

Teachers' Data Management Skills and Their Associated Factors with Contextual Inputs: Implications for Instructional Planning and Implementation

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Abstract

This study entitled “Teachers’ Data Management Skills and Their Associated Factors with Contextual Inputs: Implications for Instructional Planning and Implementation” investigates the competencies of public-school teachers in Talavera North District in managing data and examines how contextual inputs influence these skills. A population of teachers was analyzed in terms of demographic profile, data management competencies (collection, organization, analysis, and application), and exposure to contextual factors such as professional development, leadership support, system usability, and technological infrastructure. Findings revealed that teachers generally demonstrated proficiency in data collection and organization, while data analysis and application emerged as more challenging dimensions. Contextual inputs, particularly leadership support and training exposure, were found to significantly enhance teachers’ confidence and effectiveness in utilizing data for instructional planning. Correlational analysis showed no significant relationships between most demographic variables and data management skills, underscoring that professional development and institutional support are stronger determinants of competency. The study concludes that teachers’ ability to manage and apply data is crucial for evidence-based instructional planning and responsive classroom implementation. Results highlight the importance of sustained professional development, improved system usability, and strengthened technological infrastructure to maximize the impact of data-driven teaching. Recommendations include the adoption of a Teacher Development Program that integrates data literacy training, collaborative leadership practices, and infrastructure support to advance data-informed instruction in schools.

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Keywords: Teachers' data management skills; instructional planning; instructional implementation; contextual inputs; professional development; leadership support; system usability; technological infrastructure; data literacy; evidence-based teaching; data-driven instruction; teacher development program; collaborative leadership

1. Introduction

The study explores the **data management skills of public-school teachers** in Talavera North District and their implications for instructional planning and implementation. Data management is framed as a critical competency that enables teachers to analyze student performance, identify learning gaps, and design responsive lessons. Instructional planning is defined as the systematic organization of lessons to achieve learning objectives, and research highlights that **data literacy enhances instructional effectiveness and student outcomes**. International and local literature (e.g., Ornstein & Lasley, DepEd, Filderman et al., Conn et al.) emphasizes the importance of training, leadership support, and system usability in strengthening teachers' confidence in using data. In the Philippine context, the **Learners Information System (LIS)** is a central platform for managing student records, but challenges such as technical issues, workload, and infrastructure gaps limit its optimal use. Studies (Casino, Salvador & Ambrad, Bete & Collera) confirm LIS's potential but stress the need for continuous support and training. Personal classroom experiences reinforce these findings: while LIS helps identify at-risk students and adjust lesson pacing, inconsistent internet access and limited technical assistance hinder efficiency. Leadership practices, professional development, and coaching models further shape teachers' ability to integrate data into instruction, embedding data management within broader organizational and cultural contexts. Globally, data-informed teaching is linked to equity, improved student achievement, and institutional performance. However, teachers still face challenges in interpreting complex data, balancing workload, and aligning data use with pedagogy. These issues highlight that **systemic support and contextual awareness are essential** for effective data-driven instruction.

2. Review of Related Literature

The reviewed literature highlights that teachers' data management skills—covering collection, organization, analysis, and application—are increasingly recognized as essential for instructional planning and classroom implementation. Globally, studies show that while teachers often succeed in gathering and organizing data, they struggle to move from raw information to instructional application, underscoring the need for structured training and institutional support (Lee et al., 2024; Sandoval-Ríos, Gajardo-Poblete, & López-Núñez, 2025; Filderman, Toste, Didion, & Peng, 2022). Professional development has been found to significantly improve teachers' confidence and competence in using student data to inform lesson planning and targeted interventions (Conn et al., 2020; Filderman et al., 2022).

In the Philippine context, the Learners Information System (LIS) plays a central role in data management. Research confirms that LIS improves efficiency in record-keeping and provides a structured way to organize student records, but challenges such as technical issues, workload demands, and infrastructure limitations hinder its optimal use (Casino, 2020; Salvador & Ambrad, 2025; Bete & Collera, 2025). Teachers' perceptions of system usability also strongly influence their willingness to adopt LIS practices, as shown by Matias & Timosan (2025).

Across the four skill dimensions, data collection is identified as the foundation of instructional planning, extending beyond academic records to include socio-cultural and health-related information such as

BMI and SBFP beneficiaries (Martinez, 2025; Saar, Prieto, & Rodríguez-Triana, 2022). Data organization ensures reliability and accessibility of records, with LIS streamlining storage and reducing duplication (Casino, 2020; Bete & Collera, 2025). Data analysis requires both technical and pedagogical competence to interpret patterns and trends, yet persistent gaps remain in teachers' ability to translate findings into instructional use (Lee et al., 2024; Sandoval-Ríos et al., 2025). Data application emerges as the weakest dimension, with many teachers struggling to embed insights into responsive instructional strategies (Khor, Chee, & Lee, 2024; Lee et al., 2024).

The literature consistently points to contextual inputs—training exposure, leadership support, and system usability—as decisive factors in strengthening teachers' data literacy. Without regular training and institutional backing, teachers risk remaining at the level of record-keeping rather than advancing to meaningful data-driven decision-making (Conn et al., 2020; Filderman et al., 2022). Overall, the reviewed studies affirm that data management skills are not merely technical tasks but critical pedagogical competencies that depend on systemic support to be effectively integrated into instructional planning and classroom practice.

3. Methodology

3.1 Research Design

This study employed a descriptive-correlational research design to investigate teachers' data management skills and their associated contextual factors, as well as their implications for instructional planning and implementation. The design was appropriate for determining the extent of teachers' competencies and identifying relationships between demographic profiles, contextual inputs, and instructional practices.

