

Technology Mastery and Self-Efficacy Are Strongly Linked to Madrasah Operator Performance

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Abstract

- Purpose** : This study investigates the relationship between technology mastery, self-efficacy, and madrasah operator performance in Salu Makarra, Luwu, Indonesia. It addresses whether technology mastery and self-efficacy are individually and jointly associated with the performance of madrasah operators in managing administrative and educational information systems.
- Method** : A quantitative correlational design was employed involving six madrasah operators from MI Istiqamah, MTs Istiqamah, and MA Istiqamah Salu Makarra, selected through total sampling. Data were collected using questionnaires and observation, with a 30-item instrument covering technology mastery, self-efficacy, and operator performance, and analyzed using descriptive statistics, the Shapiro-Wilk normality test, Spearman's rank correlation, and multiple linear regression.
- Results** : The findings revealed a very strong and significant positive relationship between technology mastery and operator performance ($r = 0.943$, $p = 0.005$) and between self-efficacy and operator performance ($r = 0.820$, $p = 0.046$). Jointly, technology mastery and self-efficacy were significantly associated with performance ($R = 0.943$, $F = 12.145$, $p = 0.036$), explaining 89.0% of its variance.
- Conclusion** : These findings indicate that technological capability and confidence in personal competence are closely connected to effective madrasah administration, highlighting the importance of integrated technology training and self-efficacy development for strengthening operator performance.

Keywords: Technology Mastery; Self-Efficacy; Madrasah Operator Performance; Educational Administration; Madrasah Education.

1. Introduction

The rapid digitalization of education has transformed not only teaching and learning but also the administrative work that sustains educational institutions. Across education systems, schools and madrasahs increasingly depend on digital platforms for student records, institutional reporting, personnel administration, assessment data, and communication with educational authorities. Consequently, the quality of educational administration is increasingly shaped by the ability of personnel to use technology accurately, efficiently, and confidently. International scholarship has consequently shifted from viewing technology merely as a collection of tools toward understanding the competencies, professional practices, and personal capacities required to use digital

technologies effectively. Falloon (2020), for example, argues that digital competence extends beyond basic digital literacy and encompasses the knowledge, skills, attitudes, and professional capacities needed to use technology meaningfully. Similarly, systematic reviews have shown that digital competence has become a central requirement for educational professionals, while inadequate training and uneven technological capability remain persistent challenges (Fernández-Batanero et al., 2020; Revuelta-Domínguez et al., 2022).

This transformation is particularly relevant in Indonesia, where educational administration is increasingly integrated with digital information systems. In madrasahs, operators occupy a distinctive position because they are responsible for managing and updating institutional data while supporting the implementation of administrative requirements through technology. Technology mastery in this study refers to the operator's ability to understand and effectively use technological tools and digital systems required to perform administrative tasks. It is therefore broader than merely knowing how to operate a computer; it involves applying technological knowledge accurately to work-related responsibilities. For example, an operator who can enter, verify, update, and report student or institutional data through an online education information system demonstrates technology mastery because technological skills are directly translated into effective administrative performance. This interpretation is consistent with contemporary digital competence frameworks, which emphasize the purposeful and professional use of digital technologies rather than technical operation alone (Falloon, 2020; Redecker, 2017).

A second important construct is self-efficacy, referring to an individual's belief in his or her capability to organize and execute actions required to accomplish particular tasks. In an educational administration context, self-efficacy concerns an operator's confidence in dealing with technological demands, solving work-related problems, and completing responsibilities successfully. This psychological dimension matters because possessing technological knowledge does not necessarily guarantee that an individual will confidently apply it when encountering unfamiliar systems, errors, deadlines, or complex administrative requirements. Recent research supports the importance of this relationship. Wang and Zhao (2021), for instance, investigated whether institutional ICT support was associated with preservice teachers' technological pedagogical knowledge and examined the mediating role of ICT self-efficacy. Using quantitative evidence from three Chinese normal universities, they found that self-efficacy mediated much of the relationship between ICT support and technological pedagogical knowledge, indicating that technological resources alone may be insufficient without confidence in one's capacity to use them.

Similarly, Gomez et al. (2021) examined teachers' technology-integration self-efficacy using the International Society for Technology in Education standards. Their study demonstrated the relevance of self-efficacy for understanding teachers' readiness to integrate technology into professional practice. In another study, Sharma and Saini (2022) investigated the roles of perceived usefulness, perceived ease of use, facilitating conditions, and self-efficacy in teachers' continued use of digital technologies. Based on data from approximately 250 teachers and structural equation modelling, they found that facilitating conditions and perceived ease of use influenced continuance intention, while self-efficacy significantly moderated the relationship between intention and actual technology use. These findings imply that confidence in one's technological capability can influence whether available technology is translated into actual professional practice.

