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Digital Management Information Systems, Bureaucratic Friction, and Instructional Leadership Efficacy among Public Secondary School Leaders in Division I of Manila

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Abstract

This quantitative research investigates the relationship between **Digital Management Information Systems (DMIS)**, **Bureaucratic Friction (BF)**, and **Instructional Leadership Efficacy (ILE)** among public secondary school leaders in Division I of Manila. Utilizing a structured survey instrument administered to $N = 25$ **public school administrators** (comprising Assistant Principals, Head Teachers, OICs, and Master Teachers), the study measures core constructs across five-point Likert scales. Descriptive statistical analysis indicates high levels of **DMIS implementation** ($\bar{X} = 3.86, SD = 0.60$) and **Instructional Leadership Efficacy** ($\bar{X} = 4.42, SD = 0.60$), accompanied by moderate **Bureaucratic Friction** ($\bar{X} = 3.44, SD = 0.60$). Pearson correlation and Multiple Linear Regression demonstrate that DMIS adoption significantly and strongly predicts Instructional Leadership Efficacy ($r = 0.881, \beta = 0.842, p < 0.001$), accounting for 78.2% of the variance in leadership performance ($R^2 = 0.782, F = 39.53$). Bureaucratic friction shows a moderate positive baseline correlation ($r = 0.508$), but its direct predictive effect weakens when controlling for DMIS integration. The findings underscore that digital management tools serve as a primary catalyst for streamlining administrative workflows and enhancing instructional supervision.

1. Introduction

Public school managers within the Department of Education (DepEd) face an increasingly complex administrative landscape. Modern school leaders are expected to maintain stringent regulatory compliance while delivering effective instructional supervision, teacher mentoring, and curriculum oversight.

Digital Management Information Systems (DMIS)—such as the Learner Information System (LIS), enhanced Basic Education Information System (eBEIS), and Personnel Management Information System (PMIS)—were introduced to streamline administrative record-keeping and data submission. However, **Bureaucratic Friction (BF)**, manifested as redundant physical sign-offs, duplicative reporting, and administrative backlogs, continues to compete for school leaders' operational bandwidth.

This study examines the structural impact of DMIS and Bureaucratic Friction on **Instructional Leadership Efficacy (ILE)** among 25 public secondary school leaders in Division I of Manila.

Research Questions

1. What is the demographic profile of the respondents in terms of age, sex, educational attainment, administrative position, and years of experience?
2. What are the perceived levels of:
   - **Digital Management Information Systems (DMIS)** implementation?
   - **Bureaucratic Friction (BF)** experienced in school workflows?
   - **Instructional Leadership Efficacy (ILE)**?
3. Is there a significant relationship between DMIS implementation, Bureaucratic Friction, and Instructional Leadership Efficacy?
4. To what extent do DMIS and Bureaucratic Friction predict Instructional Leadership Efficacy?

2. Methods

2.1 Study Design and Population

A descriptive-correlational research design was employed. Data were gathered from $N = 25$ **public secondary school leaders** across Division I of Manila (Eulogio "Amang" Rodriguez Institute of Science and Technology research framework).

2.2 Profile of Respondents ($N = 25$)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Age Group	25–34 years old	4	16.0%
	35–44 years old	13	52.0%
	45–54 years old	8	32.0%
Sex	Female	16	64.0%
	Male	7	28.0%
	Prefer not to say	2	8.0%
Educational Attainment	Master's Degree (Units/Completed)	16	64.0%
	MA in Management/Supervision	7	28.0%
	Doctoral Units / EdD / PhD	2	8.0%
Administrative Position	OIC Master Teacher I / II	19	76.0%
	Head Teacher / OIC	4	16.0%

Demographic Variable	Category	Frequency (f)	Percentage (%)
	Assistant Principal	2	8.0%
Administrative Experience	Less than 3 years	6	24.0%
	3 to 5 years	5	20.0%
	6 to 10 years	8	32.0%
	More than 10 years	6	24.0%

2.3 Data Gathering Instrument & Data Analysis

A 48-item validated research questionnaire was used, utilizing a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Data were processed using Python (pandas, statsmodels). Mean scores, Standard Deviations (SD), Pearson Correlation Coefficients (r), and Multiple Linear Regression (OLS) were calculated.

3. Results

3.1 Descriptive Evaluation of Variables

Variable / Sub-construct	Mean ($\bar{X}$)	SD	Verbal Interpretation
I. Digital Management Information Systems (DMIS)	**3.86**	**0.60**	**High Implementation**
* System Adoption & Technological Integration	3.86	0.61	High Implementation
* System Functionality & Data Integrity	3.82	0.58	High Implementation
* Operational Utilization & Decision Support	3.90	0.62	High Implementation
II. Bureaucratic Friction (BF)	**3.44**	**0.60**	**Moderate Friction**
* Administrative Bottlenecks & Delays	3.32	0.61	Moderate Friction
* Red Tape & Regulatory Burden	3.57	0.62	High Friction
III. Instructional Leadership Efficacy (ILE)	**4.42**	**0.60**	**Very High Efficacy**
* Curriculum Oversight & Academic Planning	4.29	0.62	High Efficacy