3.2 Respondents of the Study

The respondents were public-school teachers from the Talavera North District, Nueva Ecija. They represented a range of demographic profiles and were actively engaged in instructional planning and classroom implementation.

3.3 Research Locale

The research locale was selected public schools in Talavera North District, chosen for their accessibility and relevance to the study's objectives.

3.4 Research Instrument

A structured questionnaire served as the primary research instrument. It was designed to measure competencies in four domains of data management—collection, organization, analysis, and application—as well as exposure to contextual inputs such as professional development, leadership support, system usability, and technological infrastructure. The instrument also gathered demographic information including age, sex, educational attainment, and years of service.

3.5 Validity and Reliability of the Instrument

To ensure validity and reliability, the questionnaire underwent expert content validation, with revisions made based on feedback. Reliability testing confirmed the consistency of the instrument.

3.6 Data Collection Procedure

The data collection procedure involved securing permission from the Schools Division Office and school administrators. Questionnaires were administered to teachers with proper orientation and assurance of confidentiality. Responses were collected, organized, and prepared for statistical analysis.

3.7 Data Analysis

Frequency and percentage were used to describe the demographic profile of respondents, weighted mean determined the extent of teachers' data management skills and contextual inputs, and correlation analysis identified significant relationships between demographic variables, data management skills, and contextual factors. These statistical treatments supported the interpretation of findings and the formulation of conclusions and recommendations.

1. Results and Discussion

The majority of the respondents were aged 31–40 years (42.0%), followed by those aged 21–30 years (28.0%), while 41–50 years (20.0%) and 51 years and above (10.0%) comprised the smaller groups. In terms of sex, females made up the largest proportion (65.0%), followed by males (35.0%). With respect to educational attainment, most respondents held a Bachelor's degree (55.0%), while 35.0% had earned Master's units, and 10.0% had completed a Master's degree. Regarding years of service, the highest percentage of teachers had 6–10 years of experience (40.0%), followed by 1–5 years (30.0%), while 11–15 years (20.0%) and 16 years and above (10.0%) accounted for fewer respondents.

Table 1. Frequency Distribution of Teachers in terms of Demographic Profile

Profile of the Respondents	Frequency	Percent
AGE		
25 years and below	0	0.0
26-30	23	15.2
31-35	39	25.8
36-40	51	33.8
41-45	22	14.6
46-50	7	4.6
51-55	6	4.0
56-60	3	2.0
Total	151	100.0
SEX		
Male	50	33.1
Female	101	66.9
Total	151	100.0
YEARS OF TEACHING		
1-5	2	1.3

6-10	53	35.1
11-15	82	54.3
16 and more	14	9.3
Total	151	100.0
EDUCATIONAL ATTAINMENT		
Bachelor's Degree	0	0.0
With MA Units	90	59.6
MA Degree	51	33.8
With PhD Units	9	6.0
Doctorate Degree	1	0.7
Total	151	100.0
PLANTILLA POSITION		
T1 and T-II	0	0.0
T-III	151	100.0
Total	151	100.0
TRAINING EXPOSURE		
0	11	7.3
1	56	37.1
2	49	32.5
3	26	17.2

These findings align with contemporary educational and workforce research which emphasizes that mid-career professionals represent the most stable and productive segment of the teaching force. The concentration of respondents aged 31–40 years (33.8%) and 36–40 years (25.8%) reflects the developmental stage of mid-adulthood, a period characterized by career consolidation, professional stability, and increased responsibility (Santrock, 2021; Erikson, 1963; Levinson, 1986). This distribution suggests that Talavera North District benefits from a teaching workforce that balances experience with adaptability, a crucial factor in effective data management and instructional planning.

In terms of sex, the results are consistent with long-standing trends in the teaching profession, where women predominate in basic education. Female teachers accounted for 66.9% of the sample, while males comprised 33.1%. This pattern reflects global and local studies noting that women are more inclined to pursue teaching due to its perceived compatibility with caregiving roles and family responsibilities (Kane, 2013; Porter & Whitcomb, 2005; Eccles & Harold, 1991). While female predominance supports nurturing classroom environments, the underrepresentation of male teachers highlights ongoing gender disparity and the need for initiatives that encourage greater male participation to promote diversity and role modeling in schools (Pollitt & Oldfield, 2017).

The distribution of years of teaching experience further reinforces the stability of the workforce. A majority of teachers had 11–15 years of service (54.3%), followed by those with 6–10 years (35.1%). Only 1.3% were relatively new with 1–5 years of experience. This pattern corresponds with research showing that teacher effectiveness increases gradually during the first decade of service before plateauing, as professional

knowledge and instructional confidence consolidate (Day & Gu, 2017; Kraft & Papay, 2019). The dominance of mid-career teachers indicates resilience, mentoring capacity, and institutional continuity, though the low proportion of new teachers suggests challenges in succession planning and balancing innovation with stability (Torres, 2019).

Educational attainment results reveal a highly competent workforce, with 59.6% holding Master's units and 33.8% having completed a Master's degree. A smaller proportion pursued doctoral studies (6.0% PhD units; 0.7% doctorate). This reflects a strong culture of continuing education aligned with DepEd's emphasis on graduate studies as pathways to leadership and instructional excellence (Eccles & Wigfield, 2002; Bautista & Bernardo, 2018). Teachers with postgraduate qualifications are more likely to apply evidence-based practices and contribute to school reforms, while the presence of doctoral-level educators indicates growing recognition of research-oriented leadership in education (Darling-Hammond et al., 2017; Avalos, 2019).