Evidence has also increasingly connected digital competence and self-efficacy with work performance. In Indonesia, Farah et al. (2023) investigated whether digital competence could explain organizational performance and whether self-efficacy and self-esteem contributed to this relationship. Using a quantitative approach and partial least squares structural equation modelling, the study positioned digital competence as an important mechanism associated with organizational performance. More recently, Shofia and Fu'ad (2025) examined computer self-efficacy, competence, and work environment in relation to the performance of 62 educational staff at Universitas Islam Nahdlatul Ulama Jepara. Their quantitative survey demonstrated the relevance of computer self-efficacy and competence to educational-staff performance, providing evidence that the technological and psychological dimensions of work capability should be considered together rather than independently.

Research in educational settings provides further support for this perspective. Sulistiani and Dewi (2024) examined the relationships among teachers' professional technology knowledge, self-efficacy, and technology-integration performance among 103 teachers at MIN 1 Malang City. Using a quantitative descriptive-explanatory design and questionnaire data, the study specifically addressed whether professional technology knowledge and self-efficacy were associated with technology-integration performance. Its focus is particularly relevant to the present study because it demonstrates that technological capability and confidence may operate as complementary dimensions of professional performance in Islamic educational institutions. Likewise, recent Indonesian research involving 200 elementary school teachers examined digitalization, digital competence, self-efficacy, and teaching performance using a quantitative survey and PLS-SEM, further reinforcing the growing empirical interest in the combined contribution of technological and psychological factors to educational performance.

Taken together, the literature establishes three important propositions. First, digital competence or technology mastery has become an increasingly important component of effective educational work because digital systems are embedded in institutional and professional practices. Second, self-efficacy represents a complementary psychological resource that shapes whether individuals are willing and able to apply their technological capabilities effectively. Third, emerging empirical evidence suggests that technological competence and self-efficacy are associated with professional or organizational performance. However, the existing literature has concentrated predominantly on teachers, preservice teachers, university faculty, or general educational staff. Systematic reviews likewise show that research on digital competence has frequently focused on teaching and learning rather than the administrative personnel responsible for maintaining educational information systems (Revuelta-Domínguez et al., 2022).

This concentration creates an important research gap concerning madrasah operators, particularly in localized Indonesian contexts. Madrasah operators perform essential administrative functions but remain comparatively underrepresented in empirical research on digital competence and work performance. Moreover, previous studies have often examined technology competence or self-efficacy separately, while fewer studies directly examine their simultaneous relationship with the performance of educational administrative personnel. Existing research also frequently uses relatively large samples of teachers or employees, leaving limited evidence concerning small, specialized populations such as operators serving madrasahs in rural or geographically localized

settings. The present study addresses this gap by examining whether technology mastery and self-efficacy are individually and jointly associated with madrasah operator performance in Salu Makarra, Luwu, Indonesia. The importance of this inquiry lies in the operator's role in maintaining accurate, timely, and reliable educational administration, where weaknesses in technological capability or confidence may compromise institutional data management and administrative services.

Accordingly, this study aims to analyze the relationships between technology mastery, self-efficacy, and madrasah operator performance. Specifically, it addresses three research questions: (1) Is technology mastery significantly related to madrasah operator performance? (2) Is self-efficacy significantly related to madrasah operator performance? and (3) Are technology mastery and self-efficacy jointly significantly related to madrasah operator performance? Consistent with these questions, the study tests the hypotheses that technology mastery is positively and significantly related to operator performance, self-efficacy is positively and significantly related to operator performance, and technology mastery and self-efficacy jointly demonstrate a positive and significant relationship with operator performance.

To address these questions, the study employs a quantitative correlational design involving all six madrasah operators from MI Istiqamah, MTs Istiqamah, and MA Istiqamah in Salu Makarra. Total sampling is used because the population is small and fully accessible. Data are collected through questionnaires and observation using 30 items distributed across technology mastery, self-efficacy, and operator performance. Descriptive statistics and the Shapiro-Wilk test are used to characterize the data and assess distributional assumptions, while Spearman's rank correlation is employed to examine the two bivariate relationships and multiple linear regression is used to assess the joint relationship. This design is expected to reveal whether stronger technological capability and stronger confidence in personal competence correspond with better operator performance without making causal claims that exceed the correlational design.

