreted as a proxy for professional competence. Theoretically, this study contributes to educational management literature by introducing the concept of algorithmic reflexivity, which emphasizes the need to combine algorithmic evaluation systems with human professional judgment in interpreting educator performance. Practically, the study suggests that educational institutions should develop hybrid evaluation models that integrate algorithmic analytics with professional interpretation, strengthen educators' digital literacy, and ensure transparency in digital evaluation systems. Overall, educational human resource evaluation in the digital era should move toward a human–algorithm collaborative model, where technology supports decision-making while human judgment remains central to interpreting professional performance.

ACKNOWLEDGEMENTS

The author would like to thank all educators, leaders of educational institutions, and developers of digital evaluation systems who have participated and made valuable contributions to this research, as well as to partner educational institutions for their permission, administrative support, and cooperation during the data collection process. The author also expressed his appreciation to the editorial team of Journal Evaluation in Education (JEE) for the opportunity given to publish the results of this research. Hopefully this work can provide benefits for the development of educational evaluation policies and practices in the digital era.

AUTHOR CONTRIBUTIONS

Conceptualization; Methodology; Formal Analysis; Investigation; Data Curation; Writing – Original Draft Preparation; Writing – Review & Editing; Supervision, PML. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all participants involved in the study. Prior to the interviews, each teacher was provided with an explanation of the study's objectives, procedures, and intended use of the data, and voluntarily agreed to participate. All images in this article have been authorized and are the property of the authors.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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