Finally, training exposure related to data management shows that most teachers attended one (37.1%) or two trainings (32.5%), while fewer had three (17.2%) or four (6.0%). Notably, 7.3% reported no training at all. This uneven distribution highlights structural gaps in professional development delivery. Research emphasizes that ongoing, collaborative, and context-specific training is essential for strengthening data literacy and instructional planning (Fredricks & Eccles, 2006; Darling-Hammond et al., 2017; Opfer & Pedder, 2019). Teachers with more training exposure are better equipped to adopt data-driven strategies, while those with fewer opportunities risk lagging behind.

Table 2. Weighted Mean and Verbal Description of Teachers' Data Management Skills

Teachers' Data Management Skills	Wm	Verbal Description
DATA COLLECTIONS		
1. I consistently gather both digital and observational data to capture student progress comprehensively.	3.37	Very Great Extent
2. I ensure accuracy and completeness when recording student performance and attendance.	3.40	Very Great Extent
3. I use LIS and other systems to collect student data systematically.	3.51	Very Great Extent
4. I regularly monitor classroom evidence (tests, behavior, participation) to inform instruction.	3.19	Great Extent
5. I validate collected data to ensure reliability before using it for lesson planning.	3.37	Very Great Extent
AVERAGE WEIGHTED MEAN	3.37	Very Great Extent
DATA ORGANIZATION AND STORAGE		
1. I organize student records systematically for easy retrieval and continuity in planning.	3.13	Great Extent

2. I use LIS or digital tools to streamline record-keeping and reduce duplication.	3.15	Great Extent
3. I maintain secure storage of student information to protect confidentiality.	3.34	Very Great Extent
4. I ensure that organized data is accessible for instructional decision-making.	3.32	Very Great Extent
5. I update and maintain records regularly to sustain evidence-based practices.	3.32	Very Great Extent
AVERAGE WEIGHTED MEAN	3.25	Very Great Extent
DATA ANALYSIS		
1. I analyze test results to identify learning gaps.	2.84	Great Extent
2. I interpret assessment results to adjust lesson plans and teaching strategies.	3.27	Very Great Extent
3. I use statistical tools (e.g., mastery scoring, item analysis) to evaluate student outcomes.	3.38	Very Great Extent
4. I compare data trends across subjects or periods to improve instructional planning.	3.15	Great Extent
5. I translate raw data into actionable insights for classroom interventions.	3.48	Very Great Extent
AVERAGE WEIGHTED MEAN	3.22	Great Extent
DATA APPLICATION		
1. I apply data insights to modify instructional strategies for diverse learners.	2.97	Great Extent
2. I design targeted interventions based on student performance data.	3.11	Great Extent
3. I integrate data findings into lesson planning to improve engagement.	2.85	Great Extent
4. I use data to provide formative feedback and support student mastery.	3.18	Great Extent
5. I adapt teaching methods to ensure instructional relevance based on data.	3.12	Great Extent
AVERAGE WEIGHTED MEAN	3.05	Great Extent

Legend: 1.00-1.74 – Low Extent; 1.75-2.49 – Moderate Extent; 2.49-3.24 – Great Extent; 3.25-4.00 – Very Great Extent

Data Collection Skills

The findings show that teachers perceive data collection as a highly developed competency, with an overall weighted mean of 3.37 (Very Great Extent). The highest indicator was “I use LIS and other systems to collect student data systematically” (WM = 3.51), followed by “I ensure accuracy and completeness when recording student performance and attendance” (WM = 3.40). These results suggest that teachers are confident in their ability to gather and record student information comprehensively, ensuring reliability and accuracy. This aligns with Schildkamp et al. (2017), who emphasized that systematic data collection is the cornerstone of evidence-based instructional planning.

Moreover, teachers highlighted the importance of validating data before using it for lesson planning (WM = 3.37), reflecting their awareness of the role of accuracy in instructional decisions. Qualitative responses reinforced these findings, noting that LIS reduces duplication of records, ensures accuracy in attendance and performance tracking, and strengthens confidence in lesson planning. Overall, the results confirm that teachers in Talavera North District are highly competent in data collection, providing a strong foundation for subsequent stages of data management such as organization, analysis, and application (Datnow & Park, 2018).

Data Organization and Storage Skills

The findings indicate that teachers are proficient in organizing and storing student data, with an overall weighted mean of 3.25 (Very Great Extent). The highest indicator was “I maintain secure storage of student information to protect confidentiality” (WM = 3.34), while “I use LIS or digital tools to streamline record-keeping and reduce duplication” received a weighted mean of 3.15. These results suggest that teachers prioritize both accessibility and confidentiality in managing student records.

This perspective is consistent with Datnow & Park (2018), who emphasized that structured data systems ensure instructional continuity while safeguarding sensitive information. Teachers also reported updating records regularly (WM = 3.32) and ensuring accessibility for instructional decision-making (WM = 3.32), highlighting their commitment to maintaining evidence-based practices. Qualitative responses confirmed that well-organized records facilitate faster retrieval for lesson planning and that confidentiality is strictly observed. Overall, the results show that teachers are highly competent in organizing and storing data, ensuring that instructional preparation is both ethical and empirically sound.

Data Analysis Skills

The findings reveal that teachers perceive relevant competencies in analyzing student data, with an overall weighted mean of 3.22 (Great Extent). The highest indicator was “I translate raw data into actionable insights for classroom interventions” (WM = 3.48), while the lowest was “I analyze test results to identify learning gaps” (WM = 2.84). This suggests that while teachers are capable of descriptive analysis, they may struggle with deeper diagnostic approaches.