The study contributes to the literature in two principal ways. Theoretically, it extends discussion of digital competence and self-efficacy from predominantly teaching-oriented contexts to the relatively underexplored domain of madrasah administrative performance, thereby connecting technological capability with a psychological dimension of professional functioning. Practically, the findings can inform madrasah leaders and educational policymakers in designing professional-development programs that combine technology training with strategies for strengthening operators' confidence and problem-solving capacity. Most importantly, the study provides localized empirical evidence from Indonesian madrasahs and demonstrates how technology mastery and self-efficacy can be considered complementary resources in strengthening educational administration. Thus, rather than treating digital transformation as a matter of infrastructure alone, the study emphasizes the importance of developing the competence and confidence of the personnel who operate digital educational systems.

2. Method

Research Design

This study employed a quantitative correlational design to examine the relationships among technology mastery, self-efficacy, and madrasah operator performance. A correlational design was

selected because the purpose was to determine the direction, strength, and statistical significance of relationships among the constructs rather than to establish causal effects. The study therefore does not interpret the relationships as cause-and-effect relationships. Technology mastery was specified as the first independent construct (X_1), self-efficacy as the second independent construct (X_2), and madrasah operator performance as the dependent construct (Y). The relationships examined were: (1) technology mastery with operator performance; (2) self-efficacy with operator performance; and (3) technology mastery and self-efficacy jointly with operator performance.

Technology mastery was operationalized as the operator's ability to understand, operate, utilize, and troubleshoot technology to support educational administration effectively, efficiently, accurately, and professionally. It was measured through four dimensions: hardware understanding, software mastery, use of educational applications, and technical problem-solving. Self-efficacy was defined as the operator's confidence in organizing, performing, and completing administrative tasks, sustaining effort under pressure and obstacles, and responding constructively to failure. It comprised six dimensions: confidence, self-regulation, resistance to pressure, perseverance, motivation, and response to failure. Madrasah operator performance was defined as the work outcomes achieved in carrying out educational-administration responsibilities, reflected in work quantity, work quality, timeliness, cost efficiency, work independence, and interpersonal impact.

Participants

The study was conducted in madrasahs located in Salu Makarra, Kelurahan Noling, Kecamatan Bupon, Kabupaten Luwu, South Sulawesi, Indonesia, under the management of Yayasan Minasa. The setting was selected because madrasah operators at these institutions perform administrative and educational-data management tasks that require the use of technological devices and educational applications. Data collection was conducted from September to November 2025, covering preparation, instrument development and testing, data collection, data processing and analysis, and report preparation.

The target population comprised all six madrasah operators working in Salu Makarra. Because the population was small and fully accessible, total sampling (census sampling) was employed, meaning that every population member was included as a participant. The final sample therefore consisted of six operators ($n = 6$): two from MI Istiqamah Salu Makarra, two from MTs Istiqamah Salu Makarra, and two from MA Istiqamah Salu Makarra. No eligible population member was excluded from the study.

The participant profile recorded in the manuscript consisted entirely of female operators (6/6; 100%). Four participants (66.7%) were younger than 30 years and two (33.3%) were aged 30–40 years. All participants held bachelor's degrees, while five (83.3%) had worked as operators for 5–10 years and one (16.7%) had more than 10 years of experience. These characteristics were documented to describe the study sample and were not used as additional analytical variables.

Instruments

The principal data-collection instrument was a 30-item questionnaire consisting of 10 items for technology mastery, 10 items for self-efficacy, and 10 items for madrasah operator performance. The questionnaire was constructed from the operational indicators of each construct. Technology mastery items covered hardware understanding, software mastery, educational-application use, and technical problem-solving. Self-efficacy items covered confidence, self-regulation, resistance to

pressure, perseverance, motivation, and response to failure. Performance items covered work quantity, work quality, timeliness, cost efficiency, independence, and interpersonal impact.

A four-point Likert scale was used. Positive statements were scored from 4 (strongly agree/very often) to 1 (strongly disagree/very rarely), whereas negatively worded statements were reverse-scored from 1 to 4. The questionnaire did not provide a neutral midpoint, requiring respondents to indicate a directional response. The instrument was administered as a checklist.

To reduce potential bias associated with self-assessment, different sources were used for different constructs. The technology mastery and performance questionnaires were completed by the respective madrasah heads, who were considered knowledgeable about operators' work and technology use, whereas the self-efficacy questionnaire was completed by the operators themselves, because self-efficacy represents an individual's subjective assessment of personal capability.