Variable / Sub-construct	Mean ($\bar{X}$)	SD	Verbal Interpretation
* Teacher Performance Oversight & Mentoring	4.42	0.59	Very High Efficacy
* Instructional Feedback & Coaching	4.56	0.60	Very High Efficacy

3.2 Correlation Analysis

Variables	Pearson r	p-value	Interpretation
DMIS ↔ Instructional Leadership Efficacy	**0.881**	**< 0.001**	Strong Positive Correlation (Statistically Significant)
Bureaucratic Friction ↔ Leadership Efficacy	**0.508**	**0.009**	Moderate Positive Correlation
DMIS ↔ Bureaucratic Friction	**0.505**	**0.010**	Moderate Positive Correlation

3.3 Regression Analysis Model ($R^2 = 0.782, F = 39.53, p < 0.001$)

$$ILE = 0.8789 + 0.8423(DMIS) + 0.0842(BF)$$

- **DMIS Effect:** $\beta = 0.8423$, $t = 7.279$, $p < 0.001$ (**Significant Predictor**)
- **Bureaucratic Friction Effect:** $\beta = 0.0842$, $t = 0.733$, $p = 0.471$ (Non-significant direct predictor when controlling for DMIS)

4. Discussion

4.1 Digital Management Information Systems as a Catalyst for Instructional Leadership

The findings demonstrate a strong, positive relationship between the adoption of Digital Management Information Systems and Instructional Leadership Efficacy ($r = 0.881, \beta = 0.842, p < 0.001$). The highest individual item rating under DMIS was the utilization of official platforms like LIS, eBEIS, and PMIS ($\bar{X} = 4.36$). Furthermore, school leaders reported high compliance in retrieving historical records ($\bar{X} = 4.00$) and utilizing automated tools to reduce manual auditing time ($\bar{X} = 3.96$).

When administrative record-keeping is digitized, school managers experience a reduction in manual processing hours. This administrative efficiency directly translates into higher leadership engagement in instructional supervision. Consequently, respondents reported high ratings in post-observation reflective dialogues ($\bar{X} = 4.72$), establishing collaborative feedback environments ($\bar{X} = 4.60$), and encouraging digital tool integration in daily teaching ($\bar{X} = 4.56$).

4.2 The Role of Bureaucratic Friction

Bureaucratic Friction recorded an overall mean of 3.44 (Moderate Friction). Sub-construct analysis reveals that **Red Tape & Regulatory Burden** ($\bar{X} = 3.57$) imposes a greater operational constraint than **Administrative Bottlenecks** ($\bar{X} = 3.32$). Specific procedural pain points identified include duplicative reporting requirements across multiple formats ($\bar{X} = 3.68$), rigid compliance protocols limiting

emergency operational flexibility ($\bar{X} = 3.68$), and unexpected shifts in division compliance guidelines ($\bar{X} = 3.56$).

In the multiple regression model, Bureaucratic Friction lost its statistical significance ($\beta = 0.0842, p = 0.471$) when analyzed alongside DMIS. This indicates that while administrative red tape exists within public school governance, effective DMIS implementation buffers its negative impacts. Automated governance platforms allow administrators to fulfill compliance demands without sacrificing instructional supervision time.

4.3 Contextualizing System Integration Challenges

While overall DMIS adoption is strong, specific technical constraints were noted:

- **System Stability & Downtime:** Technical glitches and system downtime recorded a mean of 3.44, representing the lowest score in the DMIS construct.
- **Infrastructure Support:** Hardware, software, and internet infrastructure adequacy received a mean score of 3.68.
- **Digital Literacy & Training:** Personnel digital readiness recorded a mean score of 3.76.

These results highlight that system stability and IT infrastructure remain key areas for improvement to maintain the operational benefits of DMIS.

5. Conclusion

This research demonstrates that Digital Management Information Systems (DMIS) play a key role in supporting Instructional Leadership Efficacy among public secondary school leaders in Division I of Manila.

1. **DMIS drives leadership performance:** System adoption accounts for 78.2% of the variance in Instructional Leadership Efficacy ($R^2 = 0.782$). Digitizing administrative data allows school leaders to allocate more time to classroom observation, teacher mentoring, and instructional feedback.
2. **Buffering administrative friction:** While procedural red tape and duplicative reporting persist ($\bar{X} = 3.57$), robust DMIS integration helps mitigate these administrative burdens, preventing them from hindering instructional supervision.
3. **Addressing technical infrastructure gaps:** Sustaining long-term leadership efficacy requires addressing recurring technical glitches ($\bar{X} = 3.44$) and improving school-level IT infrastructure ($\bar{X} = 3.68$).

6. Recommendations

1. **System Integration & Unified Portals:** Standardize DepEd digital platforms (LIS, eBEIS, PMIS) into an integrated single-sign-on dashboard to eliminate duplicative data entry across formats.
2. **Targeted IT Infrastructure Investment:** Upgrade connectivity and digital hardware in public secondary schools to minimize system downtime during peak reporting periods.
3. **Continuous Professional Development:** Provide specialized analytics and digital management training for Master Teachers and Head Teachers handling administrative duties.
4. **Policy Streamlining:** Re-evaluate administrative compliance rules to eliminate redundant physical sign-offs when digital records are already verified online.