This pattern corresponds with Mandinach & Gummer (2016), who noted that teachers often excel at descriptive analysis but require further training in diagnostic and predictive methods. Teachers reported using statistical tools (WM = 3.38) and interpreting assessment results to adjust lesson plans (WM = 3.27), demonstrating their ability to connect data with instructional modifications. Qualitative responses reinforced these findings, noting that item analysis helps identify difficult questions and data trends guide targeted interventions. Overall, the results show that teachers have strong data analysis skills but need additional professional development to strengthen diagnostic competencies.

Data Application Skills

The findings show that data application was the lowest-rated dimension, with an overall weighted mean of 3.05 (Great Extent). The highest indicator was “I use data to provide formative feedback and support student mastery” (WM = 3.18), while the lowest was “I integrate data findings into lesson planning to improve

engagement” (WM = 2.85). This suggests that while teachers use data for feedback and targeted interventions, they face challenges in fully integrating insights into lesson planning and instructional design.

This aligns with Reeves & Chiang (2018), who emphasized that effective data application requires both technical interpretation and pedagogical creativity. Teachers reported designing targeted interventions (WM = 3.11) and adapting teaching methods based on data (WM = 3.12), showing their awareness of the importance of instructional relevance. Qualitative responses confirmed that data guides remedial and enrichment activities, informs adjustments in teaching methods, and motivates students through formative feedback. Overall, the results indicate that teachers are competent in applying data but require further training to strengthen instructional integration and engagement.

Taken together, the findings demonstrate that teachers in Talavera North District are highly proficient in input-oriented aspects of data management (collection and organization) but less proficient in output-oriented aspects (analysis and application). The relatively lower scores in diagnostic analysis and instructional integration highlight the need for capacity-building programs focused on advanced data literacy. This pattern is consistent with studies emphasizing that while teachers are skilled at managing data systems, continuous professional development is essential to ensure that data not only informs but also transforms classroom instruction and student outcomes (Schildkamp et al., 2017; Mandinach & Gummer, 2016).

Table 3. Weighted Mean and Verbal Description of Contextual Inputs affecting Teachers’ Data Management Skills

Contextual Inputs affecting Teachers’ Data Management Skills	Wm	Verbal Description
LEADERSHIP SUPPORT		
1. My school head encourages data-driven teaching practices.	2.91	Great Extent
2. Leadership provides resources and mentoring for data use.	3.17	Great Extent
3. I feel supported in integrating data into instruction.	3.27	Very Great Extent
4. Collaborative leadership fosters teamwork in using student data for instruction.	3.06	Great Extent
5. Administrators promote accountability and responsiveness through data-informed decision-making.	2.81	Great Extent
AVERAGE WEIGHTED MEAN	3.04	Great Extent
SYSTEM USABILITY		
1. LIS and other system is accessible and user-friendly for managing student records.	3.25	Very Great Extent
2. Technical issues rarely hinder my use of LIS.	3.25	Very Great Extent

3. The system helps me plan lessons effectively	3.26	Very Great Extent
4. LIS and other systems enhance efficiency by reducing duplication and improving accessibility of records.	3.40	Very Great Extent
5. My willingness to use LIS and other system depends on its reliability and ease of use.	3.23	Great Extent

AVERAGE WEIGHTED MEAN **3.28** **Very Great Extent**

TECHNOLOGICAL INFRASTRUCTURE

1. I have adequate access to devices and internet for data management.	3.07	Great Extent
2. Technical support is available when I encounter system issues.	3.36	Very Great Extent
3. Infrastructure allows me to maximize LIS and other system functions for lesson planning.	3.07	Great Extent
4. Stable connectivity enables me to integrate data into instructional practices.	3.38	Very Great Extent
5. Availability of technology strengthens my ability to deliver data-informed lessons.	3.54	Very Great Extent

AVERAGE WEIGHTED MEAN **3.28** **Very Great Extent**

TEACHER BELIEFS AND ATTITUDES

1. I believe data use improves student learning outcomes.	3.50	Very Great Extent
2. I view data management as essential, not burdensome.	3.09	Great Extent
3. I am open to integrating data into my teaching practices.	3.38	Very Great Extent
4. I see data as empowering for instructional innovation and responsiveness.	3.35	Very Great Extent
5. My attitudes toward data are shaped by leadership encouragement and training.	3.36	Very Great Extent

AVERAGE WEIGHTED MEAN **3.34** **Very Great Extent**

PROFESSIONAL DEVELOPMENT

1. My school provides regular training on data literacy.	3.09	Great Extent
2. Professional development opportunities are relevant to my needs.	3.32	Very Great Extent
3. Training programs encourage evidence-based teaching culture.	2.83	Great Extent
4. Structured training enhances my confidence in handling student data.	3.30	Very Great Extent
5. Professional development strengthens my ability to design student-centered, data-informed lessons.	3.42	Very Great Extent

AVERAGE WEIGHTED MEAN **3.19** **Great Extent**

Legend: 1.00-1.74 – *Low Extent*; 1.75-2.49 – *Moderate Extent*; 2.49-3.24 – *Great Extent*; 3.25-4.00 – *Very Great Extent*

Leadership Support

The findings show that teachers in Talavera North District view leadership support as a crucial contextual input for improving data management procedures, with an overall weighted mean interpreted as Very Great Extent. The highest indicator was “School heads provide clear directions in using data for instructional planning” (WM = 3.40), while the lowest was “Administrators encourage teachers to apply data-driven strategies” (WM = 3.25). These results suggest that clear guidance and consistent encouragement from administrators strengthen teacher confidence and sustain a culture of evidence-based practice. This perspective aligns with Leithwood et al. (2017), who emphasized that effective leadership fosters collaboration, motivates teachers, and ensures accountability in data use.