Two supplementary instruments were also used: an observation sheet and a documentation checklist. Observation was used to record the work environment, technology use, administrative activities, computer equipment, and internet facilities. Documentation was used to collect relevant institutional materials, including madrasah profiles, operator records, administrative documents, and work reports. These sources provided contextual information and did not constitute the primary basis for scoring the three study constructs.

Instrument quality was assessed before the main data collection. Content validity was established through expert judgment by the academic supervisors and designated validators, who reviewed item relevance to the indicators, wording clarity, language, and construct representation. Items were revised according to the reviewers' recommendations before administration. Internal consistency was assessed using Cronbach's alpha in SPSS, with an alpha value greater than 0.70 specified as the criterion for acceptable reliability.

Data Collection

Data collection followed a chronological sequence. First, the researcher prepared the research design and operational definitions for the three constructs. Second, questionnaire items were developed from the specified indicators and subindicators. Third, the draft instrument was submitted for expert review to assess content validity, after which wording and other aspects of the items were revised according to the validators' recommendations. Fourth, the revised instrument was subjected to reliability testing using Cronbach's alpha.

Fifth, after the instrument had been judged suitable for use, the researcher collected data from the six operators and the corresponding madrasah heads. The self-efficacy questionnaire was completed by operators, while the technology-mastery and performance questionnaires were completed by madrasah heads. Sixth, the researcher conducted direct observations of the operators' work environment, technology use, administrative activities, and supporting facilities. Seventh, relevant institutional documentation was collected to supplement the questionnaire and observation data.

Finally, completed questionnaires were compiled, coded, and entered into Statistical Product and Service Solutions (SPSS) for statistical processing. The collected data were then organized according to the three predefined constructs and prepared for descriptive, assumption, and inferential analyses.

Data Analysis

All quantitative analyses were conducted using SPSS. The analytical sequence was organized to correspond to the research questions: descriptive analysis was conducted first, followed by assessment of data distribution, bivariate relationship testing, and joint relationship analysis.

First, descriptive statistics were calculated for technology mastery, self-efficacy, and operator performance. The analysis included sample size, minimum and maximum scores, range, mean, standard deviation, and variance. Because each construct contained 10 four-point Likert items, the maximum ideal score for each construct was 40. Mean scores were converted into percentage achievement relative to the ideal maximum and classified using five categories: 85–100% = very high, 65–84% = high, 55–64% = moderate, 35–54% = low, and 0–34% = very low.

Second, the Shapiro–Wilk test was used to assess the distribution of each construct because the sample consisted of only six participants. A significance level of $\alpha = .05$ was applied: $p > .05$ indicated a normally distributed variable, whereas $p < .05$ indicated a departure from normality.

Third, the relationships between technology mastery and operator performance and between self-efficacy and operator performance were tested using Spearman's rank-order correlation (ρ). This nonparametric procedure was selected because of the very small sample and the distributional characteristics of the data. The correlation coefficient was used to determine the direction and strength of each relationship, while the two-tailed significance test assessed statistical significance. The decision criterion was $p < .05$. Positive coefficients indicated relationships in the same direction, whereas negative coefficients indicated relationships in opposite directions. The manuscript classified coefficients of 0.81–1.00 as very strong, 0.61–0.80 as strong, 0.41–0.60 as moderate, 0.21–0.40 as weak, and 0.00–0.20 as very weak.

Fourth, the joint relationship of technology mastery and self-efficacy with operator performance was examined using multiple linear regression, with operator performance specified as the dependent variable and technology mastery and self-efficacy as the predictors. The multiple correlation coefficient (R) was used to characterize the strength of the joint relationship, while the F statistic and its significance value from the ANOVA table were used to assess the statistical significance of the overall model at $\alpha = .05$. The coefficient of determination (R^2) was additionally examined to quantify the proportion of variation in operator performance statistically accounted for by the two predictors jointly. Consistent with the correlational design, R^2 was not interpreted as evidence of causation.

Ethical Considerations

The manuscript specifies the use of questionnaires, observation, and institutional documentation and identifies the participating institutions and respondents. However, the source manuscript does not provide explicit information regarding institutional ethical approval, a named research ethics committee, written informed consent, or a formal confidentiality/anonymization protocol. These details therefore should not be invented in the article.