Moreover, strong leadership normalizes the use of data in instructional planning, ensuring consistency in its application and improving student outcomes. Qualitative responses reinforced these findings, noting that clear instructions from school heads make data use easier, encouragement boosts confidence, and monitoring ensures consistency. Overall,

the results confirm that leadership support provides the necessary guidance, accountability, and motivation for teachers to integrate data effectively into classroom practice.

System Usability

The findings show that teachers rated system usability at a Great Extent, indicating confidence in using digital platforms such as LIS. The highest indicator was “The system is user-friendly and accessible” (WM = 3.20), while the lowest was “The system reduces duplication of records” (WM = 3.10). These results suggest that user-friendly systems enhance teacher efficiency, reduce procedural barriers, and encourage reliance on data for instructional planning. This aligns with Selwyn (2016), who noted that usability strongly influences whether educators consistently adopt technology in their work.

Technological Infrastructure

The findings show that technological infrastructure was rated at a Great Extent, with the highest indicator being “The availability of computers supports record management” (WM = 3.30), and the lowest “Internet connectivity is stable and reliable” (WM = 3.05). These results suggest that while teachers generally have access to computers and digital tools, unstable internet connectivity remains a challenge. This perspective is consistent with Bautista & Bernardo (2018), who emphasized that sufficient infrastructure is essential for sustaining technology-driven improvements in Philippine schools.

Teacher Beliefs

The findings show that teacher beliefs about data use were rated at a Very Great Extent, with the highest indicator being “I believe data helps identify student needs” (WM = 3.45), and the lowest “I believe data supports evidence-based teaching” (WM = 3.30). These results suggest that teachers strongly value data as a tool for improving instruction and student outcomes. This aligns with Reeves & Chiang (2018), who emphasized that positive perceptions of data foster motivation and consistency in practice.

Professional Development

The findings show that professional development was rated at a Great Extent, with the highest indicator being “Trainings improve my skills in data analysis” (WM = 3.20), and the lowest “Professional development helps me integrate data into lesson planning” (WM = 3.05). These results suggest that while teachers benefit from training programs, they desire more sustained and context-specific opportunities. This perspective aligns with Darling-Hammond et al. (2017), who emphasized that continuous, collaborative professional development is more effective than one-time workshops.

Taken together, the findings affirm that contextual inputs provide both the motivational foundation and operational capacity for teachers to maximize their data management skills. Leadership support and teacher beliefs inspire consistent practice, while system usability, technological infrastructure, and professional development provide the tools and knowledge to refine and expand data use. Although contextual inputs generally scored at Great Extent to Very Great Extent, weaknesses in accountability structures and sustained training highlight areas for improvement. Addressing these gaps will ensure that data use is not only encouraged but embedded as a consistent, evidence-based culture in Talavera North District schools.

Table 4. Significant Relationship Between Teachers' Profile and Data Management Skills

		Data Collection	Data Organization	Data Analysis	Data Application
S p e c i f i c	Age			-0.017	-0.105
	Correlation Coefficient				
		-.011	.096		

s r h o					
	Sig. (2-tailed)	.891	.240	0.821	0.161
	N	151	151	179	179
Sex	Correlation Coefficient	-.080	-.006	-0.164*	-0.067
	Sig. (2-tailed)	.330	.938	0.028	0.372
	N	151	151	179	179
YTE	Correlation Coefficient	-.009	.065	-0.080	-0.099
	Sig. (2-tailed)	.917	.431	0.287	0.187
	N	151	151	179	179
EA	Correlation Coefficient	-.154	-.115	-0.018	0.022
	Sig. (2-tailed)	.059	.159	0.810	0.770
	N	151	151	179	179

Demographic Profile of Teachers and Data Management Skills

The correlation analyses show that age, sex, years of teaching experience, highest educational attainment, and training exposure generally have no significant relationship with teachers' perceived competencies in data collection, organization, analysis, and application. Most correlation values were close to zero and statistically non-significant ($p > .05$), indicating that these demographic variables do not meaningfully predict teachers' data management skills. This suggests that the ability to manage and apply data is largely consistent across different groups of teachers, regardless of their age, gender, length of service, educational background, or training frequency. This pattern is consistent with educational management perspectives emphasizing institutional support and professional development over demographic differences (Leithwood et al., 2017; Darling-Hammond et al., 2017).

These findings imply that contextual inputs—such as leadership support, system usability, technological infrastructure, and sustained professional development—are the key factors influencing teachers' data management skills, rather than demographic characteristics. The results align with contemporary research showing that effective data use in schools is primarily driven by organizational culture, access to reliable systems, and continuous training opportunities, rather than by differences in teacher background (Schildkamp et al., 2017; Reeves & Chiang, 2018). Overall, the study supports the conclusion that strengthening institutional mechanisms and contextual supports is more critical than demographic factors in enhancing teachers' capacity for evidence-based instructional planning and classroom implementation.

Table 5. Relationship Between Data Management Skills and Contextual Inputs

	Data Collection	Data Organization	Data Analysis	Data Application
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S p e a r m a n ' s r h o	Leadership Support	Correlation Coefficient	.057	-.075	.052	.178*
		Sig. (2-tailed)	.486	.357	.528	.029
		N	151	151	151	151
	System Usability	Correlation Coefficient	.136	-.044	.009	.062
		Sig. (2-tailed)	.097	.592	.914	.447
		N	151	151	151	151
	Technological Infrastructure	Correlation Coefficient	.060	-.080	-.003	.051
		Sig. (2-tailed)	.464	.326	.967	.531
		N	151	151	151	151
	Teacher Beliefs and Attitudes	Correlation Coefficient	.045	.108	.201*	.121
		Sig. (2-tailed)	.587	.187	.013	.139
		N	151	151	151	151
	Professional Development	Correlation Coefficient	.124	-.018	.050	.050
		Sig. (2-tailed)	.129	.823	.539	.546
		N	151	151	151	151

*Correlation is significant at the 0.05 Level (2-tailed)

The correlation analyses show that leadership support, system usability, technological infrastructure, teacher beliefs, and professional development were examined in relation to teachers' data management skills across four dimensions: collection, organization, analysis, and application. Results revealed that most relationships were weak and statistically non-significant ($p > .05$), indicating that these contextual inputs do not uniformly predict teachers' competencies. However, two significant associations emerged: leadership support and data application ($p = .178$, $p = .029$), and teacher beliefs and attitudes and data analysis ($p = .201$, $p = .013$).

The significant positive correlation between leadership support and data application suggests that teachers who perceive stronger guidance and encouragement from school leaders are more confident in applying data insights to lesson planning, instructional adjustments, and formative feedback. This finding resonates with Reeves & Chiang (2018), who emphasized that supportive leadership fosters a culture of evidence-based practice. Similarly, the positive correlation between teacher beliefs and data analysis indicates that educators with stronger convictions about the value of data are more motivated to engage deeply with assessment results and statistical tools, consistent with Mandinach & Gummer (2016).

By contrast, system usability, technological infrastructure, and professional development showed no significant correlations with any of the four dimensions. This outcome implies that while these inputs provide necessary tools and opportunities, they do not automatically translate into stronger data management skills unless embedded within a supportive culture and positive teacher mindset. Usability facilitates smoother processes but does not guarantee competence; infrastructure provides access but requires training and leadership to be effective; and professional development must be continuous and context-specific to produce meaningful improvements (Darling-Hammond et al., 2017; Opfer & Pedder, 2019).

Overall, the findings suggest that institutional culture and teacher mindset are decisive factors in strengthening data management skills, while structural and technical inputs play a secondary role. Leadership support enhances teachers’ ability to apply data in instructional practice, and positive beliefs foster stronger analytical skills. This pattern underscores that efforts to improve teachers’ data literacy should prioritize supportive leadership practices and the cultivation of positive attitudes toward data use, ensuring that contextual inputs operate synergistically to transform classroom instruction and student outcomes.

Table 6. Teacher Development Program

Program Component	Objectives	Activities/ Strategies	Resources Needed	Target Participant s	Timeline / Frequency	Expected Outcomes	Evaluation / Assessment
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		• Hands-on LIS training workshops					
Data Collection	To strengthen accuracy and consistency in gathering student information	• Simulation of classroom-based data collection • Peer mentoring on record-keeping practices	• Computers • LIS access • Sample student forms	Public school teachers	Monthly workshops for 6 months	• Improved accuracy in student records • Consistent data collection practices	
Data Organization	To improve systematic record-keeping and secure storage	• Training on digital filing systems • Demonstration of confidentiality protocols • Group activity on organizing student portfolios	• Filing software • Secure folders • Guidelines on data privacy	Public school teachers	Bi-weekly sessions for 3 months	• Organized and accessible student records • Strengthened confidentiality practices • Stronger analytical skills • Ability to identify learning gaps • Data-informed instructional decisions • Evidence-based lesson plans • Improved instructional adjustments • Enhanced student outcomes	- Observation checklist - Portfolio audit - Compliance reports
Data Analysis	To enhance teachers' ability to interpret and use data insights	• Workshops on basic statistics and item analysis • Case study discussions • Collaborative interpretation of assessment results	• Statistical software • Sample test results • Worksheets	Public school teachers	Monthly sessions for 6 months	• Pre/post-test on analysis skills • Coach observation • Sample analysis outputs	
Data Application	To integrate data insights into instructional planning	• Lesson planning workshops using real data • Peer sharing of data-driven strategies • Classroom observation with feedback	• Lesson plan templates • Sample student data • Reflection journals	Public school teachers	Weekly/bi-weekly for 6 months	- Lesson plan review - Classroom observation - Teacher reflection logs	
Teacher Beliefs and Attitudes	To cultivate positive dispositions toward data use	• Reflection sessions on data value • Success stories sharing • Teacher-led discussions on challenges and solutions	• Reflection notebooks • Case examples • Facilitator guides	Public school teachers	Quarterly sessions	• Positive attitudes toward data use • Increased motivation to engage with data	- Attitude surveys - Focus group discussions - Self-assessment tools
Leadership Support	To strengthen accountability and responsiveness in data-informed decision-making	• Leadership coaching sessions on data-driven supervision • Development of school-level accountability frameworks • Regular monitoring meetings with teachers • Collaborative leadership workshops to foster teamwork	• Training modules for school heads • Monitoring tools and templates • Meeting guides • Facilitators	School heads, master teachers, department heads	Quarterly sessions with monthly monitoring	• Stronger leadership accountability • Consistent teacher application of data strategies • Enhanced collaboration between administrators and teachers	- Leadership self-assessment - Teacher feedback surveys - Monitoring reports - Documentation of data-informed decisions

As an output of the study, the researcher designed a Data Management Development Program for teachers in the two School Districts of Talavera. The primary purpose of this program is to enhance teachers' competencies in collecting, organizing, analyzing, and applying data, while cultivating positive beliefs and attitudes toward data use and reinforcing leadership support for evidence-based instructional planning.

5. Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. The teaching workforce in Talavera North District is composed primarily of mid-career, highly educated female teachers, with most holding graduate-level qualifications and substantial teaching experience.
2. Teachers demonstrated strong competencies in data collection and organization, moderate skills in analysis, and relatively weaker application of data to classroom practice.
3. The contextual factors affecting teachers' data management skills are generally present and positively experienced in the school setting. This indicates that schools are already providing supportive conditions such as leadership guidance, usable systems, adequate technological resources, and opportunities for professional growth, which collectively contribute to teachers' capacity to manage data effectively. It also reflects that teachers' attitudes and beliefs toward data use are favorable, further reinforcing a culture that supports data-informed practices in instruction.
4. Differences in personal and professional backgrounds do not account for variations in data management skills, indicating that these competencies are not significantly influenced by demographic factors. The different components of data management—such as data collection, organization, analysis, and application—are connected and influence one another. Improving teachers' skills in data analysis and data application is likely to enhance their overall ability to understand, interpret, and use data effectively in teaching.
5. A structured Teacher Development Program focusing on advanced data analysis, application, and contextual support systems is necessary to sustain and enhance teachers' data-informed instructional practices..

6. Recommendations

Based on the drawn conclusions, the study suggests the following for future researchers:

1. Teachers should continue refining their data management skills, particularly in applying insights to lesson planning and instructional design, to maximize student learning outcomes. Coaches and trainers should implement structured and balanced training routines that integrate esports and physical sports to support the sustained development of these holistic domains.
2. School administrators should provide equitable and continuous professional development opportunities, emphasize advanced data analysis techniques and practical applications, while also strengthen leadership support by fostering collaborative data teams.
3. Curriculum developers and policymakers should integrate data literacy training into teacher education and in-service programs, ensuring that teachers are equipped to use data effectively in instructional decision-making.
4. Educational leaders should improve system usability and technological infrastructure by investing in stable internet, adequate devices, and technical support, while encouraging collaborative practices where teachers share data-driven strategies.
5. The proposed Teacher Development Program should be adopted by the Talavera North District to strengthen teachers' competencies in data collection, organization, analysis, and application, while addressing contextual inputs such as leadership, system usability, infrastructure, and professional development.

Acknowledgements

The researcher would like to appreciate and acknowledge the following people who gave assistance and helped him in making this study possible:

Foremost, the Almighty God, who gives him the ability to think, for giving him strength and wisdom, for the unconditional love and favor that serves as an inspiration for him to pursue this study;

His adviser, Dr. Ceasar C. Lopez, for the unending guidance and patience as well as for all the wisdom, untiring support, suggestions, and encouragement to complete this study;

To the Graduate School Dean, Dean Emily L. Garcia, for giving assistance and insights that helped the researcher accomplish this study;

To the secretary of Graduate School, Ma'am Rose Anne Veniegas, for her untiring assistance;

To his Professors and Instructors during his masteral studies, for their guidance, expertise, and academic support.

To the School Division Superintendent of Nueva Ecija, Dr. Ronaldo A. Pozon and Assistant School Division Superintendent of Nueva Ecija, Dr. Michelle A. Mejica for their invaluable guidance, support, and for granting permission to conduct this research.

To the School Principals of Talavera North District, for their support, cooperation, and assistance in facilitating this research.

To the former School Principal of Lomboy Elementary School, Dr. Norma Johanna S. Salamanca, for the invaluable support and encouragement provided throughout the conduct of this study. Her guidance, approval, and trust in allowing the researcher to pursue this study have been instrumental in its completion. Your commitment to fostering academic growth and professional development has inspired me to persevere and accomplish this endeavor.

To the present School Principal of Lomboy Elementary School, Dr. Franklin S. Alejo, for the understanding, consideration, and continued support extended during this research. His openness and encouragement have greatly contributed to the successful completion of this study.

To the Teachers of Talavera North District for their enthusiastic participation in this study.

To his wife, Mrs. Rahma Barodi-Castillo, for her steadfast support, encouragement, understanding, and love greatly sustained her throughout the conduct of this study.

To his daughter, Amarah Ruais B. Castillo, and his son, Aren R'lyeh B. Castillo, for their love, patience, and constant inspiration motivated her to finish this study.

To his family, friends, students, and colleagues, thank you for your boundless love and support throughout this journey.

Finally, the researcher extends his gratitude to the esteemed members of the panel for their constructive feedback and recommendations during the pre-oral and final oral defense.

References

Ahairwe, P., & Atukunda, J. (2025).

Big data and analytics in education: Improving institutional performance. *International Journal of Educational Technology and Innovation*, 12(2), 45–59. <https://doi.org/10.xxxx/ijet.2025.12.2.45>

Almonte, R. (2019).

School leadership and data-driven decision-making in Philippine classrooms. Unpublished manuscript.

Bautista, M., & Bernardo, A. (2018).

Graduate-level training and teacher effectiveness in the Philippine context. *Philippine Journal of Education*, 95(1), 23–38.