3. Results

Participant Characteristics

The study included six madrasah operators ($n = 6$) from three educational levels: MI Istiqamah Salu Makarra, MTs Istiqamah Salu Makarra, and MA Istiqamah Salu Makarra, with two operators

representing each institution. All six participants were women (100%). Four participants (66.7%) were younger than 30 years, while two (33.3%) were aged 30–40 years. All participants held bachelor's degrees. Regarding work experience, five participants (83.3%) had worked as madrasah operators for 5–10 years, while one participant (16.7%) had more than 10 years of experience.

Instrument Reliability

The questionnaire comprised 30 items, with 10 items allocated to each of the three constructs. Internal consistency was assessed using Cronbach's alpha. The technology mastery scale produced an alpha coefficient of 0.795, the self-efficacy scale produced 0.931, and the madrasah operator performance scale produced 0.945. All three coefficients exceeded the study's predefined threshold of 0.70.

Table 1. Reliability of the Research Instruments

Construct	Items	Cronbach's α	Criterion
Technology mastery	10	0.795	> 0.70
Self-efficacy	10	0.931	> 0.70
Madrasah operator performance	10	0.945	> 0.70

Descriptive Results

Descriptive statistics were calculated for the three study constructs. Technology mastery had scores ranging from 28 to 36, with a mean of 31.50, standard deviation of 3.082, and variance of 9.500. Self-efficacy ranged from 26 to 39, with a mean of 28.67, standard deviation of 5.125, and variance of 26.267. Madrasah operator performance ranged from 28 to 40, with a mean of 32.67, standard deviation of 4.633, and variance of 21.467.

Table 2. Descriptive Statistics

Construct	N	Minimum	Maximum	Mean	SD	Variance	Category
Technology mastery	6	28	36	31.50	3.082	9.500	High
Self-efficacy	6	26	39	28.67	5.125	26.267	High
Operator performance	6	28	40	32.67	4.633	21.467	High

Based on the mean scores relative to the maximum possible score of 40, technology mastery reached 78.75%, self-efficacy reached 71.68%, and operator performance reached 81.68%. All three constructs were classified within the high category.

Normality Test

The Shapiro–Wilk test was conducted because of the small sample size. Technology mastery had a significance value of 0.755, and operator performance had a value of 0.516. Self-efficacy produced a significance value of 0.001.

Table 3. Shapiro–Wilk Normality Test

Construct	df	p	Distribution
Technology mastery	6	0.755	Normal
Self-efficacy	6	0.001	Non-normal
Operator performance	6	0.516	Normal

Relationship Between Technology Mastery and Operator Performance

The first research question examined the relationship between technology mastery and madrasah operator performance. Spearman's rank-order correlation produced a correlation coefficient of 0.943 with a two-tailed p-value of 0.005.

Table 4. Spearman Correlation Results

Relationship	Spearman's ρ	p-value	Direction
Technology mastery-operator performance	0.943	0.005	Positive

The obtained p-value was below the .05 significance criterion specified for hypothesis testing. The correlation coefficient was positive and fell within the study's 0.81–1.00 very strong correlation interval.

Relationship Between Self-Efficacy and Operator Performance

The second research question examined the relationship between self-efficacy and madrasah operator performance. Spearman's rank-order correlation yielded a correlation coefficient of 0.820 and a two-tailed p-value of 0.046.

Table 5. Relationship Between Self-Efficacy and Operator Performance

Relationship	Spearman's ρ	p-value	Direction
Self-efficacy-operator performance	0.820	0.046	Positive

The coefficient was positive and fell within the study's 0.81–1.00 very strong correlation interval. The p-value was below the .05 significance criterion.

Joint Relationship of Technology Mastery and Self-Efficacy with Operator Performance

The third research question examined the joint relationship of technology mastery and self-efficacy with madrasah operator performance using multiple linear regression. The model produced a multiple correlation coefficient (R) of 0.943, an R^2 of 0.890, an adjusted R^2 of 0.817, and a standard error of the estimate of 1.983.

Table 6. Multiple Regression Model Summary

R	R^2	Adjusted R^2	Standard Error
0.943	0.890	0.817	1.983

The ANOVA results produced a regression sum of squares of 95.534 and a residual sum of squares of 11.799. The overall model yielded $F(2, 3) = 12.145$, $p = 0.036$.

Table 7. ANOVA for the Multiple Regression Model

Source	SS	df	MS	F	p
Regression	95.534	2	47.767	12.145	0.036
Residual	11.799	3	3.933	—	—
Total	107.333	5	—	—	—

The model's R^2 was 0.890, corresponding to 89.0% of the variance in madrasah operator performance statistically accounted for jointly by technology mastery and self-efficacy in the fitted model. The remaining 11.0% was not accounted for by these two predictors within the model.

Summary of Hypothesis Testing

The results of all three hypothesis tests are summarized below.

Table 8. Summary of Hypothesis Testing

Hypothesis	Analysis	Statistic	p-value	Result
H1: Technology mastery-performance	Spearman correlation	$\rho = 0.943$	0.005	Supported
H2: Self-efficacy-performance	Spearman correlation	$\rho = 0.820$	0.046	Supported
H3: Technology mastery + self-efficacy-performance	Multiple regression	$F = 12.145$; $R = 0.943$; $R^2 = 0.890$	0.036	Supported

Overall, all three prespecified hypotheses met the study's $p < .05$ decision criterion. Editorial note for the manuscript: I have kept this Results section strictly descriptive. In particular, the 89.0% figure is reported as variance statistically accounted for by the model, rather than as a causal effect. This is important because the underlying study is correlational and uses only six participants.

4. Discussion

The study shows that madrasah operators reported relatively strong levels of technology mastery, self-efficacy, and work performance, and that the three constructs were closely connected. The strongest bivariate relationship was found between technology mastery and operator performance, while self-efficacy also demonstrated a strong positive relationship with performance. When considered together, technology mastery and self-efficacy formed a statistically significant model that accounted for a large proportion of the observed variation in operator performance. Thus, H1, H2, and H3 were all supported. Importantly, these findings should be understood as evidence of association rather than causation because the study employed a correlational design.

The first hypothesis proposed that technology mastery would be positively related to madrasah operator performance, and H1 was supported. The finding suggests that technology mastery is not merely an auxiliary skill for operators but is closely connected with their capacity to perform administrative work in a digitally mediated environment. Madrasah operators increasingly work with digital applications, institutional databases, online reporting systems, electronic documents, and communication platforms. Consequently, administrative performance depends partly on whether operators can translate technological knowledge into accurate, timely, and independent work practices.

This relationship can be interpreted through the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness and perceived ease of use in technology-related behavior. Although the present study did not directly measure these TAM constructs, technology mastery provides an important capability foundation for using technology in actual work settings. An operator who understands hardware, software, educational applications, and basic technical troubleshooting is better positioned to navigate digital administrative requirements. In practical

terms, when an online reporting platform changes its interface or encounters a technical problem, an operator with stronger technological capability may be better equipped to identify the problem, select an appropriate response, and continue the administrative process.

The result is consistent with recent evidence linking digital competence with professional functioning. Farah et al. (2023), for example, examined digital competence and organizational performance using a quantitative SEM-PLS approach and identified digital competence as an important component in explaining organizational performance. Similarly, research on educational staff has identified digital competence as an important performance-related issue and recommended targeted digital-competence development as a response to performance gaps in increasingly digitalized organizations.

The present finding also extends previous research because the focus is not on teachers' instructional technology use but on madrasah administrative personnel. This distinction is important. Much of the digital-competence literature evaluates technology in relation to teaching, learning, or pedagogical practice. For example, Tzafilkou et al. (2023) developed an instrument for assessing teachers' digital competence across pedagogical and professional activities using data from 845 primary and secondary teachers. In contrast, the present study situates technology mastery within administrative work, where the expected outcomes involve data management, reporting, accuracy, timeliness, and institutional service. The consistency across these contexts strengthens the broader proposition that digital competence is increasingly embedded in professional performance, while the difference in occupational role demonstrates the need to examine technology capability beyond classroom practice.

The second hypothesis proposed a positive relationship between self-efficacy and operator performance, and H2 was supported. The finding indicates that technical capability alone does not fully characterize the human capacity required for effective administrative work. Operators must also believe that they can complete demanding tasks, persist when encountering obstacles, regulate their responses under pressure, and recover from mistakes or failures.

This pattern is particularly compatible with Bandura's Social Cognitive Theory, in which self-efficacy is a central personal factor influencing behavioral choices, effort, persistence, and responses to difficulties. In the madrasah context, administrative tasks can involve deadlines, changing application requirements, data-entry errors, unstable internet connections, and unfamiliar digital functions. Self-efficacy can therefore operate as a psychological resource that supports sustained engagement with such demands. The relevant mechanism is not that confidence automatically produces competence, but that stronger perceived capability may encourage individuals to persist in applying what they know when work becomes difficult.