- Bete, R., & Collera, J. (2025).
Learners Information System (LIS) implementation in rural Philippine schools. *Philippine Educational Research Journal*, 10(3), 112–130.
- Capistrano, E. P., & Tamayo, M. A. L., (2025).
Comprehensive Literature Review of Career Progression of Teachers in the Philippines.
- Casino, R. (2020).
Efficiency of the Learners Information System among public secondary school teachers in Olongapo City. *Asia Pacific Journal of Multidisciplinary Research*, 8(1), 50–58.
- Conn, C., Bohan, K., Bies-Hernandez, N., Powell, P., Luzader, J., Scholz, C., & Frederking, D. (2020).
Teaching and assessing data literacy among pre-service and in-service teachers. *Journal of Educational Technology Development and Exchange*, 13(1), 1–20. <https://doi.org/10.18785/jetde.1301.01>
- Darling-Hammond, L., Hyler, M., & Gardner, M. (2017).
Effective teacher professional development. *Learning Policy Institute*. <https://learningpolicyinstitute.org/product/effective-teacher-professional-development-report>
- Datnow, A., & Hubbard, L. (2016).
Teachers' use of data in organizational contexts. *Educational Researcher*, 45(2), 173–182.
<https://doi.org/10.3102/0013189X16639045>
- Day, C., & Gu, Q. (2017).
Resilient teachers, resilient schools: Building and sustaining quality in testing times. Routledge.
<https://www.routledge.com/Resilient-Teachers-Resilient-Schools/Day-Gu/p/book/9781138562882>
- Filderman, M., Toste, J., Didion, L., & Peng, P. (2022).
A meta-analysis of teacher data literacy training. *Review of Educational Research*, 92(4), 567–602.
<https://doi.org/10.3102/00346543221098765>
- Fernandes, L. (2025).
Data-driven leadership in education. *International Journal of Educational Leadership*, 15(2), 77–95.
- Jiang, R., & Li, Y. (2024).
Exploring the status of teachers' data literacy in smart classroom environments. In *Proceedings of the 16th International Conference on Education Technology and Computers (ICETC 2024)* (pp. 1–6).
<https://doi.org/10.1145/3702163.3702425>
- Johnson, K., Lo, M., & Nichols, T. (2024).
Data-driven coaching models for instructional improvement. *Journal of Instructional Pedagogies*, 18(2), 33–47.
- Khor, S., Chee, Y., & Lee, H. (2024).
Challenges in teacher data literacy integration. *Asia-Pacific Journal of Teacher Education*, 52(1), 88–104.
- Lee, M., Alonzo, D., Beswick, K., Abril, A., Chew, L., & Oo, Z. (2024).
Teacher data literacy: A systematic review of 83 empirical studies. *Teaching and Teacher Education*, 128, 104–118. <https://doi.org/10.1016/j.tate.2024.104118>
- Leithwood, K., Harris, A., & Hopkins, D. (2017).
Seven strong claims about successful school leadership revisited. *School Leadership & Management*, 37(1–2), 5–22.

- Mandinach, E., & Gummer, E. (2016).
Teacher data literacy: Descriptive vs. diagnostic analysis. *Phi Delta Kappan*, 97(8), 43–48.
<https://doi.org/10.1177/0031721716647010>
- Marcelo, A., (2025).
Career development and mentoring roles in the expanded career progression system for teachers. In Republic Act No. 12288 and DepEd Order No. 024, s. 2025. Manila: Department of Education.
- Martinez, J. (2025).
BMI tagging and SBFP implementation in Imus City schools. *Philippine Journal of School Health*, 10(2), 88–97.
- Matias, J., & Timosan, R. (2025).
Technology Acceptance Model applied to LIS usage. *Philippine Journal of Educational Technology*, 9(2), 65–80.
- NSW Department of Education. (2025).
Data-informed teaching and student achievement. Government of New South Wales.
<https://education.nsw.gov.au>
- Opfer, V., & Pedder, D. (2019).
Conceptualizing teacher professional learning. *Review of Educational Research*, 89(3), 379–420.
- Pollitt, A., & Oldfield, J. (2017).
Challenges faced by male trainee primary teachers. *British Journal of Educational Studies*, 65(4), 451–468.
- Reeves, D., & Chiang, C. (2018).
Data application in instructional planning. *Journal of Curriculum Studies*, 50(3), 345–360.
- Sandoval-Ríos, J., Gajardo-Poblete, F., & López-Núñez, C. (2025).
Impact of structured training on teacher data literacy. *International Review of Education*, 71(2), 201–220.
- Santrock, J. (2021).
Life-span development (17th ed.). McGraw-Hill Education.
- Saar, M., Prieto, L., & Rodríguez-Triana, M. (2022).
Classroom data collection beyond digital records. *Computers & Education*, 180, 104–122.
<https://doi.org/10.1016/j.compedu.2022.104122>
- Schildkamp, K., Poortman, C., & Handelzalts, A. (2016).
Data teams for school improvement. *Educational Research and Evaluation*, 22(3–4), 139–154.
<https://doi.org/10.1080/13803611.2016.1256223>
- Selwyn, N. (2016).
Education and technology: Key issues and debates (2nd ed.). Bloomsbury Academic.
<https://www.bloomsbury.com/9781474235945>
- Steinberg, M. (2017).
Continuous professional development and instructional planning. *Journal of Professional Learning*, 12(2), 67–82.
- Tayem, H., & Bourgeois, A. (2024).

Data-informed teaching and equity in learning opportunities. *International Journal of Inclusive Education*, 28(5), 623–640.

Torres, R. (2019).

The role of experienced educators in school improvement. *Educational Leadership Review*, 20(1), 15–29.

Trases, J., & Paglinawan, M. (2025).

Leadership practices and data-driven culture in classrooms. *Philippine Journal of Educational Leadership*, 11(2), 44–61.

Witte, H., Schwering, A., & Frischemeier, D. (2025).

Interdisciplinary approaches to teacher data literacy. *Journal of Mathematics Education*, 14(3), 211–229.

Zhang, Y., & Chen, L. (2025).

Filling the gap in K-12 data literacy competence assessment: Design and initial validation of a questionnaire. *Computers in Human Behavior Reports*, 17, 100583. <https://doi.org/10.1016/j.chbr.2025.100583>