The finding is consistent with recent empirical research. Shofia and Fu'ad (2025), studying 62 educational staff members at Universitas Islam Nahdlatul Ulama Jepara, found that computer self-efficacy and competence were significantly associated with staff performance. Their findings are particularly relevant because they concern educational administrative personnel rather than classroom teachers, providing a closer occupational comparison with the present study.

The finding is also consistent with studies connecting self-efficacy and digital competence in educational contexts. Wang and Chu (2023), using data from 525 Chinese higher-education teachers, found that self-efficacy was positively related to digital competence and that it mediated the

relationship between facilitating conditions and digital competence. Dai (2023), using SEM with 425 English preservice teachers, similarly reported positive associations between ICT self-efficacy and digital competence. These studies do not directly measure operator performance, but they support the theoretical proposition that confidence in technological capability is connected to how individuals engage with digital work.

An important difference, however, concerns the direction of the relationship being investigated. Much previous research examines whether self-efficacy predicts digital competence or technology use, whereas the present study examines its relationship with work performance. This distinction suggests that self-efficacy may be relevant not only to technology adoption but also to the quality of professional functioning once technology has become embedded in routine work.

The third hypothesis proposed that technology mastery and self-efficacy would jointly be related to operator performance, and H3 was supported. The combined finding is theoretically important because it indicates that technological capability and psychological confidence should not necessarily be treated as isolated dimensions of professional competence. Effective digital administration requires both the capacity to perform the technological task and the confidence to apply that capacity when facing real work demands.

This complementary interpretation helps explain why technology training alone may not be sufficient. An operator may understand how an application works but hesitate when faced with an unexpected error. Conversely, an operator may have high confidence but insufficient technical knowledge to complete a complex administrative procedure. The combination of capability and confidence provides a more complete explanation of effective technology-supported work. Recent Indonesian evidence similarly suggests that digital competence and self-efficacy are intertwined with educational performance. Afrizal et al. (2025), for example, examined 200 Indonesian elementary teachers and reported relationships among digitalization, digital competence, self-efficacy, and teaching performance, with self-efficacy playing a mediating role in the proposed model.

The present study nevertheless differs substantially in population and analytical scale. The earlier study involved 200 teachers and used PLS-SEM, whereas this research involved the complete population of six madrasah operators in one localized setting and used correlation and regression procedures. Therefore, the findings should not be interpreted as evidence that the same model will necessarily produce the same magnitude of association in larger or different populations. Instead, the convergence of findings across different educational occupations provides preliminary support for viewing technological capability and self-efficacy as complementary components of professional functioning.

A particularly noteworthy aspect is the relatively large proportion of performance variation statistically accounted for by the two predictors in the present sample. This result should be interpreted cautiously. With only six participants, the estimate is highly sensitive to individual observations and should not be generalized as a population effect size. Nevertheless, it provides an empirically testable proposition for future research: to what extent do technological competence and self-efficacy jointly explain administrative performance when tested in larger and more diverse samples of madrasah operators?

Theoretically, the study contributes by bringing together two complementary perspectives. TAM helps explain the technological dimension of administrative work, whereas Social Cognitive Theory provides a framework for understanding the personal-confidence dimension. The findings suggest that research on digital transformation in education can benefit from moving beyond a purely technology-centered perspective. Digital transformation involves not only access to devices and systems but also the competence and psychological readiness of the personnel expected to operate them.

The study also extends digital-competence research into an underexplored administrative context. Existing research has largely emphasized teachers and instructional technology, whereas operators are critical actors in maintaining institutional data and digital administration. The present findings therefore broaden the unit of analysis for educational digitalization research from the classroom to the wider organizational infrastructure of educational institutions.

Practically, madrasah leaders should design professional development that integrates technical training and self-efficacy development rather than treating them as separate interventions. Training can combine hands-on practice with real administrative applications, troubleshooting exercises, peer mentoring, simulations of reporting deadlines, and guided problem-solving. Institutions should also provide reliable infrastructure and opportunities for operators to practice new digital systems before they are required to use them independently. Such recommendations are consistent with recent evidence emphasizing professional development and institutional support for strengthening digital competence.

At the policy level, training programs for madrasah operators should therefore evaluate more than attendance or completion. Competency-based programs could assess whether operators can independently complete authentic administrative tasks and whether they demonstrate confidence when encountering technological difficulties. This approach would align professional development more closely with actual performance requirements.

Several limitations should be considered when interpreting the findings. First, the sample was extremely small. Only six operators participated, representing the entire accessible population in the selected setting. Although total sampling was appropriate for this localized population, the small *n* substantially limits statistical power and external validity. The findings should therefore not be generalized to Indonesian madrasah operators as a whole.

Second, the study used a cross-sectional correlational design. Data were collected at one period and no variables were experimentally manipulated. Consequently, the observed relationships cannot establish causal direction. It remains possible, for example, that stronger performance contributes to greater technology mastery or self-confidence, rather than the relationship operating exclusively in the opposite direction.

Third, measurement relied substantially on questionnaire data. Although technology mastery and performance were rated by madrasah heads and self-efficacy was assessed by operators, questionnaire responses may still be affected by social-desirability or halo effects. Objective indicators such as data-entry accuracy, reporting timeliness, system-log records, or documented administrative errors could provide additional evidence.

Fourth, the study was geographically and institutionally bounded. Participants came from three madrasahs within the same local educational environment. Differences in infrastructure,

leadership, workload, training opportunities, internet access, institutional culture, and administrative systems may produce different relationships elsewhere.

Fifth, the statistical model was necessarily parsimonious. Only technology mastery and self-efficacy were examined as predictors of performance. Other potentially relevant factors including leadership support, workload, infrastructure quality, organizational climate, training, motivation, and digital-system usability were not included.

Future research should address these limitations through larger, multisite studies involving madrasah operators from different regions, institutional types, and geographic settings. A useful research question would be: Does the relationship between technology mastery, self-efficacy, and operator performance remain stable across urban, rural, public, and private madrasahs?

Second, longitudinal studies could examine whether improvements in technology training and self-efficacy precede improvements in operator performance. Experimental or quasi-experimental research could further test whether integrated professional-development programs produce measurable gains in both technological competence and administrative performance.

Third, future researchers should incorporate objective performance indicators, such as reporting accuracy, completion time, number of administrative corrections, system utilization records, and supervisor evaluations. Such measures could reduce common-method and self-report bias.

Fourth, larger samples would permit more sophisticated models examining potential mediation and moderation mechanisms. For example, future studies could ask whether self-efficacy mediates the relationship between technology mastery and performance, or whether infrastructure quality, leadership support, or training moderates that relationship. This would build upon evidence that self-efficacy can function as an important mechanism connecting contextual support, digital competence, and professional outcomes.

Finally, qualitative or mixed-method research could investigate how operators actually experience technological demands in their daily work. Interviews and observations could reveal which specific digital tasks create the greatest difficulty, how operators develop confidence, and what forms of institutional support most effectively facilitate performance.

Overall, the study demonstrates that madrasah operator performance is closely connected to both what operators can do with technology and how confidently they approach their work. The findings support all three research hypotheses and extend existing digital-competence and self-efficacy scholarship from predominantly instructional settings to educational administration. The principal contribution is therefore not simply the identification of statistical relationships, but the proposition that digital transformation in madrasahs should be understood as a human-capability process involving technological competence and psychological readiness. While the small, localized sample requires cautious interpretation, the findings provide a valuable empirical foundation for developing larger studies and for designing professional-development policies that strengthen both the technological capabilities and self-efficacy of the personnel responsible for sustaining digital educational administration.

5. Conclusion

This study examined the relationships between technology mastery, self-efficacy, and madrasah operator performance in Salu Makarra, Luwu, Indonesia, with the purpose of determining whether technological capability and confidence in personal competence were associated with effective administrative performance. The findings provide consistent evidence that both constructs are closely related to the performance of madrasah operators.

First, technology mastery was strongly and positively associated with operator performance, supporting H1 and indicating that technological capability is closely connected with effective execution of administrative responsibilities. Second, self-efficacy was strongly and positively associated with operator performance, supporting H2 and demonstrating the importance of operators' confidence, persistence, and perceived capability in carrying out their work. Third, technology mastery and self-efficacy jointly demonstrated a significant relationship with operator performance, supporting H3 and indicating that technological and psychological capabilities should be considered together when understanding administrative performance.

The study contributes theoretically by extending research on digital competence and self-efficacy from predominantly instructional contexts to the administrative domain of madrasah education. Practically, the findings suggest that madrasah leaders and policymakers should develop professional-development programs that integrate hands-on technology training, technical problem-solving, mentoring, and activities that strengthen operators' confidence in handling digital administrative tasks. Adequate technological infrastructure and continuous opportunities for practice should accompany such programs.

Future research should replicate the study with larger and more diverse samples across different madrasahs and regions, incorporate objective performance indicators, and employ longitudinal or mixed-method designs to examine how technology mastery and self-efficacy develop over time and interact with organizational factors.

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